THE INTERPLAY BETWEEN COMPETITION AND CO-OPERATION AND THE EFFECT ON INNOVATION IN MATURE INDUSTRY CLUSTERS: A CASE STUDY OF THE NORTH STAFFORDSHIRE CERAMICS INDUSTRY, TABLEWARE AND GIFTWARE SECTOR

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PhD **2017**

Abstract

This thesis explores the relationship between competition and co-operation and identifies how the interplay between the two can affect innovation in industry clusters. The guiding theories underpinning this thesis are drawn from key theories of industry clusters and cluster competitive advantage, the starting point for which is Michael Porter's (1990) theory of national/regional competitive advantage. From Porter's studies of industry clusters two key elements are cited as being crucial to the success or failure of an industry cluster, they are: the roles of '*co-operation*' and '*competition*'. Since Porter's original studies, many cluster theories have been developed to examine and explain the roles of *co-operation* (1) and *competition* (2) and their effects on *innovation* (3) within industry clusters (*e.g.*, Audretsch and Feldman, 1996; Baptista and Swann, 1998; Audretsch, 2000; Tallman *et al*., 2004; Lorentzen, 2008). Other recent studies have contended that co-operation and competition vary across the different stages of the *industry life-cycle* (4) (*e.g.*, Klepper, 1996; Swann *et al*., 1998; Brenner, 2005; Belussi and Sedita, 2009; Potter and Watts, 2010, 2014). Consequently, the theoretical framework for this research study is drawn primarily from these four key themes (and related sub-themes), it combines and synthesises key elements of cluster theories from researchers in such fields as Industrial Districts, Production Systems, Economic Geography, and Industry Life-cycle. In addition, several other related theories are referred to, where relevant, *e.g.* dominant firm theory and transaction cost theory. These theories, whilst not core to the research, are included to clarify terminology and concepts.

A critical-realism paradigm is the core philosophical stance taken for this research study. A mixed/multi methods approach, that includes both deductive and inductive elements, is applied throughout the research process. Thus, this research study both tests and builds theory. To achieve the research objectives, three unique pieces of research are undertaken that, when integrated together, give important insights into the competitive advantage of the Stoke-on-Trent Ceramics Cluster (tableware and giftware sector). The first chapter of the empirical findings presents results of a longitudinal study of the cluster's evolution between 1960 and 2016. The empirical findings clearly identify that a prolonged period of consolidation occurred in the cluster between 1960 and 2010. Moreover, the emergence, pattern of acquisitions and growth of the Cluster's two once dominant firms, Wedgwood and Royal Doulton, are established. The second empirical chapter presents a historic analysis of co-operative behaviours in the cluster between 1700 and 2016. The empirical findings indicate that cluster firms have a long history of minimal co-operation with each other, and with other firms and institutions. The research findings suggest several reasons that may

explain the un-cooperative culture apparent in the cluster. The empirical evidence also suggests that cluster firms may be starting to co-operate more, possibly due to changes in local governance, *i.e.* the balance of power and control has shifted since the decline of Wedgwood and Doulton. The final empirical chapter presents unique data from a questionnaire and interview survey into innovation and co-operation in the cluster between 2010 and 2016. The results indicate that strong innovative activity is evident in the cluster. However, co-operative activity appears to be relatively weak. The results also suggest that there are many opportunities for cluster firms to co-operate across a range of industry issues. Overall, the empirical findings indicate that the Stoke-on-Trent ceramics cluster is a relatively successful industry cluster but it could be stronger.

Although the empirical results supported several of the research propositions, in some areas the findings did not clearly map to either the maintained, or alternative, propositions, but positioned the Stoke-on-Trent cluster somewhere between the two. Consequently, alternative propositions that more closely fitted the apparent reality of the situation are presented in the conclusions chapter.

This thesis has contributed to knowledge by further developing the theory on industry clusters, *i.e.* through testing and further developing cluster theories a new framework for cluster analysis has been constructed. This new framework is based on Arikan's original model (see chapter 2, Figure 2.2), which is aimed at identifying knowledge creating opportunities, but was further developed by the researcher to include other factors identified in the various literatures as important to knowledge creation and competitive advantage (see chapter 2, Figure 2.4 for an extension of Arikan's original model). After application to the SOT cluster, the model was developed even further to include a new determinant, 'factors affecting the propensity to co-operate'. The new determinant examines other historical antecedents not included in Arikan's original model. Figure 7.1 Presents the new model for analysing industry clusters. Thus, the research makes a significant contribution to extant literature on clusters, industrial districts, networks and governance by providing new knowledge and new perspectives on the importance of co-operation in industry clusters. The empirical findings make a further contribution to cluster theory in that they develop the literature on dominant firm effects on the competitive advantage of clusters, an area that is somewhat under-reported in the extant literature. Finally, the research also contributes to the theory on evolutionary economics through the findings of the longitudinal study into the Stoke-on-Trent ceramic cluster's evolution.

Acknowledgements

I would sincerely like to thank Dr Ian Jackson and Professor Geoff Pugh for their invaluable supervision, help, support and enthusiasm over the years of my PhD journey. I would also like to thank Stoke-on-Trent Ceramics Manufacturers, who graciously gave me their time and co-operation in the surveys. A final thank-you goes to my partner, Enrico, for his endless patience and encouragement throughout this process.

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1. Introduction

This chapter begins by briefly outlining the overall aim of the research (1.1). Secondly, it presents an overview of the Stoke-on-Trent (SOT) ceramics cluster, the central case study in the research, including some of the key challenges that the cluster has faced over recent years (1.2). Thirdly, the academic literature on competitive advantage in industry clusters is introduced (1.3). Fourthly, the aims and objectives of the research study are stated (1.4). Fifthly, the research methodological approach and design are explained (1.5). Finally, a brief overview of each of the findings and conclusions chapters is provided (1.6), along with a chapter summary (1.7).

1.1: The Research Aim

The aim of this thesis is to determine the competitive advantage situation of the Stoke-on-Trent (SOT) ceramics industry cluster, tableware and giftware sector, as measured by innovative output. In particular, it looks at the interaction between competition and co-operation within the cluster itself and assesses the contribution that each has made to the competitive advantages that the industry has today.

1.2: History & Profile of the Stoke-on-Trent Ceramics Industry

An abundance of natural materials, *e.g.* clay, salt and lead for glazing and, most importantly, coal for firing, were the main reasons for the Pottery Industry becoming established in North Staffordshire[1]. Starting as a small community of farmer-potters in the mid-seventeenth century, the trade of making butterpots for the easier marketing of butter developed in the town of Burslem[2]. From Burslem, potters started small factories in the nearby hamlets of Tunstall to the north, and Cobridge, Hanley, Shelton, Stoke, Fenton and Longton to the South. All these towns lay along a belt of coal and clay and they eventually formed into the City of Stoke-on-Trent (Federated 1910). White burning clays from Dorset, Devon and Cornwall were brought into North Staffordshire from 1720 onwards[3]. By 1740, a substantial industry had been established, and benefited from a wealth of skilled craftspeople

[1] Thepotteries.org. (2008), *Stoke-on-Trent the world's largest and most famous pottery producing city*, [ONLINE]. Available at: http://www.thepotteries.org/sot/five.htm [Accessed 27 June 2017]
[2] Ellis, S. (2010), *Pots of Appeal in Stoke-on-Trent*, [ONLINE]. Available at: https://britishheritage.com/pots-of-appeal-in-stoke-on-trent/. [Accessed 27 June 2017]
[3] Wedgwood, J. C. (1913), *Staffordshire Pottery and Its History*, [ONLINE]. Available at: https://archive.org/stream/staffordshirepot00wedg/staffordshirepot00wedg_djvu.txt. [Accessed 27 June 2017]

composing at least half the population of the area. The nature of the industry changed constantly as new materials and ideas were tried. Although there is evidence from various local sources[4] that many pottery companies had a short life, there is also evidence that some firms operated successfully for long periods of time (see Henrywood, 2002). Moreover, some of these firms are still in existence today. Many of the more successful companies were founded by master potters, with two of the most famous names being Wedgwood and Spode. The provision of machinery and supplies for the specialised industry led to concentration in the areas of ceramic colour-makers, pottery machinery-makers, as well as the millers who prepared the body and glaze materials essential for the pottery manufacturers. At its peak in the late 19th century the region was the epicentre of the world's ceramic production and home to more than 2,000 kilns firing millions of products a year[5]. Today Stoke-on-Trent is still famous for its tablewares, giftwares, tiles and hi-tech ceramics sold globally[6].

The researcher first became interested in the SOT ceramics cluster in 1997, after starting employment as a Senior Lecturer in Strategic Management at Staffordshire University. The Business School at the University is situated in the heart of the ceramics cluster. Through lecturing and researching in the field of Strategic Management the author began to develop an interest in theories of national competitive advantage, in particular Michael Porter's (1990) work on industry clusters. As the author's knowledge and understanding of both the theory and the local industry developed, it emerged that, although the SOT cluster appeared to fit the criteria of an industry cluster, it did not, however, seem to exhibit many of the characteristics of a successful Porter-type cluster. In particular, competitive rivalry and interdependencies between firms in the cluster appeared to be weak. Moreover, SOT cluster firms have a long history of not co-operating with each other (*e.g.* Imrie, 1987; Whipp, 1990). Interestingly, cluster theories (*e.g.* Porter, 1990; Dei Ottati, 1994) identify extensive co-operative linkages as a key success factor in the competitive advantage of clusters, yet these linkages appear to be missing or minimal at best throughout the SOT cluster's history, despite it having been a very successful industry for several hundreds of years. Thus, this was an important area of investigation for the research, *i.e.* there was a desire to determine the 'reality' behind the apparent phenomena. Furthermore, whilst it was not the main aim of this research study to predict the future direction of the Stoke-on-Trent ceramics industry,

[4] For example, the Potteries Museum and Art Gallery and visitstoke.co.uk
[5] Nicholls, D. (2011), *All Fired Up: The Future of Pottery,* [ONLINE]. Available at: http://www.telegraph.co.uk/lifestyle/interiors/8281433/All-fired-up-the-future-of-pottery.html. [Accessed 27 June 2017]
[6] visitstoke.co.uk, (2017), *Ceramics in Stoke-on-Trent Today,* [ONLINE]. Available at: http://www.visitstoke.co.uk/ceramics-trail/history-ceramics-today.aspx. [Accessed 27 June 2017]

the ambition is that the findings will be of interest to the wider ceramics industry community in that they may highlight issues for further discussion and debate. On a more personal level, the researcher hoped to test and develop the theory on industrial clusters, and thus significantly contribute to the existing body of literature.

Between 1960 and 2008, the UK ceramics industry experienced a period of rapid and profound change. Firstly, a process of consolidation occurred in the SOT cluster resulting in the loss of many ceramics jobs, and indeed ceramics manufacturers, from the cluster. This period also saw the emergence of the cluster's two then largest firms, Wedgwood and Royal Doulton (hereinafter called Doulton). Between 1980[7] and circa 2008 the industry suffered a prolonged period of decline (Tomlinson and Branston, 2017), mainly due to increasing competition from overseas and changes in lifestyles and disposable incomes. Consequently, there were many demand-side pressures on SOT cluster firms, such as design of products and response times, as well as price. In addition, there were many supply-side pressures on SOT cluster firms too, such as competition from overseas, pressures of outsourcing and costs. Many of these issues forced some SOT cluster firms to make redundancies, close factory sites and, in some cases, cease production altogether (Jackson, 2000). For example, in 2009 Wedgwood, the SOT cluster's largest ceramics manufacturer who had acquired Doulton in 2005, went into administration resulting in the loss of thousands of jobs. In 2009, Wedgwood was purchased by American KPS group and renamed WWRD Holdings. In 2015, WWRD was purchased by Norwegian homewares group Fiskars[8]. Although Wedgwood is still producing ceramic goods in Stoke-on-Tent today, it is significantly smaller than it was in 2008.

In 2001, the results of a research project carried out by the Department of Trade and Industry (DTI) to map existing cluster activity in the UK were published. The UK ceramics industry was classed as a 'regional cluster', belonging to the West Midlands region but highly concentrated around Stoke-on-Trent. Clusters were further classified according to their stage of development with the research suggesting that the deepest clusters, those with the most industries and institutional and other linkages, often perform the best. However, the ceramics cluster in the West Midlands is cited in the report as an example of "*a deep and globally*

[7] The SOT industry's sales peaked in 1978 and then declined (Imrie,1987).
[8] Armstrong, A. (2015), *Waterford Wedgwood sold to Finnish heritage brand*, [ONLINE]. Available at: http://www.telegraph.co.uk/finance/newsbysector/retailandconsumer/11597355/Waterford-Wedgwood-sold-to-Finnish-heritage-brand.htm. [Accessed 27 June 2017]

competitive cluster which is losing employment and is perceived to be in decline" (DTI, 2001: Executive Summary, p. 4). However, recent reports on the industry are claiming that the SOT ceramics cluster is recovering and is currently experiencing a revival (Tomlinson and Branston, 2014), with sales in both domestic and export markets increasing year-on-year over the past five years (see chapter 4, Table 4.2).

1.3: An Overview of Cluster Theories

To identify the current strategic position of the SOT ceramics cluster, key theories of industry competitive advantage were reviewed, the starting point for which was Michael Porter's (1990) National Diamond framework, applied at the cluster level. From Porter's studies of industry clusters, two key elements were identified as crucial to the success or failure of an industry cluster. They are, co-operation (strong vertical and horizontal linkages enabling innovation) and competition (vigorous domestic rivalry resulting in innovation), which both have to be present for a cluster to be successful. In addition to Porter's original studies, cluster theories have been developed by researchers in the fields of: economic geography (*e.g.* Audretsch and Feldman, 1996); industrial districts (*e.g.* Belussi and Sedita, 2009); production systems (*e.g.* Scott, 1988b); and, networks (*e.g.* Brusco, 1995). Other areas of research also relevant to cluster studies include: innovation/knowledge studies (*e.g.* Matusik and Hill, 1998; Arikan, 2011); and, industry life-cycle studies (*e.g.* Klepper, 1996, 2000). From an extensive review of the academic literature, and drawing all of the key success factors and failure factors together, a theoretical framework was constructed and a set of research propositions (see chapter 2, Table 2.3) and objectives were formulated (see chapter 2, Table 2.4). The overall research question and the main research objectives are presented next.

1.4: The Research Question:

> *"To what extent does the SOT ceramics cluster exhibit characteristics of a successful industry cluster, or a failing industry cluster, as defined by the theory on industry clusters?"*

1.4.1: The Research Objectives and Research Stages (for a full set of objectives see table 2.4):

1. To track the development of SOT tableware & giftware manufacturers from 1960 – 2016 (stage 1 of the research);

2. To examine the nature of demand for the SOT cluster's products and its effect on competition between 2000 and 2016 (stage 1);
3. To determine the breadth of knowledge required to offer the products that characterise the cluster (stage 2);
4. To determine the degree of modularity in the product technologies underlying the products that characterise the cluster (stage 2);
5. To determine the level of technological dynamism surrounding the products that characterise the cluster (stage 2);
6. To determine the number of core firms in the cluster in 2015 that leverage the same general purpose technology (stage 3);
7. To determine the output of innovative activity in the cluster between 2010 and 2015;
8. To establish the degree of inter-firm knowledge exchanges within the cluster between 2010 and 2015 (stage 3);
9. To establish the balance of power and control within the SOT cluster in 2016 (stage 4);
10. To determine whether dominant firms have had a positive or negative effect upon competition and co-operation in the SOT cluster between 1980 and 2016 (stage 4);
11. To synthesise findings and draw accurate conclusions about the competitive advantage of the SOT cluster (research conclusions).

1.5: The Research Approach and Design

A post-positivist/critical realist approach was selected as the most appropriate core research paradigm for this research study. This is because 'ontologically' there was a need to identify the reality of causal relationships in the SOT cluster, and 'epistemologically' because theory is partially how such discovery can take place. Another reason for this approach is because the research required both quantitative and qualitative elements in order to meet the objectives and answer the research question. For example, some objectives (*e.g.* elements of 1-8) require primary research in the form of a questionnaire survey and this requires the researcher to be independent and objective (positivist stance). However, the researcher cannot remain truly independent as interpretation and explanation of the findings are potentially subjective and value laden, *i.e.* findings are interpreted by the researcher in light of theory. In addition, several of the objectives (9-11) call for a purely qualitative approach, and thus findings are again potentially subjective and value laden (critical theory approach). Given that the research objectives are linked to several competing paradigm approaches, *i.e.* positivism, critical realism and critical theory, this research study utilises a mixed

paradigms approach (Onwuegbuzie and Johnson, 2006). Full details of the adopted paradigm approach are located in the methodology chapter (see chapter 3.3).

From a critical review of the strategic management literature pertaining to industry clusters, eleven propositions and a theoretical framework for the research were carefully constructed to guide the empirical investigation. A mixed/multi methods approach (Trochim, 2002; Tashakkori and Teddlie, 2003; Small, 2011) is adopted for this research study. Multiple methods, *e.g.* a longitudinal study, a questionnaire survey and interviews, are employed and the different quantitative and qualitative findings are combined and nested (Lieberman, 2005, 2013) in each other in order to fulfil the overall research aim. The mixed/multi method approach is also consistent with a critical realism paradigm, as it is both deductive, *i.e*. theory testing, and inductive, *i.e*. theory building (Saunders *et al*., 2003). Thus, both inductive and deductive elements are incorporated into the research design, *i.e.* the research starts with a theoretical framework, to identify, describe and analyse what is happening in the SOT cluster, and then progresses onto an inductive approach, which further develops the theory on industry clusters.

As the main 'object' of the research is the theory on industry clusters, a single case study is adopted as the 'subject' of the research. According to Thomas (2011), the subject of the research can act as a lens through which the theoretical focus, *i.e.* the object, can be viewed and explicated. The SOT cluster is defined as a single case study for the purposes of this research study because it represents virtually the whole of the UK ceramics production industrial sector, *i.e*. approximately 80%, and is therefore of high relevance to both the local (West Midlands) and UK economies. Furthermore, a single case study approach is particularly suited to investigating the SOT industry cluster, as it has been the strategy adopted in many previous cluster studies where the cluster is viewed as a single case (*e.g.* Porter, 1990; Dayasindhu, 2002; Zhang *et al.,* 2004).

The research approach and design are discussed in more detail in chapter three of this thesis, where details are provided of how knowledge is intended to be discovered and of how the aims and objectives are intended to be met. In addition, a full discussion of the relevant research paradigm, alternative paradigms, mixed/multi methods approach, data requirements, sampling, data collection/analysis techniques and ethical consideration are

included. Chapter seven of this thesis presents a reflection on the adopted methodologies (see chapter 7.7).

The objectives and the theoretical framework provided a roadmap for the research consisting of many complementary elements that were mostly linear, in that they built on each other, but some findings from later stages are integrated into findings from earlier stages of the research. The main elements comprise: a longitudinal study of the evolution of the SOT ceramics cluster from 1960-2016; several historic analyses of competition, co-operation and demand in the SOT cluster; a questionnaire survey on the innovation and co-operation activities of six representative SOT ceramics manufacturers; and, an in-depth interview survey of six SOT core manufacturers' views on co-operation and dominant firm effects in the SOT cluster.

The research objectives are divided into three main stages. Stage 1 (objectives 1 and 2) is aimed at identifying the development of the SOT ceramics cluster, and resultant effects on competition between 1960 and 2016. Stage 2 (objectives 3-5) is aimed at identifying the historical need for co-operation in the SOT ceramics cluster up to 2016. Stage 3 (objectives 6-8) is aimed at identifying innovation and co-operation activities in the SOT cluster as at 2015. Finally, stage 4 (objectives 9-10) is aimed at identifying further evidence of co-operation, the balance between power and control, and dominant firm effects on the SOT cluster in 2015/16.

1.6: The Three Findings Chapters

In this section each of the three findings chapters, and the final conclusions chapter, are briefly outlined.

1.6.1: Chapter 4 (Research Stage 1, Objective 1) - SOT Cluster Evolution (1960 – 2016)

In order to meet this objective it was necessary to collect time-series data from historical sources to create a unique longitudinal secondary data set. Based on multiple secondary data sources, that were cross-referenced and triangulated with each other, an initial database of SOT core manufacturing firms still operating in the early 1960s was compiled. This starting data set was brought up-to-date (2016) by utilising a variety of additional sources of raw secondary data, *e.g.* company websites, trade publications, company listings, *etc.* A listing of sources used to construct the database is included in the appendices section

of this thesis (see Appendix 4a). The resultant data set is unique in that, as well as spanning a period of 56 years, no other data set of its kind exists for the SOT cluster, or for any other mature industry cluster that the researcher is aware of. From this initial data set, it was possible to distil the number of firms operating in each of the decades from 1960 up to 2016. Moreover, it was also possible to track the destination of firms' decade-by-decade, *e.g.* acquisitions, new entrants, firm closures, and to identify the number of tableware and giftware manufacturers still operating in the SOT cluster in 2016. The final list of firms in 2016 formed the total population for the primary research (survey questionnaire), required for objectives 6-8. Full details of data collection and analysis techniques are provided in chapter three (see chapter 3.7) and findings from the longitudinal study are presented in chapter four of this thesis.

1.6.2: Chapter 4 (Research Stage 1, Objective 2) – Historical Analysis of Competition and Demand in the SOT Cluster up to 2016

Objective 2 had two main aims. Firstly, it aimed to examine the external environment surrounding the SOT cluster in order to determine the nature and level of demand for the SOT ceramics cluster's products as at 2016. Secondly, it aimed to determine the pattern of competitive activity apparent in the SOT cluster between 2000 and 2016. In order to meet this objective it was necessary to collect compiled secondary data from multiple sources. This involved gathering historical data from a wide variety of industry specific secondary sources. These sources included both raw data and published summaries. This type of data is useful in both descriptive and explanatory research (Saunders *et al.,* 2012). Moreover, the data was a mix of quantitative and qualitative data, which is in-line with the critical realist, mixed-methods approach. Moreover, by using data from well-established organisations and researchers the data was considered reliable and trustworthy. Data analysis at this stage involved assigning relevant units of the data to appropriate categories identified in the theoretical framework. Through a further process of filtering and selection, the data was reduced into key findings, tentative conclusions were drawn and issues were highlighted for further exploration in later stages of the research.

1.6.3: Chapter 5 (Research Stage 2, Objectives 3-5) – Identifying the Need for Co-operation in the SOT Cluster up to 2016

In order to meet objectives 3-5, it was necessary to collect compiled secondary data from multiple sources. This involved gathering historical data from a wide variety of industry specific secondary sources, such as historical books and academic research papers, *e.g.*

papers based on research into the structure of processes and technologies in the UK ceramics industry include: "*The illusion of flexible specialization: the case of the domesticware sector of the British ceramics industry*" (Rowley, 1994); "*Technological Innovation in the UK Ceramics Industry*" (Warren *et al*., 2000); and, "*Turning the tide: Prospects for an industrial renaissance in the North Staffordshire Ceramics Industrial District*" (Tomlinson and Branston, 2014). Examples of books include: "*The British Pottery Industry*" (Gay and Smyth, 1974); and, "*Industrial Restructuring in the British Pottery Industry*" (Imrie, 1987). A similar approach to the data analysis techniques used for objective 2 was taken for objectives 3-5. Analysis involved assigning relevant units of the data to appropriate categories identified from the theoretical framework (pattern matching /explanation building). Through a further process of filtering and selection the data was reduced into key findings and tentative conclusions were drawn in light of theory. Findings from objectives 3-5 were also utilised in later stages of the research to explain and/or reinforce primary research findings, *e.g*. to explain why firms do/don't co-operate. This is a further example of 'nesting' and of 'triangulation' of data and is consistent with a mixed-methods research design.

1.6.4: Chapter 6 (Research Stage 3, Objectives 6-8) – Establishing Levels of Innovative and Co-operative Activity in the SOT Cluster Between 2010 and 2015

Stage 3 of the research was aimed at determining the current situation regarding: the number of core firms in the SOT cluster leveraging the same general-purpose technologies; and, innovation and co-operation in the Stoke-on-Trent Ceramics Cluster as at 2015. In order to ensure reliability and validity in the research instrument a questionnaire that had already been employed by researchers in the recent past, *i.e.* a questionnaire that was previously administered by the European Union GPrix project[9], was adapted and administered to SOT firms.

In addition to adapting the existing questions to meet the specific needs of this research project, several new questions are included. Full details and a rationale for the questionnaire are provided in chapter three of this thesis (see chapter 3.7). Validity and reliability of the survey instrument are ensured in several ways. Firstly, 'content validity' (Saunders *et al.,* 2012) was achieved by adapting a widely applied, existing research instrument from an

[9] Gprix. (2012), *GPrix Innovation Policy Support Survey,* [Online]. Available from: http://business.staffs.ac.uk/gprix/en/survey.htm [Accessed 30 June 2017]

extremely reliable source. This ensured that the participants would understand the questions, as the questions had been asked before for similar purposes. Secondly, questions were carefully matched to the specific objectives and propositions of the research, thus ensuring 'construct validity' (Saunders *et al.*, 2012). In addition, several different types of questions were included in the questionnaire for different uses, *e.g.* ranking, listing, rating, quantity and open questions. A copy of the questionnaire is included in the appendices section of this thesis (see Appendix 9). Finally, a 'pilot study' was conducted in order to ensure that respondents would have no problems in answering the questions, and also so that their responses could be recorded correctly (Saunders *et al.*, 2012). The pilot study was issued to small number of people working in or connected to the SOT industry and was conducted between October 2015 and October 2016. Firstly, two academics with knowledge of the SOT ceramics industry, including one who had been involved in the GPrix innovation survey, appraised the questionnaire. After making adjustments to several questions, the questionnaire was administered to one of the SOT cluster firms (company 'D', see Appendix 13 for company profiles). The pilot study respondent is a senior manager of a medium sized ceramics firm who has been employed in the industry for many years. As a result of the final pilot, one question was refined further to enhance validity.

The questionnaire was administered to firms in the total research population (see chapter 3.6) by the researcher in person. Such face-to-face interviews are called structured interviews (Saunders *et al.*, 2012). Firstly, several different methods, *e.g.* telephone, e-mail, letter, were utilised to make contact with the firms and to identify 'appropriate persons' within the companies, *i.e.* owners or senior managers. During this initial contact, the nature of the research study was explained and requests made for company participation. Secondly, a copy of the questionnaire and covering letter was sent to every company in the population (all 16 firms). In order to convince companies to participate, the covering letter ensured anonymity of the company data (confidentially agreement) and offered to make the research findings available to participants. Despite exhaustive efforts to contact, and re-contact, all sixteen firms in the population over a six-month period, only six firms agreed to take part in the questionnaire survey. Subsequently, the questionnaire survey was completed by these six firms between November 2016 and April 2017.

The data collected from the questionnaire responses was mostly quantitative and the original intention had been to analyse the data using statistical software. However, due to the comparatively small number of respondents, and hence the small number of data points, it

was decided not to use software to analyse the data but to use simple one-way frequency tables instead. Since the questions were standardised, the data collected from the questionnaire responses was analysed and included in both descriptive and explanatory research findings. For example, SOT cluster firms' innovative activities were described from the numerical analysis of the questionnaire responses, and explanations of what the findings meant were made in light of theory (theory testing). Moreover, relationships across the data were identified, described and explained. For example, the relationships between firm size and innovation were firstly identified from the data, then described and explained in light of theory. The descriptive and explanatory approach was in keeping with the intended research design as discussed previously in this chapter. Full results, analysis and evaluation of the innovation questionnaire are presented in chapter six of this thesis (see chapter 6.3-6.4).

1.6.5: Chapter 6 (Research Stage 4, Objectives 9-10) Establishing Power and Control, and the Role of Dominant firms Past and Present, in the SOT Cluster up to 2016

Stage 4 of the research was aimed at: 1) exploring in more depth some of the findings on innovation and collaboration from earlier stages of the research; 2) identifying the balance of power and control within the SOT cluster; and, 3) determining the roles that dominant firms have played in the competitive advantage of the cluster. The research method employed at this stage involved the collection of primary data from semi-structured interviews. This is because a qualitative approach was required to further explore the 'what', and to be able to explain the 'how' and 'why' behind the reality. The semi-structured interview approach was consistent with exploratory studies (Saunders, *et al.,* 2003) and was used to explore and explain themes that had emerged from earlier stages of research, in addition to validating findings from the earlier stages (Wass and Wells, 1994). The number of interviews that took place was six, *i.e.* the six firms who had also completed the questionnaire survey. In four cases, the interviews followed on directly after the questionnaire meeting and, in two cases, a future appointment was required to complete the interviews. For this stage of the research a list of themes and questions was derived from three sources: 1) from the questionnaire results, *e.g.* emergent themes and issues on innovation and co-operation were explored in more depth; 2) from the theoretical framework, *e.g.* questions on co-operation, dominant firms and power and control were pre-constructed; 3) from earlier findings (chapters four and five), questions on co-operation and competition were pre-constructed.

All interviews were recorded to ensure accuracy of data and were later professionally transcribed. As all interviewees held senior management positions, *e.g.* some were company owners and thus had high-profile roles in the industry, the identities of all respondents were

kept anonymous. The rigorous approach adopted in preparation for the interviews, in preparing respondents, and in recording and analysing the data, ensured validity, reliability and consistency in the way the data was collected and analysed.

The interview data was analysed by firstly assigning relevant units of the data to appropriate categories. By having a well-defined research question and objectives, and a clear framework and propositions derived from the theory, it was relatively simple to identify the categories/units (see conceptual framework) for analysing the data for all stages of this research project. Thus, analysis of 'embedded units' (Yin, 1994) was as an appropriate strategy as it allowed individual units to be compared across the firms surveyed and for conclusions to be drawn. Through a further process of filtering and selection, the data was then reduced into key findings, rearranged into a series of tables, and responses were compared (see Appendix 19). The next stage of analysis involved the deductively based approach 'explanation building', which is a similar approach to 'pattern matching' (Yin, 1994). This approach was deemed appropriate, as attempts had not been made to predict in advance which of the alternative propositions, if any, applied to the SOT ceramic cluster. Thus, it was the maintained and alternative propositions that generated different expected patterns, which were then compared with the actual ones to identify the degree of association. As discussed in chapter seven of this thesis (see chapter 7.6), the depth of evidence collected from the questionnaire and interview responses contributed towards the development of cluster theory, and further demonstrates the inductive nature of the research at this stage. Whilst, it was not intended that the interview responses would establish reliability in any quantitative or statistical way, *i.e.* due to not having a large number of respondents, it was intended that the interview findings would provide sufficient context and evidence of validity so the informed reader could decide whether, or not, the findings generalise to their circumstances.

1.6.6: Chapter 7 (Objective 11) - Conclusions

The final chapter of this thesis involves synthesising the findings from all stages of the research and mapping them back to the theoretical framework (objective 11). From this, overall conclusions were drawn regarding the competitive advantage of the SOT cluster, recommendations were made, and theory developed. In addition, chapter seven also provides: a discussion of the research contribution to theory (see chapter 7.6); a reflection on the methodologies adopted for the research (see chapter 7.7); and, an identification of areas for future research. (see chapter 7.8).

1.7: Chapter 1 Summary

This chapter has introduced the aims and objectives of the research and has given brief overviews of the case study, theoretical background and methodologies adopted for the research. In the next chapter, a critical review of the academic literature is provided.

2. Literature Review

2.1: Introduction

The main aim of this thesis is to determine the 'strategic health' of the Stoke-on-Trent (SOT) Ceramics Industry Cluster, Tableware & Giftware sector. In this study, the term 'strategic health' refers to the 'competitive advantage' of the cluster as a whole. Competitive advantage rests on making more productive use of inputs, which requires continual innovation (Porter, 1998). Consequently, a nation's competitiveness depends on the capacity of its industry to innovate and upgrade (Porter, 1990). The competitive advantage situation of the SOT ceramics cluster will be determined by analysing and evaluating the roles that co-operation, competition, path-dependence and dominant firm decisions have had on the evolutionary processes and innovative output of the industry cluster. Therefore, a key objective of the literature review is to develop a theoretical framework for the empirical research.

The literature review will concentrate on key theories of industry clusters and competitive advantage, the starting point for which will be a brief review of Michael Porter's (1990) theory of national competitive advantage;[11] more specifically, the determinants and variables that make up the National Diamond Model, which has been widely applied by practitioners and policy makers globally (*e.g.* Rugman and D'Cruz, 1993; Cartwright, 1993; Clancey and Twomey, 1997). In addition, and most important to this study, the review will focus on the 'local diamond system' or geographic industry cluster. From Porter's studies of industry clusters two key elements are cited as being crucial to the success or failure of an industry, or region, they are: the roles of '*co-operation*' and '*competition*' in industry clusters.

Since Porter's original studies many cluster theories have been developed that examine the roles of *co-operation* (1) and *competition* (2) and their effects on *innovation* (3) within the cluster (*e.g.*, Audretsch and Feldman, 1996; Baptista and Swann, 1998; Audretsch, 2000; Tallman *et al*., 2004; Lorentzen, 2008). In addition, more recent studies have contended that co-operation and competition vary across the different stages of the *industry life-cycle* (4) (*e.g.*, Klepper, 1996; Swann *et al*., 1998; Brenner, 2005; Belussi and Sedita, 2009; Potter

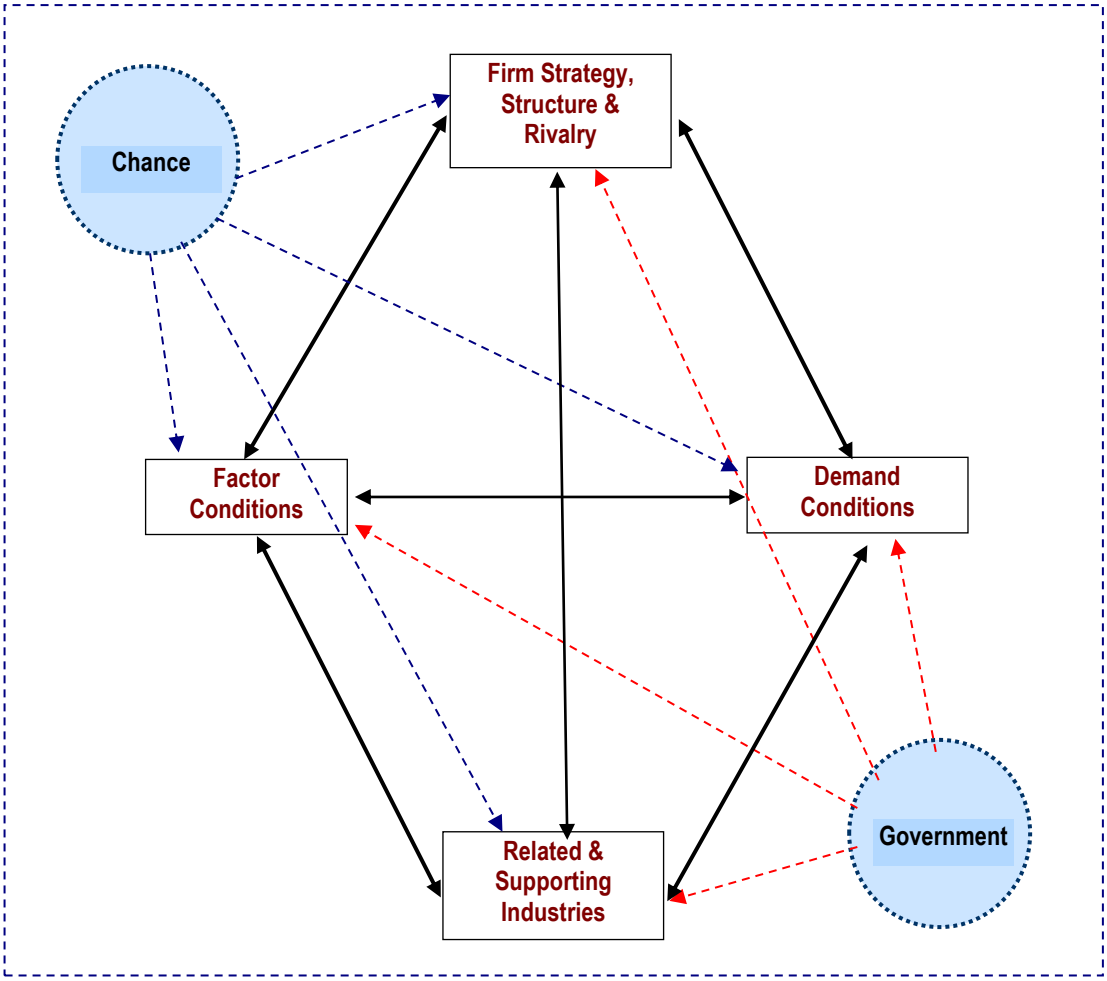
[11] Michael Porter wrote "The Competitive Advantage of Nations" in 1990. The book is based on studies of ten self-selected nations and argues that a key to national wealth and advantage was the productivity of firms and workers collectively, and that the national and regional environment supports that productivity.

and Watts, 2010, 2014). The majority of the literature review is structured around these four key themes (and related sub-themes) and involves examining cluster theories from researchers in such fields as Industrial Districts, Production Systems, Economic Geography, and Industry Life-cycle. The final section of the literature review draws together, from across the different literatures, the most commonly cited reasons why clusters decline or fail. For example, regularly cited reasons are over consolidation in an industry (Porter, 1990; Dei Ottati, 1994; Rosenfeld, 1997), and negative dominant firm effects (Lorenzen and Mudambi, 2013; Bell *et al*., 2009). This is an area of cluster theory which has been somewhat neglected in the literature as theories tend to focus more on the positive benefits of geographic clustering. Therefore, this is an aspect of cluster theory where the thesis will make a significant contribution to the body of existing research. Throughout the chapter, different theoretical perspectives will be linked to relevant themes and/or sub-themes, in this way synergies across the different literatures can be identified. From this synthesis, conclusions will be drawn and a theoretical framework for the empirical research will be constructed. Finally, a series of testable propositions will be formulated and the research objectives identified.

2.2: National Competitive Advantage

Michael Porter (1990) takes the view that the national environment plays a central role in the competitive success of firms and, that some national environments seem more stimulating to advancement and progress than others. The unit of analysis is at the national level, unlike Porter's earlier work (1980, 1985) where the focus was on firm-level competitive strategy. Porter advocates that a dynamic and challenging *national* environment must also be in place to encourage and support an industry. The determinants of national advantage are drawn together into a mutually reinforcing system, *i.e.* the 'National Diamond' model. There are four main determinants in the formation of the diamond: factor conditions; demand conditions; related and supporting industries; and, firm strategy, structure and rivalry. In addition, there are two variables that can influence the diamond: chance events; and, the role of government. The National Diamond system is depicted in Figure 2.1 and the key points from Porter's theory are summarised in appendices 1 and 1a.

Figure 2.1: The National Diamond System



(Source: Author, adapted from Porter 1990, p.127)

2.2.1: The Dynamics of National Advantage

According to Porter (1990), the National Diamond system as a whole is more important than the individual parts, as the determinants reinforce each other and proliferate over time in fostering competitive advantage in an industry (p. 132). The dynamic effect is to create a unique environment that is difficult for foreign competitors to replicate and, in which case, domestic firms appropriate the benefits. Two main elements in particular, domestic rivalry and geographic concentration, exert most impact upon the dynamics of the system: domestic rivalry (competition) as it promotes upgrading of the entire national diamond (*e.g.* through new entrants and innovation); and geographic concentration, as it elevates and magnifies the interactions (co-operation) within the diamond, *e.g.* through speed of information and knowledge transfer (Porter, 1990: 131). A consequence of the diamond system is that competitive industries in a nation are not spread evenly throughout the economy but are geographically concentrated in clusters, consisting of industries related by links of various kinds. Clustering does not appear as a separate point of the national diamond; rather, the effects of clustering permeate all determinants of competitiveness highlighted by Porter's model (Porter, 1990). Appendix 2 demonstrates the dynamic nature of the diamond and how the 'system' benefits are reinforced and magnified through cluster effects (*i.e.* geographic concentration and proximity to rivals).

2.3: The Importance of industry clusters

One of the most striking findings in Porter's studies of successful industries is that geographic industry clusters are a central feature of all the advanced national economies that he studied. One competitive industry within a cluster helps to create another in a mutually reinforcing process, and it is the combination of both national and local conditions that fosters competitive advantage (Porter, 1990). According to Lorentzen (2008), a functioning diamond is a cluster, and the quality of the cluster is decisive for the development of competitive advantage of individual firms.

There is a wealth of empirical evidence to support Porter's view that geographic concentration of rivals enhances competitiveness and stimulates innovative activity, firm growth and entry (*e.g.* Jaffe, 1989, 1993; Glaser *et al*., 1992; Dei Ottati, 1994; Feldman, 1994; Audretsch and Feldman, 1996; Rosenfeld, 1997; Baptista, 1998, 1999, 2000; Baptista and Swann, 1996, 1999; Audretsch, 2000; Tallman, *et al.,* 2004; Jenkins and Tallman, 2012; Fundeanu, 2015).

According to Porter (1990) *"a nation's successful industries are usually linked through vertical and horizontal relationships"* (p.149)…"*entire clusters of industries are often located in a single region or town"* (p.154).

As stated in the Introduction chapter of this thesis (see chapter 1.2), the UK ceramics industry is classed as a 'regional cluster', belonging to the West Midlands region but highly concentrated around SOT. Therefore, the SOT ceramics cluster is an appropriate case for the application and development of cluster theories, as well as a rich source of analytical findings.

The idea of clustering is not new, as the prominent economist Alfred Marshall first wrote about industrial districts in 1890. Marshallian districts, like clusters, represent a division of labour between firms and formal and informal institutions, which helps to reduce uncertainty. The 'industrial atmosphere', inside as well as between firms, enables the transmittance of tacit knowledge within the district (Marshall, 1890, 1923). Thus the district, like the cluster, is considered to be a 'space of knowledge', bound to a particular place, since this industrial atmosphere cannot be moved (Corolleur and Courlet, 2003; Lorentzen, 2008). Being part of a cluster allows companies access to specific benefits that can help them to operate more productively in sourcing inputs; accessing information, technology, and needed institutions; coordinating with related companies; and measuring and motivating improvement (Porter, 1998). Cluster benefits can be likened to 'agglomeration economies' that come when firms and people locate near one another in cities and industrial clusters. Agglomeration benefits ultimately come from transport costs savings (Glaeser, 2010: 1).

2.3.1: Towards a Working Definition of a Cluster

Definitions of clusters in the literature vary widely. Rosenfeld (1997), describes the usual problems of defining the term 'cluster'. Government agencies typically use too broad, general classifications, *e.g.* metals, tourism, *etc.*, but nothing that binds firms into a production system. Academics and researchers rely too heavily on statistical and econometric analyses, *e.g.* SIC codes, agglomerations, transactions, *etc.*, again resulting in very broad classifications. Business Schools (*e.g.* Harvard) have favoured models based on comparative advantages in global markets, and the most widely accepted of these models is Michael Porter's Diamond Model (Tallman, *et al*., 2004). Related to cluster theory is network

theory which focuses on inter-firm co-operation (*e.g.* Piore and Sabel, 1984; Rosenfeld, 1997; Braczyk *et al*., 1998; Simmie and Hart, 1999; Simmie, 2010; Giuliani, 2007; Lorentzen, 2008). According to Porter (2008), cluster theory bridges network theory and competition because a cluster is a form of network that occurs in a geographic location (p. 242). The key difference between clusters and industrial districts is that cluster theory builds on the theory of the firm (*e.g.* Coase, 1988; Teece *et al.,* 1997; Williamson, 2002) by explaining, for instance, not only the firm boundaries but also their heterogeneity and their performance. On the other hand, the industrial district concept aims to provide an alternative way to analyse industries, by taking equally social and economic issues into account (Ortega-Colomer *et al.,* 2016).

Despite the differences across the literature there are many common elements to be found in the definitions. For example, in the literature on industrial districts, Becattini (1990) defines the industrial district as:

> *"A socio-economic entity which is characterised by the interactive presence of a community of people and a population of firms in one both historically and naturally bounded area"* (p. 38).

Dei Ottati (1994) develops this definition further by defining the productive system of an industrial district as:

> *"A concentration, in a specific area, of a large number of firms, each of which carries out a specialised activity that may regard either the realisation of a certain phase in the production process of the typical industry of the district….the division of labour within the industrial district is both vertical and horizontal"* (p. 464).

Industrial district theory, like cluster theory, also stresses the importance of the involvement of formal institutions, such as trade associations, trade unions and local government, involved in supporting, regulating and spreading constructive co-operation within the industrial district (Becattini, 1990; Dei Ottati, 1994; Rosenfeld, 1997). However, it should be noted that specialisation (fragmentation of the production process that provides more opportunities for co-operation) is mentioned more in the literature on industrial districts than it is in the cluster literature. Indeed, in some industries, opportunities for specialisation are limited due to the integrated nature of technological processes within the specific industry. The issue of specialisation will be discussed subsequently in this chapter.

According to Rosenfeld (1997), the absence of sound methods for analysing clusters as production and social systems was the impetus for convening 26 academics, practitioners and policy analysts, with an interest in and/or experience of developing clusters. The group arrived at a working definition:

> "*A geographically bounded concentration of interdependent businesses with active channels for business transactions, dialogue, and communications, and that collectively shares common opportunities and threats"* (p. 8).

This definition asserts that 'active channels' are as important as 'concentration' and without active channels even a critical mass of related firms is not a local production or social system and, therefore, does not operate as a cluster. Similar to Porter's view: "*the dynamics of the cluster are the key to synergy and thus its competitiveness*" (Rosenfeld, 1997: 8).

In 1998, Porter further developed his definition of the term 'cluster':

> *"A geographically proximate group of interconnected companies and associated institutions in a particular field, which encompass an array of linked industries and other entities important to competition"* (p. 78).

According to Porter, linked industries and other entities can include foreign firms (his original definition excluded foreign firms), providing they make permanent investments in a significant local presence. Thus, both domestic and foreign firms contribute to the prosperity of a location. Although this definition is similar to Rosenfeld's, Porter, in addition to the emphasis upon co-operation, stresses the importance of *competition*.

Although only a few examples of cluster/district definitions are discussed in this chapter, the literature acknowledges a wide variety of theoretical approaches. For example, as Newlands (2003) stated: "*the striking feature of different theories of clusters is their diversity"* (p. 521); and, according to Bell *et al*., (2009),

> *"Although Porter may have popularised the cluster concept, his work on clusters can be viewed as a synthesis of ideas derived from a range of social scientists*" (p. 624).

Despite that fact that clusters and industrial districts are often dealt with separately in the literature, many commonalities have been established and will be explored in more detail throughout the rest of this chapter. In this research study, clusters and the industrial district concept will be used without distinction, although differences in both concepts are noted where relevant.

A growing number of researchers (Storper and Harrison, 1991; Markusen, 1996; Gordon and McCann, 2000; Bell *et al.*, 2009; Arikan, 2009; Arikan and Schilling, 2011; McCann and Folta, 2009; Delgado *et al*., 2014, 2016), do not view clusters as homogenous but rather that they vary significantly in terms of why and how they emerge, how they are governed, and consequently what types of costs and benefits they create for firms located within them. For example, according to Bell *et al*., (2009):

> "*There is considerable descriptive evidence of successful clusters that exhibit a fundamentally different design principle – hierarchical command, involving unilateral rules originating from a dominant firm*" (p. 623).

Different influences on an industry's emergence, growth and governance are explored further in subsequent sections of this chapter (see 2.7). So far, the literature review has focused on Porter's original model and on defining the term 'industry cluster'. From the definitions reviewed there is a clear focus on 'co-operation' and, to a lesser extent, 'competition'. Both of these central themes are now considered separately.

2.4: Co-operation and Clusters

Underlying the operation of the national diamond and the phenomenon of clustering, is the exchange and flow of information and knowledge between buyers, suppliers and related industries that ultimately leads to innovative output (Porter, 1990). These interchanges are termed 'positive' forms of co-operation and are considered in the in the economic literature as 'cluster externalities' (Hervas-Oliver and Albors-Garrigos, 2009). There is much evidence to be found, across a range of different literatures that links co-operation and successful clusters. For example, Dei Ottati (1994) in his work on industrial districts, argues that co-ordination through co-operation and the inseparable linking of this with the market is what distinguishes the industrial district as a model of organisation. According to Camagni (2002), the industry cluster or region is described as "*a system of localised technological externalities, social relations and local governance*" (p. 2396). This idea of cluster

externalities is not new, such externalities were highlighted by Marshall in 1890, when he first used the term 'industrial atmosphere'. Since then a variety of terms have been used to refer to a cluster's external resources including, 'social complexity' (Piore & Sabel, 1984), and 'non-traded interdependencies' (Storper and Scott, 1989; Storper, 1992, 1997). According to Bell *et al*., (2009):

> "*Cluster macro-cultures can have important effects on the organisation of individual transactions. At the transaction level particular attributes (i.e. specific assets, tacitness) provide a motivation for partner firms to deploy appropriate governance mechanisms, whereas the shared cluster macro-culture influences firms' ability to deploy*" (p. 629).

2.4.1: Co-operation and Knowledge Spillovers

Essentially, the economists' view of clusters has centred on the idea of knowledge spillovers and their link with innovation (Arrow, 1962; Audtretsch and Feldman 1996; Baptista and Swann, 1998; Giuliani, 2007; Roper *et al.*, 2017). A number of studies have focused on the role of a firm's internal resources as crucially important in accessing this external knowledge, *i.e.* to absorption capacity which, according to Hervas-Oliver and Albors-Garrigos (2009), "*is crucial to the effective exploitation of external know-how and to obtaining benefit from complementarities between internal and external resources*" (p. 263). Therefore, to understand competitiveness, consideration needs to be made of both internal factors and external resources in clusters (McEvily and Zaheer,1999; Zaheer and Bell, 2005; Bell *et al*., 2009; Laursen and Salter, 2014).

2.4.2: Co-operation and Knowledge Transmission Mechanisms

The main knowledge transmission mechanisms in clusters include linkages between the different agents located nearby, such as clients, suppliers and other related industries, through informal and formal collaboration and relationships (Becattini, 1990; Porter, 1990; Hervas-Oliver and Albors-Garrigos, 2009). Linkages within a cluster can be classified as first-order embeddedness (firm-to-firm relations), second-order embeddedness (relationships with social and economic institutions) and third-order embeddedness (firms indirectly related through social and economic institutions) (Johannisson *et al*., 2002). Moreover, it is the lead-firms in the industry who are called upon to expand and develop the number of linkages in the cluster in order to increase the potential to generate innovation (Burt, 1992). However, although firms have the potential to exploit external resources, the extent to which they do so may vary, *i.e.* firms have different absorptive capacities.

2.4.3: Knowledge Transfer and Absorptive Capacity

Absorptive capacity is the ability of any firm to acquire, assimilate, adapt, and apply new knowledge, that is 'to learn' (Zahra and George, 2002; Lorentzen, 2008; Grandinetti, 2016). Internal resources (capabilities to exploit external resources) determine how external resources are accessed, combined and exploited in clusters. Consequently, a lower level of a firm's internal resources leads to constrained absorption of external resources. Thus, investing in developing internal resources can lead to greater success in exploiting external resources and, the synergistic interaction effect can positively influence a firm's innovative performance in clusters. Moreover, the effects on the whole cluster can be dynamic (Porter, 1990, 1998; Giuliani, 2007; Hervas-Oliver and Albors-Garrigos, 2009). Furthermore, industry conditions can create incentives or disincentives to invest in developing absorptive capacity. Participation in a cluster network may provide access to resources, but, it may also involve relations of dominance and dependence. Therefore, the balance among actors depends on the governance structure of the network (Lorentzen, 2008; Bell *et al*., 2009; Belso-Martinez, 2010). Governance structures are discussed in more detail later in this chapter.

2.4.4: Co-operation and Transaction Costs[12]

Common across the literature is the view that co-operation is a crucial requirement in transactions where sunk costs are high (*e.g.* transactions involving developing innovation) and, where firms from different phases are engaged in the realisation of a customised product (Marshall, 1920; Rosenfeld, 1997; Bianchi, 1993). These types of transactions require trust and discretion between those involved. Rosenfeld (1997) also takes the view that close proximity allows firms to transact business more cheaply and easily, resolve their problems more quickly and efficiently, and learn earlier and more directly about new and innovative technologies and practices (p. 3). This idea that the cost of communication and transactions can be lower within industry clusters is also a feature of the work of Glaser *et al.*, (1992). However, certain transactions in labour markets, inter-firm relations, innovation and knowledge development require appropriate co-ordinating institutions (Storper 1997), and this is particularly true during the later stages of the industry's development.

[12] Transaction costs are the economic costs of using the price mechanism over and above production costs (Williamson, 1975, 1985).

2.4.5: Co-operation and Networking

The literature on 'networking' also places importance on the link between co-operation and innovative activity. Tassey (1991) argues that networking is essential for the development of a region's knowledge infrastructure. Ebadi and Utterback (1984) have demonstrated that network cohesiveness is positively correlated to the degree of innovative success. Roberts *et al*., (1992) found that network cohesiveness has a positive impact on the diffusion of industrial innovations. However, there are some differences in the literature regarding the definition of a network. According to Braczyk *et al*., (1998), local networks are suggested to represent both personal networks and trust among the agents, and on this background the emergence of new and competitive regions can be understood. However, Rosenfeld (1997) takes the view that clusters are different to networks:

> "*clusters are systems in which membership is based on interdependence and making a contribution to the functioning of the system, unlike networks or inter-firm co-operation where collaborative business activities are carried out by discrete, usually small, groups of firms in order to generate sales and profits through, e.g. joint exporting, production, R&D, product development or problem solving"* (p. 3).

Asheim *et al*., (2011: 879) also acknowledge several differences between networks and clusters:

1) Cluster firms may exist in a geographic area but may not take part in networking relationships;
2) Clusters are inherently geographic and spatial, while the network concept is 'by definition an *a-spatial* concept';
3) Clusters and networks each give rise to different types of external economies, and thus each has different effects on regional competitive advantage.

The main difference between clusters and networks has already been noted in this thesis (see 2.3.1). For this research study, key aspects of network theory are combined with key aspects of cluster theories and industrial district theories into a comprehensive theoretical framework, which will be applied to analyse the SOT ceramics industry cluster (see Figure 2.4).

2.4.6: Co-operation and Trust

Similar to the view of Braczyk *et al*., (1998), modern Industrial District Theory also emphasises the interdependence of firms and the importance of trust in creating and sustaining collaboration between economic actors within the districts (Maskell, 2001; Newlands, 2003). These types of interdependent networks permit the establishment of trust between actors. Firms within networks of trust benefit from the reciprocal exchange of information (particularly tacit information that cannot be codified) but are simultaneously bound by ties of obligation which regulate behaviour (Brusco, 1982; Piore and Sabel, 1984; Dei Ottati, 2004). The implicit assumption is that social trust is more likely to be sustained in geographically concentrated networks than more dispersed ones (Belussi, 1996; Lorenzen, 2002; Newlands, 2003). According to Casson (2000), to be of theoretical distinction trust must denote a form of market coordination that is different from the spot transactions treated by orthodox economics. A useful definition of trust in this context could be:

> "*The expectation held by a trustor (i.e., a representative of a firm) that one or several trustees (i.e., representatives of another firm or firms) will cooperate (i.e., not act dishonestly or otherwise opportunistically against the trustor), even if the trustor holds no power over the trustee to ensure that he does so*" (Lorenzen, 2002: 17).

Trust lowers coordination costs, *e.g.* by having common objectives and by lowering contract costs (Lorenzen, 2002, 2007). A distinction is drawn in the literature between 'dyadic' trust and 'networked' trust. Dyadic trust facilitates dyadic trade, and trust that is mutual within a small group of firms, networked trust facilitates trade within this exclusive network of firms. However, another term, 'social trust' (Coleman, 1984; Lorenzen, 2007; Belussi and Sedita, 2009), describes trust that facilitates trade within a whole environment of potential suppliers and customers through lowering contract costs, hence allowing for a mix of long-term, short-term and shifting economic relations (Lorenzen, 2002). The social capital and mutual trust within such networks is what makes firms, associations and public agencies engage in processes of self-organised, interactive learning (Simmie, 1997; Storper, 1997; Braczyk *et al*., 1998; Cooke and Morgan, 1998; Lorentzen, 2008).

2.4.7: Co-operation and the Strength of Network Ties

According to Lorentzen (2008), the outcome of network relations can be said to depend on two factors: 1) the quality of the network ties, *i.e.* weak ties[13] are thought to have higher value, and; 2) the quality of the firm (Lorentzen, 2008). Ties can be either strong or weak. Strong ties are intense relations between agents of great similarity (similar to Rosenfeld's 1997 view), they offer a great depth of knowledge but little diversity of knowledge. Weak ties offer access to diverse information, they call existing knowledge into question and add new elements leading to innovation (Julien *et al*., 2004; Tallman *et al*., 2004). This concept of strong and weak ties is similar to Johannisson's classifications of embeddedness (Granovetter, 1973; Johannisson *et al*., 2007).

Empirically, it has been shown that weak ties can trigger technological innovation (Julien *et al*., 2004: 266-267). Moreover, 'non-redundant' ties, those ties of network members that are not connected with each other, are also important in knowledge sourcing (Lorentzen, 2008). Another important factor determining the outcome of networking is the capability of firms to network and to use the resources provided by the network (Lorentzen, 2008; Tallman *et al*., 2004). Furthermore, it is also mentioned in the literature that some firms in an industry cluster will follow exploration-based search strategies (weak ties) which involve conducting searches in technologically proximate domains, typically generating incremental knowledge closely related to their existing knowledge. The more firms in a cluster that follow exploration-based search strategies, the more opportunities arise for inter-firm knowledge exchanges within the cluster (Arikan, 2009). Knowledge exchange in clusters refers to cluster firms transferring and using each other's knowledge, through both formal and informal mechanisms (Biggiero, 2006; Malmberg and Maskell, 2002, 2005; Maskell, 2001b). According to Tallman, et al. (2004), economic geographers have come to see knowledge exchange (through knowledge spillovers[14], informal exchange, movement of people, and so forth) as critical to defining performance in regional clusters (p. 254). However, whether a firm chooses to make its knowledge available to other firms in the cluster is dependent on whether external exploitation of knowledge endangers the firm's competitive standing inside the cluster[15].

[13] In 1973 the sociologist Mark Granovetter published a paper titled "The Strength of Weak Ties" in which he explains and discusses the value of weak ties. Granovetter analogizes weak ties to being bridges which allow us to disseminate and get access to information that we might not otherwise have access to.

[14] Knowledge spillovers are the direct or indirect transfer of knowledge from one party to another. They are typically generated by firms engaging in innovation activities and are valued because they provide knowledge that is new, even novel to the receiving firm. (Source: Gilbert *et al*., 2008)

[15] Network capability is linked to the concept of 'absorptive capacity' and has been discussed in more detail previously in this chapter.

2.4.8: Co-operation with Agents Outside the Cluster

An emerging theme in the literature on clusters and networks acknowledges the need, in response to changing technological and global economic conditions, for non-local knowledge relations in order to maintain and vitalise the local characteristics of clusters (Belussi and Asheim, 2003; Bathelt *et al*., 2004; Cook, 2005; Giuliani and Bell, 2005; Anderson and Lorenzen, 2007; Hervas-Oliver *et al*., 2011; Lai *et al*., 2014; Boschma, 2015). Although network theory focuses on the benefits of weak ties and non-redundant information in closely knitted networks, network theory has no geographic focus. Strong and weak ties may develop on all spatial scales (MacKinnon *et al*., 2002). Moreover, strong ties and redundant network ties, characterised by proximity, trust, common values and so on, are likely to result, eventually, in the circulation of redundant information, In other words, a 'technological lock-in' (Bell *et al*., 2009). One way of overcoming negative lock-in effects is to develop the cluster's external ties, *i.e.*, to develop relationships with agents outside the cluster or with foreign firms (Hervas-Oliver *et al*., 2011). Reasons for lock-in situations can originate, not only in an exhausted regional trajectory, but also in 'long existing, closed, and homogeneous networks', which are unable to renew the cluster with new knowledge (Lazzeretti and Capone, 2016). According to Lorentzen (2008), "*such close networks must be supplemented by loose networks, with odd partners, if knowledge leading to innovation is to be sourced*" (p. 542). This view is similar to those of Lai *et al*., (2014), who suggests that cluster firms need to 'consciously cultivate' distant linkages in their network ties in order to neutralize the tendencies for lock-in and to arrest entropic deterioration in their respective clusters, and also Tavassoli and Carbonara (2014), who suggest that the intensity of external knowledge flowing into a region has a positive effect on innovation of a region.

In the modern day global economy, the majority of clusters *are* connected in global value chains. However, regions and clusters should be more open to 'newcomers' that act as knowledge diffusers and create both inflows and outflows of knowledge (Cook, 2005; Giuliani, 2011; Boschma, 2015). The transfer of knowledge from local to a global scale has received names such as 'non-cluster economies' (Yeung *et al*., 2006), 'extra-cluster linkages' (Giuliani and Bell, 2005; Giuliani, 2011), or 'global pipelines' (Anderson and Lorenzen, 2007; Maskell, 2014; Fitjar and Rodriguez-Pose, 2013). The concept of pipelines takes its origin from the fact that new knowledge could come from outside the cluster and so encourage firms to establish pipelines to global customers of excellence. However, it should also be noted that clusters may be incapable of moving away from traditional ways of

working, perhaps due to historical reasons and/or path dependency. For example, a type of intellectual lock-in made it hard for the Detroit automobile cluster to shift out of large-car production in the 1970s (Audretsch, 1998). Lock-in effects and other reasons for cluster failure are discussed later in this chapter.

2.4.9: Co-operation and Governance Structures

Arikan and Schilling (2011), in their work on governance structures in industrial districts, contend that different governance types in clusters lead to radically different types of interactions inside clusters, as well as different bases of competitive advantage for member firms (p. 774). They describe two continuous dimensions along which they argue that clusters vary in their structure and governance: the 'need for co-ordination'; and, 'centralisation of control'. In many clusters, firms are co-located but otherwise exhibit little co-ordination, co-operative behaviours may exist but they are usually the outcome of market forces, rather than through explicit control or negotiation between firms. According to Arikan and Schilling, the primary factor that leads to a high need for co-ordination is a combination of 'complexity' and 'imperfect separability'.

2.4.9.1: Governance Structures and Complexity

Complexity can take two forms: firstly, high or low technological complexity. High technological complexity may require firms to break down product systems into more manageable components, leading to specialisation and hence the need for co-ordination. In contrast, industries such as furniture and wine-making (and possibly ceramics sectors like tableware and giftware) are characterised by relatively simpler technologies (low technological complexity), where individual firms may possess most or all of the knowledge and capabilities needed in production, and thus have little need for inter-firm co-ordination. For example, some clusters are single industry clusters where firms are dependent on a common knowledge base. In such cases opportunities for specialisation may be limited (few components in the production system) and, firms' may engage in direct competition with each other (St. John and Pouder, 2006). Therefore, in industries that are characterised by relatively simple technologies, where individual firms may possess most or all of the knowledge and capabilities needed in production, they may have little need for inter-firm co-ordination (Arikan and Schilling, 2011). Moreover, in such industries firms are likely to be hesitant to make their valuable knowledge available to other firms in the cluster for fear of endangering their competitive position (Arikan, 2009). Consequently, the structure of the

industry plays an important role in cluster firms' willingness to engage in inter-firm knowledge exchanges.

The second form of complexity relates to the nature of the business environment. When an industry has many different types of customers with varying and rapidly-changing demand characteristics, the firms in that industry will experience pressure to produce more alternative configurations from available inputs and frequently change product characteristics in order to meet idiosyncratic customer preferences (Arikan and Schilling, 2011). Firms may disaggregate activities across a group of participants, each can specialise in a narrow range of activities. Such disaggregation will lead to a greater need for inter-firm co-ordination. Firms in industries that have relatively simpler technologies, and have not previously had a great need for inter-firm co-operation, may experience sudden changes in the external environment, *e.g.* increased and unprecedented global competition, and this may create a greater need for inter-firm co-operation. In such cases, due to historical reasons and path dependency, cluster firms may not possess the necessary capabilities to forge co-operative linkages.

Complexity may provide the motivation for firms to pool their efforts to break down that complexity into more manageable pieces, but it is the separability of activities and resources that determines the ease or effectiveness of doing so (Baldwin and Clark, 1997; Schilling, 2000; Arikan and Schilling, 2011). In clusters where product systems are characterised by inseparability, joint production within a single firm might be the most effective form of governance due to the difficulty of separating production activities in a way that allows multiple firms to act in parallel, *e.g.* in the steel industry (and possibly ceramics). Conversely, if the activities in the production system are highly independent, they can be performed by different firms with little or no co-ordination. Most industries lie in-between these two extremes, *e.g.* the computer industry (Arikan and Schilling, 2011).

2.4.9.2: Governance Structures and Control

Centralisation of control refers to the degree to which one or more parties have disproportionate authority or influence over which interactions take place and how they are carried out (Sacchetti and Tomlinson, 2009). For example, a cluster can vary from being almost purely market-like with no centralised control and characterised by governance only in the form of the invisible hand, to being very hierarchy-like with a single powerful entity

exerting great control over others in the cluster (Bell *et al*., 2009; Arikan and Schilling, 2011). Control over the architecture of the final system may be highly concentrated within the hands of a single (or few) firms (Brusoni *et al*., 2001; Belso-Martinez, 2010). For example, when a firm retains control over a dominant technology standard in an industry it may be able to exert some degree of architectural control over the system in which the technology is embedded (Schilling, 2000), *e.g*. the firm may also be able to control the rate at which the technology is upgraded or refined. Thus, the firm that possesses control can rise to become hubs that dictate much of the behaviour in the district due to their large potential bargaining power (Belso-Martinez, 2010; Arikan and Schilling, 2011). Moreover, these powerful actors may use their position to further their own strategic interests, possibly to the detriment of others (Cowling and Sugden, 1998). For example, smaller firms might find themselves 'closed out' of markets because of the anti-competitive strategies of larger competitors, or they might be coerced into accepting an iniquitous set of contract conditions from a large powerful contractor (Sacchetti and Tomlinson, 2009).

2.4.10: Examples of Cluster Governance Structures

An example of clusters where some opportunities for co-ordination exist (low-medium technological complexity) are the ceramic tile and textile clusters in 'Third Italy' (Becattini, 1990; Becattini and Rullani, 1996). These clusters consist of predominantly small and medium-sized firms with relatively little market-power differentials, *i.e.* no one firm has enough power to influence other cluster firms strategic postures, a degree of flexible specialisation (some separability of the production process) is a feature of these clusters. Other clusters emerge around powerful, globally connected, vertically-integrated[16] lead firms surrounded by less powerful suppliers. For example: Detroit's automotive cluster (Markusen, 1996; Gordon and McCann, 2000; Hannigan *et al.,* 2015); and, Pittsburgh's steel cluster (Treado, 2010). Although lead firms are vertically-integrated, separability exists within the supply chain. In clusters of this type hierarchical control by the lead firm can replace institutional norms as the dominant co-ordinating mechanism for inter-firm knowledge exchanges (Arikan, 2009, 2011).

[16] Vertical integration is the expansion of a firm into different steps along its production path or supply chain. A vertically integrated produce company, for example, might hold a farm, a produce distribution business and a green grocery. A farm's acquisition of a distributorship would constitute forward integration, while the green grocer's launch of a distributorship would be considered backward integration. (Source: Small Business Chronicle (2018), *Examples of Vertically Integrated Companies*, [ONLINE]. Available at: http://smallbusiness.chron.com/examples-vertically-integrated-companies-12868.html. [Accessed 20th February 2018]

According to Giuliani and Bell (2005), the presence of firms with a stronger knowledge base in clusters is associated with denser and better connected intra-cluster knowledge systems. These 'leading firms' (Lazerson and Lorenzioni, 1999) or 'technological gatekeepers' (Giuliani, 2011, 2013; Grandinetti, 2016) are mainly responsible for acquiring *external* knowledge and subsequently transferring it as specific 'know-how' adapted to each cluster, or as operational knowledge to be exploited in local clusters. When knowledge is transferred in this way it contributes to the 'industrial atmosphere' (Marshall, 1923: 287) of the cluster and also helps to avoid lock-in. However, as Marshall also acknowledges, lead firms in clusters do not always share their knowledge with other cluster members and this can be to the detriment of the cluster. Examples of clusters that are characterised by low technological complexity and imperfect separability are the steel industry and, possibly, the UK ceramics industry cluster (tableware and giftware sector). In the UK ceramics cluster, possibly due to these conditions, the need for co-ordination has historically been low. Moreover, according to Sacchetti and Tomlinson (2009), since the 1970s the cluster has consolidated and evolved towards a more hierarchical mode of economic governance, with lead firms having a major negative impact on the 'shape' and 'direction' of the cluster. As Sacchetti and Tomlinson state: "…*the larger ceramics firms have neglected the cluster's longer-term development, in particular in relation to new investment capacity and the skills base*" (p. 1854).

2.4.11: Other influences on Co-operation

Another factor that influences whether a cluster firm chooses to exploit a particular body of knowledge internally is the level of technological dynamism surrounding the cluster's products. The higher the level of technological dynamism surrounding the products that characterise the cluster, the more opportunities arise for inter-firm knowledge exchanges within the cluster (Arikan, 2009).

Initial governance choices made by transacting firms within clusters can enable and constrain the design of future transactions between these firms owing to *path dependencies*[17] that reside in the governance devices themselves. Such path dependencies influence firms' ability to adapt to new circumstances (Bell *et al*., 2009; Belussi and Sedita, 2009). Successful clusters display the capacity to match governance mechanisms with

[17] In this thesis, path dependency refers to 'the historical pattern of technological development that is thought to play a central role in determining the pace of future technological change', (Redding, 2002).

transaction attributes, both cross-sectionally at the level of individual transactions, and over time across related transactions. However, the number of clusters that manage to reinvent themselves over time in changing circumstances is small in relation to those that decline as new technologies and competitors emerge elsewhere (Pouder and St. John, 1996). Path dependency may also be strongly related to issues discussed earlier in this chapter, such as the need-for co-ordination, technological complexity and separability of the production processes.

The literature emphasises that the most successful districts tend to be those that are the most racially and *culturally homogeneous* (Harrison, 1992). Wider national influences, such as economic, legal and policy traditions, can also influence the development of inter-firm co-operation. Various studies have shown that the development of inter-firm co-operation is more likely in some countries, *e.g*. Italy, than in others, *e.g.* the UK, because of differences in the operations of competition policy and labour markets (Porter, 1990, 2000a; Becattini, 1991, 2000; Saxenian, 1994). There is also some evidence that differences in the culture*s* of regions may contribute to differences in attitudes towards co-operation. For example, Saxenian (1994) argues that a culture of greater interdependence and exchange among individuals in the Silicon Valley region contributed to a superior innovative performance than found around Boston's Route 128, where firms and individuals tended to be more isolated and less interdependent. However, it must be noted that Silicon Valley is a high technology cluster with a high degree of separability in the production process and, therefore, not comparable to the comparatively low-tech SOT ceramics cluster. In the case of Silicon Valley, due to separability, the need for co-ordination would be high. Saxenian's view is similar to the concept of 'shared vision' (Exposito-Langa *et al.*, 2015; Tomlinson and Branston, 2017), whereby cluster members who share a vision are more likely to influence local industry issues and initiatives.

2.5: Competition and Clusters

As noted previously in this chapter (see 2.2.1), competitive rivalry promotes upgrading of the entire national (local) diamond, *e.g.*, through new entrants and innovation (Porter, 1990). To be most effective, interchanges (co-operation) between firms in the cluster must occur at the same time as 'active competitive rivalry' is maintained in each separate industry. Thus, the city or region becomes a unique environment for competing in the industry. Not only does the increased number of firms provide greater competition for new ideas, greater competition

across firms facilitates the entry of a new firm specialising in some particular new product niche (Jacobs, 1969; Dei Ottati, 1996).

2.5.1: Positive versus Negative Competition

Geographic concentration of rivals then can promote efficiencies and specialisation and, more importantly, influence improvement and innovation. Rivals located spatially close together often tend to be jealous and emotional competitors (Porter, 1990, 1998, 2000a). As discussed earlier, innovation is widely viewed as a driver of competition, thus a firm may possess technologies which are superior to others regardless of the level of factor prices (Newlands, 2003). Distinctions are drawn in the economic literature between 'negative' versus 'positive' competition (Porter, 1990), and 'weak' versus 'strong' competition (Hudson, 1999).

Positive or strong competition involves the creation of new goods or new technologies to produce existing goods. Weak or negative competition involves the search for lower cost means of producing existing goods with existing technologies, often leading to price-based competition. According to Dei Ottati, (1994, 1996), price competition can lead to: conflict and tensions that act as an obstacle to co-operation among individuals and firms in a district; a reduction in financial resources (lower profits) available to invest in innovative activity; decreased willingness to collaborate on the part of workers within the firms (due wage reductions); and, decreased willingness on the part of other local specialised firms engaged in complementary activities to co-operate. This outcome occurred in the Prato textile district in Italy after a period of decline in demand for the woollen fabrics in which the district specialised (Dei Ottati, 1996).

2.5.2: The Balance Between Competition and Co-operation

Dei Ottati (1994) also recognised the need for a balance between co-operation and competition in the industrial district, *"the stability of the industrial district over time calls for internal competition and co-operation to be well behaved and to stay together in a reciprocally balanced relationship"* (p. 474), hence the need for the involvement of formal and informal institutions to support and regulate the industry. According to Newlands, (2003), "*there is no necessary contradiction between collaboration and competition*" (p. 528). Moreover, the benefits of collaboration can overcome the negative externalities of corrosive competition and diseconomies of scale (Raco, 1999). Particularly for small firms, co-

operation in the establishment of marketing or training facilities, or of R&D laboratories, may allow them to gain access to economies of scale, scope and agglomeration, whilst enhancing competition in the product market (Oughton and Whittam, 1997; Newlands, 2003). Competition between firms may provide market disciplines which ensure the continued competitive advantage of a cluster and, in turn, attract new firms to it. Thus, co-operation and competition become a mutually reinforcing positive relationship (Newlands, 2003), that raises the average level of competitiveness of firms and systems (Belussi and Sedita, 2009). When the cluster reaches a balance between co-operation and competition the interplay between the two can be dynamic and can act to prime a kind of virtuous circle (Dei Ottati, 1994).

Constructive competition may involve firms constantly searching for some kind of competitive advantage. This may be through product/process innovation or through emulating industry leaders. Such competition promotes new firm start-ups, possibly as spin-offs from existing firms by ex-employees with new ideas. This increases competition and innovation further. Constructive competition in an industry can lead to co-operation based on local customs, reciprocity and trust. If all firms agree (informally) to adhere (behave) to local norms, an environment that facilitates knowledge transfer can develop. Thus, stimulating further investments in reputation and innovation, which lead to a further increase in constructive competition.

Both Porter (1990), and Dei Ottati (1994), acknowledge that certain types of co-operation and competition can also be destructive. For example, when restrictive agreements are made which act as barriers, and when competitive behaviour leads to predatory practices with the precise aim of eliminating not the least efficient competitors but those with lower market power or who offer better quality goods, often by fraudulent means to obtain monopoly power. Cost leadership strategies are another strongly path-dependent triggering factor that can lead to lock-in trajectories. Such strategies tend to be myopic and firms adopting them risk being stuck in a perverse spiral, or ‘vicious circle’ (Dei Ottati, 1994) of cost reduction, which does not provide any relevant resources to face global competition from low-cost countries (Belussi and Sedita, 2009). When the cluster experiences mounting pressures of competition it may have a negative effect on the creation and maintenance of trust within the cluster, as firms may choose to trade-off between the benefits of mutual collaboration and the potential loss of competitive advantage (Newlands, 2003). The view that competition is more conducive to knowledge externalities than is local monopoly is also

found in the literature on Economic Geography and Industrial Districts (*e.g.* Jacobs, 1969; Dei Ottati, 1994; Audretsch and Feldman, 1996), *i.e.* an increased number of firms provides greater competition for new ideas and facilitates the entry of new firms specialising in some particular new product niche.

Thus far, the Literature Review has focused on knowledge in clusters, and on how knowledge is created through various forms of: 1) local inter-organisational co-operation and collaborative interaction; and, 2) increased local competition and intensified rivalry. The benefits of increased local co-operation and local competition should lead to innovation (Porter, 1990, 1998; Dei Ottati, 1994, 1996). Innovation can be linked to the ability to come up with new and better ways of organising the production and marketing of new and better products (Porter, 1990; Lundvall, 1992; Malmberg and Power, 2005). Hence, the next section of this chapter examines the literature on innovation in industry clusters and its link to knowledge creation and knowledge transfer.

2.6: Innovation and Clusters

As discussed in earlier sections, firm innovation[18] is a function of the strength of the cluster in which it is located and, as stated in earlier sections of this chapter, cluster theories have already identified external localisation economies as drivers of innovation in industry clusters. According to Jaffe (1989) and Jaffe *et al*., (1993), the transmission of technological knowledge works better within spatial boundaries because this type of knowledge has a tacit and uncodified nature. Audretsch & Feldman (1996) and Baptista and Swann (1998), through their work on measuring the extent of knowledge spillovers and linking them to the geography of innovative activity, suggest that location and proximity clearly matter in exploiting knowledge spillovers (innovation). Glaser *et al*., (1992) also suggest that an increase in concentration of a particular industry, within a specific geographic region, facilitates knowledge spillovers across firms and, therefore, facilitates innovative activity. However, numerous studies have shown that clusters vary widely with respect to their innovative outcomes and, in particular, in their ability to enhance individual firms' knowledge creation efforts (Saxenian, 1994; Porter, 1998; Tallman *et al*., 2004).

[18] Innovation is taken to mean, "the successful introduction of new products and processes. The sources of novelty may include, new technology, new skills, new forms of organisation and new markets and frequently a combination of any or all of these" (Barber and Lambert, 1997 *cited* in Simmie, 2002, p. 887).

2.6.1: The Distinction Between Knowledge and Information

Audretsch (2000), in response to claims that new communications technologies have reduced the need to cluster spatially (as information can be transferred more easily and cheaply), reaffirmed that geographic location "*is indeed important to the process of linking knowledge spillovers to innovative activity*" (p. 157). According to Porter (2000a) geographic co-location, "*still allows special access, special relationships, better information, powerful incentives and other advantages that are hard to tap from a distance*" (p. 32). Since his original research in 1990, Porter further developed his work on national competitive advantage to address claims that global competition has diminished the importance of proximity to suppliers and customers. The main conclusions from this research also show a growing importance of location and clusters in increasingly complex, knowledge-based and dynamic economies (Porter, 1998, 2000a).

However, Audretsch (1998: 21) also argues that it is 'knowledge' rather than 'information' that can be fully exploited within the cluster and therefore a distinction must be made between the two. Knowledge that is simpler, codified, less tacit,[19] and less path dependent is more likely to be mobile (Tallman *et al.,* 2004). Although the costs of transmitting information, *e.g.* prices, exchange rates and other data, may have been significantly reduced as a consequence of the telecommunications revolution, knowledge is very different, it is vague, difficult to codify and, according to Audretsch (2000), "*the cost of transmitting knowledge, especially tacit knowledge, rises with distance"* (p.157). This view is supported by Simmie (2002), who states: "*successful knowledge transfer decays with distance*" (p. 889).

Other empirical evidence to support the 'tacit knowledge' argument has been provided by: Von Hipple (1994), who believes high context, uncertain knowledge, or 'sticky knowledge' is best transmitted via face-to-face interaction and through frequent and repeated contact; and, Glaser *et al.,* (1992), who claims that intellectual breakthroughs can "*cross hallways and streets more easily than oceans and continents*".

[19] Tacit knowledge incorporates so much embedded learning that its rules may be impossible to separate, thus it is almost impossible to reproduce in a document or database. That is, tacit knowledge normally cannot be spoken, but rather demonstrated and imitated (Source: Polanyi, 1966). Tacit knowledge is also called artistry that expresses itself in occupational know how of an expert. It develops as a result of a long practice. It is shown as a skillful, intuitive-like action and it is completely dependent on its holder. (Puusa and Eerikaenen, 2010)

However, in recent studies there is some evidence that the internet and social media are making it easier to transfer information (not tacit knowledge) about companies and products. For example, according to Negrusa *et al.*, (2014), "*it is very easy for a company to obtain information about the industry in general, competitor's intentions, consumer behaviour etc*." (p. 590). Moreover, by applying new forms of communication, such as different tools of social media, the network or cluster may collectively employ initiatives to gain strong reputation and brand image in the market. Presence in a branded cluster, or network, can also help remote members find companies or partners, and to trust them to perform the kinds of activities needed and cooperate (p. 591).

2.6.2: Component versus Architectural Knowledge

In 1998, Matusik and Hill developed a typology of organisational knowledge which focuses on two types of knowledge 'component' versus 'architectural'. Component knowledge ranges in nature from straightforward technical (simple, tangible, explicit) know-how through to highly systemic (complex, intangible, tacit) scientific knowledge. Highly technical knowledge includes blueprints, product patents, step-by-step instructions for an operation, and so forth, in other words 'information'. Whereas, systemic component knowledge includes scientific theory, complex process patents, activities that require learning-by-doing, organisational routines and so on. The more technical, as opposed to systemic, a piece of component knowledge is, the faster and more coherently it will be disseminated within a regional cluster (Tallman *et al*., 2004; Jenkins and Tallman, 2012). This view is linked to the concept of transaction costs, which has the paradigm problem to make or buy (Williamson, 1985).

However, when a cluster's product technologies are highly modular, it is possible for different firms in the cluster to specialise in different bodies of knowledge associated with different components. Under perfect modularity, each firm would be able to integrate its component into the overall product architecture without exchanging any knowledge associated with the design and manufacture of its component, thanks to the presence of standardised component interfaces (Baldwin and Clark, 1997; Arikan, 2009). Low modularity in product technology reduces the number of opportunities for inter-firm knowledge exchanges within the cluster. Therefore, component knowledge will only provide short-term competitive advantage to firms within a cluster while it remains private, and component knowledge that is public only within the cluster provides short-term competitive advantage to the cluster as a whole (Tallman *et al*., 2004).

Architectural knowledge relates to an organisation as an entire system and to the structures and routines for co-ordinating and integrating its component knowledge for productive use, and for developing new architectural and component knowledge (Henderson and Cockburn, 1994; Matusik and Hill, 1998; McGaughey, 2002; Tallman *et al*., 2004). Architectural knowledge evolves endogenously as an inseparable part of the firm rather than existing independently and, as no two firms are exactly the same, is highly individual. Although the body of architectural knowledge is not coherently assembled, and so not readily transferable, elements may leak-out through constant interaction with other firms in the cluster. As a result, through constant interaction, the firms in a regional cluster will develop a stock of architectural knowledge over time, *i.e.* understandings that develop at the regional level and distinguish the cluster from the rest of the industry (Matusik and Hill, 1998; Tallman *et al*., 2004; Lorentzen, 2008). Such architectural knowledge is identified in the Strategic Management literature as: 'core competencies' (Prahalad and Hamel, 1990); 'organisational resources/competences' (Barney, 1991); 'dynamic capabilities' (Teece *et al*., 1997); and, is widely viewed as the key to sustained competitive advantage for individual firms providing it remains private to the firm for an extended time period (Porter, 1990; Sanches *et al*., 1996).

2.6.3: Innovation Mechanisms

The arguments presented above suggest that firms located in clusters should be more likely to innovate than firms outside these clusters. Several types of mechanisms leading to new knowledge and innovations have been identified (Bellandi, 1992; Tallman *et al*., 2004; Boix and Trullen, 2010). They include: R&D; learning by doing; learning by using, entrepreneurship; and, the breaking up of the production chain into many phases. According to Becattini (1991), R&D is not the main source of innovations, the main amount of innovations seem to proceed from spontaneous creativity. However, direct co-operations between firms are not the usual ways of diffusing innovations, this takes place through a social process (weak-ties) in which there is informal exchange of information in public spaces or domestic life between the workforce and, sometimes, between entrepreneurs and managers (Becattini, 1991; Bellandi, 1992; Asheim, 1994; Boix and Trullen, 2010).

Another factor is the spin-off mechanism of entrepreneurship, where new ideas or conceptions lead to the creation of new firms, or vice versa (Boix and Trullen, 2010). Thus, entrepreneurship can serve as a conduit for the spillover of knowledge and is, thereby, conducive to economic growth (Acs *et al.*, 2012). Furthermore, there is a growing body of research claiming that smaller firms account for a disproportionate share of product

innovations (Acs and Audretsch, 1990; Acs *et al.,* 1994; Klepper, 1996; Audtretsch, 2002; Hall *et al*., 2009). These studies have identified vigorous innovative activity emanating from small firms in certain industries. As Acs and Audretsch (1990) and Acs *et al*., (1994) demonstrated, small and frequently new firms are able to generate innovative output while undertaking generally negligible amounts of investment in knowledge generating inputs such as R&D. One explanation for this is that small firms exploit knowledge created by expenditures on research made by others, *e.g.* Universities and R&D departments in large corporations.

2.6.4 : Innovation Communication Channels

Several communication channels for knowledge exchange exist in clusters (Arikan, 2009). One is 'local-buzz' (Bathelt *et al*., 2004), created by face-to-face interactions between members of cluster firms that take place within local community organisations as well as informal forums such as bars and restaurants. The second channel is local collaboration networks (Arikan, 2009).Thus, the partners involved in the innovation process have to understand each other very well, *i.e.* they must 'share codes'. It has been suggested in the literature that only partners belonging to the same social, cultural and institutional environment are able to understand each other so well (Cooke and Morgan, 1998; Lorentzen, 2008; Bell *et al*., 2009). Other ways in which innovations are diffused include inter-firm mobility of workers (Porter, 1990; Rosenkopf and Almeida, 2003; Arikan, 2009), when moving employees carry information to their new employers about their previous employers' knowledge assets and possible uses of knowledge in different contexts. As a result, higher levels of labour mobility lead to higher connectivity among cluster firms. Other channels include media (Arikan, 2009) and the chain of specialised suppliers and their innovations (Boix and Trullen, 2010). Therefore, it can be assumed, that the more information channels and knowledge brokers there are present in a cluster to establish connectivity between cluster firms, the greater the number of opportunities for inter-firm knowledge exchanges there will be.

2.6.5: Measuring Innovation

The measurement of innovation is a widely discussed topic in the literature, and there is no widely accepted agreement as to which indicator is the most appropriate (Griliches, 1990; Acs *et al*., 1992; Boix and Trullen, 2010). The most commonly used innovation indicators are usually either 'input indicators', such as R&D expenditure or employment (*e.g.* Beaudry and Breschi, 2003), or 'output indicators' such as patents and new product announcements (*e.g.*

Jaffe, 1989; Santarelli, 2004; Boix and Galletto, 2009; Boix and Trullen, 2010), or combinations of any or all of these (Barber and Lambert, 1997; Simmie, 2002). The main problem with measuring innovation based only on input indicators is that it fails to take into account those activities related to contextual knowledge, which are more important in smaller firms, thus underestimating their innovative capacity (Boix and Galetto, 2009). Patents and new product announcements represent some of the outcomes of the innovative process. However, there is a commonly held view that patents are not always suitable indicators of innovation in industrial clusters, as firms in clusters commonly do not always register innovations. Where patent data is available, possibly from several different sources, it is common practice to consider that data over a period of about 4-5 years (Griliches, 1992; Boix and Trullen, 2010). Hence, it is likely that several input/output variables may need to be measured in order to achieve a more accurate picture of innovation in an industry cluster (Massa and Testa, 2008). Table 2.1 presents some possible innovation variables that could be considered in attempts to measure innovation. A full discussion of innovation measures utilised for the research will be provided in the Methodology chapter of this thesis.

Table 2.1: Possible Variables When Measuring Innovation

Processes	**Products**	**Markets**
Technology uptake	Designs	New markets
Labour/employment	Patents	New segments

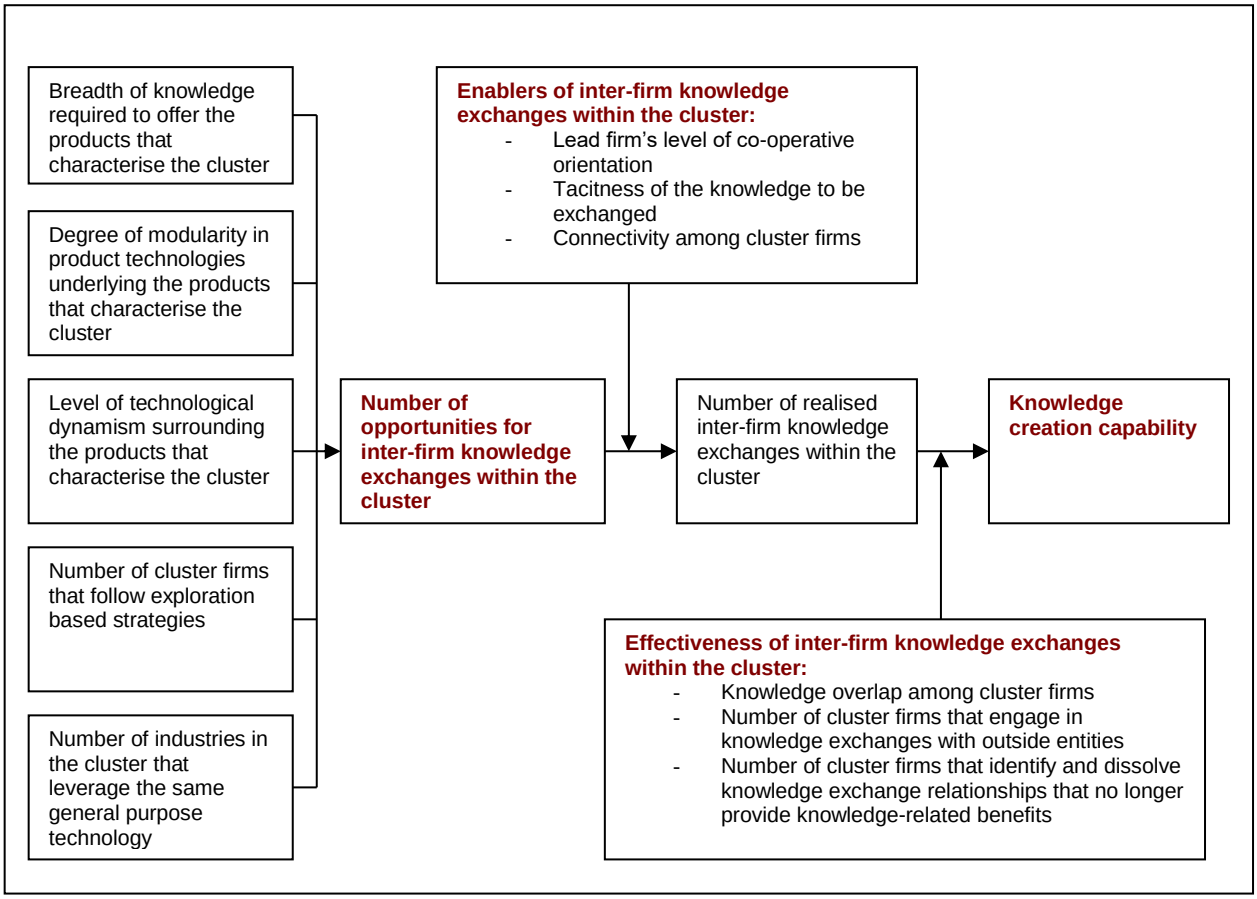
2.6.6: Innovation and Knowledge Creation Capability

It is widely recognised in the literature that innovative activities in clusters have a highly cumulative nature, moreover inventive activity will tend to concentrate in locations where invention rates have long been high and where a market for technology has evolved more fully, irrespective of the share of industry production (Lamoreaux and Sokoloff, 1996; Beaudry and Breschi, 2003). Thus, a firm is more likely to innovate if located in a cluster where the presence of innovative firms and supporting institutions in its own industry is strong, and where there is a large pool of potential spillovers associated with a large accumulated stock of knowledge. On the contrary, quite strong disadvantages arise from a strong presence of non-innovative companies in a firm's own industry. There is also some evidence in the literature that clustering in itself may be necessary, but not sufficient, to explain all of a firm's propensity to innovate. Bridging institutions that provide information about technological opportunities and mediate relations among inventors, suppliers, and those that commercially develop or exploit new technologies, also play an important role in

the cluster (Saxenian, 1994; Beaudry and Breschi, 2003). Overall, the propensity to innovate is linked to the concept of 'absorptive capacity' (p. 10).

In 2009, Andac Arikan developed a framework that identifies contributors to a cluster's knowledge creation capability (Figure 2.2). Many of these contributors have already been discussed in the preceding sections of this chapter. In the author's opinion, this framework can be adapted and developed into a model that can be applied to identify a cluster's innovative output. By including other important influences on knowledge creation and innovation already identified in this literature review, a 'testable' model can be developed, *i.e.* a model from which hypotheses or propositions can be developed, and utilised to examine the SOT ceramics cluster. Additions to the original framework could include, for example, 'industry life-cycle stage', 'demand conditions', 'absorptive capacity' and 'innovative output' (as measured by R&D expenditure, uptake of new technology, patent registrations, labour, *etc.*). The newly formulated model will be presented towards the end of this chapter.

Figure 2.2: Antecedents of a Cluster's Knowledge Creation Capability



(Source: Arikan, 2009, p. 661)

2.7: The Industry Life-cycle and Clusters

Much of the literature reviewed in this chapter focuses on the benefits of clustering/agglomeration for firms in industry clusters. Some of the negative aspects of agglomeration have also been highlighted and will be further developed in later sections of this chapter. This section of the literature review attempts to link the positive and negative aspects of agglomeration to industry life-cycle stages, and to examine the resultant effects on innovation.

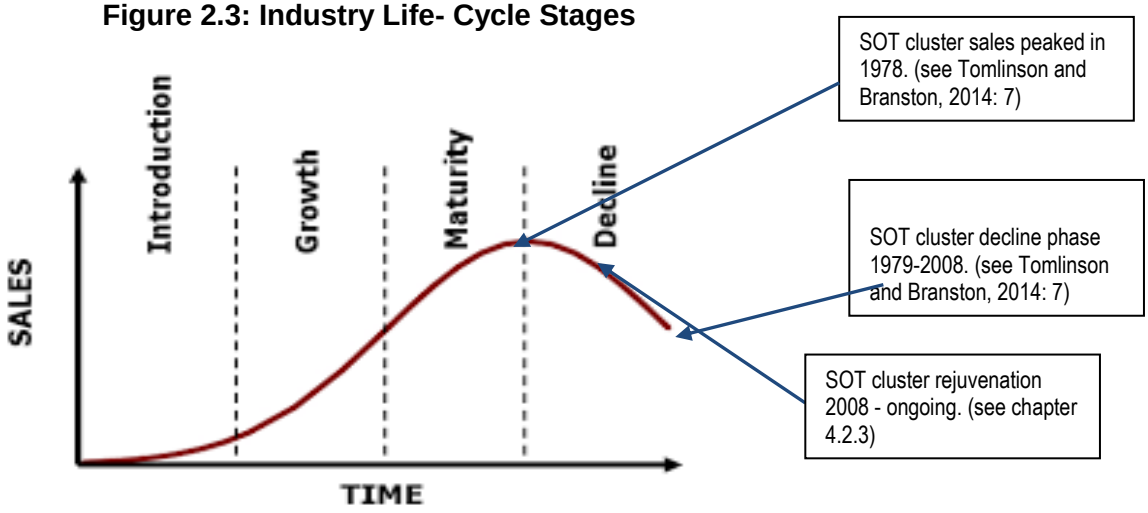
More recently, a growing literature from a range of disciplines, argues that agglomeration benefits are linked to the industry life-cycle stage, *i.e.* agglomeration[20] (clustering) generates increasing returns or diminishing returns dependent on the specifics of the evolution of the industry. Moreover, the literature also suggests that who innovates, and how much innovative activity is undertaken, is also closely linked to phases of the industry life-cycle (Klepper, 1996, 2007; Audretsch & Feldman, 1996; Breziz and Krugman, 1997; Simmie, 2002; Maskell and Malmberg, 2007; Potter and Watts, 2011). This idea that an industry's life-cycle stage is linked to the degree of agglomeration benefits is not new. Marshall (1890), in addition to highlighting the possible benefits of agglomeration, also warned explicitly that the agglomeration of firms in close geographical proximity could have a substantial negative impact on the development of firms, cities, and regions. For example, if an agglomeration is dependent on one industry for its economic development, the industry (cluster) is likely to suffer from diminishing returns over time, and even 'extreme depressions' (Marshall, 1890, p. 273).

Modern industry life-cycle theories argue that industries evolve according to a similar pattern known as the industry life-cycle (Klepper, 1996; Audretsch and Feldman, 1996), the concept of which is similar to product life-cycle theory (Vernon, 1966). According to this theory, the archetypal evolution of an industry (or product) follows a curve, which consists of a series of stages: an embryonic stage; followed by a growth stage; which is succeeded by a mature stage, and; an eventual decline stage (see Figure 2.3). Figure 2.3 also shows various stages of the industry life-cycle for the SOT cluster. Although some industries and clusters have their own idiosyncrasies, that can alter the nature of their development, many do evolve according to the industry life-cycle pattern (Storper, 1985, Audretsch and Feldman, 1996).

[20] According to Porter *et al*., (2000) The locus of agglomeration is increasingly the cluster and not urban areas or narrowly defined industries (p. 259).

Moreover, recent studies (Potter and Watts, 2011), argue that incentives to agglomerate and disperse actually evolve over time, and that the industry life-cycle changes the relationship between agglomeration benefits and cluster performance.

Figure 2.3: Industry Life- Cycle Stages



(Source: Author, based on Klepper, 1996, p. 564)

2.7.1: The Embryonic Stage

The beginning of the industry life-cycle starts with a mutation process (Schumpeter, 1942; Potter and Watts, 2011). This occurs when a small group of inquisitive individuals, entrepreneurs, scientists, technologists, and R&D-intensive firms begin to develop new knowledge, routines, technology, radical innovations, products and services that do not exist within the marketplace (Schumpeter, 1942; Audretsch and Feldman, 1996; Klepper, 1996). Other triggering factors include the pre-existence of certain endowments and the availability of craft skills (Belussi and Sedita, 2009). Founder firms will experience a first-mover advantage by being the first firms to enter the embryonic industry, and will become the common ancestors from which different descendants and species of firm will evolve within the industry (Potter and Watts, 2011). During this creative period, the embryonic industry is characterised by high rates of new start-up firms, spin-off firms and firm entry (*i.e.* migration). As the number of firms in the cluster increases, so does competition within the cluster. Competition is seen as one of the most important drivers of evolution.

Geographic proximity is crucial during this embryonic stage because a number of evolutionary processes occur which encourage firms to cluster in close geographical

proximity (Boschma and Frenken, 2006). First, a small number of firms begin to cluster in close geographical proximity to the founders, entrepreneurs, and star scientists who create start-up firms within the industry, a process known as the founder effect (Zucker and Darby, 2006). Second, owing to heredity conditions and the spin-off process, the firms that spin-off from their parent firm will naturally inherit some of the knowledge and routines that enabled their parent firm to become successful. Spin-off firms often co-locate near to their parent firm (Potter and Watts, 2011). A key endogenous triggering factor at this stage is technological innovation (Belussi and Sedita, 2009). At this stage, the tacit knowledge created within the new industry remains inherently difficult to transfer between firms, except when they in close proximity (Audretsch, 2000). Third, firms may begin to specialise in particular stages of production, although this is dependent on the characteristics of the production system (see earlier sections of this chapter: 2.4.8-2.4.9). Specialisation increases the cluster's biodiversity and results in the development of a local supply chain and a local production network. Fourth, During this period firms begin to develop cluster linkages, *i.e.*, local social ties, network connectivity, and supply chain linkages, characterised by a high degree of embeddedness, relational trust, altruism, reciprocity and cognitive proximity. Fifth, eventually, through the imitation process, competing firms begin to imitate, mimic, and reverse engineer the new products and routines developed by the first movers within the industry and, because imitation is facilitated by geographical proximity, this encourages firms to cluster as well (Potter and Watts, 2011). Consequently, during the embryonic stage, firms experience greater economic performance and increasing returns by agglomerating in close geographical proximity (Audretsch and Feldman, 1996).

2.7.2: The Growth Stage

After a long process of learning-by-doing and incremental innovations, the embryonic stage eventually evolves into the growth stage of the industry life-cycle, characterised by a rapid increase in the rates of firm entry, start-up, spin-off and survival, combined with a continued low rate of firm exit from the industry (Potter and Watts, 2011). During this period in the industry life-cycle there can be increases of 30% or more in the number of firms within the industry (Klepper, 1996; Agarwal and Gort, 2002). Within this environment, firms continue to compete by pursuing product differentiation strategies and the number of segments in the market increases. Diversification and differentiation strategies enlarge local capabilities and pave the way for new development and growth trajectories (Brenner, 2005; Belussi and Sedita, 2009). The early growth stage is also called the ‘fluid phase’ in the early life-cycle literature (Abernathy and Utterback, 1978). In this early stage the firm is in pursuit of product

innovations and the rate of product innovation is at its highest, aimed at achieving highest technological standards (Sabol *et al.*, 2013).

It is during the early stages of the industry life-cycle that institutional investors, trade associations, supportive institutions, universities, colleges (post-16 years), and professional gatherings become involved with the industry, often choosing to co-locate in close proximity to the firms within the cluster to ensure network centrality and connectivity (Boschma and Frenken, 2006). As both new and existing firms continue to cluster in close proximity, a large growth agglomeration, that has a positive lock-in effect for regional development, emerges (Porter, 1990; Pyke *et al*.,1990; Saxenian, 1994). Agglomeration economies (as discussed earlier) play an important role within the cluster, as they allow cluster firms to experience external economies of scale that are external to any single firm, but are internal and place-specific to the agglomeration as a whole.

By having such a large cluster of firms at the growth stage of the industry life-cycle, the surrounding region benefits from a phenomenal period of economic growth and prosperity. However, the rapid growth in the number of firms also causes the returns within the industry to begin to diminish (Klepper, 1996). A number of negative externalities emerge within the cluster at this stage, such as higher labour costs, greater land rents, congestion costs, and pollution (Phelps and Ozawa, 2003). Put simply, the growth cluster becomes a victim of its own success and eventually, because of the changes that take place within the industry and the cluster, returns from agglomeration begin to diminish. Consequently, the cluster starts to spread out across geographical space (Potter and Watts, 2011).

2.7.3: The Mature Stage

Few industries are capable of sustaining growth indefinitely and the growth stage is eventually succeeded by the mature stage of the industry life-cycle (Klepper, 1996), although it is noted that the rate of evolution varies between different industries (Potter and Watts, 2011). During this period, a number of evolutionary changes occur that cause the industry to mature. First, as a result of the knowledge codification process, some knowledge within the industry becomes codified and transferable across geographical space with lower transaction costs (Audretsch and Feldman, 1996; Bathelt *et al*., 2004, see earlier references too). Second, due to rapidly increasing demand (Brenner, 2005), a dominant design emerges within the industry that enables products to become standardised, and produced

using capital intensive high-volume mass production processes, rather than craft production processes (Klepper, 1996). Third, firms begin to shift their R&D emphasis away from a product differentiation strategy that focuses on product innovation and towards a cost-saving strategy that emphasises production innovation (Klepper, 1996; Brenner, 2005). Finally, a shakeout happens, whereby many firms exit the industry and are no longer replaced by new entrants, which ultimately reduces the total number of firms within the industry (Brenner, 2005).

During this stage of the industry life-cycle, the development path of the cluster can become locked in to the path dependent trajectory of the industry life-cycle (Belussi and Sedita, 2009; Potter and Watts, 2011). Consequently, the growth cluster evolves into a mature cluster, with an increasing number of firms experiencing diminishing returns from agglomeration economies, especially from the persistence of: local negative externalities; a large shake-out of firms; slowdown in industry growth; local market saturation; and, fierce local competition (Phelps and Ozawa, 2003; Brenner, 2005). At the same time, evolutionary changes, such as the codification of knowledge, the standardisation of products, and lower transaction costs, enable many firms to experience increasing returns from dispersion economies (Audretsch and Feldman, 1996; Potter and Watts, 2011).

2.7.4: The Decline Stage

The final stage of the industry life-cycle is characterised by a period of decline that affects the whole industry and has implications for the survival of the cluster. A number of different factors can trigger the decline stage including, a large shake-out of firms, intensive price competition, market overcapacity, disruptive innovations, product substitution, exogenous shocks, or unpredictable changes in the supplier or customer markets (Porter, 1990; Klepper, 1996; Potter and Watts, 2011). The decline stage can be characterised by falling product prices, small profit margins, low firm survival probabilities, a high rate of firm exit from the industry, and the closure of firms with unfit routines (Agarwal, 1997). During this stage, a large shake-out can occur that changes the nature of competition within the marketplace, with some industries experiencing net decreases of 50–80% of firms (Klepper 1996; Swann *et al*., 1998). Consequently, the firms that remain within the industry, attempt to adapt their routines and place greater emphasis on a variety of new management routines and strategies. These new routines may include geographic relocation, industry diversification, increasing plant size, business mergers and acquisitions (Swann *et al.*, 1998). As the cluster matures, there is consolidation as weaker firms exit or are taken over

by the larger rival firms. At this point the economic power and strategic decision making becomes more concentrated within the leading firms (Sacchetti and Tomlinson, 2009: 1842).

During this period of structural change, if a cluster is approaching the end of the industry's life-cycle, it is likely that agglomeration economies will decrease the economic performance of firms, create a negative lock-in effect, and tend to generate diminishing returns for the development of the cluster (Porter, 1990; Klepper, 1996; Pouder and St. John, 1996; Belussi and Sedita, 2009). At this time, firms that continue to depend upon a local pool of skilled labour will specialise in outdated technology, replicate established routines through labour mobility, and experience higher labour costs (Frenken and Boschma, 2007; Maskell and Malmberg, 2007). The firms that maintain local supplier linkages may become locked-in to old supply chain networks of uncompetitive local suppliers that supply outdated, low-quality, highly-priced products within the cluster. The firms that rely only upon local knowledge spillovers will receive out-dated technological know-how, and will, via the lock-out effect, become locked out of the new knowledge developed by new industries and emerging agglomerations in other parts of the world (Potter and Watts, 2011). This view is also supported by Tavassoli (2012), who purports that for firms belong to a declining industry (like manufacture of office machinery), it is better to invest in exploring the international market as this would create new channels of learning from customers abroad, which eventually can enhance firm's innovation (p.19)[21].

It is during these later stages of the industry life-cycle that these diminishing agglomeration economies can decrease the economic performance of cluster firms and create widespread diminishing returns that have a negative impact on the development of the whole cluster (Pouder and St. John, 1996; Belussi and Sedita, 2009). For example, a large shake-out out of the number of firms within an industry can have a substantial negative impact on the local economy if many of these firms remain agglomerated within a single region (Potter and Watts, 2011). According to Tomlinson and Branston (2014):

> *"The prospects for mature (and declining) districts depend upon their own adaptive capacity to reconfigure internal structures and instigate the necessary changes in adapting to new (and very different) market and technological challenges: this is essentially a measure of their resilience"* (p. 4).

[21] See also section 2.8 'when the cluster stops working'.

Elsewhere in the literature, clusters can also renew themselves (Trippl and Todtling, 2008; Menzel and Fornahl, 2009; Boschma and Frenken, 2011; Ter Wal and Boschma, 2011). This stage of the life-cycle has been called ‘rejuvenation’ (Boschma, 2005). Renewal can occur by integrating and applying new technologies and knowledge that lead to new growth phases. Another cause for rejuvenation can be an exogenous shock, like the development of a radical technological breakthrough that leads to a new cycle of industry evolution and an associated evolution of new networks (Ter Wal and Boschma, 2011: 928).

2.7.5: The Life-cycle and its Link to Governance Systems

It is apparent from the literature reviewed in earlier sections (see 2.4.10), that governance systems within clusters develop over time and change according to the different life-cycle stages. It has also been noted that clusters are not all homogeneous, each cluster develops differently, and the nature and distribution of economic power will change over time. In 2003, Sacchetti and Sugden identified two broad types of governance systems inherent in traditional clusters. They classified these networks as ‘networks of mutual dependence’ and ‘networks of direction’.

2.7.5.1: The Life-cycle and Mutual Dependence Systems

Networks of mutual dependence exhibit a relatively 'flat' or 'heterarchical’ governance structure, whereby firms are engaged in a series of ongoing economic relationships with each other, which are such that their mutual interdependencies, *e.g.* their dependence upon each other’s resources and activities, tend to support and re-enforce co-operation, reciprocity and mutually supportive actions across the network. It is the mutual dependence of these interactions which tends to reduce the dominance of any one particular firm, thus maintaining heterarchy and promoting pluralism in the decision-making processes (Sacchetti and Sugden, 2003). Such forms of heterarchy can be difficult to supervise due to logistical reasons. For example, trust within inter-personal relations may not be easy to manage and maintain as networks grow, while co-ordinating resources between organisations is problematic, particularly where resource synergies are not easily transparent and individual organisations are inert in adapting to changing circumstances (Sacchetti and Tomlinson, 2009).

As the cluster grows, social mechanisms develop that include collective sanctions, where participants may be ostracised by others if they engage in opportunism or breach accepted norms and/or reputation effects, whereas reliability and commitment among participants is rewarded. Moreover, in the later stages of the life-cycle, transparency, fluidity and adaptability of mutual dependence network exchanges can provide all firms involved in the production process with the flexibility to deal with both changing output demands and varying product mixes, often at short notice (De Propris, 2001, 2008). Furthermore, repeated interaction between firms, leading to knowledge and information exchanges, can be the source of new (collective) learning opportunities. However, as discussed previously in this chapter (see 2.4.8), an over-emphasis upon co-operation and consensus building within clusters can also impede creativity and constrain problem solving in times of crisis, especially in times of economic turbulence, where quick and immediate solutions maybe required (Jessop, 1998).

2.7.5.2: The Life-cycle and Networks of Direction Systems

Networks of direction are predominantly hierarchical in the sense that the core firms independently pursue their own strategic objectives, often with little consultation with their trading partners and/or other stakeholders in the locality (Sacchetti and Sugden, 2003). Such a network might typically be observed in a vertical production chain, where there is either a monopolistic buyer or monopolistic seller, which engages in activities with less empowered partner firms, *e.g.* smaller subcontractors. The terms of such engagements are often dictated by the dominant or core firm, with the smaller partners playing a largely subservient role, often being required to deliver lower production costs and meet tight (output) efficiency criteria (Sacchetti and Tomlinson, 2009; Belso, 2010). For such partner firms, there is little room for manoeuvre and few opportunities to influence the whole production process, which is geared towards serving the flexibility requirements of the core firms (Sacchetti and Tomlinson, 2009).

The implications of the networks of direction model for the cluster can be both positive and negative. On the positive side, the emergence of large dominant firms within a cluster can lead to new investment in technology on a scale which might not have been undertaken by smaller firms (Lazonick, 1993; Belso, 2010). This can lead to greater economies of scale, thus improving the cluster's competitiveness. A further advantage is that core firms may possess strong brand identities on a national and international scale, and these may act as a reflected demand for smaller cluster-based subcontractors. Strong brand identities of

particular firms could, over time, become synonymous with the cluster/region itself, with positive effects such as attracting new firm entry into the district and the promotion of industrial tourism. On the other hand, the networks of direction model raises particular concerns for the cluster. These issues primarily relate to the cluster becoming locked-in to the objectives and strategic direction of a few or even a single firm (Sacchetti and Tomlinson, 2009). A more detailed discussion of 'lock-in effects' and the role of the 'dominant firm' is presented later in this chapter.

It is obvious from the literature presented so far, that the nature of a cluster's inter-firm relations evolve over time, as firms enter/exit the cluster, and as the nature and control of technologies change (Sacchetti and Tomlinson, 2009). These changes can be linked to the cluster's development path and life-cycle stages. According to Swann *et al.,* (1998), a cluster's dynamism (and growth) begins to tail off once congestion costs and the increased competition between firms (in both input and output markets) within a cluster begin to outweigh the benefits of agglomeration. In such cases, entry levels begin to stabilise and then eventually fall. As the cluster matures, there is consolidation as weaker firms exit or are taken over by larger rival firms. At this point, the cluster begins to resemble the networks of direction model, as economic power and strategic decision making become more concentrated within the leading firms. These firms may have little interest in sharing new knowledge. Indeed, its core organisation might prefer such knowledge to remain hidden since it strengthens its hold over its strategic options and capabilities, particularly in relation to technological change (Sacchetti and Tomlinson, 2009).

2.7.6: The Life-cycle and Innovation

As identified earlier, innovative activity is promoted by knowledge spillovers that occur within a distinct geographic region (see section 2.6) and, this is particularly apparent in the early stages of the industry life-cycle (positive effect on cluster), but as the industry evolves towards maturity and decline it may be dispersed (negative effect on cluster) by additional increases in concentration of production that have been built up within the cluster. Therefore, it can be claimed that technological change varies from the birth of technologically progressive industries through maturity (Klepper, 1990, 1996; Audretsch and Feldman, 1996; Swann *et al*., 1998; Brenner, 2005; Giuliani, 2013; Sabol *et al*., 2013). Technological change is also seen as path dependent since it involves sequenced, and not simultaneous, choices which are often irreversible (Newlands, 2003). What is particularly relevant to this research study is the relationship between life-cycle stage and the *type* of innovative activity,

e.g. product or process. Also relevant are the number of new entrants at each stage of the life-cycle as new-entrants affect technological change and competition within industry clusters.

There is also much evidence in the literature on inter-firm networks that suggests a strong relationship between the level and nature of co-operation in an industry and the life-cycle development of an industry (Gemser *et al*., 1996; Balland *et al*., 2013; Huggins *et al*., 2015). For example, Gemser *et al*., (1996) carried out a study that examined the dynamics of inter-firm networks and from this produced a conceptual framework for explaining why inter-firm networks change over time. The framework focuses on horizontal (between rivals) and vertical (complementary products) inter-firm linkages between firms. As discussed, inter-organisational linkages are considered to be a major source of innovation.

Gemser (1996), takes the view that firms' abilities to appropriate the profits of innovations are especially difficult at the beginning and end of the industry life-cycle because of the high costs of R&D and marketing and the high capital needs of production. Therefore, horizontal inter-firm linkages should be particularly dense at these stages. However, in the decline stage of the life-cycle they may be weak, due to negative competition or dominant firm effects that may be a feature of the cluster. Huggins *et al*., (2015) also link different types of network relationships to different stages of the industry life-cycle. Their work suggests that demand for network relationships is strong at the emergence stage, but as firms become more established and less vulnerable, the demand for network formation falls (p. 477).

The relevant conclusions drawn from Gemser's research suggest that firms can rejuvenate an industry's pattern of development by adapting their co-operative and competitive behaviour with rivals and/or suppliers up and down the value chain. For example, in the Italian furniture industry cluster (which bears many similarities to the SOT ceramics cluster) the emergence of dominant firms has changed the dynamics of the competitive environment in a positive way. Large core firms are called upon to act as 'lighthouses', sourcing small firms with information on foreign markets and new technologies, while the small firms should function as a production base for the large core firms. Table 2.2 below combines key aspects of life-cycle theory with Gemser's studies to demonstrate the relationship between inter-firm linkages, competition, innovation and industry development.

Table 2.2: Inter-firm Linkages, Competition, Innovation and Industry Development

Environmental Conditions That Increase/Decrease the Necessity to Establish:			
Life-cycle phase	**Horizontal Linkages Between Competing Firms**	**Vertical Linkages between Firms & Suppliers**	**Competition and Innovation**
Emergence	Establishment of linkages to pool resources, to create the necessary industry infrastructure and to enhance appropriability conditions.	Forging linkages to create the necessary infrastructure.	There are only one or few firms in the market. Product life-cycles are short. Focus is on product innovation
Growth	Decrease of linkages. The fast expansion of firms induces de-concentration process. Firms start to specialise and vertical disintegration occurs.	Increase of linkages because of specialisation.	The number of new entrants grows. Incremental innovators and imitators enter the industry. De-concentration takes place and firms start to specialise. Focus is on Product innovation.
Maturity	Stagnant growth of demand causes excess production. Further decrease of linkages owing to take-overs and mergers which must enlarge resources and create economies of scale and scope.	Decrease of linkages because firms integrate vertically and because the overall number of firms reduces significantly.	The number of new entrants slows, declines and eventually stops. Focus is on cost-cutting process innovation Slow/stagnant growth of demand causes excess production capacity.
Decline	Increase of linkages in order to reduce competition, to rationalise (over-capacity) and to enhance appropriability conditions	Increase of linkages because firms focus on 'core capabilities' and/or enhance innovative capability	The number of new entrants has stopped. Firms try to escape from price competition by focusing on product differentiation. Many firms are taken-over to reduce competitive pressure. Ultimately, the number of firms in the industry declines.

(Source: Author, based on Gemser, 1996)

2.8: When the Cluster Stops Working - Loss of Cluster Advantage

According to Porter (1990), national competitive advantage in an industry is lost when conditions in the national diamond no longer support and stimulate investment and innovation to match the industry's evolving structure. The ability of a nation's firms to adapt to change is a function of the national diamond. The national industry may not perceive the need for change, may fail to invest aggressively enough to advance, or may have assets and skills that are specialised to outmoded ways of competing. Therefore, if national and local conditions no longer support the cluster, the theory predicts that this will lead to a loss of competitive advantage in the cluster, and ultimately a decline in the 'strategic health' of the cluster. The remainder of this section examines some of the main reasons for loss of cluster advantage in more detail.

2.8.1: Globalisation

According to the literature, improvements in global transport, communications and organisational management skills have reduced the importance of cluster benefits (Newlands, 2003; Tallman *et al*., 2004). Some writers argue that cluster effects will increasingly be observed at the regional, or frequently much larger scale (Johansson and Quigley, 2004; Lorentzen, 2008; Belussi and Sedita, 2009). Moreover, the incidence of

larger scale effects can be expected to increase as new communications technologies reduce a whole variety of spatial distance transactions costs (Newlands, 2003).

As discussed in earlier sections of this chapter, most of the reasons given in the literature for clustering are based around the benefits accruing within the cluster from both traded and untraded interdependencies. Transactions between cluster members contribute to the cluster's 'industrial atmosphere', by which knowledge and information is developed and exchanged. As already noted, untraded interdependencies, or weak ties, are more closely linked to uncodified knowledge and information flows, traded interdependencies are more commonly associated with codified knowledge. According to Lorentzen (2008), codified knowledge can be shared by people globally. This view is supported by other writers who argue that different kinds of knowledge, even some tacit knowledge, can be shared 'virtually' through different forms of representation (Foray and Steinmuller, 2003; Belussi and Sedita, 2008). The codification infrastructures become global, and codes can be shared by people around the globe (Lorentzen, 2008). If personal contact or geographic proximity is needed on some point, short visits may suffice to share knowledge or solve problems. Such 'temporary proximity' of actors is facilitated by the advance in transport technology. In addition, personal encounters can be substituted by the meeting in cyberspace of economic actors through the use of the Internet (Lorentzen, 2008).

According to Belussi and Sedita (2009), globalisation has played a relevant role in clusters from the early 1990s.[22] It is defined as a process of opening up an economic system and it is characterised by the global reorganisation of production processes. Nevertheless, it is based on the increasing integration of the local system within a pattern of international division of labour (p. 510). The need for a 'coupling' between local and global production, and consequently the need to develop an integrated local/global network, is widely cited in the literature (Cooke *et al*., 1997; Maskell, 1999; Maskell & Malmberg, 1999; Lorentzen, 2008; Arikan, 2009). The flows of commodities, capital, workers, information and knowledge, along with entry of multinational organisations or relocation processes, can work as triggers for the evolution of clusters and represents a shift in the industry structure from a local/national model to an open local/global interdependent system. The challenge for clusters is to become nodes of global networks, keeping their historical and social identity, and absorbing

[22] The pace of global economic integration accelerated during the decade of the 1990s, as many governments reduced policy-induced barriers that impeded international trade and investment flows (Das, 2011).

knowledge and technologies developed elsewhere (Belussi and Pilotti, 2002; Simmie, 2002; Belussi and Sedita, 2009; Boschma, 2015). The most open clusters, *i.e.* outward looking and receptive, will gain competitive advantage because they will be the first to receive 'new knowledge', and to receive larger amounts of knowledge compared to other clusters (Lorentzen, 2008).

However, as noted previously, co-operation between firms in a cluster often depends on motives and incentives of firms. In times of comparably high uncertainty, firms may choose to sink few investments into co-operative ventures and share only a little information with partner firms, because of the risk of opportunism and loss of investments, ideas, and so on. Due to limited information about each other, agents may differ in terms of their expectations or beliefs, even when a fear of opportunism is unwarranted (Lorenzen, 2002). If a firm is operating in an effective cluster, the learning it acquires through relationships outside of the cluster is more apt to be rapidly diffused to other firms, multiplying its impact (Rosenfeld, 1997). Moreover, small firms may not have access to external knowledge resources without the regional network provided by industry institutions (Simmie, 2002).

If cluster firms do not make external linkages outside the cluster, *i.e.* knowledge partners are limited only to other firms inside the cluster, little or no new knowledge from outside the cluster will enter the cluster (Lorenzen and Mudambi, 2013). Over time, as more cluster firms exchange their knowledge with others inside the cluster, the knowledge overlap between cluster firms will increase (Pouder and St. John, 1996). This, in turn, will weaken the positive relationship between the number of realised inter-firm knowledge exchanges within the cluster and the cluster's knowledge creation capability (Arikan, 2009). Marshall (1923) also warned of the risks that firms' collaboration, in the development of shared inputs, risked blunting competitive forces. Untraded interdependencies can not only facilitate effective collective learning and action but also impede it, especially where familiar conventions become well established, 'sclerosis' can set in. Areas can become locked-into outdated and inferior technologies and institutions (Newlands 2003). Global linkages can help to de-lock negative evolutionary paths of clusters through infusing them with knowledge, technology and capital from worldwide sources (Martin and Sunley, 2006; Lorenzen and Mudambi, 2013).

2.8.2: Changing Demand Conditions

Competitive challenges currently facing traditional industrial districts (clusters) include the saturation of their traditional markets, changes in patterns of consumer demand, the growth in low-cost international competition and moves by leading cluster firms towards global outsourcing strategies. According to Newlands (2003), intensified global competition poses significant problems for the survival of local clusters, and efforts to develop local institutional capacities may produce only short-term benefits if similar competitive pressures are in operation elsewhere (p. 527). These growing competitive challenges have undermined many clusters' abilities to retain and also to attract new firms. According to Sacchetti and Tomlinson (2009), in many European regions, the growth in international competition, mainly from low-cost operators in the Far East, along with the increased use of global outsourcing by cluster firms, "*has often had a painful impact upon local industry and employment levels, raising serious concerns of industrial hollowing-out*" (p. 1837).

One response to these challenges is that some clusters have attempted to avoid competing at the bottom end of the market, focusing instead upon the higher end through technological upgrading and higher value added activities. This is a strategy that has been recommended in the cluster literature for dealing with increasing low-cost competition from abroad (Porter, 1990; Pyke & Sengenberger, 1992). However, again possibly due to path-dependency, some traditional clusters have had limited success in making this transition. Moreover, increased competition in output markets, resulting in lower profit margins, often reduces the amount of resources devoted to R&D (Beaudry and Breschi, 2003), making it even more difficult for cluster firms' to focus on the higher end of the market.

Porter also cites some of the most common and most fatal reasons for loss of cluster competitive advantage as: diminished competitive rivalry; perhaps as a result of industry consolidation or an over reliance on informal agreements; and, widespread negative forms of co-operation (*e.g.* cartels). Both can stifle innovation as rivals are no longer aggressive, *i.e.* there is a lack of pressure and challenge (Porter, 1990). This view is supported by Dei Ottati (1994), who claims that when important disequilibria between the forces of competition and co-operation occur, their interaction can produce a chain reaction in the opposite direction to that of the virtuous circle (see section 2.5.4). Two examples are offered to demonstrate this effect:

- A prolonged period of slack demand for goods produced in the cluster leads to price competition. The weakest firms are hit the hardest and this results in conflicts and

tensions that reduce the innovative impulse of firms and blocks the mechanism of co-ordination. This may be because price pressures mean that firms do not have the necessary finances to invest in innovation, and/or because firms may be more suspicious of competitors and so are less willing to co-operate. Less innovation and a reduction in the propensity to co-operate feeds a vicious circle that can lead to the decline of the cluster.

- A process of economic concentration takes place. Transactions become hierarchically co-ordinated. This reduces the need for co-operation and obstructs competition. This process, giving rise to the formation of a few large firms, leads to the breaking up of what was a single, compact production system.

2.8.3: Other Influences on Knowledge Exchange Capability

Apart from the lack of new 'external' knowledge there are several other reasons for knowledge creation failures within clusters cited in the literature. The first type of failure occurs when opportunities for inter-firm knowledge exchanges do not emerge (see sections 2.4.3, 2.4.9, 2.4.11). The lack of opportunities may be due to characteristics inherent in the cluster, such as low knowledge intensity or narrow breadth of knowledge requirements (Arikan, 2009). Alternatively, a cluster may originate as a knowledge-based cluster, but the number of opportunities for knowledge exchanges may change over time. For example, environments surrounding the cluster's products may become more stable over time, making self-sufficiency in terms of knowledge requirements a more valued goal to pursue than flexibility. Or technologies underlying the cluster's products may become increasingly modular over time, reducing cluster firms' need for external knowledge. These developments are dangerous for knowledge-based clusters, because when the knowledge-related benefits lessen or disappear, firms are left with immense competitive pressure due to intense local rivalry (Baum & Mezias, 1992; Arikan, 2009).

The second type of failure occurs when opportunities for inter-firm knowledge exchanges exist within the cluster, but the exchanges do not materialise and the cluster fails to realise its innovative potential (Arikan, 2009). One reason may be failure in local knowledge markets, possibly due to the lack of mechanisms that connect knowledge buyers and sellers, and/or lack of an appropriate institutional environment in the cluster for co-operative relationships. As discussed earlier, closer co-operation among regional actors, regional universities, industry associations and technology transfer organisations is essential for international competitiveness of an industry cluster (Cooke *et al*., 1997; Lorentzen, 2008).

However, increasing competitive challenges make the development of co-operative norms highly difficult while at the same time creating numerous reasons to break them once they are established (Arikan, 2009).

2.8.4: Consolidation and Dominant Firm Effects

Rosenfeld (1997), identifies a 'latent or underachieving cluster' as one where scale and geographic concentration exist but the potential is not fully realised, generally because the social fabric is weak. Interaction among workers and employees is weak and the businesses involved neither share a vision of the future nor think of themselves as a cluster. According to Rosenfeld, one reason for this may be that the cluster is dominated by branch plants and large corporations. It is not uncommon for a regional cluster to be dominated by a small number of very large companies and they can wield considerable power over smaller subordinate suppliers (see section 2.4.9). This situation can undermine reciprocity and trust. Insular clusters, *e.g.* the British cutlery industry (Porter, 1990: 171), can be a negative effect of clusters that have become too consolidated, *i.e.* one or few large firms dominate the industry. This can potentially act as a barrier to new entrants and overall there is a decline in domestic rivalry. According to Porter (1990), complacency and inward focus are the main problems of an insular cluster, typified by a failure to constantly innovate and a hesitancy to employ global strategies. This view is similar to those of Audretsch & Feldman (1996) who have identified a link between industry consolidation and a decline in innovative activity within the cluster. The concept is known as the 'congestion effect', which can result in greater dispersion of innovative activity outside of the cluster and is most likely when the industry is in the mature and declining phases of the life-cycle. This type of intellectual 'supply-side' congestion refers to 'lock-in' with respect to new ideas, whether from inside the cluster or from innovations generated elsewhere (Suarez-Villa and Walrod, 1997). In other words, the 'industrial atmosphere' as a general system of rules for local organisation can be an obstacle to rapid change (Bianchi, 1993). Thus, the cluster may be incapable of moving away from traditional ways of working, *e.g.*, as in the case of the Detroit automobile cluster (see 2.4.8).

The view that branch plants and large corporations can undermine the value and sustainability of clusters is quite common across the literature (Porter, 1990; Bianchi, 1993; Rosenfeld, 1997; Audretsch, 1998; Schilling, 2000; Brusoni *et al*., 2001; Sacchietti and Sugden, 2003; Sacchetti and Tomlinson, 2009; Bell *et al.*, 2009; Arikan, 2009; Belso, 2010; Arikan and Schilling, 2011; Hervas-Oliver *et al.,* 2011; Tomlinson and Branston, 2017). It is

not uncommon for a regional cluster to be dominated by a small number of very large companies. Branch plants may be subject to strategic decisions made by the parent some distance from the core of the cluster. Some may abandon the cluster for places where costs are lower. Moreover, the shared macro-cultures of hub-and-spoke clusters dominated by one or several large, vertically-integrated firms might be disproportionately influenced by the governance choices, or even the organisational cultures, of the hub firms, (Bell, *et al*., 2009).

This view is supported by Tomlinson and Branston (2017), who suggest that clusters can be dominated by a few core actors who are able to exert their economic strength to gear local development paths to suit their own strategic aims, often without consultation (p. 5). Lead firm strategies can range from highly co-operation oriented to highly competition oriented. Some lead firms are more likely to emphasise cost considerations over co-operation considerations while managing their partner networks. They may encourage high levels of competition within their supplier networks by pitting one supplier against the other to achieve more favourable exchange terms. In such a competitive environment, few incentives exist for firms to engage in inter-firm knowledge exchanges (Arikan, 2009). It may be argued then that when firms refrain from networking, it is often because of misaligned expectations about each other (Lorenzen, 2002). This kind of situation may lead to intellectual lock-in. Once intellectual lock-in becomes sufficiently rigid, the evidence suggests that new ideas need new space outside the cluster (see 2.8.1). Network structures can also be completely centralised so that a single actor, *e.g.* a dominant firm, controls all access to global linkages (Lorenzen and Mudambi, 2013), and this can have a detrimental effect on the health of the overall cluster (Audretsch, 1998). Large-scale firms can also negatively affect entrepreneurship, due to low levels of human capital and entrepreneurship skills and, ultimately, can contribute towards an entrepreneurship deterring regional culture (Stuetzer, *et al.*, 2016).

Considering that negative effects of dominant firms in a cluster appear to be a commonly cited reason for cluster failure, it is worth briefly reviewing the economics theory on dominant firms to determine whether the theory is relevant for this research study.

Dominant firm theory was developed by the German economist Heinrich von Stackelberg in 1934 and is an extension of Cournot's 1838 model. Stackelberg's duopoly model assumed that one firm acts as a dominant firm in setting quantities and dominance implies knowledge of the way competitors will react to any given output set by the leading firm (in the Cournot

model neither firm had the opportunity to react). A dominant firm can then select that output which yields the maximum profit for itself. It is assumed, by von Stackelberg, that one duopolist is sufficiently sophisticated to recognise that his competitor acts on the Cournot assumption[23].

In some highly concentrated industries, a single ("dominant") firm serves a majority of the market and a group of smaller ("fringe") firms supply the rest. This is not the case with the SOT ceramics industry as there is much evidence that, in the past, there were several hundreds of firms of differing sizes manufacturing ceramic wares in the cluster, so not a monopolistic structure. According to Martin (1994), a dominant firm differs from a monopolist in one important respect. The only constraint on the monopolist's behaviour is the market demand curve: if the monopolist raises price, some customers will leave the market. Like the monopolist, the dominant firm is large enough to recognize that a price increase will drive some customers from the market. But the dominant firm faces a problem that the monopolist does not: the possibility that a price increase will induce some customers to begin to buy from firms in the fringe of small competitors. That dominant firm, in other words, must take into account the reaction of its fringe competitors (p. 68). The evidence on the SOT industry cluster (see chapter 4), indicates that this is likely to be the situation, *i.e.* if larger dominant firms increase their prices, then smaller firms may benefit, as some customers may switch to smaller competitors. However, there is no evidence of price-based competition existing in the SOT cluster at the current time. This is an area that will be explored further in the empirical research stages of this research study.

Similar to monopoly theory, oligopoly can also be defined as a market model of the imperfect competition type, assuming the existence of only a few companies in a sector or industry, from which at least some have a significant market share and can therefore affect the production prices in the market (Severova *et al.*, 2011). A duopoly is a form of oligopoly where only two sellers exist in one market. In practice, the term is also used where there are many firms in the market but where only two firms have dominant control over a market. Although, the SOT industry cluster is comprised of many firms, it is often referred to as a 'two-tier' cluster (Padley and Pugh, 2000), with a few (two up until fairly recently) large firms

[23] The Cournot model, which shows that two firms assume each other's output and treat this as a fixed amount, and produce in their own firm according to this. (Cournot, 1838).

and many SMEs. Consequently, it can be classified as an oligopoly for the purposes of this research study.

Many models of oligopoly are found in economics literature and differ from each other mostly in the nature of the competitive companies' behaviour. These different models agree in several assumptions (Samuelson and Nordhaus, 2004; Severova *et al.*, 2011):

1) *The existence of a small number of companies in a sector* - It is usually about big companies with a deciding part in the offer of a sector. Some models describe only the behaviour of two companies in the monitored market (duopoly), others describe several companies of the same power (cartel), still others assume that one of the companies has a dominant position in the market. As previously discussed, several large ceramics firms appear to dominate the SOT cluster. Positive and negative effects of these large firms will be explored in the primary research stages of this research study.
2) *The nature of production, e.g. If companies in an oligopoly create differentiated goods and services that are substitute to each other* - the theory refers to a heterogeneous oligopoly with differentiated market prices. If differences among products of the individual oligopolistic companies are usually not significant, then products can be defined as close substitutes. However, at the same time, competition exists both in the price and non-price forms, represented by product innovations and advertisement. There is some evidence from early investigations to indicate that the SOT cluster's products are highly differentiated. Moreover, cluster firms appear to operate in different segments of the market to each other. However, it is not clear whether the cluster's products can be classed as close substitutes to each other and, therefore, this is another area that will be investigated further in this research study.
3) *The possibility of each company in a sector to make real estimates regarding the reactions and actions of competitors* - The empirical evidence does not fully comply with the theory in this respect. This outcome may be the result that the SOT firms simply do not have sufficient available data to react to the other firms due to incomplete or asymmetric information.
4) *Limitation (barriers) of the entry of new companies into a sector, allowing for a longer-lasting existence of several few big companies in a sector* - typical forms of barriers against the entry of new companies into an oligopolistic sector are: relatively high costs of the capital needed to start a new company, patent limitations, the

preference of consumers in relation to the existing companies and the arrangements or agreements among the existing companies. Preliminary investigations into new firm entry into the SOT cluster indicate that there have been few new entrants into the cluster over recent years. However, it is not clear whether this is due to barriers imposed by large firms in the SOT cluster. This is yet another area that will be investigated further in this research study.

2.9: Literature Review Conclusions

The main conclusions drawn from the literature review are that positive forms of co-operation and interdependence tend to be the most essential feature of successful industry clusters and, therefore, the most important determinant in influencing the whole cluster system. The next most important feature of successful clusters involves positive forms of vigorous domestic rivalry that results in strong innovative output. These two influences promote robust, rapid and on-going innovation activity within the cluster which, it would appear, is the key to the long-term strategic health of the cluster. The geographic clustering of firms linked through vertical and horizontal relationships has a reinforcing and magnifying effect upon the cluster benefits. It can also be concluded from the literature that the level and nature of co-operation and competition in an industry cluster will vary according to the industry life-cycle stage, *i.e.* in successful clusters competition and co-operation should be balanced at each stage of the life-cycle, despite changes in the numbers of firms and focus of innovative activity.

From the literature a number of characteristics of declining or failing clusters are identified. Most important is a lack of co-operation and interdependence between firms in the cluster, which is seen as detrimental to the cluster's knowledge creation capabilities and innovative output. Another important feature of a failing cluster is a significant reduction in competitive rivalry within the cluster, which also contributes to a decline in innovative activity. A number of reasons are given to explain why these two phenomena may occur. The most common of these is the emergence of one/few dominant firms in the industry cluster. Over-concentration in the cluster results in a reduction in the overall number of firms in the industry. The dominant firm(s) may engage in negative forms of competition and other predatory practices which can undermine trust and reciprocity and lead to a reduction in co-operation and interdependence. Ultimately this will have a negative effect on innovative activity within the cluster.

The remainder of the Literature Review conclusions focuses on these identified characteristics for successful and failing industry clusters. From these conclusions a theoretical framework for the research is developed (see Figure 2.4) and a series of testable propositions formulated. Finally, propositions and objectives have been drawn together into two tables (see Tables 2.3 and 2.4).

2.9.1: Conclusions on Co-operation in Clusters

Co-operation in clusters is based on interchanges that facilitate the exchange and flow of information and knowledge in the cluster (between buyers, suppliers and related industries) that ultimately leads to innovative output. These interchanges (linkages) accrue unique agglomeration benefits to cluster members by lowering transaction costs. Linkages in clusters consist of 'strong ties' and 'weak ties'. Strong ties are more formalised, intense relationships that offer depth but not diversity of knowledge. Moreover, strong ties can lead to technological lock-in over time, possibly due to path dependency. Weak ties are more informal, they offer access to diverse information and are said to trigger innovation. In transactions where sunk costs are high, *i.e.* transactions involving developing innovation, trust and discretion between actors is a requirement. Relationships in networks of trust are bound by ties of obligation which regulate behaviour, *i.e.* the cluster is self-regulating, and this lowers transaction costs.

Proposition 1. Successful industry clusters will exhibit a strong network of cluster interrelationships involving both strong and weak ties.
Proposition 1a. Failing industry clusters will exhibit a weak network of cluster interrelationships.

The effective exploitation of external know-how depends on firm-specific factors as well as external cluster resources. Firms have different absorptive capacities, hence a lower level of a firm's internal resources leads to constrained absorption of external resources. Industry conditions will also affect a firm's absorptive capacity. For example, clusters may involve relations of dominance and dependence, which may constrain or facilitate co-operation. Therefore, governance structures are an important consideration in researching co-operation within a cluster. Control may be balanced across firms within a cluster or may be concentrated within the hands of a single (or few) dominant firms. Dominant firms may have positive (knowledge facilitator) or negative (abuse of power) effects on the cluster.

Proposition 2. Firms in successful industry clusters will demonstrate strong absorptive capacity as evidenced by a significant number of inter-firm linkages.
Proposition 2a. Firms in failing industry clusters will demonstrate weak absorptive capacity as evidenced by few (no) inter-firm linkages.

Proposition 3. In successful industry clusters, control will be equally balanced across firms, if there are dominant firms they do not abuse their powerful positions.
Proposition 3a. In failing industry clusters, control will be concentrated into the hands of a few dominant firms who use their power to exert control over other cluster firms.

The *need* for co-ordination is another important consideration when examining the level of co-operation within a cluster. Factors influencing the need for co-ordination are the technological complexity of the cluster's production processes (highly technical or simpler technologies) and the separabilty (potential to break down the production system into components) of the processes. Highly technical and separable processes result in a higher potential for specialisation and thus co-ordination. Firms that have historically had little need for co-ordination (lower technology and inseparable) may not possess the necessary capabilities to forge co-operative linkages if external (outside the cluster) conditions change.

Proposition 4. Firms in successful industry clusters are more likely to have a higher need for co-ordination as evidenced by high technological complexity and highly separable processes.
Proposition 4a. Firms in failing industry clusters are more likely to have a little need for co-ordination as evidenced by low technological complexity and inseparable processes.

Co-operation in successful clusters also features the involvement of formal institutions who are involved in supporting, regulating and spreading constructive co-operation within the industrial district. Another feature of successful clusters is the ability to develop 'extra-cluster' linkages or 'global pipelines' to access new-knowledge from outside the cluster that leads to innovation. Such external knowledge can help to avoid technological lock-in. Therefore, co-operation in clusters should have a global/local element.

Proposition 5. Successful clusters facing the challenges of globalisation will have adopted global/local strategies, characterised by a strong global network of agents from the core industry, plus related and supporting industries.

Proposition 5a. Failing clusters, facing the challenge of globalisation, will not have made new linkages with firms and institutions outside the cluster. Moreover, the number of inter-cluster linkages will have reduced.

The key points identified in the literature on co-operation have been drawn together, linked to the research propositions, and implications for the research are identified (see Appendix 3).

2.9.2: Conclusions on Competition in Clusters

Competition is a key driver of innovation within clusters. The greater the number of firms there are in the cluster, the more vigorous competition will tend to be between cluster firms and, hence, the greater the potential to innovate. Moreover, because of dynamic agglomeration benefits, innovations will happen earlier and will be brought to market more quickly. Thus, cluster firms will have a competitive advantage over firms from outside the cluster. However, competition can take either 'positive' forms or 'negative' forms. Positive competition leads to the creation of new goods or new technologies to produce existing goods. Competition is particularly important in attracting new firms to the cluster, which further increases competitive rivalry (more firms equals more competitors equals more innovations). Negative competition involves cost-cutting strategies and/or low-price strategies. Both of these strategies can result in less being spent on R&D and product/process innovations. In addition, such strategies can lead to de-motivation of employees and can reduce the number of co-operative linkages within the cluster. Moreover, negative forms of competition can drive firms out of the industry and act as a barrier to new entrants (fewer firms equals fewer competitors equals less innovation).

Competition and co-operation are balanced in successful industry clusters. Particularly for small firms, co-operation in areas such as marketing, training, bulk purchasing or R&D can result in innovations and/or cost-savings that benefit the whole industry. The resulting innovations, which may not have been possible without collaboration, raise the level of competition within the cluster. Trust is a key element in such co-operative agreements within the cluster and is based on local norms that govern the cluster. Thus, in successful industry clusters, competition and co-operation become a mutually reinforcing positive relationship.

However, certain types of competition and co-operation can be destructive, *e.g.* restrictive agreements between firms which: may act as barriers to new entrants; lead to predatory practices (with the aim of eliminating cluster competitors); lead to technological lock-in. Moreover, in the face of external changes in key markets, such as rising global competition, adoption of cost or low-price strategies can have a detrimental effect on co-operation and trust within the cluster. The key points identified in the literature on competition have been drawn together, linked to the research propositions, and implications for the research are identified (see Appendix 3a).

Proposition 6. Successful industry clusters will demonstrate vigorous competition between cluster firms as evidenced by a large number of firms in the industry and a constant stream of new entrants.
Proposition 6a. Failing industry clusters will demonstrate weak competition between cluster firms as evidenced by a declining number of firms in the industry and few (no) new entrants.

Proposition 7. In successful industry clusters firms compete mostly on the basis of differentiation.
Proposition 7a. In failing industry clusters firms compete mostly on the basis of low-cost/price.

2.9.3: Conclusions on Innovation in Clusters

Innovation, amongst other things, is a function of the strength of a cluster, *i.e.* a successful industry cluster will exhibit evidence of strong innovative output. Typical categories where innovations can be made are processes, products, markets and organisational (*e.g.* the supply chain). Innovation in successful clusters is strongly linked to the transmission of knowledge between cluster members. Knowledge can be classified as tacit knowledge or information based knowledge. Tacit knowledge is viewed as more important because it is uncodified and less capable of being transferred easily outside the geographically concentrated cluster. Information, on the other hand, is more codified, and therefore more easily transferred within and outside the cluster. Over time, some tacit knowledge may become codified, and thus can be transferred more easily to cluster firms, and eventually, outside the cluster itself.

Proposition 8. In successful industry clusters there will be evidence of strong innovative output as measured by the adoption of new technologies, new markets and new product developments.

Proposition 8a. In failing industry clusters there will be evidence of weak innovative output as measured by the lack of adoption of new technologies, new markets and new product developments.

Knowledge can consist of 'component' knowledge and 'architectural' knowledge, with each category containing both information and tacit knowledge. Component knowledge ranges from, simple and straightforward technical know-how linked to different components of its operations (easily transferred), to systemic knowledge which is more closely to the organisation's whole 'system'. If the cluster's product technologies are highly modular, *i.e.* capable of being broken-down into components, there are more opportunities for specialisation, co-operation and knowledge transfer within the cluster. However, such knowledge can eventually spill-out beyond the cluster. Therefore, component knowledge can bestow only short-term competitive advantages on the cluster, providing such knowledge remains private to the cluster. Low modularity in product technology reduces the number of opportunities for inter-firm knowledge exchanges.

Proposition 9. In clusters where there is high modularity in product technology, there will be a high number of opportunities for inter-firm knowledge exchanges.
Proposition 9a. In clusters where there is low modularity in product technology, there will be a low number of opportunities for inter-firm knowledge exchanges.

Architectural knowledge relates to an organisation as an entire system and is an inseparable part of the firm. This is because architectural knowledge is highly individual, it is closely linked to the idea of 'core competencies'. Bodies of architectural knowledge are not coherently assembled (no easily identifiable components) and, therefore, not easily transferrable outside of the firm. However, elements of architectural knowledge may leak out of the firm over time through constant interaction with other firms in the cluster. Thus, eventually, the cluster will develop a stock of architectural knowledge that is unique. However, the degree of knowledge transfer will depend on the cluster's propensity to co-operate, which in turn is dependent on the degree of technological dynamism of the industry's products and the balance of power and control in the industry (see earlier sections). A firm is more likely to innovate where; there is a presence of strong innovative firms in its own industry; where there is a large pool of potential knowledge spillovers associated with a large stock of knowledge; and, where there is a strong network of supporting institutions that provide information about technological and other opportunities.

Thus, the more information channels and knowledge brokers there are present in a cluster to establish connectivity between cluster firms, the greater the number of opportunities for inter-firm knowledge exchanges there will be (see section on co-operation).

The most widely used methodologies in previous cluster studies for measuring innovation include both input and output indicators, such as R&D expenditures, technology uptake, employment, patents and new product announcements. In order to achieve an accurate picture of innovation in an industry cluster several input/output variables may need to be measured. The key points identified in the literature on innovation have been drawn together, linked to the research propositions, and implications for the research are identified (see Appendix 3b).

2.9.4: Conclusions on the Industry Life-cycle and Clusters

According to the literature, incentives to cluster and disperse evolve over time and can be linked to the industry's life-cycle pattern. Moreover, the relationship between cluster benefits and cluster performance will vary according to the life-cycle stage. Therefore, an initial objective of this research study is to identify the life-cycle stage of the SOT ceramics cluster. The key points from the life-cycle literature have been drawn together and are summarised in Appendix 3c. From the summary it is clear that many of the issues relating to the industry life-cycle and clusters are linked to issues that will be analysed and discussed in other sections of the research, *e.g.* outcomes of the investigation into co-operation, competition and innovation. The results of these various analyses will be used to determine the life-cycle stage of the SOT ceramics cluster. Moreover, outcomes from this analysis will be linked to conclusions about co-operation, competition and innovation.

2.9.5: Conclusions on Failing Industry Clusters

Globalisation is seen as one of the key challenges for traditional industry clusters. Improvements in global transport, communications and organisational management skills may have reduced some cluster benefits as now some 'codified' knowledge is capable of being transferred to agents outside the cluster, *i.e.* on a national/global scale. Moreover, if personal contact (geographic proximity) is needed, this can be facilitated through advances in transport technology which enable short visits to be made. Virtual meetings, via the internet, can also facilitate personal encounters. Globalisation is also characterised by the global reorganisation of production processes, which may involve re-location of some cluster

firms or outsourcing to lower-cost countries. A common response in the literature to clusters facing these problems is that cluster firms should develop an integrated global/local network. The addition of 'new learning' from outside the cluster can act as a trigger for the evolution and/or re-generation of clusters. The key for the cluster is to keep its historical and social identity (industrial atmosphere), and absorb knowledge and technologies developed elsewhere. The learning the cluster acquires through relationships outside the cluster will be more rapidly diffused within the cluster if the cluster already has a history of co-operation.

However, if cluster firms do not make linkages outside the cluster, then no new knowledge will enter the cluster. Moreover, in times of high uncertainty, such as increasing competition from outside the cluster, firms may choose to co-operate less because of risk of opportunism, loss of ideas, *etc.* This is even more likely to happen in clusters that have historically had little need to co-operate. Moreover, limited information about each other may lead to distrust and misunderstanding of each other's expectations. Overall, the net result is a reduction in opportunities for knowledge exchange. Furthermore, as no new knowledge is entering the cluster, the cluster can become locked-into out-dated and inferior technologies.

Apart from lack of new external knowledge there are several other reasons for knowledge creation failures in clusters, including:

- Opportunities for knowledge exchanges do not emerge;
- Opportunities for knowledge exchanges have changed over time (as environments became more stable);
- The breadth of knowledge requirements is low (simple technologies);
- There are few mechanisms to facilitate networking and knowledge transfer.

Many of these issues are linked to issues that will be analysed and discussed in other sections of the research, *e.g.* outcomes of the investigation into co-operation, competition, innovation and life-cycle. Therefore, the results of these various evaluations will be used to determine the degree of knowledge creation that takes place in the SOT ceramics cluster.

Competitive challenges currently facing traditional clusters include: the saturation of their traditional markets, possibly due to growth of low-cost international competition and/or

changes in patterns of consumer demand; and, moves by leading cluster firms towards global outsourcing. These growing challenges have undermined many clusters' abilities to retain firms and attract new firms. The subsequent reduction in the number of cluster firms has had a negative impact on many traditional clusters who have experienced many firm closures and significant reductions in employment. Diminished competitive rivalry is cited in the literature as one of the most fatal reasons for loss of cluster competitive advantage. One common response to low-cost competition from abroad has been to shift focus from the lower end of the market to the higher end segments. However, some clusters have had little success in making this transition, possible due to path-dependency and other historical reasons, and/or because of reduced financial resources to invest in higher end products. The key points identified in the literature on failing clusters have been drawn together, linked to the research propositions, and implications for the research are identified (see Appendix 3d).

2.9.6: Conclusions on Dominant Firm Effects

Another key reason given in the literature for cluster failure is over-concentration in an industry that reduces the need for co-operation and obstructs competition. Consolidation has been linked in the cluster literature to a decline in innovative activity (fewer firms equates to fewer cluster competitors equates to less innovation). This is called the 'congestion effect' or 'intellectual lock-in' and is seen as an obstacle to rapid change. The concentration process is said to give rise to the formation of one or few large firms.

Proposition 10. Failing clusters will have undertaken a significant process of consolidation resulting in a reduction in the number of firms and, in the emergence of one/few dominant firms who do not act in the best interests of the cluster as a whole.

According to the literature, it is not uncommon for a cluster to be dominated by a small number of very large companies. Lead firm strategies can range from highly co-operation oriented to highly competition oriented. Cost oriented lead firms can wield considerable power over smaller subordinate suppliers which, in turn, can undermine reciprocity and trust within the cluster. In such an environment few incentives exist for firms to engage in inter-firm knowledge exchanges that may result in innovation. The presence of large firms can also act as a barrier to new entrants, which also reduces the potential for innovation.

Proposition 11. Failing clusters are dominated by a few large firms who engage in competitive strategies resulting in a reduction in co-operation and innovation.

The key points identified in the literature on dominant firms have been drawn together, linked to the research propositions, and implications for the research are identified (Appendix 3e).

The full set of propositions is presented in Table 2.3. By drawing all of the key points from the literature together, a theoretical framework for the research has been constructed and is presented in Figure 2.4. From the theoretical framework four distinct research stages have been identified and detailed research objectives and data requirements have been formulated and are all presented in Table 2.4.

Table 2.3: The Research Propositions

P1	*Proposition 1. Successful industry clusters will exhibit a strong network of cluster interrelationships involving both strong and weak ties.*
P1a	*Proposition 1a. Failing industry clusters will exhibit a weak network of cluster interrelationships.*
P2	*Proposition 2. Firms in successful industry clusters will demonstrate strong absorptive capacity as evidenced by a significant number of inter-firm linkages.*
P2a	*Proposition 2a. Firms in failing industry clusters will demonstrate weak absorptive capacity as evidenced by few (no) inter-firm linkages.*
P3	*Proposition 3. In successful industry clusters, control will be equally balanced across firms, if there are dominant firms they do not abuse their powerful positions.*
P3a	*Proposition 3a. In failing industry clusters, control will be concentrated into the hands of a few dominant firms who use their power to exert control over other cluster firms.*
P4	*Proposition 4. Firms in successful industry clusters are more likely to have a higher need for co-ordination as evidenced by high technological complexity and highly separable processes.*
P4a	*Proposition 4a. Firms in failing industry clusters are more likely to have a little need for co-ordination as evidenced by low technological complexity and inseparable processes.*
P5	*Proposition 5. Successful clusters facing the challenges of globalisation will have adopted global/local strategies, characterised by a strong global network of agents from the core industry, plus related and supporting industries.*
P5a	*Proposition 5a. Failing clusters, facing the challenge of globalisation, will not have made new linkages with firms and institutions outside the cluster. Moreover, the number of inter-cluster linkages will have reduced.*
P6	*Proposition 6. Successful industry clusters will demonstrate vigorous competition between cluster firms as evidenced by a large number of firms in the industry and a constant stream of new entrants.*
P6a	*Proposition 6a. Failing industry clusters will demonstrate vigorous competition between cluster firms as evidenced by a declining number of firms in the industry and few (no) new entrants.*
P7	*Proposition 7. In successful industry clusters firms compete mostly on the basis of differentiation.*
P7a	*Proposition 7a. In failing industry clusters firms compete mostly on the basis of low-cost/price.*
P8	*Proposition 8. In successful industry clusters there will be evidence of strong innovative output as measured by the adoption of new technologies, new markets and new product developments.*
P8a	*Proposition 8a. In failing industry clusters there will be evidence of weak innovative output as measured by the lack of adoption of new technologies, new markets and new product developments.*
P9	*Proposition 9. In clusters where there is high modularity in product technology, there will be a high number of opportunities for inter-firm knowledge exchanges.*
P9a	*Proposition 9a. In clusters where there is low modularity in product technology, there will be a low number of opportunities for inter-firm knowledge exchanges.*
P10	*Proposition 10. Failing industry clusters will have undertaken a significant process of consolidation resulting in a reduction in the number of firms and, in the emergence of one/few dominant firms who do not act in the best interests of the cluster as a whole.*
P11	*Proposition 11. Failing industry clusters are dominated by a few large firms who engage in competitive strategies resulting in a reduction in co-operation and innovation.*

Figure. 2.4: The Theoretical Framework for the Research *(Source: Author, developed from Arikan, 2009)*

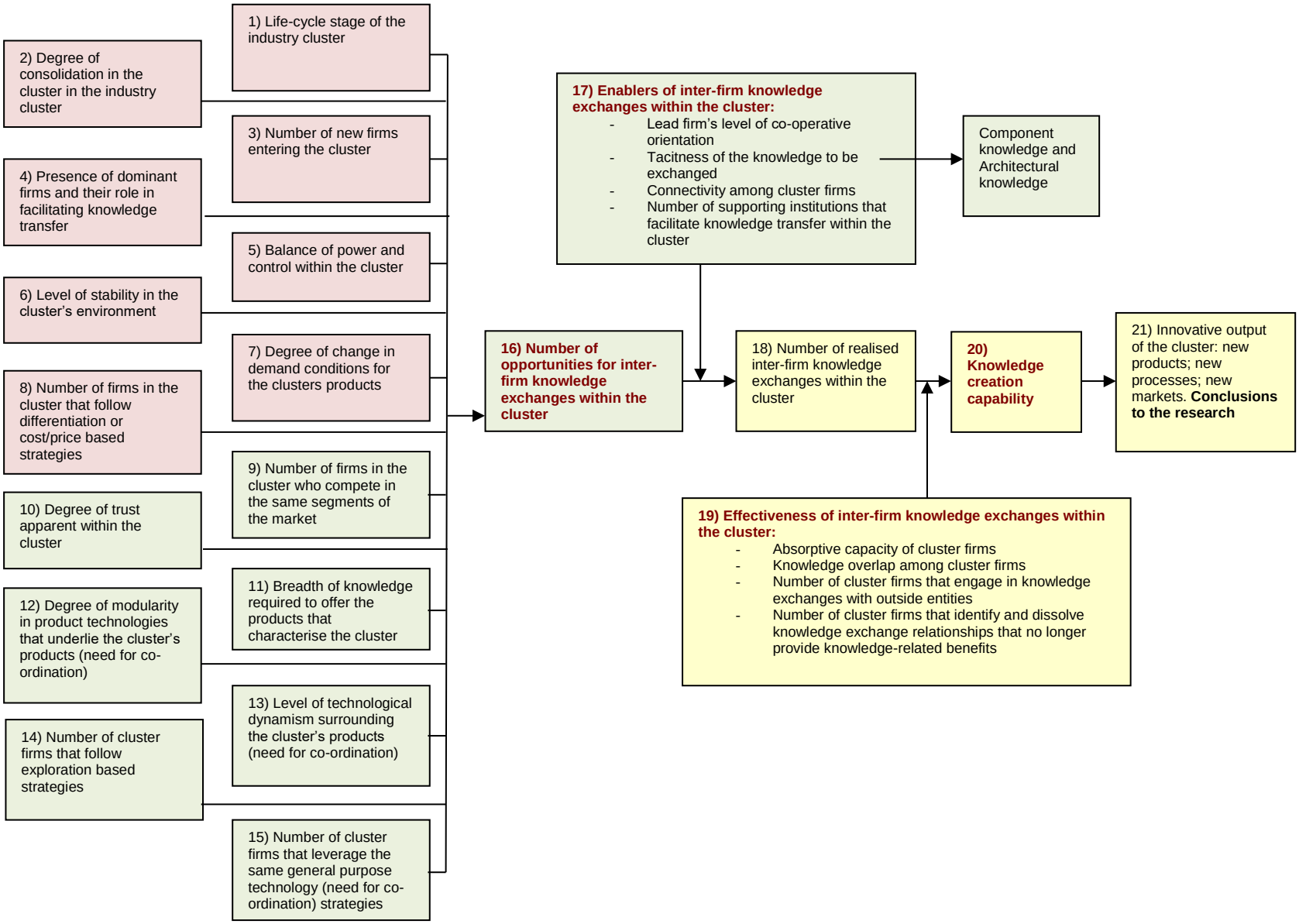


Table 2.4: The Research Objectives

Stage 1 Research Objectives – Industry life-cycle, demand and competition	Propositions	Data Requirements and Examples of Sources	Link between Objectives
1. To track the development of SOT tableware & giftware manufacturers from 1960 – 2016: i. Establish the total number of firms operating in each decade from 1960 – 2016 ii. Establish the total number of new entrants in each decade from 1960–2016 iii. Establish the number of firm closures in each decade from 1960-2016 iv. Establish the number of acquisitions & mergers in each decade from 1960-2016 v. Determine the degree of consolidation in the cluster as at 2016 vi. Establish the life-cycle stage of the cluster as at 2016 vii. Establish the emergence of dominant firms in the industry and their history of mergers and acquisitions 1960-2016	P5, P5a P6, P6a P7, P7a P10, P11	**Secondary Data (examples)** Various market intelligence reports, Keynote Reports, Business Monitor Reports and other secondary sources including various internet websites, *e.g.* Godden (1964) Keynote (1997) ECOTEC (1999) MINTEL (various dates) DTI (1994) Ceramic Ambitions (2000)	Objectives 1 & 2 are aimed at determining: the life-cycle development of the SOT cluster; the ownership structure of the SOT cluster; the nature and type of competitive activity in the SOT cluster and the presence of dominant firms in the SOT cluster. A longitudinal study will be compiled (based on existing historical data) that tracks the development of the SOT cluster between 1940 and 2016.One key aim is to identify the number of tableware & giftware manufacturers operating in the cluster in 2016. This final list of firms will form the total population for stage 3 of the research.
2. To examine the nature of demand for the SOT cluster's products and its effect on competition between 2000 and 2016. i. Establish whether demand is increasing or declining ii. Establish the level and sophistication of demand as evidenced by increasing segmentation and product variations iii. Establish the pattern of local competitive activity (cluster) between 2000 and 2012 iv. Establish the extent of competition from abroad, including competitors from low-cost countries	P5, P5a P6, P6a P7, P7a	Staffordshire TEC (1996) Tableware Strategy Group (1995) UK Markets Central Statistics Office FWC Sector Competitiveness Studies: Competitiveness of the Ceramics Sector EU (2008) Day et al. (2000) **Plus Primary Data** Findings from section 1 in the innovation/co-operation questionnaire.	A descriptive and explanatory study will be compiled.
Stage 2 Research Objectives – Establishing the 'Need for Co-operation'	**Propositions**	**Data Requirements**	**Link between objectives**
3. To determine the breadth of knowledge required to offer the products that characterise the cluster i. Is a wide breadth of knowledge required? ii. Is a narrow breadth of knowledge required?	P4, P4aa P9, P9a	**Secondary Data (examples)** Rowley (1994, 1996, 1998), Manufacturing and Flexible Specialisation in the British ceramics Manufacturing Industry (academic papers). Gay & Smyth (1974), The British Pottery Industry (Book). Imrie (1989), Industrial Restructuring in the British Pottery Industry (book).	As discussed in the Literature Review, there is a need to discover the 'need' for co-operation in the SOT cluster. The literature indicated that this need depends upon issues such as: the degree of technological dynamism; the degree of separability of product technologies; and, the degree of vertical integration apparent in cluster firms. Hence, objectives 3-5 are aimed at identifying the need for co-operation.
4. To determine the degree of modularity in the product technologies underlying the products that characterise the cluster i. Are product technologies separable? ii. Are product technologies inseparable? iii. Is knowledge within the cluster mostly 'component' knowledge or 'architectural'?	P4, P4a P9, P9a	Niblett (1990), The British Pottery Industry 1940-1990 (Book). Day et al. (2000), A case study of British ceramics Production (Academic paper). Warren et al. (2000), Technological Innovation in the UK Ceramics Industry (Book).	
5. To determine the level of technological dynamism surrounding the products that characterise the cluster i. Is the industry's technology highly dynamic? ii. Is the industry's technology slow changing?	P4, P4a P9, P9a	Caroll et al. (2001), Outsourcing in the UK Ceramics Industry (Academic paper).	

		Whipp (1990), Patterns of Labour, Work and Social Change in the Pottery Industry (Book).	
Stage 3 Research Objectives – Continuing to Establish the 'Need for Co-operation' and Establishing Levels of Innovative and Co-operative Activity	**Propositions**	**Data Requirements**	**Link between objectives**
6. To determine the number of core firms in the cluster in 2015 that leverage the same general purpose technology i. Are all core firms fully vertically-integrated? ii. Is there any evidence of specialisation?	P4, P4a	**Primary Research** Questionnaire on Innovation: i. Q1.4 ii. Q1.4	
7. To determine the output of innovative activity in the cluster between 2010 and 2015. i. Establish whether product innovation has increased/decreased ii. Establish whether process innovation has increased/decreased iii. Establish whether other forms of innovative activity have increased/decreased, *e.g.* markets and marketing iv. Identify the main reasons why some firms innovate and others don't. v. To determine the success of the cluster's innovative activities	P8, P8a	Questionnaire on Innovation: i. Q 2.1 – 2.4 ii. Q 3.1 – 3.2 iii. Q4.1 – 4.4 iv. Q7.1 – 7.2 + Interview question v. Q5.4 – 5.5	The target will be core manufacturers of tableware and giftware as determined by the findings from the longitudinal study on the SOT cluster's development. Links to objectives 9 & 10.
8. To establish the degree of inter-firm knowledge exchanges within the cluster between 2010 and 2015. i. Establish the existence and nature of horizontal co-operation & collaboration ii. Establish the existence and nature of vertical co-operation and collaboration iii. Establish the presence of formal and informal institutions that support the SOT industry cluster iv. Establish lead firm's level of co-operative orientation v. Identify the number of knowledge exchanges within the cluster vi. Identify the type and depth of knowledge exchange relationships within the cluster vii. Identify the main reasons why some firms co-operate and others don't. viii. Identify the number of firms who exchange knowledge with outside (the cluster) entities	P1, P1a P2, P2a P3, P3a P10, P11	Questionnaire on Innovation and other sources: i. Q 6.1 – 6.4 ii. Q 6.1 – 6.4 iii. Secondary research (data exists) iv. Primary research interviews v. Q 6.1 – 6.4 plus interviews vi. Interview question vii. Interview question viii. Interview question	This objective will only be partially achieved through the questionnaire survey. The number, type and depth of collaborative relationships will be explored further in stage 4 of the research
Stage 4 Research Objectives – Power & Control and The role of Dominant Firms	**Propositions**	**Data Requirements**	**Link between objectives**
9. To establish the balance of power and control within the SOT cluster in 2016 i. Is power and control balanced across firms? ii. Is balance and control hierarchical, *i.e.* do dominant firms have more control?	P3, P3a	**Primary Research** i. Interviews ii. Interviews iii. Builds on findings from Chapter 4 of this thesis (objective 1 (vii))	Stratified purposeful sampling from the questionnaire respondents will be employed to identify firms for the interview stage of the research. Respondents will be selected from small/medium/large categories and also from firms who innovate and from firms who do not innovate (as indicated on questionnaire responses). Links to objectives 1, 6, 7, 8.
10. To determine whether dominant firms have had a positive or negative effect upon competition and co-operation in the SOT cluster between 1980 and 2016. i. Ascertain the motivations behind dominant firm strategies and their effects upon competition and co-operation in the cluster ii. Establish whether dominant firms have taken a prominent role in facilitating knowledge exchange within the cluster iii. Establish whether dominant firms have established linkages outside the cluster	P10, p11	**Primary Research** i. Interviews ii. Interviews iii. Interviews and questionnaire Q 6.2	As above.
11. To synthesise these findings and draw accurate conclusions about the 'strategic health' of the SOT cluster.			

3. Methodology

3.1: Introduction

The previous chapter identified a series of propositions based on key issues arising from a synthesis of the different cluster literatures. It was noted from the literature reviewed that a gap exists relating to the role and effects of dominant firms in industry clusters. Several key points from the literature were drawn together into a comprehensive theoretical framework for this research study (see literature review conclusions). Subsequently, a set of research objectives were developed from the theoretical framework in order to answer the research question:

> *"To what extent does the SOT ceramics cluster exhibit characteristics of a successful industry cluster, or a failing industry cluster, as defined by the theory on industry clusters?"*

This chapter sets out the methods that will be utilised to achieve the aims and objectives of this research study. When undertaking research of this nature it is important to fully consider different research paradigms and matters of ontology and epistemology. Consequently, this chapter begins by exploring alternative research paradigms along with associated ontological and epistemological stances. This discussion is followed by the identification of an appropriate paradigm for this research study. Thirdly, an appropriate research design is identified and covers issues such as, the methods to be employed, data collection and data analysis. The final section discusses aspects of validity, reliability and ethics. A reflection on the research process is presented in chapter seven of this thesis (see chapter 7.7).

3.2: The Research Paradigm

Research paradigms can be viewed as basic belief systems representing different worldviews and can be explained as a function of how the inquirer (researcher) thinks about the development of knowledge. Inquiry paradigms define for inquirers what it is they are about, as well as what falls within and outside the limits of legitimate enquiry (Guba and Lincoln, 1994). The research paradigm should combine the research philosophy and the research methods as, according to the definition given by Gliner and Morgan (2000), "*The paradigm is a way of thinking about and conducting a research, It is not strictly a methodology but, more a philosophy that guides how the research is to be*

conducted" (p. 17). However, different paradigms relate to different ontological stances and are therefore "*deeply embedded in the socialisation of practitioners*" (Patton, 1990, p. 69). This relationship between the researcher and what is to be researched is also acknowledged by Guba and Lincoln (1994), who purport "*any given paradigm represents simply the most informed and sophisticated view that its proponents have been able to devise, given the way they have chosen to respond to three defining questions*" (p. 108). The three appropriate questions are:

1. The ontological question, *i.e*. what is the form and nature of reality and, therefore, what is there that can be known about it? Ontology identifies the claims and assumptions about what constitutes reality (Grix, 2001), as well as the configuration and character of reality (Guba and Lincoln, 1994). Different ontologies can be explained as a continuum, with the positivist 'natural/scientific' worldview at one end, and the constructivist 'individual constructs of reality' worldview at the other. Somewhere between the two ends of the continuum lies the post-positivist/critical realist approach.
2. The epistemological question, *i.e.* what is the nature of the relationship between the knower or would-be knower and what can be known? Epistemology is linked to ontology in that it is about how one gains access to knowledge and about the relationship between knowledge and truth (Kilduff *et al*., 2011). For example: if a positivism 'real' reality is assumed, then the posture of the inquirer must remain one of objective detachment and value freedom; if a critical realist posture is assumed (reality can only be imperfectly known), then the inquirer, whilst trying to remain objective, will not be totally independent from that which is being observed.
3. The methodological question, *i.e.* how can the inquirer (would-be knower) go about finding out whatever he or she believes can be known?

Guba and Lincoln (1994) purport that the answer given to any one question, taken in any order, constrains how the others may be answered. However, with this research study the research started with the object of investigation, *i.e.* the SOT ceramics cluster, and then progressed on to the theory on industry clusters which helped to clearly identify what knowledge was needed. Therefore, the research did not consider Guba and Lincoln's three questions in any order, as implied above, but matched the ontological and epistemological stances to the proposed research task and selected appropriate methods to best achieve the specific aims and objectives of the research. Guba and Lincoln (1994) also advocate that no paradigm is or can be incontrovertibly right. Here

the research has attempted to devise the most appropriate paradigm, given the nature of the research task, whilst also acknowledging that the chosen paradigm will not be perfect, by definition.

The following section presents key issues in the paradigm selection process and culminates in the selected paradigm for this research study. The main focus for the discussion is the debate around positivism and critical realism, as they are deemed to be most closely linked to the research to be undertaken. For example, parts of the research require positivist, quantitative methods (objectives 6-8) and other parts of the research require a more critical-realist perspective and application of qualitative methods (objectives 9-10). However, paradigms other that positivism and critical realism have not been completely overlooked in this chapter, the main arguments and rationale for rejection of such alternatives are presented subsequently in Table 3.1.

3.2.1: Positivism, Post-positivism and Critical Realism

The main positivist methodologies include experimentation and manipulation, where questions and/or hypotheses are subjected to empirical testing under strict control conditions. Positivist methodologies are those associated with the independence of the researcher from that being researched, they do not take into consideration the value-determined nature of enquiry. Hence, the investigator is assumed to be capable of studying the object without influencing it or being influenced by it (Guba and Lincoln, 1994). There is a strong positivist element in this research study in that it starts with theory, which is used to develop and test hypotheses and this is positivism. However, the theory is only a starting point as it is conditional and needs to be modified in order to understand more deeply the object of enquiry. Consequently, a purely positivist approach would not allow the research to achieve all of the objectives, *i.e.* the UK ceramics industry is unique in that it is a function of a particular set of circumstances and individuals (an 'open system') and, therefore, there is a need to discover the details of the situation and understand the reality, or perhaps a reality working behind them (Remenyi *et al*., 1998). It is this requirement to discover the 'how' and 'why' behind the apparent reality that pushes this research beyond a textbook approach to positivism.

A purely positivist approach would also not recognise the researcher's influence in interpreting and explaining what is happening in the SOT cluster. The researcher is

aware of the need to exercise caution when conducting the research in order to reduce personal biases. For example, the researcher has worked in the SOT area for many years and has a long-standing interest in the local ceramics industry and, therefore, may be prone to bias, albeit subconscious. Such biases may include some degree of emotional attachment and intellectual curiosity and, perhaps, a predisposition to favour certain expected outcomes. The researcher is aware of such potential problems and will work hard to maintain a professional distance where possible and to keep an open mind. Moreover, the mixed methods approach (discussed later) should also assist in ensuring that the research findings are valid and reliable.

In an attempt to find a more suitable paradigm this next section looks at alternatives to the positivist world view. Since the middle part of the 20th century there has been a shift in the way some researchers' view science based research. One of the most important developments has been the shift away from positivism into 'post-positivism'. Post-positivism assumes that the world or 'reality' may only be probabilistically and imperfectly known (Fischer, 1998). This idea seems to make sense, especially in the complex field of management research. One of the main components, or strands of thought, contributing to post-positivism is 'Critical Realism'. Critical Realism seems particularly appropriate to this research study as the critical realist asserts that while there is a reality to investigate, '*real objects are subject to value laden observation*', accordingly the reality and the value-laden observation of reality operating in two different dimensions (Bhaskar, 1978, 1979, 1991).This approach can be both objective, in that quantitative data may form part of the study, and subjective in that it recognises that researcher biases and values may influence explanations and interpretations of more qualitative research findings. Hence, critical realism is an eclectic approach that is theoretically informed.

The post-positivist critical realist approach also recognises the importance of using multiple measures and observations. Each single measure may possess different types of error, but by using 'triangulation' across multiple sources the researcher is more likely to obtain a more accurate picture of what's happening in reality. The use of multiple measures and the importance of triangulation will be discussed later in this chapter.

Moreover, the post-positivist considers that all observations are theory-laden and that scientists (and everyone else, for that matter) are inherently biased by their cultural

experiences, world views, and so on (Moutinho and Hutcheson, 2011). According to Guba and Lincoln (1994), "*theories and facts are quite interdependent – that is, that facts are facts only within some theoretical framework"* (p. 107). Another supporter of this view is Karl Popper who argued, "*we approach everything in the light of a preconceived theory*" (Popper, 1970, p. 52). In this research study propositions and observations will not be independent, as the facts about the SOT cluster will be viewed through a theoretical 'window' formulated from the different cluster literatures. Furthermore, the facts determined by the theory window will be subject to value-ladenness (Guba and Lincoln, 1994); namely, the values attached to them by the researcher in light of theory, *e.g.* whether a particular fact has had a positive or negative influence, according to cluster theory, on the strategic health of the SOT cluster. Therefore, the facts of this research study will be determined through interaction between the researcher and the phenomenon. This approach where facts and values are seen as interrelated, offers further evidence to reject a positivist approach, which takes the view that the researcher does not influence the phenomena or vice versa and, therefore, facts are value-free (Guba and Lincoln, 1994).

So far, this chapter has discussed two ontological stances, positivism and post-positivism/critical realism. However, there are several other important ontological stances that the researcher has considered in deciding on the most appropriate paradigm for this research study, *e.g.* critical theory and constructivism. Table 3.1 presents the basic beliefs of Guba and Lincoln's (1994) main alternative enquiry paradigms. It presents the main ontological stances and then links-in associated epistemological characteristics and methodologies. The author has extensively adapted and added to Guba and Lincoln's original table (p. 109), and has also attempted to link the discussion to aspects of the research to be undertaken in order to provide a rationale for the paradigm chosen for this research study (discussed in more detail in section 3.3).

Table 3.1 Basic Beliefs of Alternative Enquiry Paradigms Mapped to the Current Research

	POSITIVIST (Objectivist/ Realist)	CRITICAL REALISM (post-positivist)	CRITICAL THEORY (and related ideological positions, *e.g.* postmodernism/ post-structuralism)	CONSTRUCTIVIST
Ontology	Naïve realism – 'real' reality but apprehendable. Knowledge of the 'reality' is conventionally summarised in the form of time and context-free generalisations, some of which take the form of cause-effect laws (Guba and Lincoln, 1994). Aims are explanation, prediction and control (Willmott, 1997).	Critical Realism – 'real' reality but only imperfectly and probabilistically apprehendable – due to basically flawed human intellectual mechanisms and the fundamentally intractable nature of phenomena. Claims about reality must be subjected to the widest possible critical examination to facilitate apprehending reality as closely as possible. Aims are still explanation, prediction and control (Willmott, 1997).	Historical Realism – virtual reality shaped by social, political, cultural, economic, ethnic, and gender values: crystalised over time into a series of structures that are now taken as 'real'. The structures are seen as a virtual or historical reality (Guba and Lincoln, 1994). Discourse is deconstructed to reveal hidden structures of domination particularly dichotomies, then reconstructed to offer alternative, less exploitative social arrangements. Critical theory focuses more on the macro level, whilst critical postmodernism focuses more on the micro level (Boje, 2001).	Relativism – local and specific constructed realities. Realities are apprehendable only in the form of multiple, intangible mental constructions (realities), socially and experientially based, local and specific in nature, and dependent for their form and content on the individual persons or groups holding the constructions. Constructions are alterable, as are their associated realities (Guba and Lincoln, 1994).
Epistemology	Dualist/objectivist; findings are true. The investigator and the investigated object are assumed to be independent entities and the investigator to be capable of studying the object without influencing it or being influenced by it. Values and biases are prevented from influencing outcomes. Findings can be replicated (Guba and Lincoln, 1994). Deductive methods of enquiry are utilised to seek knowledge and test theory, outcomes are often in value-free, law-like generalisations (Reige, 2003)	Modified dualist/objectivist; critical tradition/community; findings probably true. The investigator and the investigated object are linked, the investigator attempts to maintain objectivity. However, findings are, to some extent, value-laden. Special emphasis is placed on external 'guardians' of objectivity such as critical traditions (do the findings fit with pre-existing knowledge?) and the critical community (such as editors, referees, and professional peers). Replicated findings are probably true (but always subject to falsification) (Guba and Lincoln, 1994). Critical realism is associated with both deductive and inductive methods and relies on multiple methods of discovery. Post-positivist, critical realists review literature before formulating research questions and setting hypotheses/propositions (Denzin and Lincoln, 2000)	Transactional/subjectivist; value mediated findings. The investigator and the investigated object are assumed to be interactively linked, with the values of the investigator (and of situated 'others') inevitably influencing the enquiry. Findings are value mediated. Thus, the boundary between ontology and epistemology becomes blurred (Guba and Lincoln, 1994).	Transactional/subjectivist; created findings. The investigator and the investigated object are assumed to be interactively linked so that the 'findings' are literally created as the investigation proceeds. Again, the boundary between ontology and epistemology becomes blurred (Guba and Lincoln, 1994). The focus is on the case itself and inductive methods of enquiry are utilised.
Methodology	Experimental/manipulative; verification of hypotheses; chiefly quantitative methods. Questions and/or hypotheses are subjected to empirical test. Conditions are carefully controlled to prevent outcomes from being improperly influenced (Guba and Lincoln, 1994). Examples include, laboratory tests, other experiments and sample surveys (Saunders and Lewis, 2012).	Modified experimental/manipulative; critical multiplism (version of triangulation) as a way of falsifying hypotheses; may include qualitative methods. Inquiry takes place in more natural settings and discovery is re-introduced as an element (especially in social sciences where emic viewpoints are solicited to assist in determining the meanings and purposes that people ascribe to their actions). Contributes to 'grounded theory' (Glaser and Straus, 1967; Strauss and Corbin, 1998).	Dialogic/dialectical. The transactional nature of the inquiry requires a dialogue between the investigator and the subjects of the inquiry. The dialogue is aimed at transforming ignorance and misapprehensions into more informed consciousness about how the structures might be changed and what actions are required to affect change (Guba and Lincoln, 1994). The researcher takes the role of 'transformational enquirer' (Giroux, 1988). Positivist and interpretivist methodologies can be	Hermeneutical/dialectical. Individual constructions are created and refined through interaction between and among investigator and respondents. Constructions are interpreted using conventional hermeneutical techniques, and are compared and contrasted through a dialectical interchange. The final aim is to distil a consensus construction that is more informed and sophisticated than any of the

			used but the overall commitment is to dialectical analysis (Gephart, 1999).	predecessor constructions (Guba and Lincoln, 1994). Methods include the intrinsic case-study, grounded theory methods, ethnography and observation.
Summary & Discussion	**There exists a single external reality.** **The researcher is objective.** The researcher is independent from that being researched. Findings are value-free. Utilises quantitative methods such as experiments and surveys. Deductive approach. Is explanatory. Driven by laws and mechanisms. Replicable and generalisable. **Positivism, along with associated epistemology and methodologies, was not deemed appropriate as a single, overall research paradigm for this study as positivism is based mainly on finding out the facts about 'what' exists. Although this research study IS concerned with discovering the 'reality' that is the SOT ceramics cluster, it is not only concerned with gathering quantitative data, but also with gathering 'rich' qualitative data in order to interpret, explain and predict what is happening in the SOT cluster. Therefore, whilst this paradigm may be appropriate for partially achieving some of the research objectives (Objective 7, for example), it is not appropriate as a paradigm for the whole research study.**	Multiple realities exist. The researcher attempts to maintain objectivity. The researcher is interlinked with that being researched. Findings are to an extent value-laden. Utilises both quantitative and qualitative mixed-methods approach. Is both deductive (mostly) and inductive. Is both explanatory and interpretive, and can be predictive. **The researcher started with a review of literature and the formulation of a theoretical framework and propositions. The researcher is not independent from the research and there will be a degree of value-ladenness. Multiple methods are required to achieve the objectives (see Figure 3.2). Triangulation will be achieved through integration and synthesis of multiple sources. Both quantitative methods and qualitative methods are required to achieve the objectives. Therefore, this paradigm is particularly appropriate for this research study.**	Multiple realities exist. Is about de-constructing (and re-constructing) the current 'reality' with the aim of making structures more visible and by encouraging self-conscious criticism, and by developing emancipatory consciousness in social members. The researcher is both objective and subjective. Findings are to an extent value-laden. Focus is on qualitative but some quantitative methods may support. Is both deductive and inductive (mostly). Uses positivist and interpretive but the focus is on dialectical analysis **There are some aspects of critical theory ontology that may be appropriate in achieving some of the objectives of this research study. For example, to discover, through in-depth interviews, deeper explanations/reasons pertaining to the proposed innovation & collaboration questionnaire survey findings (objectives 7 & 8), and also to achieve objectives 9 & 10. This stage of the research involves deconstructing interview discourse and analysing/re-constructing in light of the theoretical framework. Therefore, this paradigm is appropriate for the final stage of the research.**	Multiple realities are socially and empirically based. Is about constructing the 'truth'. The researcher operates a subjective relationship with respondents. Inquirer and the inquired are interactively locked into an interactive process of talking, listening, reflecting, *etc.* Research is heavily value laden. Focus is mostly on qualitative methods at the micro level (dialectical), although quantitative methods may supplement. Is inductive. **This paradigm is rejected outright on the grounds that this research study starts with a theoretical framework and a series of propositions closely linked to the literature. This paradigm approach is inductive in that it does not start with theory. Therefore, this approach is not suitable for this research study.**
Decision	**Rejected**	**Accepted for objectives 1-10**	**Accepted for objectives 9 and 10**	**Rejected**

(Source: Author)

3.3: The Research Paradigm Selected for this Research Study

As demonstrated in Table 3.1 (decision row), this research study involves elements of three of the four main research paradigm categories. The research requires both quantitative and qualitative elements. Some objectives, for example, require the researcher to be independent and objective (Positivist stance) in determining the 'reality' that is the current situation of the SOT ceramics cluster, *e.g.* elements of objectives 1-8 will be achieved through analysis of extant data and from a questionnaire survey. However, the researcher cannot remain truly independent as interpretation and explanation of such findings will be subjective and value laden, *i.e.* the researcher will interpret the findings in light of the theory. Some of the objectives call for a purely qualitative approach, *e.g.* elements of objectives 1-8 and all of objectives 9 and 10 can only be achieved through discourse, deconstruction and reconstruction in light of theory (Critical Theory approach). Therefore, a greater degree of subjectivity is required for these objectives.

After careful consideration of all research paradigms presented above, along with the specific requirements of this research study, the post-positivist/critical realist approach is deemed to be the most appropriate as the *core* research paradigm for this research study. However, given that the research objectives can be linked to several competing paradigm approaches, *i.e.* positivism, critical realism and critical theory, the researcher intends to utilise a mixed paradigms approach for this research study. This approach is in line with that of Onwuegbuzie and Johnson (2006) who, whilst acknowledging that combining quantitative and qualitative approaches may sometimes be considered as tenuous because of competing dualisms, purport that both viewpoints can be used in a study by having a pure qualitative part and a pure quantitative part, and then by constructing meaning from both pure components of the study. They also offer another approach, which is to assess in terms of a continua rather than dualisms and then take more moderate positions on each continuum (p. 59).

It is the researcher's intention to carry out qualitative and quantitative research to satisfy differing objectives as mentioned in Table 3.1 above. Moreover, it is also the researcher's intention to combine the different quantitative and qualitative elements in order to fulfil the overall research aim which is to discover whether the SOT ceramics cluster is functioning as a 'successful' industry cluster, as determined by the cluster literature. For example, one of the key reasons given in the literature for cluster failure is an imbalance of power between firms, where dominant firms may not act in the best interests of the whole industry cluster.

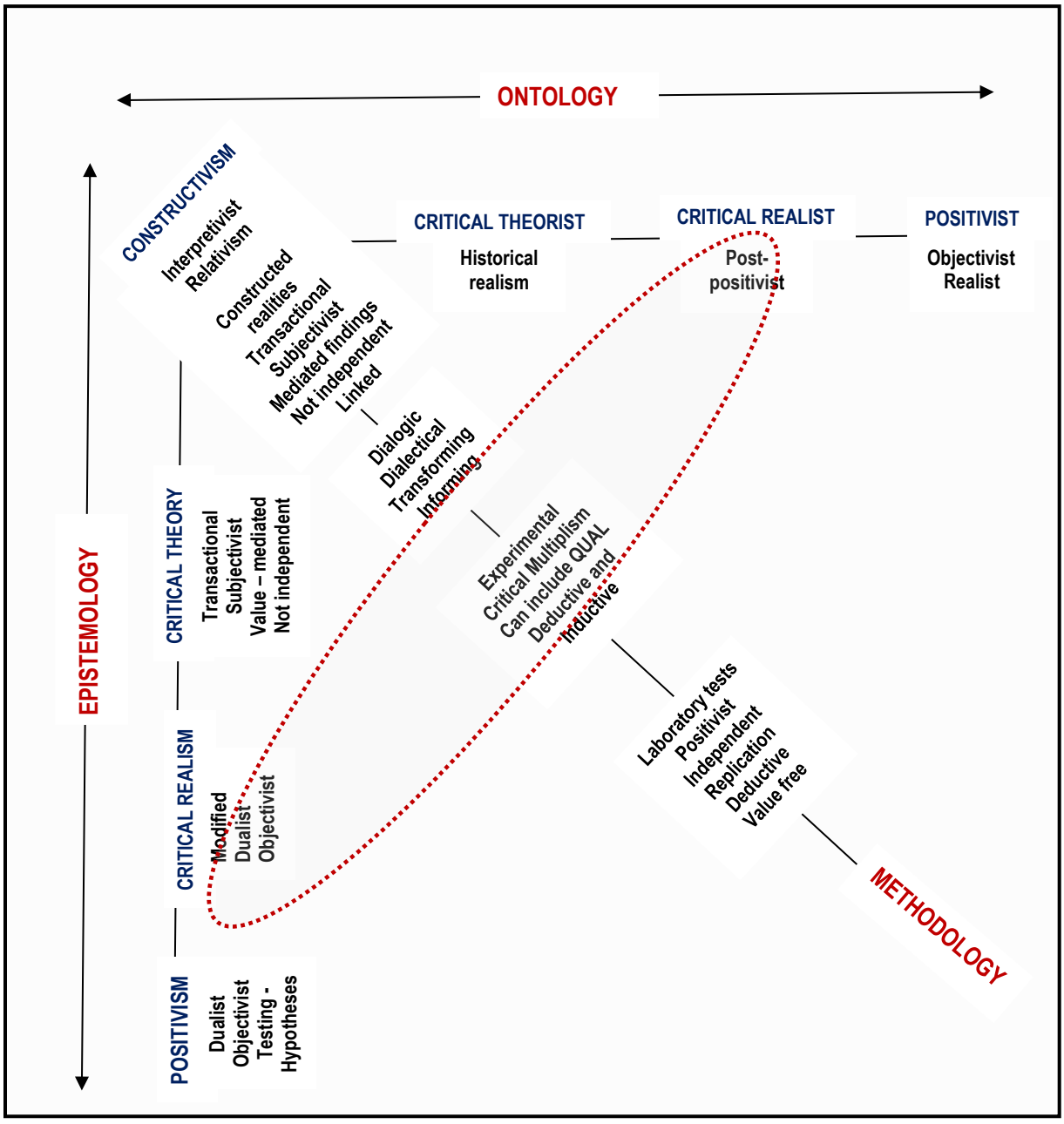
Quantitative methods will establish if dominant firms are present in the SOT cluster (objectives 1 & 2), qualitative methods will establish the nature and effects of dominant firms' power and control (objectives 9 & 10). The findings from both components will be considered together by the researcher and value-laden inferences will be made in light of theory (objective 11). The researcher is also aware that particular findings might not support existing theories as, according to Shannon-Baker (2016) "*theories cannot offer an all-encompassing view of a phenomenon*" (p. 329).

Table 3.2 draws together the key characteristics of the different paradigm approaches and identifies the combined paradigm approach adopted for this research study. However, such a simple table does not fully demonstrate, with accuracy, the adopted elements from the different paradigm approaches as it is only two dimensional. Consequently, Figure 3.1 (next page) has been constructed as a three-dimensional depiction of where the chosen paradigm 'sits' along the three axes.

Table 3.2: The Paradigm Adopted For This Research Study

	Positivism	**Critical Realism**	**Critical Theory**	**Constructivism**
Ontology	Natural world. Facts/laws. Verified hypotheses.	Social world. Human behaviour. Time bound. Non-verified hypotheses that are probable facts/laws. Falsification.	Structural/historical insights.	Individual reconstructions coalescing around consensus.
Epistemology	Independent from that being studied. Objective. Value free. 'Disinterested scientist'.	Not totally independent from that being studied. Objective and subjective. Not value free. Elements of disinterested scientist and 'transformative intellectual'	Interdependent with that being studied. Subjective. Value laden. Transformative intellectual	Interdependent with that being studied. Subjective. Value laden. 'Passionate participant' as multi-voice reconstruction.
Methodology	Laboratory tests Quantitative Validation Hypo-deductive	Modified experimental/ manipulative Critical Multiplism Quantitative & qualitative Case studies Questionnaires Falsification Deductive & inductive	Dialogic Dialectical Deconstructs Observation Qualitative Deductive and Inductive	Hermeneutical Dialectical Constructs Observation Description Qualitative Inductive
		THE PARADIGM		

Figure 3.1: The Philosophical Research Approach



(Source: Author)

Figure 3.1 locates this research study on each of three axes. The first axis on the left represents different epistemological positions. The selected epistemological stance (see dashed oval line) is located in-between positivism and constructivism, it is positioned slightly closer to positivism on the axis as the proposed research does not follow constructivist principles but does include elements of positivism. The top axis represents the main ontological stances available. The current research is firmly located in the critical realism position as, although the chosen research paradigm includes elements from positivism,

critical realism and critical theory (discussed earlier), critical realism combines elements of all three approaches. The central axis represents different methodologies. Again, the proposed research is positioned centrally along this axis to demonstrate the multiple method approach (quantitative and qualitative), which is required to achieve all of the objectives.

A multiple-method approach is in-line with a critical realism paradigm as it is both deductive (theory testing) and inductive (theory building). According to Saunders *et al*., (2003), it is not only possible to combine these approaches it is often advantageous. By starting with a coherent theory, the researcher can derive, by *deduction*, at a series of facts that ought to exist. However, a key aim of this research study is to further develop the theory on industry clusters, especially the theory on dominant firm effects where a gap in the literature has already been identified. Therefore, there are also *inductive* elements to this research study.

3.3.1: The Paradigm and Deductive/Inductive Elements

There are a number of aspects of the deductive approach that are appropriate to this research task, *e.g.* the research study involves developing a theoretical framework and testing it through a case study of the SOT ceramics cluster. In addition, causal relationships between the variables can be explained, *e.g.* the relationship between the number of firms in the industry and innovative output. The main purpose of the deductive approach will be to describe and analyse what is happening. For example, an increase or decrease in the number of firms in the SOT cluster, and who innovates and what the nature and level of such innovation is. Thus, the deductive approach is particularly appropriate for achieving objectives 1-8. Data requirements at this stage will be mostly quantitative and will rely upon both existing secondary data (objectives 1-5) and, primary data gathered through questionnaires (objectives 6-8). However, not all elements of objectives 6-8 can be achieved through questionnaires as a qualitative approach is required to determine reasons and motivations for why firms may/may collaborate.

The inductive approach is particularly suitable for achieving objectives 9-11 because it reflects the changing research emphasis as the research progresses, *i.e.* from identifying "what" is happening in the SOT ceramics cluster to explaining 'why' and 'how'. This stage of the research seeks to gather qualitative data in order to answer these questions and to fill gaps arising from research stage 1 (objectives 1-8). The main data collection method at this stage (objectives 9-10) will be semi-structured interviews (discussed in detail later in this

chapter). Objective 11 will involve: combining, refining and synthesising all of the findings from the various stages and attempting to validate/falsify the theoretical propositions; and, developing the theory, in particular the theory on dominant firm effects. Robson's (1993) five sequential stages of the deductive research process have been modified and mapped to the research task and are presented in Table 3.3 below.

Table 3.3: The Deductive/Inductive Research Process

Deducing Propositions	Propositions 1-10
Expressing the Propositions in operational terms	Research Objectives 1-8 (mostly quantitative)
Expressing the Propositions in operational terms	Research Objectives 9-10 (mostly qualitative)
Testing the Propositions	Through a case-study of the SOT ceramics cluster (Tableware & Giftware sector)
Examining the specific outcome of the inquiry	Through mapping findings to the theoretical framework developed in the literature review and drawing conclusions.
If necessary modifying the theory	In light of the conclusions. Research Objective 11

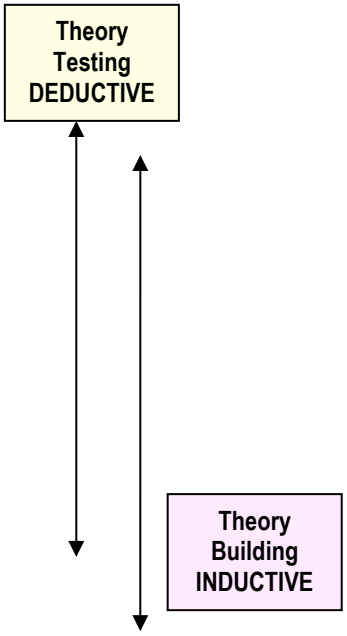


Table 3.3 demonstrates the 'overlapping' nature of the deductive and deductive elements of the research. The research starts with theory (see literature review and theoretical framework) from which a set of propositions was developed. This stage of the research is deductive, however as the research progresses it is envisaged that theory will be refined and possibly modified along the way. For example, cluster theory purports that in successful industry clusters there is strong evidence of co-operation between members. However, there is some evidence that some industry clusters can be successful with minimal co-operation, perhaps because historically industry technologies and processes have not necessitated a need for firms to establish strong co-operative links. The proposed research intends to identify the need for co-operation in the SOT ceramics cluster at an early stage (objectives 3-5). The results of this stage of the research will influence the findings from later stages, *e.g.* when analysing and evaluating actual levels of innovation and co-operation in the SOT ceramics cluster. The theory on industry clusters will be developed and possibly modified

throughout the research process. Hence, some stages of the research will be both inductive and deductive simultaneously. The final stage of the research will be inductive and will include a review, modification and new contribution (if appropriate) to existing cluster theory.

3.4: Research Strategy

As already noted in this chapter, the post-positivism/critical realist approach emphasises the importance of multiple measures and observations, each of which may possess different types of error, and the need to use triangulation across these multiple errorful sources to try to get a better bead on what's happening in reality (Trochim, 2002). According to Small (2011), mixed-method thinking should inform all stages of the research process, from problem definition through write-up, rather than only measurement or the assessment of evidence (p. 61). The author has already employed a mixed-methods approach in selecting an appropriate paradigm and will employ a mixed-method approach in utilising differing methods for data collection and data analysis in order to meet the objectives, *e.g.* historical review, questionnaires and interviews for data collection, and quantitative techniques such as statistics and numerical tables, pattern-matching and triangulation for data analysis. However, it is first necessary to define what is meant by mixed methods research and this is not straightforward to achieve.

Johnson and Onwuegbuzie (2004) define mixed methods research as "*the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts, or language into a single study*" (p. 17). One problem with this definition is that it does not state 'how' the different methods, *etc.* should be combined. The problem is further identified by Bryman (2009) who states "*mixed methods research is an approach to the research process that is in an ambiguous position*" (p. 516). The ambiguity is caused because it is not always obvious what mixed methods research denotes in specific terms.

This is an important issue as different authors attach different meanings to the term 'mixed methods'. For example, according to Yin (2006), a frequent practice in carrying out mixed methods research is to split the original set of questions, so that different research methods address different questions. However, according to Small (2011), different methods can be used to answer the same questions.

Yin's definition of mixed methods appears to be more aligned with what Tashakkori and Teddlie (2003) call 'multi-methods' design. According to Tashakkori and Teddlie, "*the major difference between multi-method and mixed method designs is that in multi-method design all studies are complete in themselves*" (p. 199). With multi-method design there is one over-arching research question, but there can be two or more interrelated studies. The results of each method are 'pulled together' to address the overall research question. With mixed methods design, however, textual data can be transformed to numerical data and used in analysis of a quantitative study (Tashakkori and Teddlie, 2003; Maxwell, 2016). Thus, this definition of mixed methods is much more consistent with Small (2011), who also purports that one of the main approaches to data analysis in a mixed methods design is 'crossover analysis' where quantitative techniques are applied to qualitative data or vice versa. However, Small (2011) also identifies 'integrative analysis' as another technique in mixed methods analysis where two or more different analytical approaches or techniques are merged into a single study, and this second technique appears to be more in-line with Tashakkori and Teddlie's multi-methods approach. In addition, other researchers also advocate the use of mixed methods in the analysis of data (Onwuegbuzie *et al*., 2009; Sandelowski *et al*., 2009; Molina-Azorin and Lopez-Gamero, 2016).

Such confusion over the meaning of the term 'mixed methods' calls for the researcher to define clearly at this point exactly what mixed methods means within the context of this research study. For the purposes of the research, *i.e.* to achieve all of the research objectives, and thereby answer the research question, a multi-methods approach will be the overriding strategy. Different methods will be employed to achieve different objectives and data will be analysed using integrative data analysis techniques. However, it should also be noted that the research will also involve a true mixed methods approach to achieve objectives 9-10 (discussed in more detail later), where some of the findings from the quantitative study will be combined with the qualitative findings.

3.4.1: Mixed Methods and Verification

One of the advantages of using a mixed-methods approach is that the author can attempt to verify the findings derived from one type of data with those derived from another, *e.g.* outcomes of the questionnaire survey will be compared to those of the in-depth interviews. This approach is sometimes referred to as 'triangulation' where different kinds of data are collected to measure the same phenomenon (Kadushin, *et al*., 2008; Farquhar and Michels, 2016). According to Yin (2006), mixed methods within a single study are valuable for

producing converging evidence that may provide a more compelling argument than evidence from any single method alone. Although the research will mostly use different methods to address different objectives there will, as stated earlier, be some combining of methods to obtain a fuller picture of innovation and co-operation in the SOT cluster (objectives 6-8).

Another advantage of a mixed methods approach is that alternative types of data can also produce conflicting results (Small, 2011). Thus, weaknesses in single-source findings can be minimised by using different methods to answer the same questions. For example, this research study intends to utilise questionnaires followed by in-depth interviews to find out about innovation in the SOT cluster. It will be interesting to discover if the findings from both methods match. According to Brewer and Hunter (2006), one of the greatest values in combining different types of data lies in the ability of one type to compensate for the weaknesses of the other.

3.4.2: Mixed Methods and Sequencing

A mixed-methods approach can also be adopted when deciding on the sequencing of the data collection (Small, 2011; Hong *et al.,* 2017). The basic issue is whether two or more types of data are collected concurrently (at the same time) or sequentially (one after the other). In this research study data will be collected data both concurrently and sequentially. For example, the data required (secondary data) to achieve objectives 1 and 2 will be collected and analysed first, as the one of the aims at this stage is to identify the research population (all ceramic firms left in the SOT cluster in 2016) which will form the target for the questionnaire. Secondly, the data required to achieve objectives 3-8 will be collected concurrently after objectives 1 and 2 have been achieved, *i.e.* objectives 3-5 can be achieved through extant secondary data collection and analysis and objectives 6-8 can be achieved (partially) through questionnaire survey.

The final stage involves drawing a sample from the questionnaire survey responses for in-depth interviews. One aim in this respect is to assess the believability of the survey responses in addition to achieving objectives 9-10. In this way objective 11 (conclusions) can be achieved from a process in which prior data collection has informed the nature and form of the subsequent alternative type of data. The strength of this approach derives from the ability of the different stages to resolve specific questions that emerge in the process of data

collection with additional data collection (Small, 2011; Subedi, 2016). All of these stages are in-line with a mixed-methods approach as, according to Tashakkori and Teddlie (2003):

> "*when used sequentially the method that theoretically drives the study is usually conducted first, with the second method designed to resolve problems/issues uncovered by the first study or to provide a logical extension to the findings of the first study*" (p. 199).

Another characteristic associated with mixed data-collection studies is the extent to which the design employs 'nested' data (Small, 2011; Lieberman, 2005, 2013). Nesting refers to the extent to which multiple data types are collected from the same actors, organisations, or entities (Lieberman, 2005). The data collection methods and the sequencing of those methods, as described above, demonstrate the intended nested design of this research study. For example, individual SOT ceramics manufacturers will be surveyed and some of those respondents will be selected for in-depth interviews. In this way findings from the interviews will be used to reinforce or refute the survey findings (triangulation).

3.4.3: Mixed Methods in Data Analysis

A final consideration in a mixed-methods research approach are the methods employed in analysing the data. Most researchers analyse multiple data sources the way they examine single data sources, *e.g.* when analysing interview transcripts, ethnographic field notes, or historical texts, researchers have approached the data qualitatively, *e.g.* developed narratives, inferred meanings, quoted passages, *etc.* When analysing survey responses, census tabulations, or large sample data, they have approached the data quantitatively, *e.g.* calculating averages, plotting distributions, *etc.* (Small, 2011).

In this research study a number of different analytical techniques to analyse the data at different stages. For example, objectives 1 and 2 will involve the construction of a longitudinal study to track the development of the SOT cluster from 1960-2016 and to arrive at the number of firms left in the industry in 2016 (the population to be surveyed). It is intended to use data reduction techniques along with descriptive statistics at this stage so that percentages and averages can be calculated. However, the subsequent analysis of those findings will involve mapping findings to the theoretical framework and providing a narrative to explain their meaning in light of theory, *e.g.* the effects of consolidation on competition in the industry will call for value-laden assumptions on the part of the researcher.

Objectives 3-5 will involve qualitative techniques in analysing existing historical texts and other secondary data, such as providing narrative and drawing inferences in light of theory (as before). Objectives 6-8 can be achieved from the survey questionnaire responses which will be analysed using statistical software or simple frequency tables (depending on the number of responses). Findings will again be mapped to the theoretical framework and narrative/inferences provided. Objectives 9 & 10 can be achieved from the semi-structured interview responses and will involve purely qualitative techniques such as pattern matching, based on themes arising from the literature review and presented in the theoretical framework, followed by narrative and inferences. The final stage of analysis will involve combining all of the data and mapping it to the theoretical framework and to the propositions, from which overall conclusions will be drawn (objective 11).

3.5: Research Design – the Single Case Study

This research study started with a theoretical focus, *i.e.* the theory on industry clusters from which an analytical framework was developed. Thus, the main 'object' of the research is the theory on industry clusters. Subsequently the SOT ceramics industry cluster, tableware and giftware sector, was selected as the 'subject' of the research. The subject of the research will be a case study which acts as a lens through which the theoretical focus, the object, will be viewed and explicated (Thomas, 2011). A recent definition of a case study is provided by Yin (2014), who defines case study analysis as "*an empirical enquiry that investigates a contemporary phenomenon (the case) in-depth and within its real world context*" (p. 16). The SOT cluster is defined as a single case study for the purposes of this research study because it represents virtually the whole of the UK ceramics production industrial sector and is, therefore, of high relevance to both the local (West Midlands) and UK economies.

According to Stake (1995), although the case study approach can involve analysis of a relatively small number of situations, the number of cases can be only one. Such intensive study of one case can lead to the discovery of relationships that may not be found by any other means. A single case study methodology is appropriate to this research study as it is suited to the empirical enquiry that investigates bounded contemporary phenomena within a real life context (Creswell, 1997). Moreover, a case study must be reasonably bounded, *i.e*. it should not stretch over too wide a canvas, either temporal or spatial (Remenyi *et al.,* 2002). As seen in the literature review, cluster theory views the cluster as a 'whole', a functioning, dynamic 'system'. Furthermore, according to Porter (1990), cluster analysis starts with a large core firm, or several core firms, and spreads out from there (see literature

review). Thus, a single case study approach is particularly suited to investigating the SOT industry cluster. It has also been the strategy adopted in many previous cluster studies where the cluster is viewed as a single case. For example: the ten key case studies from Porter's original work on industry clusters (Porter, 1990); the Indian software industry (Dayasindhu, 2002); and, Malaysia's multimedia cluster (Richardson, 2013).

However, it should be noted that what may appear to be a single case study may consist of "*many potential observations, at different levels of analysis, that are relevant to the theory being evaluated*" (King, *et al.,*1994, p. 208). In this study, as in previous studies (*e.g.* Porter, 1990), only one industry cluster was adopted as the case study. However, the theoretical framework for this research study requires many observations to be made, at different levels, *e.g.* from secondary data, questionnaires and interviews, *etc.* if a full picture of the functioning of the SOT cluster is to be gained.

Thus, the research strategy for this study is a multi-strategy approach that combines case study, descriptive studies, explanatory studies and longitudinal studies. However, the overriding focus of this research study is a single case study of the SOT Ceramics Cluster (*i.e.* the tableware and giftware sector), which is defined here as the unit of analysis. According to the research methods literature, the unit of analysis is what holds a study together (Yin, 2006, 2014; Harrison *et al.,* 2017). A further refinement of the unit of analysis is required at this point. It is not the researcher's intention to survey all firms belonging to the SOT ceramics cluster, *e.g.* suppliers and distributors, but to only survey the cluster's manufacturers of tableware and giftware (core firms). These firms will be identified by achieving objective 1, which seeks to track the development of SOT tableware and giftware manufacturer's from 1960-2016. At the end of this process all core manufacturers still operating in this industry sector will be identified. This final list of firms will form the total population for the primary research.

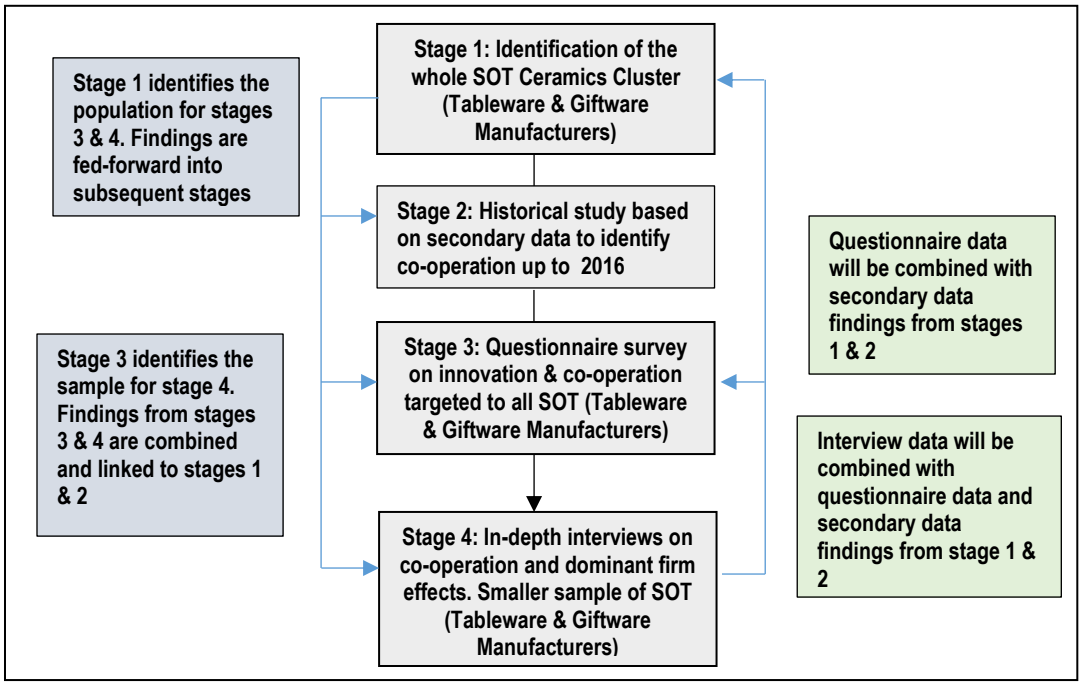
3.5.1: Case Studies and Nested Samples

Despite the varied methods that will be utilised to achieve the objectives, the researcher will consistently maintain the SOT ceramics cluster as the same point of reference and an integrated approach is taken to blend all of the methods into a single study. Sampling procedures are also carefully considered in maintaining a single study. According to Yin

(2006), "*most desirably, the samples of each method maybe nested within that of the other.....nesting may be in either direction*" (p. 44).

In this research study samples will be nested as follows: achievement of objective 1 will determine the whole population to be surveyed; to achieve objectives 6-8 the whole population will be targeted to be surveyed; to achieve objectives 9 and 10 a sample will be drawn from the actual survey responses for in-depth interviews. In this way the researcher will achieve nesting of samples. Figure 3.2 shows how the research will integrate the unit of analysis.

Figure 3.2: The SOT Cluster as an Integrated Unit of Analysis



3.5.2: Case Studies and Critical Realism

The case study method, as described above, fits perfectly with the critical realist approach and is deemed appropriate for this research study as, according to Robson (2002), it is "*a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence*" (p. 178). In fact, multiple data collection methods are one of the distinguishing features of a case study (De Vaus, 2001; Saunders *et al*., 2003). In this study, the empirical investigation is concerned with finding out whether the SOT ceramics cluster functions as a successful or failing industry cluster, according to cluster theory. Multiple sources of evidence include

various published secondary data, and primary data gathered from the questionnaire survey and in-depth interviews.

The case study strategy was selected as the core strategy for this research study for two main reasons:

1. Case studies are consistent with the critical realist approach where there is an interest in testing and developing external theory.
2. The complexity of the SOT cluster requires both a holistic perspective (whole cluster as the main unit of analysis), as well as individual management and industry expert perspectives. The research requires an examination of historical and documentary evidence as well as responses to questionnaire and in-depth interviews. Thus, the case study approach allows for real-life interactions of variables to be examined, *e.g.* the relationship between co-operation and innovation, thereby allowing for 'identification of detailed interactive processes' (Remenyi *et al*., 1998).

One of the unique strengths of the case study approach is its ability to deal with a full variety of evidence and this is particularly useful in combining deductive and inductive approaches within the research frame. The single case study strategy was selected as the core unit of analysis as it allows for both holistic and sub-units to be investigated and for findings to be combined. Failure to research holistic as well as sub units of data may result in research that cannot test the propositions. Furthermore, the case study approach, with mixed methods, supports the requirements for theoretical generalisation (De Vaus, 2001). The carefully formulated propositions and theoretical framework for this research study provide clear direction for what the researcher needs to examine within this study. Subsequently, the case study strategy should facilitate in carrying out the necessary secondary and primary research required to fulfil the research objectives and to test the propositions.
As mentioned previously, whilst the single case study will be the overall focus of the research, several other research strategies will be incorporated into the case study approach for this research study. For example, 'longitudinal', 'descriptive' and 'explanatory' studies (Robson, 2002), will be applied at various stages throughout the research.

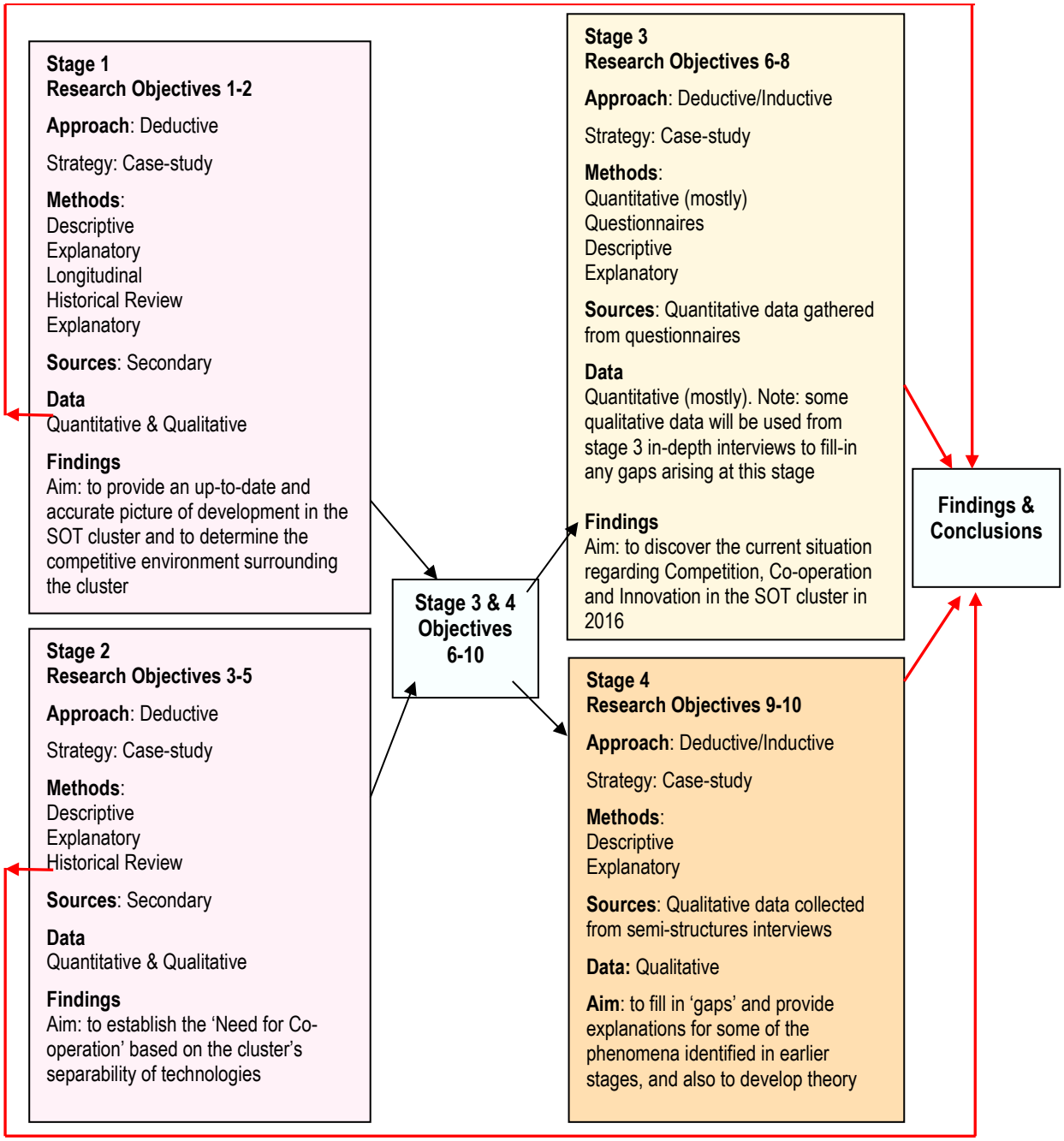
- Longitudinal - the main strength of longitudinal research is the capacity that it has to study change and development (Saunders *et al.* 2003). This approach will be particularly relevant to objective 1. There is much published data, constructed over a long time, pertaining to the UK and SOT ceramics industry. From these sources it will be possible to produce a series of snapshots of the SOT cluster over a period of time

which, when joined together, will give a ‘moving image’ (McGivern, 2002). Valuable data can be gained in this way which when analysed may give powerful insights into developments in the SOT ceramics cluster.

- Descriptive – to construct an accurate profile of firms, events and situations in the SOT ceramics cluster. Appropriate for all stages of the research.
- Explanatory – to establish causal relationships between variables and to explain the relationships between them, *e.g.* the relationship between competition and innovation.

The approaches used in this study to achieve objectives 1-5 are also similar to what Jankowicz (1995) calls ‘historical review’, where the purpose is to describe what has happened in the past and to trace the development of issues. The various research strategies and methods described above are presented in Figure 3.3.

Figure 3.3: The Research Strategies and Methods Employed at Various Stages of This Research Study



3.6: Sampling Approaches

This section presents a discussion of the different sampling approaches and techniques that will be employed to achieve the objectives of this research study. It has already been stated that the unit of analysis for this research study is the Stoke-on-Trent Ceramics manufacturing cluster, tableware and giftware sector. It has also been stated that the

research will focus on core manufacturers of tableware and giftware only, *i.e.* those firms who carry out all/most stages of production. It is the researcher's intention to include all such manufacturers who are located within the main Stoke-on-Trent postcode areas, *i.e.* ST1 - ST6, in defining the SOT cluster. Moreover, only firms with 10 or more employees will be included in the survey. The rationale for selecting only core manufacturers for the study is supported by Michael Porter's technique for cluster identification where he advocates starting with a "*large firm or concentration of like firms*" at the core of the industry (Porter, 1998b: 5).

3.6.1: The Research Population – Research Stages 1 and 2

Stage 1 and 2 (objectives 1-5) will be achieved through the collection and analysis of existing secondary data pertaining to the SOT ceramics cluster (discussed in more detail later). It is the intention to construct a unique database that tracks the number and movement of all core ceramics firms from 1960 to 2016 including all firms entering the industry and all firms exiting the industry. This first stage of the research involves gathering and analysing existing quantitative and qualitative data and identifying patterns that match they key themes identified in the theoretical framework. Subsequently, this exploratory and explanatory process will lead to initial assumptions being made about the competitive advantage of the SOT cluster, in particular about competition, collaboration and innovation in the cluster.

The next stage of the research will require the researcher to check out the viability of these emergent findings with new data, *i.e.* it will involve testing assumptions and confirming/disconfirming the importance and meaning of identified patterns. According to Patton (1990), the source of questions or ideas to be confirmed or disconfirmed may be from previous scholarly literature. This approach is in-line with the deductive nature of the research at this stage where findings will be analysed and discussed in light of the cluster literature. Confirming or disconfirming emergent findings from stages 1 and 2 will require further primary research. For example, the research will enable some early assumptions regarding competition and cooperation to be made at this stage, but questionnaire and interview surveys are required in order to gain a more accurate picture. Consequently, a further key outcome for this initial stage will be the identification of all core manufacturers of tableware and giftware remaining in the SOT cluster in 2016. These remaining firms represent the total population, or research frame, for the following two stages of the research.

3.6.2: The Research Population – Research Stage 3

Stage 3 (objectives 6-8) will involve a questionnaire survey (quantitative) of all firms identified from stage 1, *i.e.* the total population. Existing unsubstantiated evidence estimates the number of firms to be somewhere between 15 and 30 in 2011 (see chapter 4.2.1), and so the whole population is small enough to be surveyed in its entirety. According to Yin (2006), sampling procedures need to be considered carefully in maintaining a single study while using mixed methods. The different logics that underpin quantitative studies and qualitative studies are also reflected in different sampling approaches (Patton, 1990). Quantitative inquiry typically depends on large samples selected randomly. Qualitative studies tend to focus in-depth on relatively small samples (Patton, 1990). However, despite the quantitative nature of stage 3 of this research study, the intention is to survey the whole population of ceramics firms, if possible, and therefore random sampling is not required. Surveying the whole population in this way will permit confident generalisations to be made.

3.6.3: The Research Sample – Research Stage 4

Stage 4 of the research (objectives 9 and 10 and further in-depth inquiry into issues raised from stage 3) will involve purposeful sampling techniques to select from the questionnaire survey responses a sample of the total population for in-depth interviews. This approach is appropriate, as in a mixed-methods study, the samples of each method may be nested within that of the other (Yin, 2006). In this study, the sample for the interviews is nested within the questionnaire total population. *Stratified, purposeful*[25] *sampling* (Patton, 1990) will be the main technique at this stage. The questionnaire responses will be categorised, using standard industry classifications, into small, medium and large sized firms. Within each of these classifications the responses will be analysed and further categorised into three subgroups, *e.g.* those firms who: innovate/collaborate most; engage in some innovation/collaboration; do not engage in any innovation/collaboration. Subsequently the sample for interviews will be drawn from each subgroup within each category (small/medium/large). By carrying out this process the research will account for 'maximum variation' (Patton, 1990) in the sample, *i.e.* the researcher can be sure that the size variation among firms is represented in the study. In this way common patterns that emerge from great variation will be of particular interest and value in capturing core experiences and central, shared aspects or impacts of/on innovation and collaboration. Purposeful sampling

[25] Stratified purposeful sampling involves, "*taking a stratified purposeful sample of above average, average, and below average cases. This is less than a full maximum variation sample. The purpose of a stratified purposeful sample is to capture major variations rather than to identify a common core, although the latter may also emerge in the analysis. Each of the strata would constitute a fairly homogeneous sample. This strategy differs from stratified random sampling in that the sample sizes are likely to be too small for generalization or statistical representativeness*" (Patton, 1990, p.174.

techniques are deemed appropriate for this stage of the research as they allow for the selection of information-rich cases for studying in-depth (Patton, 1990). Furthermore, according to Saunders *et al*., (2003), non-probability sampling techniques are commonly used in case study research. The difference between probability and non-probability sampling is that non-probability sampling does not involve *random* selection.

3.6.4: Other Sampling Techniques

In addition to stratified sampling, another specific type of purposeful sampling intended for this stage of the research is '*extreme or deviant case sampling*' (Patton, 1990, p. 69). Extreme or deviant case sampling focuses on cases that are rich in information because they are unusual or special in some way. Unusual cases may be particularly troublesome or especially enlightening, such as outstanding successes or notable failures. For this research study, information will be gathered from the questionnaire survey on innovation and co-operation in the SOT cluster. The evaluation focus at stage 4 will be on understanding the conditions under which firms do/do not collaborate. According to Patton (1990), it is not necessary to randomly sample from within the subgroups as the researcher should "*think through what cases they could learn the most from and those are the cases that are selected for the study"* (p. 170).

3.6.5: Rationale for sampling Methods

In many instances more can be learned from intensively studying extreme or unusual cases than can be learned from statistical depictions of what the average case is like. An example of how this sampling approach has been used before in management research is Peters and Waterman's (1982) study of America's best run companies, where their sample list of 'innovative and excellent' companies was drawn from information provided by a group of business experts. Thus, the researcher's intended strategy of purposeful selection of extremes from the subgroups identified above is justified. However, this thesis also intends to interview firms from in-between the two extremes. Moreover, extreme or deviant cases may not be found, in which case the researcher may use '*intensity sampling*' (Patton, 1990), or a combination of the two sampling methods, as an alternative strategy. Intensity sampling involves the same logic as extreme case sampling, but with less emphasis on the extremes. The researcher may decide to select cases from the questionnaire responses that manifest sufficient intensity to illuminate the nature of success or failure, but not at the extreme. If the questionnaire responses show minimum variation then the researcher may use a combination approach, where stratified purposeful sampling is used to determine the small,

medium and large sized firms and then random sampling is utilised to select firms from within each category. According to Patton (1990), more than one qualitative sampling strategy may be necessary and, moreover, purposeful sampling and random sampling approaches are not mutually exclusive (p. 181).

It has already been stated that it is the intention to further explore emergent findings from stages 1 and 2 in the subsequent two stages of this research study. It is also the intention to utilise some of the findings from stage 4 to confirm/disconfirm and further explain findings from stage 3 (objectives 7 and 8 in particular), in addition to fulfilling the specific objectives for stage 4 (objectives 9 and 10). As well as demonstrating a mixed-methods approach to sampling, by outlining the different sampling techniques to be adopted for this single-case research study, the research has also demonstrated the 'nested data' approach that is another feature of mixed-methods research. The objectives for the four stages of the research and the differing approaches to sample selection at each stage are presented in Table 3.4.

Table 3.4: Research Approaches for the Total Population and Sample Selection

Stage 1 &2	**Total Population**	**Technique**	**Comments**
Objectives 1-5	The SOT ceramics cluster, tableware & giftware manufacturers	No sampling technique required as research is based on secondary sources of published data pertaining to the whole population of this sector	The unit of observation is a specific sector of the SOT Ceramic Industry Cluster (tableware & giftware. The sample for this study is comprised of core tableware and giftware manufacturers only. Moreover, the research is focused only on those ceramics manufacturers with 10 employees or more and who are engaged in most or all stages of production.. The rationale for choosing only core manufacturers for the sample is supported by Michael Porter's technique for cluster identification ***(Porter, 1990)***. All core-manufacturing firms in the cluster will be included.(so is representative)
Stage 3	**Total Population**	**Technique**	**Comments**
Objectives 6-8	The SOT ceramics cluster, tableware & giftware manufacturers	Construct own sampling frame based on empirical work by the author. Again, the whole population is studied.	A unique database will be constructed in stage 1. (based on quantitative data and tracking the number and movement of all core firms between 1960 and 2016 (so is representative)). From this database the whole population will be identified.
Stage 4	**Sample**	**Technique**	**Comments**
Objectives 9-10	The sample will be drawn from stage 3 questionnaire responses.	Purposeful/ Judgmental sampling. Purposeful sampling strategy employed was "'heterogeneous" or "'maximum variation" sampling ***(Saunders, et al., 2003)***	Respondents will be selected according to the three main categories of small/medium/large firms to provide the qualitative data required to validate/falsify key themes identified in stage 1 and to determine the role of dominant firms. Another criteria for selection will be respondents' level of involvement/non-involvement in innovation and co-operation. *"A sample containing cases that are different can be a strength as any patterns that do emerge are likely to be of particular interest and value and represent key theme"* ***(Patton, 2002)***

3.7: Specific Data Requirements

As stated earlier in this chapter, a combination of both secondary and primary data is required to achieve the objectives of this research study. The research objectives have been divided into four distinct stages:

Stage 1, (secondary research) The development of the Stoke-on-Trent Ceramics cluster and resultant effects on competition (1960 – 2016);

Stage 2, (secondary research) Identifying the historical need for co-operation in the Stoke-on-Trent ceramics cluster (up to 2016);

Stage 3, (primary research) The current situation regarding competition, co-operation and their effects on innovation in the Stoke-on-Trent ceramics cluster 2010-2015;

Stage 4, (primary research) Further evidence on co-operation and, power and control and the role of dominant firms in the Stoke-on-Trent cluster (1980 – 2016).

Some of the above stages can be carried out sequentially and some in parallel. For example, stages 1 and 2 can be carried out in parallel as one stage is not dependent upon the next. However, stage 1 must be completed before stage 3, as the population for stage 3 will be identified from the results from stage 1 (explained in more detail later). Similarly, stage 4 cannot take place until stage 3 is complete, as again the sample for this stage will be drawn from the questionnaire responses returned in stage 3. As discussed earlier (sampling section), this further demonstrates the 'nested data' approach that is a feature of mixed-methods research. The rest of this section is structured around identifying and justifying the data collection and data analysis methods required for each of the four stages and their associated objectives.

3.7.1: Research Stage 1 Aims: The Development of the SOT Cluster and Competition (1960 – 2016)

Stage 1 of the research is aimed at determining: the life-cycle development of the SOT cluster; the current (2016) ownership structure of the SOT cluster; the nature and type of competitive activity present in the SOT cluster; and, the presence (or not) of dominant firms in the SOT cluster. This data is required in order to fully/partially test the following propositions (see chapter 2, Table 2.3 for a full list of propositions):

P5 and P5a – Will be partially achieved through objective 2, *e.g.* the challenges of globalisation on the SOT cluster will be determined. The identification of linkages inside/outside the cluster will be achieved through objective 8 (see 3.7.14 – 3.7.18). Cluster literature indicates that successful clusters form internal and external linkages.

P6 and P6a – Will be partially achieved through objective 1, which requires analysis of competition in the SOT cluster as measured by the numbers of firms, including new entrants. The cluster literature emphasises the need for vigorous competitive activity for cluster success. The literature indicated that a reduction in the number of firms equals less competition, *i.e.* fewer firms to compete with each other.
P7 and P7a – Will be partially achieved through objective 2, which requires identification of the nature and type of competitive activity existing in the cluster. Cluster literature distinguishes between 'negative' and 'positive' forms of competition and their effects on innovative output. The nature and type of competitive activity will be further identified/explored in stages 3 and 4 (questionnaire survey and interviews). In this way verification/falsification of objective 2 results can be achieved. This is further evidence of the intent to achieve 'triangulation' across multiple data sources where possible and is in keeping with the 'critical realist' approach.
P10 and P10a – Will be partially achieved through objective 2 which requires identification of consolidation in the industry and the presence of dominant firms. Both are identified in the literature as possible contributors to cluster decline. The presence and role of dominant firms will be further identified/explored in stages 3 and 4 (questionnaire survey and interviews).

3.7.2: Research Stage 1 Objective 1 – Data Collection

In order to meet this objective it is necessary to collect historical, time-series data. This will involve the author creating a unique longitudinal secondary data set. The starting point for the longitudinal study will be Godden's (1964) 'Encyclopaedia of British Pottery and Porcelain Marks', which lists UK ceramics manufacturers' according to the various 'back-stamps' used on their products and contains listings of manufacturers' dating back to the origins of the industry in the early eighteenth century. It is considered to be a valuable and reliable[26] source of information for company names, periods of operation and name-changes. By carefully sifting through the data the research aims to construct a database of SOT core manufacturing firms still operating in the early 1960s. However, the initial data set will need to be checked and be brought up-to-date (2016), so a variety of additional sources of raw secondary data will be utilised, *e.g.* company websites, trade publications, company listings, *etc.* A listing of sources used to construct the database is included in the appendices section of this thesis (see Appendix 4a). A further aim of objective 1 is to identify the number of tableware and giftware manufacturers operating in the SOT cluster in 2016. This final list

[26] Godden's Encyclopaedia was recommended as a useful source of data by the Chief Executive Officer of the British Ceramics Confederation (the UK Ceramic Industry's leading Trade Association)

of firms will form the total population for the primary research (survey questionnaire) required for objectives 6, 7 and 8.

3.7.3: Research Stage 1 Objective 1 – Suitability of Secondary Data

As stated, each of the sources that will be analysed to construct the longitudinal study will be, where possible, cross-checked with each other (triangulated) to ensure that the findings are as accurate as possible. Furthermore, every firm listed in the final database will be subjected to further rigorous internet searches, *e.g.* utilising popular search engines such as Google[27]. In this way consistency and accuracy of the data can be ensured. If it is found that there are still 'gaps' remaining in the data, and if company contact details are available, firms will be emailed or telephoned with a request for company information. Furthermore, the researcher will use her own contacts in the SOT industry to further verify the results. The final version of the database along with an explanation of how data is classified is included in the appendices section of this thesis (see Appendix 4).

3.7.4: Research Stage 1 Objective 1 – Data Analysis

Once complete, the database will be analysed using quantitative techniques. Firstly, a series of simple tables and diagrams will be derived from the database, identifying the movement of firms within each decade (1960-2016). For example, firms existing in 1960 will be examined to see if they are still there in 1969, if firms existing in 1960 are not there in 1969 then further secondary data investigation will be carried out to determine what happened to them, *e.g.* closure, merger or acquisition. New firms appearing within the decade will be identified as 'new entrants', investigations will be made to determine if they are 'true' new firms and not the result of mergers or name changes. A full set of tables for each decade will be included in the appendices section of this thesis (see Appendices 5a-5g). From the tables, diagrams in the form of flow charts will also be constructed to show the pattern of mergers and acquisitions taking place in the SOT cluster between 1960 and 2016. Also from the tables, a series of bar charts will be constructed for each decade using Microsoft Office Excel spreadsheet software. The second part of the data analysis will involve qualitative techniques, *e.g.* a descriptive analysis of statistics (what is happening) will be provided along with an explanation of relationships and trends (possible explanations of 'how' and 'why'). At this stage findings will be explained in relation to key themes identified from the literature, *e.g.* life-cycle theory and the effects of consolidation on competition. Throughout the data

[27] Google is a search engine for finding resources on the World Wide Web

analysis a series of cross-checks will be carried out on the data to eliminate error, *e.g.* analysed data will be checked back to source tables and the database.

3.7.5: Research Stage: 1 Objective 2 – Data Collection

Objective 2 has two main aims. Firstly, it examines the external environment surrounding the SOT cluster in order to determine the nature and level of demand for the SOT ceramics cluster's products as at 2016. Secondly, it determines the pattern of competitive activity apparent in the SOT cluster between 2000 and 2016. In order to meet this objective it is necessary to collect compiled secondary data from multiple sources. This will involve the researcher gathering historical data from a wide variety of industry specific secondary sources. Examples of reports include marketing intelligence reports such as MINTEL reports "*China & Earthenware UK"* (2004 - 2014), and Keynote Reports "*China & Earthenware Market Report"* (2008), as well as specialist commissioned reports such as ECOTEC Research & Consulting Report "*Strategic Analysis of the Ceramics Industry in Staffordshire"* (1999) and FWC Sector Competitiveness Studies Report "*Competitiveness of the Ceramics Sector"* (2008). Examples of academic papers based on research into the ceramics industry include: "*Economic Governance and the Evolution of Industrial Districts Under Globalisation: The Case of Two Mature European Industrial Districts"* (Sacchetti and Tomlinson, 2009), which is a paper based on structure and governance in the North Staffordshire Ceramics District and, "*A Case Study of British Ceramics Production"* (Day *et al.,* 2000). Examples of books include: "*The British Pottery Industry 1940-1990*" (Niblett, 1990).

3.7.6: Research Stage 1 Objective 2 – Suitability of Secondary Data

The sources that will be utilised for objective 2 include both raw data and published summaries. This type of data is useful in both descriptive and explanatory research (Saunders *et al.,* 2012). Moreover, the data will be a mix of quantitative and qualitative data which, again, is in-line with the critical realist, mixed-methods approach. Moreover, by using data from such well-established organisations and researchers the data can be considered reliable and trustworthy.

3.7.7: Research Stage 1, Objective 2 – Data Analysis

Data analysis for objective 2 will involve assigning relevant units of the data to appropriate categories identified from the theoretical framework. By having a well-defined research question and objectives, and a clear framework and propositions derived from the theory, it

should be relatively straightforward to identify the categories (see conceptual framework: chapter 2, Table 2.4) for analysing the data for all stages of this research study. Through a further process of sifting and selection the data will then be reduced into key findings and tentative conclusions will be drawn in light of theory, to be explored further in later stages of the research.

The analytical procedure that will be adopted here is the deductively based approach 'explanation building' which is a similar approach to 'pattern matching' (Yin, 1994). However, unlike pattern matching, which involves testing a predicted explanation, explanation building attempts to build an explanation while collecting data and analysing them. This approach is appropriate as the research does not attempt to predict in advance of the research which of the alternative propositions is correct. According to Yin (1994) the hypothesis/proposition testing approach is related to an 'explanatory case study' strategy, which is the dominant research strategy adopted for objectives 2, 3, 4, 5, 9 & 10. Throughout the data analysis a series of cross-checks will be conducted on the data to eliminate error.

3.7.8: Research Stage 2 Aims: Identifying the Historical Need for Co-operation in the SOT Custer

Stage 2 of the research is aimed at identifying the 'need for co-operation' in the SOT cluster. This theme was identified from the literature as being important in helping to explain the existence, or lack, of extensive networks of collaborative relationships in an industry cluster. Cluster literature purports that such networks of relationships are a feature of successful industry clusters. However, if an industry has had little need to co-operate, perhaps because of low technological dynamism and/or a high instance of full vertical integration within individual firms, then firms may historically have had little need to co-operate. Hence, there is a need to determine the structure of production processes, along with the technologies that underpin them within core manufacturing firms in the SOT cluster.

This data is required in order to fully/partially test the following propositions:
P4 and P4a – Will be partially achieved through objectives 3, 4 and 5, *e.g.* whether processes are highly technical or not and/or highly separable or not. Objective 3 will identify knowledge requirements which, whilst not specifically linked to any one set of propositions, are closely linked to the need for co-operation and also to ease of knowledge transfer.

Objective 6 will also contribute to identifying the 'need for co-operation' but requires primary research and so is included in stage 3 of this research study (questionnaire survey).
P9 and P9a – Will also be partially achieved through objectives 3, 4 and 5, *e.g.* modularity in the cluster's manufacturing processes. Findings from these objectives will help to determine the number of opportunities for inter-firm knowledge exchanges. However, the number of opportunities will also be determined from the achievement of objective 6 and 8 (questionnaire survey and interviews – see stages 3 and 4 discussion).

3.7.9: Research Stage 2, Objectives 3-5 – Data Collection

In order to meet these objectives it is necessary to collect compiled secondary data from multiple sources. This will involve the gathering of historical data from a wide variety of industry specific secondary sources. So far, early investigations indicate that the data required will be found in historical books and academic research papers. Examples of academic papers based on research into the structure, processes and technologies in the UK ceramics industry include: "*Economic Governance and the Evolution of Industrial Districts Under Globalisation: The Case of Two Mature European Industrial Districts*", (Sacchetti and Tomlinson, 2009); and, "*Technological Innovation in the UK Ceramics Industry*", (Warren *et al*., 2000). Examples of books include: "*The British Pottery Industry*", (Gay and Smyth, 1974); "*Work and Social Change in the Pottery Industry", (Whipp, 1990);* and, "*Industrial Restructuring in the British Pottery Industry*", (Imrie, 1987).

3.7.10: Research Stage 2 Objectives 3-5 – Suitability of Secondary Data

Similarly to the approach taken for objective 2, the sources utilised for objectives 3-5 include both raw data and published summaries of both a quantitative and qualitative nature. By using data from such reputable authors and researchers the data can be considered reliable and trustworthy.

3.7.11: Research Stage 2 Objectives 3-5 – Data Analysis

A similar approach to the data analysis techniques used for objective 2 will be taken for objectives 3-5. Analysis will involve assigning relevant units of the data to appropriate categories identified from the theoretical framework (pattern matching/explanation building). Through a further process of sifting and selection the data will then be reduced into key findings and tentative conclusions will be drawn in light of theory. Findings from objectives 3-5 will also be utilised in later stages of the research to explain and/or reinforce primary

research findings, *e.g.* to explain why firms do/don't co-operate. This is a further example of 'nesting' of data and of 'triangulation' of data and is consistent with a mixed-methods research design. Furthermore, it is hoped that some of the key trends identified in stage 1 of the research will be supported by stage 2 findings and, moreover, may be more accurately defined. (See objective 2 data analysis discussion for a more detailed explanation and justification for the data analysis methods adopted here).

3.7.12: Research Stage 1 & 2 – Possible Limitations of Secondary Data

It is envisaged that some of the aggregations and definitions found in sources of secondary data (*e.g.* ECOTEC Report, MINTEL and Keynote Reports) may not be entirely consistent with each other, or with the researcher's definitions, due to the different approaches and methodologies. For example, ECOTEC (1999) lists firms by business unit and the researcher intends to lists firms by ownership (firms may consist of several business units). However, as the researcher is interested in general trends over time, and it is intended that the methods of collecting the data will remain constant, any differences found will not be deemed to be that important in achieving the overall research objectives.

It is also likely that some of the data in published reports may also be subject to 'measurement bias' in that they may represent interpretations of those who produced them, rather than offer an objective picture of reality (Jacob, 1994). For example, the ECOTEC report (1999), which was commissioned by the then Department of Trade and Industry (DTI) to prove a case for funding, has come under some criticism from industry experts for the way the data is presented, and for being based on a very small and unrepresentative sample of respondents. However, this report is only one of several such reports that will be used in stages 1 and 2 of the research. By using multiple sources of data in this way to answer the research questions, reliability and validity of the findings should be ensured.

3.7.13: Research Stage 3 Aims: Competition, Co-operation and Innovation in the SOT Cluster 2010-2016

Stage 3 of the research is aimed at determining the current situation regarding competition and co-operation and their effects on innovation in the Stoke-on-Trent Ceramics Cluster as at 2016. Furthermore, stage 3 is also aimed at determining the number of core firms in the SOT cluster that leverage the same general purpose technology. This data is required in order to fully/partially test the following propositions:

P1 and P1a – Will be achieved through objective 8, *e.g.* establishing whether there are inter-firm knowledge exchanges taking place within the cluster, and determining the nature and pervasiveness of such knowledge exchanges. Moreover, mechanisms for knowledge exchanges will also be identified. As mentioned earlier, cluster literature indicates that successful clusters exhibit a strong network of external and internal linkages consisting of both strong and weak ties.
P2 and P2a – will also be achieved through objective 8, *e.g.* an examination of inter-firm knowledge exchanges should enable the researcher to draw conclusions about the 'absorptive capacity' of the SOT cluster. However, according to the literature, there are other factors that contribute to absorptive capacity, such as 'the need to co-operate'. Consequently, the findings from objectives 3, 4, 5 and 6, will also contribute to conclusions drawn about absorptive capacity. According to the literature, a cluster's 'need to co-operate' has a direct relationship with the degree of co-operation that takes place within an industry cluster. Objectives 3-5 have already been discussed in this chapter.
P4 and P4a – will be partially achieved through objective 6 (see earlier discussion, objectives 3-5), *e.g.* by determining the number of core firms in the cluster that utilise the same technologies, the researcher should be able to draw conclusions on the degree of vertical integration and/or specialisation apparent within the cluster. This will be another important determinant in identifying the need for cluster firms to co-operate.
P8 and P8a – Will be fully achieved through objective 7, *e.g.* by identifying the output of innovative activity in the cluster between 2010 and 2015 the researcher will be able to draw conclusions about the success of the SOT cluster. Moreover, the researcher will be able to identify the focus of innovation and whether innovative activity has increased or decreased during the period in question. Strong innovative activity, leading to successful innovative output, is widely cited in the literature as a key success factor in industry clusters.

3.7.14: Research Stage 3 Objectives 6-8 – Data Collection

In order to meet objectives 6-8 it is necessary to collect primary data from the core firms in the SOT cluster. The research population and sampling procedures have already been discussed in earlier sections of this chapter. However, from preliminary research already undertaken (see chapter 4.2.1), it is envisaged that the total population will be approximately 15-30 firms. The research method employed will be a survey questionnaire. Based on the detailed objectives of this research study, it was relatively simple to identify the types of question that would be required to achieve the objectives. Furthermore, by having such detailed objectives from the beginning of the research process, the survey questionnaire to be constructed in advance of other stages of the research. In order to ensure reliability and

validity in the research instrument the questionnaire was constructed by utilising another survey questionnaire (GPrix, see below), which had been employed by researchers in the near past. In addition to adapting the existing questions to meet the specific needs of this research study, several new questions specific to the research were included.

As stated, the innovation questionnaire for this study was adapted from a questionnaire used previously by the European Union GPrix project[28]. The project was carried out to assess a set of regional innovation support measures (2005-2009 inclusive) in a representative set of European regions characterised by a large number of SMEs from traditional sectors, including the automotive, textiles, leather, ceramics, mechanical/metallurgy and food sectors. Seven European Union regions were surveyed in the project, with the West Midlands being the UK region surveyed. The online GPrix questionnaire was filled out by 333 people, mostly from traditional SMEs[29]. Two-thirds of firms were from the manufacturing sector. Regarding employment, 37% were micro, 38% small, 21% medium and 3% big companies. Most GPrix SMEs (28%) were from the metallurgy/mechanical engineering sector, followed by food sector (15%), automotive supplier and textile industry (both 12%). Below 10 % of participants were from ceramics (8%) and leather (4%) industries. Within the case study subset, 61 SMEs out of the 333 took part in subsequent interviews. The results of the GPrix survey are available in a variety of reports[30] and relevant findings from the reports are utilised in chapter six as a comparator for the SOT cluster survey results. The research acknowledges that any comparisons made between the GPrix survey data and the SOT survey data cannot be strictly reliable given the differences between the two samples in terms of size and the range of industries involved. However, the GPrix data is considered useful in this research as it provides a benchmark against which to measure the comparative performance of the SOT survey firms.

The final questionnaire for objectives 6-8 of this research study is described as follows. The questionnaire has been designed to include seven key sections, with each section aimed at achieving different objectives. In addition to objectives 6-8, some of the questions are aimed at gathering information that will help to achieve, or reinforce, several other research objectives (see below). The data to be gathered through the questionnaire spans a period

[28] GPrix, (2012), *GPrix innovation policy support survey*. [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/en/survey.htm. [Accessed 30 June 2017].
[29] GPrix, (2011), D1.7 *Impact Assessment of Measures on SMEs,* [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/docs/Del_1_7_Impact_Assessment.pdf. [Accessed 30 June 2017].
[30]GPrix, (2012), *Reports*, [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/en/reports.htm. [Accessed 30 June 2017].

between 2010 and 2015. This will enable the research to identify trends across this period, *e.g.* whether innovation is increasing/decreasing. A full copy of the questionnaire is included in Appendix 9, and an explanation of each section of the questionnaire, along with a description of how questions link to the objectives, is provided in Appendix 10.

3.7.15: Research Stage 3 Objectives 6-8 Administering the Questionnaire and Maximising the Response Rate

It is intended to administer the questionnaire to the total population (see sampling section of this chapter) by the researcher in person. Firstly, telephone contact will be made to identify an 'appropriate person' within the company, *i.e.* owner or senior manager. During this initial contact the researcher will explain the nature of the research study and request that the company participates. Secondly, the researcher will post/email out the questionnaire and a covering letter (see Appendix 11), explaining that the questionnaire will need to be completed in a face-to-face meeting with the researcher. The questionnaire and letter will be sent to each company in the population. In order to convince companies to participate the covering letter will ensure anonymity of the company data (confidentially agreement) and will also offer to make the research findings available to participants. An appointment will then be made with the 'appropriate person' for the questionnaire to be completed in the presence of the researcher. Because the questionnaire is quite complex it is though that this will be the best approach as the researcher will be able to explain questions and how the data will be used. The researcher will retain the completed questionnaire at the end of the meeting. It is estimated that the whole meeting, including completion of the questionnaire, will take approximately 45 minutes.

3.7.16: Research Stage 3 Objectives 6-8 Validity and Reliability of the Survey Instrument

Validity and Reliability of the survey instrument is ensured in several ways. Firstly, by adapting a widely applied existing research instrument from extremely reliable sources as detailed above, there is confidence that the participants will understand the questions because they have been asked before for similar purposes. This is called 'content validity' (Saunders and Lewis, 2012). Secondly, the questions have been carefully matched to the specific objectives and propositions of this research study (detailed above), and this is called 'construct validity' (Saunders and Lewis, 2012). Moreover, several different types of questions are included in the questionnaire for different uses, *e.g.* ranking, listing, rating, quantity and open questions are all included in the questionnaire. Finally, a pilot study will be

conducted to make sure that respondents will have no problems in answering the questions, and also so that their responses can be recorded correctly (Saunders and Lewis, 2012). The a pilot study will be issued to small number of people working in, or connected to, the SOT industry. This pilot sample will be identified from the researcher's list of existing contacts in the SOT ceramics cluster and includes academics researching the industry and existing managers within the industry.

3.7.17: Research Stage 3 Objectives 6-8 Data Analysis

As explained previously, the data collected at this stage will be mainly quantitative and will be analysed by either using statistical software or simple one-way frequency tables, depending on the number of responses. The questionnaire allows a set of standardised questions to be asked to a large number of respondents (Saunders and Lewis, 2012). Because the questions are standardised, the data collected by the questionnaires will be used for both descriptive and explanatory research. For example, SOT cluster firms' innovative activities can be described from the statistical analysis of the questionnaire responses and explanations of what the findings mean can be made in light of theory (theory testing). Moreover, relationships across the data can be identified, described and explained. For example, the relationship between collaboration and innovation can be identified (statistically) and described (*e.g.* it might be found that firms who innovate more also collaborate more), then explained in light of theory. This descriptive and explanatory approach is in keeping with the intended research design as discussed earlier in this chapter.

3.7.18: Research Stage 4 Aims: Co-operation, Power and Control and Dominant Firms in the SOT Cluster (1980 – 2016)

Stage 4 of the research is aimed at further identifying co-operative activity in the SOT cluster, as well as determining both the balance of power and control within the SOT cluster and the roles that dominant firms have had upon the overall strategic health of the cluster. From the relevant academic literature, it was identified that an even distribution of power and control was a feature of successful clusters. It was also identified from the literature that dominant firms can contribute towards the success or failure of an industry cluster depending on the role they take. Moreover, it has also been identified that there is a 'gap' in the literature on dominant firm effects and, therefore, this is where the research hopes to make a significant contribution to the small amount of existing research. Hence, there is a need to investigate fully the 'reality' behind power and control in the SOT cluster. Stage 4 is

also aimed at exploring in more depth some of the findings on innovation and collaboration from earlier stages of the research (see below).

This data is required in order to fully/partially test the following propositions:
P3 and P3a – Will be partially achieved through objective 6, *e.g.* to discover individual managers' views about power and control in the industry. Objective 6 will also be partially achieved from the findings of objective 1 (consolidation and the emergence of dominant firms) and from stage 3 questionnaire results (firm size).
P10 and P10a – will be achieved partially from objective 10. For example, managers' views will be sought about the motivations behind dominant firms' strategies and about their role in facilitating knowledge transfer within the cluster. Objective 10 findings will also be triangulated with the questionnaire survey findings from stage 3. For example, data on the largest firms, such as levels of innovation and co-operation will be compared with managers' views from stage 4 interviews.
P1, P1a, P8 and P8a – as mentioned earlier, some of the findings from earlier stages of the research will be further explored in more depth during the interview stage. For example, to further explore the reasons why some firms do/don't co-operate (partially fulfilling objectives 7 and 8).

3.7.19: Research Stage 4 Objectives 9-10 Data Collection

The research method employed at this stage involves the collection of primary data from semi-structured interviews. This is because a more qualitative approach is required to further explore the 'what' and to be able to explain the 'how' and 'why' behind the reality. A main strength of interviews within a case study is that they are targeted and focused. Semi-structured interviews are consistent with exploratory studies (Saunders, *et al.,* 2003) and can be used to explore and explain themes that have emerged from earlier stages of research in addition to validating findings from the earlier stages (Wass and Wells, 1994). As mentioned in the sampling section of this chapter, respondents will be purposefully sampled based on the questionnaire survey results. As the number of core firms is envisaged to be between 15 and 30, based on early indications from secondary data, it is further envisioned that the number of interviews will be between 7 and 15. However, the final number will be determined based on the questionnaire findings. For this stage of the research a list of themes and questions will be derived from two sources:

1. From the survey questionnaire as described in the previous section, quantitative findings on innovation and collaboration will be explored in much more depth. For

example, questions will be aimed at discovering the reasons and motivations behind why firms do/don't collaborate with each other;

2. From the theoretical framework in order to meet the requirements of objectives 9 and 10. For example, questions will be aimed at discovering more about power and control within the SOT cluster. This relates to the structure of the cluster itself, which will be identified from objective 1 and also from questionnaire responses about firm size. However, in stage 4 of the research more questions will be asked about specific managers' views on which firms have more power and control in the cluster. Questions will also be asked about the role of dominant firms in the cluster, *e.g.* the role they take in knowledge sharing within the cluster and, whether they act in the best interests of the cluster (these findings will be mapped back to quantitative findings from stage 1).

It is envisaged that the interviews will be approximately 30-45 minutes each. All interviews will be recorded to ensure accuracy of data and later will be professionally transcribed. Once a schedule of interview questions has been formulated they will be pilot tested in an informal interview with one of the intended interview respondents. A final interview schedule will then be constructed (see Appendix 12). The interviews will be standardised, respondent interviews where the interviewer will direct the interview and the interviewee will responded to the questions of the researcher.

Senior managers such as Chief Executive Officers or owner-managers will be selected as interview subjects. Due to the high profile roles in the industry of the respondents, and the sensitivity of some of the questions to be asked the researcher will keep the identities of all respondents anonymous. Therefore, they will be referred to as respondent 'A', 'B', 'C', *etc.* A profile of the companies (anonymous) and of the respondents will be provided in the appendices section of this thesis (see Appendix 13). Although the respondents will, at this stage, be already known to the researcher through of their participation in the questionnaire survey, the researcher will aim to further establish credibility by following a strict protocol, as follows:

- During the questionnaire survey stage of the research the respondents will be asked if they will be willing to participate in the subsequent interview survey should they be selected for further study;

- Prior to the start of the interview stage, selected respondents will be further contacted initially by telephone (or email), to clarify research intentions, to confirm participation in the interview process and to set a date for the interview;
- Results of the questionnaire survey and a schedule of interview questions will be sent (post and/or email) to the respondents one-week in advance of the interviews to allow participants the opportunity to prepare themselves for the discussion.

3.7.20: Research Stage 4 Objectives 9-10: Suitability of Data Collection Method

A rigorous and systematic approach will be adopted by the researcher in preparation for the interviews, in choosing and preparing respondents, and in recording and analysing the data. In this way validity and reliability can be ensured, both in the data that will be collected, and in the way it will be analysed (see 3.7.21). However, it is not intended that the interview research will be able to establish reliability in any quantitative or statistical way because the research may not result in a sample size sufficiently large to be fully representative, *e.g.* the total population is estimated at between 15 and 30 firms. It is intended, though, that the interview findings will provide sufficient context and evidence of validity so the informed reader can decide whether or not the findings generalise to their circumstances.

Semi-structured interviews were chosen as the research medium most suited to this stage of the research because of their potential to reduce interviewer bias due to the open-ended nature of the questions, *e.g.* the interviewer cannot easily guide the interviewee to answer in a certain way. Prior to the interviews the researcher will attempt to avoid holding a view as to which of the propositions is the most likely outcome and this should reduce bias in the way that questions are asked. However, given that the research will have already completed stages 1-3 at this point and will be aware of the findings, it is highly likely that some interviewer bias will be evident. In an attempt to reduce interviewee bias the author will also be careful to select respondents who are likely to have opposing views on some issues, *e.g.* those who see the importance of innovative activity and those who do not. This approach is discussed in more detail in the sampling section of this chapter. Furthermore, the researcher will attempt to reduce bias by seeking negative examples and alternative explanations during the interviews but, again, the researcher will be careful not to direct the interviewee to pre-chosen answers.

A further justification for choosing semi-structured interviews for this stage of the research is that, according to Easterby-Smith *et al*., (1991), interviews are advantageous when:

- There are a large number of questions. This is the case with stage 4 of this research study, *e.g.* there will be several questions on each topic of co-operation and, power and control;
- Where questions are open-ended or complex. As all questions will be open ended and are sufficiently complex not to be included in the questionnaire survey, *e.g.* questions that explore the issues of weak and strong ties in relationships;
- If the logic or order of the questions may require variance the interviewer may lead the discussion based on the schedule of questions but will be prepared to vary the order dependent upon the interviewee responses.

3.7.21: Research Stage 4 Objectives 9-10 Data Analysis

The first stage of analysis will involve assigning relevant units of the collected data to appropriate categories. By having a well-defined research question and objectives, and a clear framework and propositions derived from the theory, it will be relatively straightforward to identify the categories/units (see conceptual framework) for analysing the data for all stages of this research study. The analysis of 'embedded units' (Yin, 1994) is seen as an appropriate strategy as it allows individual units to be compared across the firms surveyed and conclusions drawn. Through a further process of filtering and selection the data will then be reduced into key findings and rearranged into a table, or series of tables, that compares responses from the interviewees.

The second stage of data analysis will be the deductively based approach 'explanation building' which is a similar approach to 'pattern matching' (Yin, 1994). However, unlike pattern matching which involves testing only a predicted explanation, explanation building goes further by attempting to build, if necessary, alternative explanations while collecting data and analysing them. This approach is appropriate as the research will not attempt to predict in advance which of the alternative propositions, if any, apply to the SOT ceramic cluster. The maintained and alternative propositions will generate different expected patterns. The predicted patterns will be compared with the actual ones to identify the actual degree of association. Where minimal associations are found with the predicted patterns then alternative explanations will be sought. In this way the research may throw new light on existing theory, or new theoretical propositions may emerge. The depth of evidence

collected from the questionnaire and interviews will contribute towards the development of cluster theory and demonstrate the inductive nature of the research at this stage. According to Yin (1994), the hypothesis (proposition) testing approach is related to an 'explanatory case study' strategy, which is one of the research strategies adopted for this study and this demonstrates the deductive nature of the research at this stage. Thus, the research at this stage is both inductive as well as deductive.

The final stage of analysis will involve synthesising the findings from all stages of the research and then mapping back to the theoretical framework (objective 11). From this overall conclusions will be drawn, recommendations made and theory developed and extended.

3.8: Validity and Reliability

Throughout this chapter, issues of validity and reliability have been discussed in different sections. For example, in the section on research strategy, it has already been discussed how mixed/multi-methods research uses triangulation as a way to reinforce or refute findings from one particular source or method, thus providing greater validity and reliability in the overall findings. In this section, previous points made about validity and reliability in research studies are pulled together and discussed as a whole. A definition of 'validity' in research is useful before commencing with the discussion of how the researcher has endeavoured to design a research paradigm that ensures, as much as is possible, validity and reliability throughout the whole research process.

As discussed earlier in this chapter, a mixed/multi-methods approach is the principal strategy for this research study. According to Onwuegbuzie and Johnson (2006), assessing the validity of findings in mixed methods research is particularly complex (p. 60). Furthermore, Bryman (2009), building upon the work of other researchers (*e.g.* Tashakkori and Teddlie, 2003, 2006; Onwuegbuzie and Johnson, 2006), recommends that validity in mixed methods research be termed 'legitimation' rather than 'validity', as validity is a term most commonly associated with a 'positivist' philosophy and has a strong association with quantitative research. The qualitative researcher is more concerned with 'contextualisation', *e.g.* where legitimation represents the standards set by a particular community at a specific time and place (Schwandt, 2001).

The term ‘legitimation’ is thought to be more acceptable to both quantitative and qualitative researchers (Onwuegbuzie and Johnson, 2006: 55). Legitimation is the degree to which mixed methods research integrates both quantitative and qualitative findings to strengthen and provide legitimacy, fidelity, authority, weight soundness, credibility, trustworthiness and even standing in the results and interpretations in mixed methods research (Brown, 2014). Legitimation can be divided into ‘internal’ validity and ‘external’ validity (Ryan *et al*., 2002). Internal validity can be defined as “*the logic between a piece of research and existing theory*” (Arbnor and Bjerke, 1977: 217). External validity determines whether more general conclusions can be drawn, based on the model used and data collected, and whether results may be generalised to other samples, time periods and settings (Ihantola and Kihin, 2011). Because the research is based on a carefully constructed theoretical framework, *i.e.* the findings of cluster studies from several fields, *e.g.* strategic management, industrial districts, network studies, *etc.* (see chapter 2.1), internal contextual validity in this research study is ensured. External validity (generalisability) is discussed in the next section of this chapter (see 3.9). As the research adopts a mixed/multi methods approach that combines both quantitative and qualitative elements, the legitimation approach is deemed appropriate for this research and, consequently, the term ‘legitimation’ will be used to represent issues concerning validity throughout the rest of this chapter.

In 2006, Onwuegbuzie and Johnson outlined a new typology of nine legitimation types in mixed research (p. 57). The following table (Table 3.5) has been adapted from Onwuegbuzie and Johnson’s ‘Typology of Mixed Methods Legitimation Types’ framework, it links each of the nine legitimation types to corresponding stages in this proposed research study. Types 1-8 can be classified as ‘internal’ legitimisation and type 9 can be classed as ‘external’ legitimation, as it is concerned with generalisability.

Table 3.5: Legitimation of Mixed Methods Approaches in This Research Study

LEGITIMATION TYPE	DESCRIPTION	LINKS TO THIS RESEARCH STUDY
SAMPLE INTEGRATION	The extent to which the relationship between the quantitative and qualitative sampling designs yields quality meta-inferences.	The researcher has conducted a concurrent design in which inferences from the secondary data are integrated with inferences from the quantitative questionnaire and with subsequent inferences from the qualitative interviews. As the questionnaire target is the whole population of core manufacturers identified from the secondary research, and the interview participants are purposefully selected from the questionnaire responses, findings should be generalisable and legitimisation problems reduced. Further details of validity in the sampling design are provided in section 3.6 of this chapter.
INSIDE-OUTSIDE	The extent to which the researcher accurately presents and appropriately utilises the insider's view and the observer's views for purposes such as description and explanation.	Through the proposed pilot testing of both the questionnaire and the interview (see sections 3.7.16 and 3.7.19) with proposed respondents and industry experts the 'insider' view will be obtained. Moreover, through the PhD supervisory process peer review will take place. In this way the 'outsider' (disinterested and trained in social research) view will be sought on interpretations, conceptualisations and relationships between data and conclusions. In addition, the carefully designed 'theoretical framework' resulting from the review of cluster literatures will provide clear guidelines as to how data are interpreted. In this way a balanced perspective, that accurately links insider/outsider views to a clearly defined theoretical framework, will be achieved.
WEAKNESS MINIMISATION	The extent to which the weaknesses from one approach are compensated by the strengths from the other approaches.	The researcher has already carefully assessed the extent to which weaknesses in one method are compensated by strengths in another (see various paragraphs in section 3.7 of this chapter).
SEQUENTIAL	The extent to which one has minimised the potential problem wherein the meta inferences could be affected by reversing the sequence of the quantitative and qualitative phases.	One way the researcher has been careful in attempting to reduce any threats to legitimation is through the sequencing design, which represents a 'multiple wave' design (Onwuegbuzie and Johnson, 2006), where the quantitative and qualitative phases oscillate. For example, stage 1 is both quantitative and qualitative, stage 2 is mostly qualitative, stage 3 is mostly quantitative, and stage 4 is qualitative. (see section 3.4.2)
CONVERSION	The extent to which the quantitising or qualitising yields quality meta inferences.	The researcher does not propose to carry out any significant quantitising of qualitative data. This issue has been discussed earlier (see section 3.4 and 3.7). However, one way of quantitising the interview findings will be to count the themes present in the qualitative data and to add-in new, emergent themes into the theoretical framework if considered sufficiently important (Sandelowski, 2001). This is another theory building element of the research. Finally, both qualitative and quantitative findings will be combined and therefore should yield high-quality meta inferences.
PARADIGMATIC MIXING	The extent to which the researcher's epistemological, ontological, axiological, methodological and rhetorical beliefs that underlie the quantitative and qualitative approaches are successfully (a) combined or (b) blended into a usable package.	The chosen critical realism paradigm, as described in detail in section 3.3. The approach blends both positivist and critical theorist approaches, which are appropriate for the different stages of the research. Methodologies are based on a multi-method approach where different data will be blended and mapped to the theoretical framework. The paradigm assumptions have been made very explicit in section 3.3., and the research has been designed to fit with the stated assumptions. This should ensure legitimation for the chosen paradigm.

COMMENSUR-ABILITY	The extent to which meta inferences made reflect a mixed worldview based on the cognitive process of Gestalt switching and integration.	The researcher has shown, through previous sections of this chapter, how the research switches from qualitative to quantitative and back again. Through this process a 'third' viewpoint is formed, a viewpoint that is informed by, is separate from, and goes beyond what is provided by either a pure qualitative viewpoint or a pure quantitative viewpoint (Onwuegbuzie and Johnson, 2006). Therefore, meta-inferences drawn from both sets of data should represent a more fully-mixed worldview that goes beyond the provision of both traditional viewpoints.
MULTIPLE VALIDITIES	The extent to which addressing legitimation of the quantitative and qualitative components of the study result from the use of quantitative, qualitative and mixed validity types, yielding high quality meta inferences.	Validity of both the qualitative and quantitative components of this research study has already been discussed in section 3.7 of this chapter. The relevant validities has been addressed for each component and further legitimation will be gained when the data from each stage of the research is combined into a whole and mapped back to the theoretical framework.
POLITICAL	The extent to which the consumers of mixed methods research value the meta inferences stemming from both the quantitative and qualitative components of a study.	Political legitimation will be achieved as the researcher will be acting alone in carrying out the different stages of the research. Therefore, there will be no value or ideology conflicts that could occur if different researchers were to be involved in the study. However, the researcher acknowledges that the research participants also hold much power (being senior managers of ceramics firms). The researcher will endeavour to achieve political legitimation through careful construction and communication of research questions that, whilst being important in achieving the research objectives, will also be of value to the participants because the results should answer important questions and also provide workable solutions.

(Source: Author. Adapted from Onwuegbuzie and Johnson's Legitimation Typologies, 2006)

Table 3.5 summarises the discussions from relevant sections of this chapter under the nine legitimation types. Cross-referencing to specific sections has been included where deemed useful to the reader. The resultant table provides evidence that the research has attempted to address validity issues throughout all stages of the research design. Onwuegbuzie and Johnson's legitimation framework was useful in helping to provide evidence that the various mixed/multi method approaches discussed in this chapter could ensure internal validity of the research process and findings. However, the framework appears to be somewhat limited in its coverage of external validity issues. The following section of this chapter examines issues of external validity, *e.g.* generalisation; whether the study's findings can be generalisable beyond the SOT ceramics cluster to other industry clusters.

3.9: Generalisability and Replication

By repeating a past study on a different population, a researcher conducting an empirical generalisation tests how far the results of the study are generalisable to another population. The research procedures of the original study are closely followed (Tsang and Kwan, 1999).

In this research study, it is not the intention to closely follow the procedures of other cluster studies. The particular elements of the theoretical framework for this research have been drawn-together from a range of previous studies on industry clusters, industrial districts, production systems, networks, *etc.* (see literature review). The resultant framework is therefore new and constructed from what the researcher considers to be significant theoretical contributions (common themes and issues) arising from these previous studies. According to Tsang and Kwan (1999):

> "*By comparing knowledge accumulated in several focal areas, researchers clearly demonstrate the explanatory power of a theory with respect to these areas; some theories are good at explaining certain phenomena only.*" (p. 775).

The main advantage of a multi-focal pattern in this research is that, in the literature review, the researcher compared and contrasted empirical evidence generated from several focal areas, then refined and constructed the theory into a usable framework for enquiry. Also according to Tsang and Kwan (1999), researchers' do frequently introduce new concepts or conceptual relations that help to develop theories (p. 771). In this research study, for example, the researcher has introduced several new concepts including the 'need for co-ordination' (based on Arikan, 2009; see Table 2.12), which is absent from previous cluster studies. Thus, it is the intention that, through the research process, knowledge of cluster theory will grow by extension in a multi-focal pattern, whereby relatively full explanation of a focal area is carried over to an explanation of the adjoining areas (Kaplan, 1964). For example, if the need for co-ordination is found to be minimal, it may explain the absence of co-operation activities within an industry cluster.

In keeping with the critical realist approach, it is not envisaged that the study into the SOT ceramics cluster will provide conclusive verification or falsification of cluster theories. This is because in the SOT ceramics cluster study (the replicated study), there is a completely different set of contingencies that may call for modification of the postulated mechanisms, or may invoke previously inactive countervailing mechanisms (Tsang and Kwan, 1999). In other words, a different set of events is being observed. In addition, this research employs different research procedures and draws from a sample of a different population of subjects. By repeating elements of past studies on different populations, the research will conduct an empirical generalisation that tests how far the results of previous studies are generalisable to the SOT ceramics cluster. For example, the research will be able to test whether competition and co-operation are really as important as cluster literature indicates to the success of

industry clusters. Although it is not envisaged that by replicating elements of previous cluster studies conclusive verification or falsification of the theories will be achieved, it is envisaged that the findings will help to support or discredit theories.

As every industry cluster is potentially different, it is not the intention that the findings for the SOT cluster study will be generalisable to other industry clusters. The intention is that the theoretical framework will be strengthened and developed further and, moreover, will be able to be applied to other industry clusters as a tool of analysis and evaluation.

3.10 Ethical Considerations

According to Resnik (2015), there are several reasons why it is important to adhere to ethical norms in research. First, norms promote the aims of research, such as knowledge, truth, and avoidance of error. Second, since research often involves a great deal of cooperation and coordination among many different people in different disciplines and institutions, ethical standards promote the values that are essential to collaborative work, such as trust, accountability, mutual respect, and fairness (p. 1). As a result of the growing interest in research ethics, many research and management institutions have introduced their own codes of ethics for management research studies. For example, the British Academy of Management (BAM) has their own code for ethics and best practice in management research[31].

This research study followed Staffordshire University's ethical approval policy[32]. Moreover, Bell and Bryman's (2007) eleven principles of ethical considerations[33], were also adopted as a suitable code of ethics for this research study as they reflected many of the elements of Staffordshire University's ethics policy. Appendix 14 presents Bell and Bryman's eleven ethical considerations mapped to the research process for this study.

[31] British academy of management, (2013), [ONLINE]. Available from: *Https://wwwbamacuk/sites/bamacuk/files/The%20British%20Academy%20of%20Management%27s%20Code%20of%20Ethics%20and%20Best%20Practice%20for%20Memberspdf.* [Accessed 2 July 2017]

[32] Staffordshire University, (2017), [ONLINE]. Available from: http://www.staffs.ac.uk/assets/Ethical%20Review%20Policy_tcm44-81619.pdf. [Accessed 2 July 2017]

[33] Bell and Bryman's ethical considerations were compiled as a result of analysing the ethical guidelines of nine professional social sciences research associations.

The concept of informed consent (Kaiser, 2009) will applied to this research study by explaining to senior managers (respondents) the research aims and objectives, the duration of the research, the purpose and possible consequence of the research and the dissemination strategy. Providing such information to respondents addresses some issues connected to deception by ensuring that participants are fully informed in a transparent way. In addition, the respondents will be informed that they can abandon the questionnaires or interviews at any time during the procedure. Before the survey, both in the covering letter and at the start of the questionnaire survey, managers will be told how the findings will be used, they will also be offered a copy of the published findings. Although the respondents will be assured of anonymity in the published research findings, the researcher recognises the potential for 'deductive disclosure' (Kaiser, 2009), also known as internal confidentiality (Tolich, 2004, *cited* in Kaiser, 2009), to occur. For example, the unique characteristics of the companies involved in the research could make them identifiable in research findings reports (Sieber, 1992, *cited* in Kaiser, 2009). Given that this research will contain rich descriptions of study participants (see Table 6.1), confidentiality could be breached via deductive disclosure. However, the researcher will be truthful and honest with the respondents in informing them that the target population will be fairly small, and they will have the questionnaire in advance and so will know the questions in section 1 are about company details.

According to Guillemin and Gillam (2004), ethical research is much more than research that has gained the approval of a research ethics committee. They suggest that there are at least two major dimensions of ethics in qualitative research: a) 'procedural ethics', which usually involves seeking approval from a relevant ethics committee to undertake research involving humans (e.g. Staffordshire University's Ethics Policy); and, b) 'ethics in practice' or the everyday ethical issues that arise in the doing of research (p. 263). A reflective diary is a way for researchers to reflect and articulate the complexities of their approach to ethical considerations that arise in doing their research (Gibbs, *et al.,* 2007). Moreover, Reflexivity in qualitative research is also a way of ensuring rigor (Cypress, 2017). According to Hammersley and Atkinson (1983), reflexivity should not be restricted merely to the planning and execution of a piece of research, but should be regarded as an integrated element of the writing process (p. 209). Consequently, in this research study, the researcher will keep a reflective diary of the research process, including the methodology stage and the data collection and analysis stages, and will use this diary to continuously reflect on ethical issues and adjust the research during the process.

3.11: Reflection on the Research Methodologies Adopted for this Research Study

Throughout the research process alternative methods and their appropriateness have been considered and discussed at various stages throughout this chapter. In chapter seven (conclusions) a detailed reflection on the research process is presented, along with a consideration of the limitations of the research as well as identification of areas for future research (see chapter 7.7). In summary, the main limitations of the research were: 1) The researcher's original intention was to survey all sixteen core firms in the SOT cluster, *i.e.* the total population. Unfortunately, despite exhaustive efforts in contacting all sixteen firms, only six firms agreed to take part in the questionnaire and interview surveys, this is a limitation of the research, and possible further evidence of a lack of willingness to co-operate. However, the six firms that did take part in the two surveys represent 38% of the total number of firms in the population, and over 60% of sales turnover and employees in the whole identified population (see chapter 6.3). Therefore, the sample, despite not capturing all sixteen firms in the population, was still deemed large enough to represent the SOT cluster, and for confident generalisations to be made; 2) The difficulty in persuading SOT firms to take part in the surveys also affected the approach taken for selecting respondents for interview. It was originally intended to use stratified purposeful sampling techniques (Patton, 1990) to select a number of firms suitable for interviewing from the firms who had completed the questionnaires (see chapter 3.6). However, due to the small number of questionnaire responses (six), it was decided to interview all six firms who had taken part in the questionnaire survey. The six firms were deemed truly representative of the SOT cluster as they comprised two small firms, two medium sized firms and two large firms. Moreover, the six firms operated in either the domesticwares or hotelwares sectors, or in a combination of both (see chapter 6, Table 6.1). Consequently, the sample of interviewees still accounted for 'maximum variation' (Patton, 1990). 3) Another limitation of the research was that it was not possible to undertake 'extreme' or 'deviant case' sampling (Patton, 1990) as also intended (see chapter 3.6.4) due to the small number of responses. The research did, however, attempt to present opposing views, and also to identify possible interviewee bias, and these are acknowledged accordingly in chapter six findings.

The next chapter of this thesis presents the first chapter of the research findings, which: 1) determines the evolution of the SOT cluster from 1960 up to 2016; and, 2) identifies and evaluates the nature of demand and competition in the SOT cluster as at 2016.

4. Research Findings, Stage 1: Industry Evolution and Demand and Competition in the SOT Cluster

Research stage 1: objective 1, Industry evolution 1960-2016; objective 2, the nature of demand and competition in the SOT cluster in 2016

4.1: Introduction

This chapter of the research findings deals specifically with research objectives 1 & 2. The data gained in achieving these objectives sets the context for subsequent primary research stages. For example, when attempting to identify innovative and co-operative activity within the SOT cluster in 2016, it is essential to analyse and evaluate findings in light of current environmental conditions. Therefore, this chapter, and the subsequent chapter, utilise secondary data from multiple sources to identify: both the current situation of the SOT cluster; and, the key environmental factors and influences that have shaped the cluster over recent decades.

Objective 1 is aimed at tracking the development of SOT tableware and giftware manufacturers, between 1960[34] and 2016 (inclusive), in order to identify the number of core manufacturing firms left in the industry by the end date, as well as to identify the pattern of mergers, acquisitions, firm closures and new entrants during the period. To date no previous studies have been carried out into the life-cycle development of the SOT cluster, *i.e.* this data does not exist in a joined-up, comprehensive format. As a result, the researcher has taken the following approaches to achieve objective 1.

[34] The year 1960 was chosen as a starting point for the research as, due to the introduction of the Clean Air Act in 1956, new gas and electricity kiln technology was introduced. In 1958 there were 298 pottery factories in North Staffordshire using 438 bottle kilns and 654 tunnel and other gas/electric kilns. By 1965 there were no longer any coal-fired bottle kilns in use. Source: visitstoke.co.uk. (2017), *Ceramics in Stoke-on-Trent 20th Century*, [ONLINE]. Available at: http://www.visitstoke.co.uk/ceramics-trail/history-20century.aspx. [Accessed 7 July 2017]. Compliance with the legislation imposed sudden and significant costs on the ceramics manufacturing process. In an attempt to offset those costs the industry embarked on a round of mergers and acquisitions, resulting in an over-concentrated ceramics sector. Source: www.parliament.co.uk. (2016), *Ceramics Industry*, [ONLINE]. Available at: https://hansard.parliament.uk/commons/2016-03-08/debates/16030869000001/CeramicsIndustry. [Accessed 7 July 2017].

4.1.2: Objective 1a (Part 1 of this chapter), The Cluster as a Whole (1996-2016)

Firstly, a basic overview of the more recent development of cluster firms between 1996 and 2016 is presented (part 1). This initial stage covers the last twenty years of the cluster's development and should provide a clear indication of the challenges and opportunities that the cluster has faced and where the industry stands today. The aim is twofold: firstly, to identify the number and size of firms remaining in the cluster in 2016; secondly, to determine the performance of SOT cluster firms with regard to growth/decline in turnover and market share over the twenty-year period. As no single-source, up-to-date, fully comprehensive report on the SOT ceramics industry could be found, the findings here are based on multiple secondary data sources, which have been, where possible, cross-referenced with each other (triangulated). The sources that will be utilised include both raw data and published summaries. This type of data is useful in both descriptive and explanatory research (Saunders *et al.,* 2012). Moreover, the data will be a mix of quantitative and qualitative data which, again, is consistent with the critical realist, mixed-methods approach. Moreover, by using data from such well-established organisations and researchers the data can be considered reliable and trustworthy.

The key secondary sources utilised for this initial stage of the research included the following:

- ECOTEC Report (1999). In 1998, ECOTEC Research and Consulting Ltd. were commissioned by the City of Stoke-on-Trent Council, Staffordshire Training & Enterprise Council (TEC), the British Ceramics Confederation (BCC) and the Government Office for the West Midlands to review the performance and prospects of the ceramics sector in Staffordshire and to make recommendations for appropriate policy responses. The subsequent report, produced in 1999, provides an up-to-date account of the SOT ceramics industry up to 1998 and therefore has been adopted as a key secondary data source for this section of the findings;
- FWC Sector Competitiveness Studies: Competitiveness of the Ceramics Sector EU (2008). In 2007, the European Commission commissioned a report into sector competitiveness of the European Ceramics Industry. Although not strictly focused on the SOT ceramics cluster, or on the tableware and giftware sector, this report provides the most recent data on the UK ceramics industry and, therefore, has been adopted as another key secondary data source for this section of the research;
- Various MINTEL (market intelligence) Reports (2004–2014) on the UK China and Earthenware and Tableware ceramics sectors;

- Various KEYNOTE (market intelligence) Reports (2008–2011) on the UK China and Earthenware ceramics sector;
- Findings from the researcher's own investigation and consequent addition of recent primary data;
- A variety of additional secondary data sources has also been used in an attempt to update, verify and fill-in any gaps in the analysis and these are referenced accordingly.

4.1.3: Objective 1b (Part 2 of this chapter), The Firms Within the Cluster (1960-2016)

Following this initial overview, and resulting from knowledge gaps, inconsistencies and limitations in the secondary data, the second section (part 2) presents findings from a comprehensive longitudinal study carried out by the researcher on the development of SOT cluster firms (1960 – 2016). The data was analysed and compiled by the researcher into a unique database which tracks the development of each individual firm in the SOT cluster from 1960 up to December 2016. The database also includes a small number of additional firms which were acquired before 1960 by other firms within the SOT cluster. The acquiring firms either become important players in the cluster, or are later acquired themselves by other firms who became important players in the cluster. Thus, these pre-1960 firms were included as they were considered an important contribution to identifying the pattern of mergers and acquisitions that took place in the cluster during the period 1960-2016, and to identifying the emergence of the SOT cluster's dominant firms. The study also identifies new entrants, acquisitions and closures taking place within the cluster over the period in question. These data are presented as a series of tables and charts which are then analysed and discussed in light of theory. Key sources of data at this stage included:

- Listings of ceramic firms in Godden (1964)[35]. The copy of Godden, which was loaned by the British Ceramics Confederation (BCC), had been annotated (updated) by a former employee of the BCC and thus provided some additional information on 'new' ceramics firms after 1964;
- The second main source of data was 'thepotteries.org' website which contains listings and information on SOT ceramics manufacturers dating from the beginning of the SOT industry;[36]

[35] Godden, G. (1964), *Encyclopaedia of British Pottery and porcelain Marks*, Herbert Jenkins

[36] The potteries.org website is home to the Potteries Heritage Society, which is an independent group of individuals who care about the towns and places that make up the City of Stoke-on-Trent, its history and its future. It is Stoke-on-Trent's Civic Society, one of a network of several hundred such societies in the UK registered with Civic Voice. Source: thepotteries.org. (2017), *Our History*, [ONLINE]. Available from: http://www.potteries.org.uk/our-history. [Accessed on 2 July 2017]

- In addition to these two main sources, a large number of additional sources were used to add to the listings and for cross-referencing purposes to ensure validity of the data (see Appendix 4a for a list of sources).

4.1.4: Objective 2 (Part 3 of this chapter), Changing Demand Conditions (2007-2016)

The third section of this chapter is concerned with examining the changing pattern of demand for the SOT cluster's products between 2007[37] and 2016. It is also concerned with resultant effects on competition within the cluster. Secondary data sources at this stage include sources already listed from the previous sections of this chapter (*e.g.* MINTEL; FWC Report) and various other relevant sources, all referenced accordingly. In addition to existing secondary data sources, relevant findings from subsequent primary research stages (Stage 3 questionnaire survey) are cross-referenced here to provide more accurate data on competitive activity, segmentation and demand. These empirical findings supplement the secondary data findings and are presented as a series of tables and charts with accompanying analysis and discussion.

4.1.5: Chapter Conclusions

The fourth and final section of this chapter presents interim conclusions for this stage of the research. Findings have been mapped-back to the Literature Review where possible and weaknesses in data highlighted.

4.2: Objective 1, Part 1 - The Development of the SOT Cluster 1996[38] to 2016 (Initial overview based on secondary data)

4.2.1: The Number and Size of Firms in the SOT Cluster

This section of the research begins in a way not conventional of previous studies of the SOT ceramics cluster, namely by drawing upon MINTEL, other market intelligence reports and company annual reports. Taken over time, these reports highlight some of the important industry trends. However, it should be noted that the many deficiencies of these sources were part of the motivation for the subsequent primary research study (objective 1b).

[37] Note: 2007 was selected as the starting point of a ten-year period of analysis, *i.e.* 2007-2016.

[38] Note: 1996 was selected as the starting point for a twenty-year period of analysis. In addition, this is the year that the first (available) industry report was published, *i.e.* ECOTEC (1999), *A Strategic Analysis of the Ceramics Industry in Staffordshire*, ECOTEC Research and Consulting Ltd., Birmingham.

According to ECOTEC (1999), in 1996 the number of SOT tableware and ornamentalware manufacturers (SIC code 23410) was reported to be 164 (ECOTEC, p. 8 & 13). However, it should be noted that not all of these firms were independent businesses as often single companies occupied a number of sites, hence many of these 164 firms are assumed to be business units belonging to groups. This point was also raised in the FWC Report on the EU Ceramics sector (2008), where it was noted that "*some large corporate groups now own, and are represented by, a portfolio of SMEs*" (p. 35). According to an article by David Nicholls of The Telegraph, the number of ceramics firms still operating in the SOT cluster in 2011 was "*about 30*" (26th January, 2011)[39]. Another article by The Independent (7th October, 2011), quoted Portmeirion Pottery's Managing Director, Michael Haynes, as stating. "*Of the 300 companies working in Stoke-on-Trent 20 years ago, perhaps only 15 exist today*"[40]. Such inconsistencies in the existing data make it difficult to ascertain an accurate number of firms operating in the SOT cluster in 2016 and this is where this research aims to fill the gap. For the purposes of this research study, SOT ceramics firms will be listed and measured by ownership, *i.e.* single ownership, and as individual businesses within a group.

Despite an extensive search for this thesis, more accurate data on the actual number of SOT ceramics manufacturing firms in 2016 was not found, or simply not gathered in the first place. Moreover, a complete list of names of existing SOT ceramics manufacturing firms could not be found either. As mentioned earlier in this chapter, and subsequent to this initial stage of the research, the researcher carried out her own primary research and will present accurate listings of SOT ceramics manufacturers' by name and ownership, as at 2016, in section 4.3 of this chapter.

Of the 164 business units identified by ECOTEC in 1996, the majority were small and medium sized enterprises (SMEs) with 135 (82%) of the total number of firms having less than 250 employees[41]. Moreover, the vast majority of these SMEs employed less than 25

[39] Nicholls, D. (2011), *All Fired Up: The Future of Pottery,* [ONLINE]. Available at: http://www.telegraph.co.uk/lifestyle/interiors/8281433/All-fired-up-the-future-of-pottery.html. [Accessed 7 July 2017]
[40] Lorenz, T. (2011), *Fired up for the future: Stoke-on-Trent's future depends on a new generation of collectors,* [ONLINE]. Available at: http://www.independent.co.uk/property/house-and-home/fired-up-for-the-future-stoke-on-trents-future-depends-on-a-new-generation-o. [Accessed 7 July 2017]
[41] Small and medium-sized enterprises (SMEs) are non-subsidiary, independent firms which employ fewer than a given number of employees. This number varies across countries. The most frequent upper limit designating an SME is 250 employees, as in the European Union. Source: OECD, (2005), *SMALL AND MEDIUM-SIZED ENTERPRISES (SMES),* [ONLINE]. Available at: https://stats.oecd.org/glossary/detail.asp?ID=3123. [Accessed 7 July 2017]

people (ECOTEC, p. 12). In 1996 the tableware and giftware sector accounted for 84% of the total number of employees in the SOT ceramics industry, approximately 17,000 employees. However, a disproportionate number of employees were employed by the sector's largest firms, resulting in a high concentration ratio. For example, according to Staffordshire TEC (1998), the 4 largest tableware and giftware manufacturers employed in excess of 10,000 people, almost 60% of the 1996 total (Staffordshire TEC, 1998). Between 1996 and 1998 there were a number of reported closures and job cuts across all firm size bands in the sector. For example: in December 1998 Royal Doulton announced 1,000 job cuts in its SOT workforce;[42] also in 1998 Staffordshire Tableware shed 80 jobs[43] and closed altogether in 1999 with a further loss of 670 jobs[44]. The industry continued to suffer from factory closures and job losses, so much so that by 2005 SOT City Council reported: *"ceramics (in SOT) now provides for only 1 job in every 10, half the rate of a decade ago"*[45]. Altogether, more than 20,000 job losses were recorded between 1998 and 2008[46]. In 2009, Wedgwood, the SOT cluster's largest firm, went into administration, 1,500 jobs were cut and much of the mass manufacturing was moved to Asia (previously only a limited amount was outsourced there)[47]. Further evidence of consolidation and factory closures is given below.

4.2.2: Performance of the SOT Cluster's Largest Firms 2000 - 2008

In 2003, the 4 largest firms in the SOT cluster still accounted for the overwhelming majority of jobs and market share in the domestic market. Table 4.1 shows that in 2003 the four largest SOT tableware and giftware manufacturers (highlighted), accounted for just over a third of sales (34%) of china and earthenware to the domestic market, down from 41% in 2001 (MINTEL, 2004). In 2008, the market share of the four largest firms had further reduced to 22% (MINTEL 2008). Of the 'other UK companies' in MINTEL's 2003 report, representing 25% of domestic market share, it is acceptable to assume that the majority of these were SMEs located in the SOT cluster as the UK industry is predominantly geographically clustered in the SOT area. It is also assumed that the MINTEL definition of China and Earthenware also includes porcelain products as there is no evidence in the

[42] Ridge, M. (2002). *Gone to Pot*, [ONLINE]. Available at: https://www.theguardian.com/society/2002/may/29/guardiansocietysupplement. [Accessed 7 July 2017]
[43] Birks, S. (2002), *Staffordshire Tableware Ltd*., [ONLINE]. Available at: http://www.thepotteries.org/allpotters/950b.htm. [Accessed 7 July 2017]
[44] Ridge, M. (2002), *Gone to Pot*, [ONLINE]. Available at: https://www.theguardian.com/society/2002/may/29/guardiansocietysupplement. [Accessed 7 July 2017]
[45] Stoke.gov.uk, (2005), The Plan to Rebuild North Staffordshire's Industry, [ONLINE]. Available at: http://www.stoke.gov.uk/ccm/navigation/news/city-life/city-life-autumn-2005/the-plan-to-rebuild-north-staffordshire-s-industry/ [accessed 16/03/17]
[46] Nicholls, D. (2011), *All Fired Up: The Future of Pottery*, [ONLINE]. Available at: http://www.telegraph.co.uk/lifestyle/interiors/8281433/All-fired-up-the-future-of-pottery.html. [Accessed 7 July 2017]
[47] Monocle. (2017), *All Fired Up*, [ONLINE.] Available at: https://monocle.com/magazine/issues/70/all-fired-up/. [Accessed 7 July 2017]

reports to the contrary and it is well known that Villeroy and Boch (listed) produce mainly porcelain products[48].

Table 4.1: Manufacturers' Share of Sales; China & Earthenware 2001, 2003, 2005 & 2008 (see footnotes)[49]

	2001		2003		2003		2005		2008 (est.)	
	£m	%	£m	%	£m	%	£m	%	£m	%
Waterford Wedgwood Group+	89.0	19	92.5	19	80.0	16	102.0	20	102.0	18
Royal Doulton	79.0	17	48.0	10	40.0	8	-	-	-	-
Denby Pottery	22.0	5	23.1	5	23.1	5	23.5	5	25.9	5
Villeroy & Boch	13.6	3	15.5	3	15.5	3	19.3	4	22.5	4
Portmeirion Potteries	12.5	3	12.9	3	12.9	3	11.2	2	11.4	2
Royal Worcester/Spode++	10.5	2	11.1	2	11.1	2	11.6	2	13.3	2
Churchill China	10.0	2	9.9	2	10.6	2	11.2	2	11.9	2
Other UK companies	116.5	25	122.6	25						
Other imports	111.9	24	154.4	32						
Other Brands					131.4	27	143.8	28	153.5	28
Own label/unbranded					165.4	34	189.4	37	214.5	39
Total	**465.0**	**100**	**490.0**	**100**	**490.0**	**100**	**512.0**	**100**	**555.0**	**100**

(Source: Mintel, 2004 and 2008)

Although the MINTEL data is useful in ascertaining a broad picture of UK manufacturers' sales for the period in question, there are many ambiguities and discrepancies in the data. Firstly, the data presented for the Waterford-Wedgwood Group includes sales of crystalwares as well as ceramic wares, consequently accurate sales figures for purely ceramics products cannot be ascertained. Secondly, the 2004 data lists Royal Worcester/Spode as one entry, when in reality the two companies did not merge until 2006[50]. Thus, it is not clear whether the figures listed refer to Royal Worcester or to Spode, or to the sales of both companies combined. Moreover, it is also worth noting that, until the merger in 2006, Royal Worcester's manufacturing facilities were located in Worcester, which

[48] Villeroy and Boch, (2017), *About Villeroy & Boch: A Timeless Tradition*, [ONLINE]. Available at: https://www.villeroy-boch.com/shop/aboutus. [Accessed 7 July 2017]

[49] Notes to table 4.1: 1) There is a discrepancy in the data for 2003 in the two Mintel Reports; 2) Shaded areas denote SOT Cluster firms; 3) Denby Pottery is located near to Derby which is outside the SOT cluster; 4) Royal Worcester/Spode merged in 2006 and so are not included in the discussions below; 5) Waterford Wedgwood Group includes Doulton from 2005, figures also include Waterford Crystal sales.

[50] Davies, E. (2013), *Rare pottery goes on display at Spode Works Visitor Centre*, [ONLINE]. Available at: http://www.stokesentinel.co.uk/rare-pottery-goes-display-spode-works-visitor/story-18167740-detail/story.html. [Accessed 7 July 2017]

is outside the Stoke-on-Trent cluster. For this reason Royal Worcester/Spode has not been included in the discussion of the data presented in Table 4.1.

The first thing to note from Table 4.1 is that the 2003 sales figures for many of the listed manufacturers do not match exactly with the data for 2003 presented in MINTEL's 2008 report. The biggest difference is in the data provided for Waterford-Wedgwood and Royal Doulton. However, exact figures on sales and market share are not considered to be of primary importance to the objectives of this research study at this stage, as the aim here is to provide evidence of growth or decline in SOT firms' performance over the period in question. The important points to note are that, according to MINTEL, the combined sales for the two companies declined from £168m in 2001 to £102m in 2008. Also significant is the drop in market share from 36% in 2001 to 18% in 2008. This represents a decline in sales of £66m and a 50% decline in market share over the seven year period 2001-2008.The data for Portmeirion also shows a decline in sales from £12.9m in 2003 to £11.4m in 2008, and a drop in market share from 3% to 2%. However, according to the MINTEL data, not all SOT firms experienced a decline in sales during this period. For example, Churchill China experienced a steady growth from £10.6m in 2003 to £11.9m in 2008, but market share remained static throughout the period at 2%, so it cannot be assumed that companies like Churchill have been more profitable.

So far, the data presented above indicates that although the market had grown overall, from £465m in 2001 to £555m in 2008, the sales and market shares of the largest SOT firms declined significantly during this period, with the exception of Churchill China who experienced a small growth in sales revenue. It should be noted that it is not clear whether the MINTEL sales data is stated in 'nominal' or 'real' terms. If the data is nominal, then deflation will have reduced the size of the apparent increase. The MINTEL data also does not include tableware and giftware manufacturers who operate in the hospitality sector, *e.g.* Steelite, Dudson and Churchill China. Another shortcoming of the MINTEL data is that the data is for UK retail sales only and does not include sales from exports. Furthermore, the MINTEL data does not provide details of profits for the companies listed above and this is another shortcoming of the data. Consequently, based on the available secondary data, it is difficult to ascertain an accurate picture of growth or decline in the fortunes of the SOT cluster's firms. The only available collated data that provides details of specific firms is MINTEL data, and this source is ambiguous and inconsistent at best. However, the MINTEL data, for all its shortcomings, does reflect broad processes, albeit with not much precision or

detail. One further point to note is that the sales data provided by MINTEL is not necessarily an indicator of profitability of the companies listed[51].

4.2.3: Performance of the SOT Cluster's Largest Firms 2010 - 2015

In an attempt to overcome some of the shortcomings in the MINTEL approach, data has been accessed for the years 2010 and 2015 from company annual reports[52] for the SOT cluster's largest firms, including those firms operating in the hospitality sector, and has compiled the data into a table (see Table 4.2). In total, four new firms not mentioned in the MINTEL reports are included in the table. Employee numbers are also included as they give an indication of the size of the cluster's largest firms. The following section provides a brief overview of each of the firms in Table 4.2, along with a discussion of sales turnover, profits and employee numbers for each firm.

[51] For example, the Waterford-Wedgwood Group went into administration in January 2009 and in March 2009 a U.S. private equity firm called KPS Capital bought the company . Waterford-Wedgwood was then called WWRD Holdings and much of its production shifted outside the SOT Cluster to Indonesia . In 2015, WWRD was purchased by Finnish based home and garden group Fiskars for £280m.
[52] Companies House UK, (2017), Find Company Information, [ONLINE]. Available at: https://www.gov.uk/government/organisations/companies-house. [Accessed on various dates April/May 2017]

Table 4.2: Revenue, Profit & Employees (2010 & 2015) for the SOT Cluster's Largest Firms

Company	Revenue £m	Operating (PBIT) £m	Employees in SOT	Revenue £m	Profit (PBIT) £m	Employees in SOT
	2010	2010	2010	2015	2015	2015
Steelite	60.5	6.0	800	102.0	8.8	1000+[53]
Portmeirion	34.8	2.7	532	50.5	7.2	684
Churchill	43.7	2.2	555	46.8	4.8	561[54]
Dudson	14.3	(1.9) loss	500	19.4	(5.3) loss	500[55]
WWRD (Wedgwood)[56]	N/K	N/K	500[57]	N/K	N/K	500[58]
Emma Bridgewater	10.7	0.6	180[59]	14.1	1.2	265[60]
Wade ceramics	10.2	0.4	150[61]	10.0	0.2	200[62]
Denby[63]	20.6	0.9	35	26.8	1.2	50+[64]
Note: Financial data for Wedgwood production in SOT could not be obtained. N/K = not known						

(Source: individual company accounts (Companies House UK) unless otherwise referenced)

Steelite International

According to the data presented in Table 4.2, Steelite International is the biggest single employer in the SOT cluster (approximately 1,000 employees in 2016)[65]. Steelite is a world-leading manufacturer and supplier of tabletop ranges for the international hospitality industry (hotelware). The company's core chinaware products are manufactured at its factory in the SOT cluster. Steelite International established in 1983, following a management buyout of

[53]Simpson, M. (20160, *Steelite to create 112 new jobs and develop eyesore site in expansion*, [ONLINE.] Available at: http://www.stokesentinel.co.uk/steelite-to-create-112-new-jobs-and-develop-eyesore-site-in-expansion/story-29466805-detail/story.htm. [Accessed 7 July 2017]

[54] Citywire, (2017), *Churchill China PLC*., [ONLINE]. Available at: http://citywire.co.uk/money/share-prices-and-performance/share-factsheet.aspx?InstrumentID=731. [Accessed 7 July 2017]

[55] The Sentinel, (2014), *Tunstall-based Dudson ceramics lands £3m from Business Growth Fund*, [ONLINE]. Available at: http://www.stokesentinel.co.uk/tunstall-based-dudson-ceramics-lands-3m-business/story-21048427-detail/story.html. [Accessed 7 July 2017]

[56] WWRD figures include crystalwares and other non-ceramic products not produced in the UK

[57] The Sentinel, (2010), *Wedgwood is back in profit two years after collapse*, [ONLINE]. Available at: http://www.stokesentinel.co.uk/wedgwood-turning-profit/story-12572943-detail/story.html. [Accessed 7 July 2017]

[58] The Sentinel, (2012), *Wade Ceramics plans expansion after doubling production rates*, [ONLINE]. Available at: http://www.stokesentinel.co.uk/wade-ceramics-plans-expansion-doubling-production/story-15933809-detail/story.html. [Accessed 7 July 2017]

[59] BBC News Business, (2010), *Emma Bridgewater*, [ONLINE]. Available at: http://www.bbc.co.uk/news/10322646. [Accessed 7 July 2017]

[60] Nicholls, D. (2011), All Fired Up: The Future of Pottery, [ONLINE]. Available at: http://www.telegraph.co.uk/lifestyle/interiors/8281433/All-fired-up-the-future-of-pottery.html. [Accessed 7 July 2017]

[61] The Sentinel, (2010), *Firm Wades into £7.5m state-of-the-art factory,* [ONLINE]. Available at: http://www.stokesentinel.co.uk/firm-wades-163-7-5m-state-art-factory/story-12573729-detail/story.html. [Accessed 7 July 2017]

[62] The Sentinel, (2012), *Wade Ceramics plans expansion after doubling production rates*, [ONLINE]. Available at: http://www.stokesentinel.co.uk/wade-ceramics-plans-expansion-doubling-production/story-15933809-detail/story.html. [Accessed 7 July 2017]

[63] Denby figures are for 2011 and are for group operations, including goods made outside SOT

[64] The Sentinel, (2013), *Burleigh Pottery workers: 'Give us a pay rise or we'll strike again'* [ONLINE]. Available at: http://www.stokesentinel.co.uk/burleigh-pottery-workers-pay-rise-ll-strike-video/story-19623885-detail/story.html. [Accessed 7 July 2017]

[65] Simpson, M. (2016), *Steelite to create 112 new jobs and develop 'eyesore' site in expansion*, [ONLINE]. Available at: http://www.stokesentinel.co.uk/steelite-to-create-112-new-jobs-and-develop-eyesore-site-in-expansion/story-29466805-detail/story.htm. [Accessed 7 July 2017]

the hotelware division of Royal Doulton[66]. In December 2012 Steelite bought Royal Crown Derby, another SOT ceramics manufacturer established in 2000, as a spin-off from Royal Doulton. Royal Crown Derby had a turnover of approximately £6m and employed 200 staff at the time of acquisition[67]. In 2015, Steelite's turnover was £102m, up from £60.5m in 2010 (see Table 4.2). Also in 2015, Steelite reported an operating profit of £8.8m, up from £6.0m in 2010. Steelite's main UK competitors in 2015 were Churchill China UK Ltd., and Dudson Ltd., both having significant presence in the hotelware segment. Steelite do not operate in the domesticware segment, and so may not be perceived as a direct competitor by some of the SOT cluster's other large firms. However, based on the data presented above, Steelite currently has the largest turnover from SOT made goods and also the largest number of SOT based employees, more than any other firm in the SOT cluster, and therefore Steelite is classed as the cluster's largest firm.

Portmeirion

Portmeirion was established in 1960 after the acquisition of Grays Pottery and Kirkhams Ltd, both were existing SOT based potteries at the time. In 2009, Portmeirion acquired the Royal Worcester and Spode brands. Portmeirion is currently the UK's largest consumer ceramics manufacturer[68]. According to MINTEL data, Portmeirion was the second largest firm in the SOT cluster in 2010 with a 5% UK market share (MINTEL, 2010). Since 2010 Portmeirion has continued to grow and prosper, mostly due to growth in export markets[69]. Data presented in Table 4.2 shows that the group employed 684 people in SOT in 2015 and had sales turnover of £50.5m, up from £34.8m in 2010. Profit before tax also increased over the same period from £2.7m in 2010 to £7.2m in 2015. From the data presented in this chapter, and based on sales turnover, profit and employee numbers, it can be assumed that Portmeirion has emerged as the second largest firm in the SOT cluster.

[66] The Sentinel, (2016), *Steelite International: A pottery history,* [ONLINE]. Available at: http://www.stokesentinel.co.uk/steelite-international-a-pottery-history/story-29451509-detail/story.html. [Accessed 7 July 2017]
[67] Derby Telegraph, (2012). *Royal Crown Derby sold to ceramics firm Steelite International*. [ONLINE] Available at: http://www.derbytelegraph.co.uk/royal-crown-derby-sold-ceramics-firm-steelite/story-17628257-detail/story.html. [Accessed 7 July 2017]
[68] Financial Times, (2016), *Spode-maker Portmeirion issues upbeat profit outlook,* [ONLINE]. Available at: https://www.ft.com/content/ee15b7b9-78b0-3392-97b4-18344e279bf4. [Accessed 7 July 2017]
[69] The Sentinel, (2010), *Pottery's sales soar after buying Spode and Royal Worcester brands,* [ONLINE]. Available at: http://www.stokesentinel.co.uk/pottery-s-sales-soar-buying-brands/story-12513000-detail/story.html. [Accessed 7 July 2017]

Churchill China

Churchill China is another large SOT ceramics manufacturer, established in 1795, and still 40% owned by the Roper family. The company operates mainly in the hotelware segment, but unlike Steelite, Churchill also has a significant presence in the domesticware segment. According to MINTEL (2010), Churchill's market share in 2010 was 4% of the UK market and sales turnover was £20m. However, the MINTEL data represents Churchill's UK domesticware retail sales only. The data presented in Table 4.2 represents all sales turnover (domesticware and hotelware and domestic and international sales), thus the combined sales turnover for both hotelware and domesticware in 2015 was £46.8m, up from £43.7m in 2010, and the combined operating profit for both hotelware and domesticware in 2015 was £1.2m, up from £0.9m in 2010. Employees in SOT in 2015 were 561. The data presented in Figure 4.2 shows that Churchill China is the third largest firm in the SOT cluster.

Dudson Limited

Dudson Pottery are a private, family-owned business, first established in 1800, and are another prominent supplier to the UK and international hotelware segments. In 2015, they had approximately 500 employees in SOT (see Table 4.2), and a sales turnover of £19.4m, up from £14.3m in 2010. However, in 2015 the company recorded a loss of £5.3m. In 2010 the company had also reported a loss of £1.9m. As Dudson are a privately owned, family-run business, very little information on their profitability is available in the public domain and so no accurate comments or explanations can be made regarding the losses. However, the situation for Dudson may not be as bad as it seems as, in 2014, the Stoke Sentinel reported that Dudson had secured £3m of funding from the UK Business Growth Fund, with the purpose of investing it in more efficient manufacturing equipment, streamlining production processes and enhancing sales and marketing capabilities[70]. Despite the loss-making situation of Dudson, and based on sales turnover and number of employees alone, the company is identified as the fourth largest firm in the SOT cluster in 2015.

Wedgwood Group (WWRD)

Prior to 2005, Wedgwood and Royal Doulton Groups were the two 'dominant firms'[71] in the SOT cluster, *i.e.* effectively a duopoly. Although both companies established in the 18th and

[70] The Sentinel, (2014), *Tunstall-based Dudson ceramics lands £3m from Business Growth Fund*, [ONLINE]. Available at: http://www.stokesentinel.co.uk/tunstall-based-dudson-ceramics-lands-3m-business/story-21048427-detail/story.html. [Accessed 7 July 2017]

[71] Definition: A dominant firm is one which accounts for a significant share of a given market and has a significantly larger market share than its next largest rival (source: OECD, (2002), *DOMINANT FIRM*, [ONLINE])

19th centuries respectively, their expansion through acquisition mainly happened in the 1960s and 1970s by the amalgamation of many independent potteries companies[72], each group continued to grow through acquisition throughout the 1980s and 1990s[73]. In 1986, the Irish company Waterford Glass Ltd., acquired Wedgwood. In 2005, the Waterford-Wedgwood Group acquired Royal Doulton[74] and effectively absorbed its main competitor[75]. Wedgwood's UK market share in 2010 was 13% (MINTEL, 2010). However, as previously stated, Waterford-Wedgwood went into administration in 2009 and was purchased by U.S. firm KPS Capital. Accurate financial data on the SOT factory's performance since then is not available. In 2014, however, WWRD's whole group turnover was reported as £280m[76] and the number of employees in Wedgwood's SOT factory was estimated to be approximately 500[77]. In July 2015, the Finnish company Fiskars Corporation, a leading global supplier of consumer products for the home, garden and outdoors, acquired the WWRD group of companies[78]. With approximately 500 employees still working at Wedgwood's SOT factory, Wedgwood is assumed to be the fifth largest firm in the SOT cluster in 2015. However, without any accurate data on sales turnover and profits, the true position of Wedgwood in the SOT cluster cannot be ascertained.

Emma Bridgewater

Emma Bridgewater was established in 1985 and, as a result, is relatively new to the SOT cluster. The company began by first designing pottery, then moved into manufacturing in 1991[79]. In 1996, having outgrown their first factory, the company moved to Eastwood Works (formerly Meakin Brothers Pottery)[80]. Emma Bridgewater specialises in hand-decorated, cream coloured earthenwares that are manufactured entirely in SOT. In 2015, the

[72] Birks, S. (2002), *Josian Wedgwood and Sons,* [ONLINE]. Available at: http://www.thepotteries.org/allpotters/1069.htm. [Accessed 7 July 2017]
[73] PR NEWSWIRE, (1997), *WATERFORD WEDGWOOD PLC ACQUISITION OF 51.58% STAKE IN ROSENTHAL AG*, [ONLINE]. Available at: http://www.prnewswire.co.uk/news-releases/waterford-wedgwood-plc-acquisition-of-5158-stake-in-rosenthal-ag-156811265.html. [Accessed 7 July 2017]
[74] Evening Standard, (2004), *Wedgwood buys Doulton for £40m*, [ONLINE]. Available at: http://www.standard.co.uk/news/wedgwood-buys-doulton-for-40m-7200534.html. [Accessed 7 July 2017]
[75] At the time of the acquisition, Waterford-Wedgwood's group chief executive, Redmond O'Donoghue, said the acquisition would "increase the volume through our factories without substantially increasing production costs". (source: Independent, (2009), *The rise and fall of Wedgwood*. [ONLINE].
[76] Includes Waterford crystal and products made outside the SOT cluster
[77] King, A. (2015), *Wedgwood bought by Finnish company,* [ONLINE]. Available at: http://www.stokesentinel.co.uk/wedgwood-bought-finnish-company/story-26479861-detail/story.html. [Accessed 7 July 2017]
[78] Waterford Crystal, (2017), *History of Waterford Crystal,* [ONLINE]. Available at: https://www.waterfordvisitorcentre.com/content/history-waterford-crystal. [Accessed 7 July 2017]
[79] Emma Bridgewater, (2015), *ABOUT THE FACTORY*, [ONLINE]. Available at: http://emmabridgewaterfactory.co.uk/pages/about-the-factory/. [Accessed 7 July 2017]
[80] Breaking The Mould, (2009), *Emma Bridgewater Pottery*, [ONLINE]. Available at: http://www.breakingthemould.info/hanley/09-emma-bridgewater/more.html. [Accessed 7 July 2017]

company's sales revenue was £14.1m, up from £10.7m in 2010 and profits were £1.2m, up from £0.6m in 2010. Employees in SOT in 2015 were approximately 265 (see Table. 4.2).Therefore, based on the data above, Emma Bridgewater appear to be the sixth largest firm in the SOT cluster.

Wade Ceramics

Wade Ceramics was originally founded in 1810 as a producer of ceramic items for industry[81]. Today Wade produces a range of porcelain and earthenware products for the domestic market, including animal figures for their Collectors Club, as well as a range of commercial products including whisky flagons and other industrial ceramics[82]. In 2015, the company's sales revenue was £10.0m, slightly down from £10.2m in 2010 and profits were £0.2m, down from £0.4m in 2010. Employees in SOT in 2015 were approximately 200 (see Table. 4.2). Based on the employee data above, Wade Ceramics appear to be the seventh largest firm in the SOT cluster.

Denby Pottery

One other tableware and giftware manufacturer, who up until 2009 could not be considered to be part of the SOT cluster, is Denby Pottery. Although based in Derby since it was established in 1850[83], and thus outside of the SOT cluster, Denby acquired the SOT ceramics manufacturer Burleigh Pottery in 2009[84]. The Denby Pottery parent company also owns Poole Pottery, now manufactured in SOT, and a number of other non-ceramic housewares brands. In 2009, investment group Hilco UK made significant investment into Denby Pottery Group. Hilco Capital is an international UK company that specialises in restructuring and refinancing other companies[85]. In 2015, Denby's turnover was £26.8m, up from £20.6m in 2010. Operating profit was reported as £1.2m in 2015, up from £0.9m in 2010 (see Table. 4.2). However, the sales turnover and profit data presented in Table 4.2 is for all of Denby Pottery Group activities, thus it is not clear what percentage of sales turnover and profits are for ceramics produced in SOT. Furthermore, although Denby Pottery Group

[81] Wade ceramics, (2017), *Wade ceramics Heritage,* [Online]. Available at: http://www.wade.co.uk/history/ [Accessed 10 July 2017]
[82] Wikipedia, (2017), *Wade Ceramics*, [ONLINE]. Available at: https://en.wikipedia.org/wiki/Wade_Ceramics. [Accessed 10 July 2017]
[83] Pottery Histories, (2011), *History of the Denby Pottery,* [ONLINE]. Available at: http://www.potteryhistories.com/Denbyhistory.html. [Accessed 10 July 2017]
[84] The Sentinel, (2015), *Sale of Burleigh pottery brand put on hold,* [ONLINE]. Available at: http://www.stokesentinel.co.uk/sale-burleigh-pottery-brand-hold/story-25923993-detail/story.htm. [Accessed 10 July 2017]
[85] Wikipedia, (2017), *Hilco*, [ONLINE]. Available at: https://en.wikipedia.org/wiki/Hilco. [Accessed 10 July 2017]

employ approximately 800 staff across the group[86], only 50-60 employees are likely to be based in the SOT cluster. For these reasons, Denby cannot be classified as one of the SOT cluster's largest firms.

4.2.4: The Influence of Dominant Firms in the SOT Cluster

From the data presented so far in this section, Steelite appears to be the current dominant firm in the SOT cluster in terms of employees, sales turnover and profit from its SOT manufacturing operations. The next three largest firms, based on employee numbers are Portmeirion, Churchill and Dudson, who, although similar in terms of employees, are less similar in terms of sales turnover and profit. Wedgwood, with 500 employees in SOT, can also be classed as one of the clusters largest firms. However, as stated previously, without financial data for Wedgwood's SOT manufactured products, it is difficult to position the company against the other large SOT cluster firms.

Interestingly, only three of the five dominant firms presented here were present in the SOT cluster before the 1960s. Wedgwood was established in 1759, Churchill China (formerly Sampson Bridgwood, then JAS Broadhurst) was established in 1795, and Dudson was established in 1800[87]. Portmeirion and Steelite are relatively new to the SOT cluster. Portmeirion was established in 1960 and Steelite in 1983, although Steelite was a spin-off from Royal Doulton hotelware division, and thus not a true new entrant. Steelite, Churchill and Dudson differ from the other large firms in the SOT cluster in that they operate extensively in the hospitality sector, producing durable tableware for the global restaurant and hotel industry. Demand in this sector has grown as people have replaced eating in for eating out[88]. Growth in export markets, particularly in Asia, is considered to be another reason for the success of these companies. It is estimated that approximately 70% of UK manufactured ceramics products are exported around the globe[89].

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[86] Derby Telegraph, (2013), *£7m backing for Denby Pottery to break into new foreign markets,* [ONLINE]. Available at: http://www.derbytelegraph.co.uk/pound-7m-backing-denby-pottery-break-new-foreign/story-19360366-detail/story.html#axzz2b6DhEati. [Accessed 10 July 2017]

[87] Dudson, (2017), *A Potted History,* [ONLINE]. Available at: http://www.dudson.com/company/about-us/a-potted-history. [Accessed 10 July 2017]

[88] Big Hospitality, (2016), *UK Diners to Spend £54.7bn on Eating Out by 2017*, [ONLINE]. Available at: http://www.bighospitality.co.uk/Trends-Reports/UK-diners-to-spend-54.7bn-on-eating-out-by-2017. [Accessed 10 July 2017];
Baer, D. (2016), *Americans Spend More on Restaurants Than Groceries, Because of Huge Social Changes*, [ONLINE]. Available at: http://nymag.com/scienceofus/2016/06/americans-spend-more-on-restaurants-than-groceries.html. [Accessed 10 July 2017]
Neilsen, (2016), *WHAT'S IN OUR FOOD AND ON OUR MIND*, [ONLINE]. Available at: http://www.nielsen.com/content/dam/nielsenglobal/eu/docs/pdf/Global%20Ingredient%20and%20Out-of-Home%20Dining%20Trends%20Report%20FINAL%20(1).pdf. [Accessed 10 July 2017]

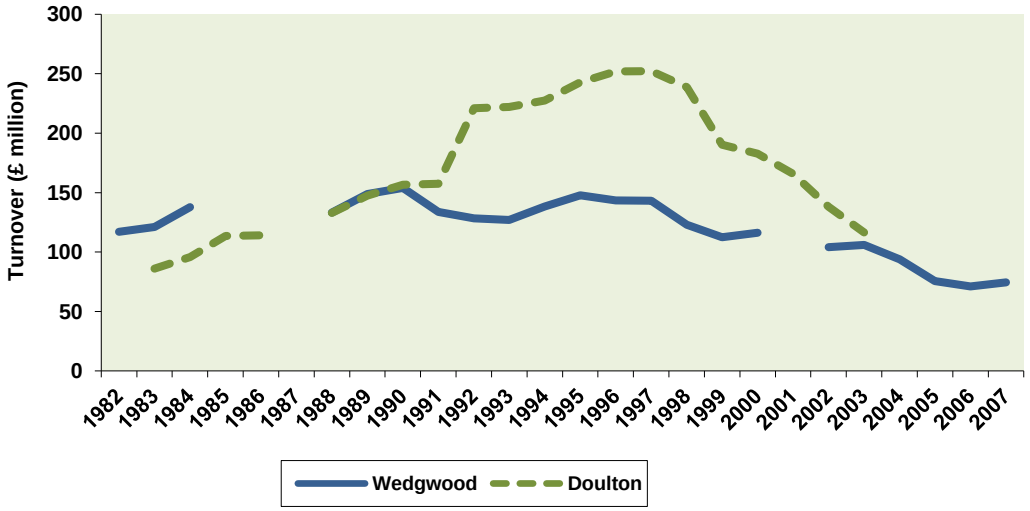
[89] Jack, I. (2010), *Fire returns to the Potteries' heart*, [ONLINE]. Available at: https://www.theguardian.com/theguardian/2010/oct/16/stoke-pottery-industry-china-ian-jack. [Accessed 10 July 2017]

Wedgwood, and Doulton prior to acquisition by Wedgwood, were by far the largest ceramics manufacturers in the SOT cluster from the 1960s onwards. By 1975, Wedgwood had approximately 9,000 employees in 20 factories in SOT[90]. In 2000 Royal Doulton employed about 3,000 people in its Nile Street factory alone in SOT[91]. Moreover both Wedgwood and Doulton operated mainly in the domesticware segment, where most of the SOT cluster's SMEs operate. Therefore, due to their previous size and long presence in the cluster, it may be assumed that these two companies have had a significant influence upon the fortunes of the SOT cluster over time.

The past dominant positions of Wedgwood and Doulton, with combined market share of 36% in 2001 (MINTEL, 2004), indicate that the fortunes of these companies have been critical to the SOT cluster as a whole (see also Padley and Pugh, 2000). Figure 4.1 below presents a comparison of sales turnover for the two largest firms in the SOT cluster between 1982 and 2007. Figure 4.2 compares the combined sales of Wedgwood and Doulton with the total sales of the UK tableware and giftware sector for the period 1996-2007. From Figure 4.1 it can be seen that Royal Doulton enjoyed rising sales until the late 1990s, while Wedgwood kept sales more or less constant for some years preceding the late 1990s. At their height, the combined annual sales of these two firms were only a little less than £400 million (£395 million in both 1996 and 1997). From there the decline of both firms was uninterrupted, with Doulton eventually being taken over by Wedgwood in 2005, and then Wedgwood being placed into administration at the beginning of 2009[92]. Figure 4.2 focuses on the years of decline since the late 1990s, it charts the combined sales of Wedgwood and Doulton from the years of their joint maximum (1996 and 1997) to 2007. To this is added the total sales of the tableware and giftware industry (ons.gov.uk, 2009).

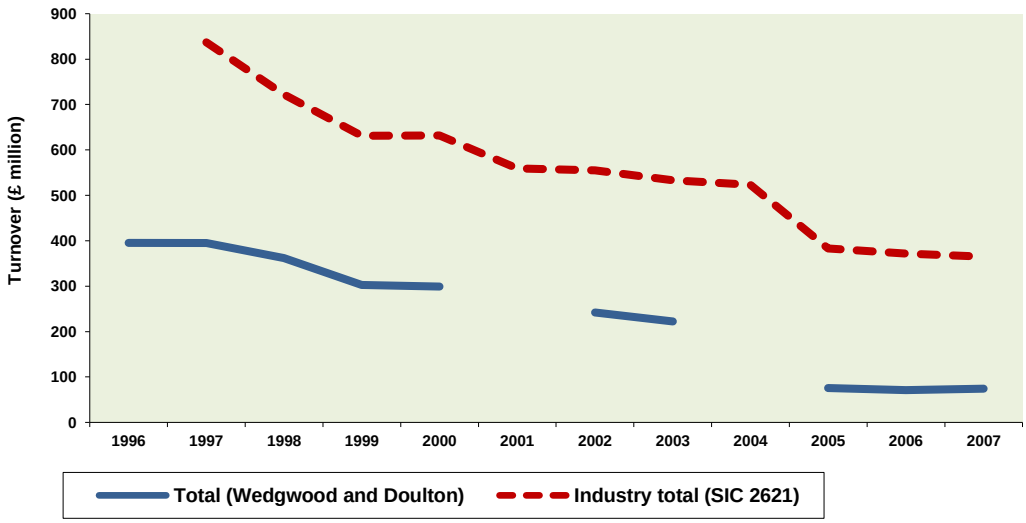
[90] Funding Universe, (2000), *Waterford Wedgwood PLC History*, [ONLINE]. Available at: http://www.fundinguniverse.com/company-histories/waterford-wedgwood-plc-history/. [Accessed 10 July 2017]
[91] The Economist, (2001), *The China Syndrome,* [ONLINE]. Available at: http://www.economist.com/node/748802. [Accessed 10 July 2017]
[92] Note: the data, which is from successive *Annual Accounts* of both firms, is not adjusted for inflation. This is not necessary given the main purpose is to compare the decline of Doulton and Wedgwood with the decline of total sales in the tableware and giftware industry (SIC 2621).

Figure 4.1: Wedgwood and Doulton Turnover (1982-2007)



(Source: Limbrick and Pugh (2009). Based on Annual Reports and Accounts for Royal Doulton and Josiah Wedgwood (with gaps reflecting missing years))

Figure 4.2: Wedgwood and Doulton turnover compared to total industry turnover (Tableware and Giftware: SIC 2621) (1996-2007)



(Source: Limbrick and Pugh (2009). Based on Annual Reports and Accounts for Doulton and Wedgwood (with gaps reflecting missing years) and the ONS on-line database for the tableware and giftware industry)

From the data presented in Figures 4.1 and 4.2 it is evident that the decline of the industry's two dominant firms moves almost in-step with the decline of the industry overall; and, that most of the decline of the industry is accounted for by the decline of its two once dominant

firms. Over the decade, from 1998 to 2007, the combined turnover of Doulton and Wedgwood declined by £287 million, and that of the tableware and giftware industry as a whole by £357 million. Hence, over the period in question, 80% of the decline of the tableware and giftware industry is accounted for by the decline of its once two dominant firms. Moreover, the data on industry turnover is for the UK as a whole, therefore an even greater proportion of the decline of the tableware and giftware industry in the SOT cluster is accounted for by the decline of Doulton and Wedgwood.

The data presented here shows that Doulton and Wedgwood were not typical of the industry they dominated. In addition to being much larger than the typical SOT cluster firm, it is thought that they substantially and systematically underperformed in relation to the industry as a whole. This is a view that has been previously analysed by industry experts (see Padley and Pugh, 2000). It would appear though, based on the data presented in previous sections of this chapter, that the end of the era of dominance by Doulton and Wedgwood has left the SOT cluster with an industry that appears to be much more sustainable. The SOT cluster is currently made up of large (albeit much smaller than Wedgwood and Doulton at their peak), medium and small firms. The success of the largest of these firms has been shown in previous sections of this chapter.

4.2.5: The Number of New Firms Entering the SOT Cluster

In the UK ceramics industry there have been only two 'real'[93] new entrants formed in the last 50 years that have grown to any significant size, both companies belong to the SOT cluster. Portmeirion was founded in 1960 and, as mentioned previously, acquired Spode (including Royal Worcester and Pimpernel in 2009) and by 2015 had approximately 684 staff. The second firm, Emma Bridgewater, was founded in 1985. In 2015, Emma Bridgewater employed approximately 265 staff (see Table. 4.2). MINTEL's 2004 report also lists successful new entrants into the SOT cluster as: Emma Bridgewater Ltd (1985); Repeat-Repeat (1984); and, The Tabletop Company (1996). Repeat-Repeat was still operating as a small (less than 10 employees) but very successful craft potter in 2016[94]. After a brief expansion in 2004 the Tabletop Company was dissolved in 2007[95]. Emma Bridgewater Ltd. is the only new firm of any size listed in MINTEL's 2004 report. MINTEL's 2008 and 2010

[93] Real new entrants are brand-new start-up firms, not spin-offs or existing firms from outside the cluster who have relocated to SOT.
[94] Repeat Repeat, (2017), *About Us,* [ONLINE]. Available at: http://www.repeatrepeat.co.uk/about-our-company.html. [Accessed 10 July 2017]
[95] Wikipedia, (2014), *The Tabletop Group,* [ONLINE]. Available at: https://en.wikipedia.org/wiki/The_Tabletop_Group. [Accessed 10 July 2017]

reports do not identify specific new entrants into the industry. The researcher could not find any other existing listings of significant new firms since 2004.

As stated previously, there is no systematic data about new entrants into the SOT cluster in the published literature. From the limited numbers listed it can be assumed that there have been fewer new entrants into the SOT cluster than there have been closures and mergers (see 4.2.1 and 4.2.2). The evidence indicates that the overall number of firms in the industry has declined, resulting in a reduction in competition and possibly also in the innovative capacity of the cluster.

From the findings presented so far, it is clear that there are several limitations in the existing published data. Firstly, there is no detailed periodic information available on the number of firms in the cluster before 1996, thus the rate of decline in the number of firms cannot be accurately determined up to 2016. Secondly, no published data is available on the exact number of firms existing in 2016. Consequently, an important aim of this thesis is to address the limitations of the existing data by undertaking a longitudinal study, that tracks the movement of SOT tableware and giftware manufacturers from 1960 up to 2016, in order to determine an accurate account of the evolution of the SOT cluster and of the number of firms left in the industry in 2016. Findings of the longitudinal study are presented next in this chapter and include: the number of firms, by ownership, existing in the SOT cluster between 1960 and 2016; the number of new entrants into the SOT cluster between 1960 and 2016; the size and development of new entrants over the period in question; and, the pattern of acquisitions, mergers and closures over the period in question.

4.3: Objective 1, Part 2 - The Development of the SOT Cluster 1960 to 2016 (based on primary research)

This section of the findings aims to determine more accurately whether domestic competition in the SOT cluster increased or decreased over the last 56 years, simply by tracking the movements of the competing firms in the cluster. Another important aim of this stage of the research is to identify the target population for the questionnaire and interview surveys on innovation, co-operation and competition, *i.e.* all core manufacturing firms remaining in the cluster in 2016.

4.3.1: Rationale for the Total Population Selection

Large firms and SMEs only are considered in the primary research stages of this study, *i.e.* firms with approximately 10 employees or more. Micro-firms, *i.e.* firms with 10 employees or less, have been excluded. The rationale for excluding micro-firms is based on a previous study of the SOT cluster by Jackson and Tomlinson (2009), who note that standard measures of innovation are not deemed suitable for micro-firms producing studio pottery, as output is often bespoke and varies considerably among firms. Moreover, studio pottery often depends upon individual artistic interests (p. 696). In addition, micro 'artisan' companies can often be difficult to identify and track, *e.g.* they can be run from home and may not be VAT registered. It is assumed that these firms represent only a small percentage of the SOT cluster.

Furthermore, only core product manufacturers who are active in all (most) stages of the value chain, including design, manufacturing and decorating of ceramics products, are included in this study (see methodology). This decision was based on the need to be able to compare like-for-like firms with each other and also over a period of time. The identified core manufacturers are listed by ownership, *i.e.* business units are not counted separately. This is an important distinction between this study and previous studies that have tended to list factory sites as separate businesses, *e.g.* ECOTEC, 1996. The number of firms still operating in 2016 will form the total population for stage 3 and stage 4 of the research.

The longitudinal study presented here is based on information gained from multiple secondary sources (see list of references in Appendix 4a). Data was compiled by the researcher into a unique database (Appendix 4) which tracks the development of firms in the SOT cluster from 1960 up to December 2016. It also includes a small number of additional firms which were acquired before 1960 by other firms within the SOT cluster. The acquiring firms either went on to become important players in the cluster, or were later acquired themselves by firms who became important players in the cluster. Thus, these pre-1960 firms were included as they were considered an important contribution to identifying: 1) the pattern of acquisitions that took place in the period 1960-2016; and, 2) the emergence of the SOT cluster's dominant firms. The database (Appendix 4) is organised as follows:

- Alphabetical listing of all known tableware and giftware manufacturers based in and around SOT;
- Company history (if known and if relevant), including details of mergers, acquisitions, closures, name changes, *etc;*

- Year of establishment and year of closure/takeover/merger/name-change.
- Current status, *i.e.* operating or not;
- Location within the SOT area.

From the main database, a number of derivative tables were compiled and these are included in the appendices. From the tables, the movement of firms in each decade can be tracked, *e.g.* new entrants, acquisitions, mergers, closures and firms remaining from the previous decade. The overall purpose, apart from the historical interest in identifying the evolution of the ceramics industry over the period, was to arrive at an accurate number of firms operating in the industry in 2016. These firms then formed the total research population for stages 3 and 4 of this research study.

- Appendices 5a-5g show the actual number of firms in existence in the periods 1960-1969, 1970-1979, 1980-1989, 1990-1999, 2000-2009, 2010-2016 and 2016.
- Appendix 6 shows the actual number of new entrants (broad definition)in each of the periods: 1960-1969, 1970-1979, 1980-1989, 1990-1999, 2000-2009, 2010-2016 and 2016.
- Appendix 7 shows the origin of new entrants between 1960 and 2016.
- Appendix 8 shows new entrants for each decade based on the narrow definition[96] of new entrants.

4.3.2: Analysis of Data

Table 4.3 summarises findings related to the analysis of data in appendices 5a-5g and 6. Discussion for each decade is provided below (see 4.3.2.1 – 4.3.2.6). The figure for 2016 denotes the number of firms carrying out all/most stages of production, with 10 or more employees, left in the SOT cluster in 2016.

[96] The number of new firms shown in appendix 6 includes all new entrants regardless of their origin and so represents the *broad definition* of new entrants. However, some new entrants are not genuine new entrants, but were previously existing firms that had changed name or were new subsidiaries of existing firms. Some firms were also formed as spin-offs from existing or previously existing firms. Only 8 firms are known to be true new start-ups. Origins are not known for 15 firms. By including only known new entrants and spin-offs, we arrive at a *narrow definition* of new entrants (Appendix 8).

Table 4.3: Development of the SOT Tableware & Giftware Cluster 1960-2016 *(see Appendices 5a-5g & 6)*

	1960-69	1970-79	1980-89	1990-99	2000-2009	2010-2016	2016	Totals
Number of firms in operation	107*	70	64	52***	46****	24	15	
New entrants over the period	(8)	(7)	(9)	(7)	(7)	(0)	(0)	38
Firms each period less new entrants	99	63	55	45	39	24		
Firms still operating at the start of next period	(63)	(55)	(45)	(39)	(24)	(16)		
Number of firms no longer operating at end of period	44	15	19	13	22	8		121
Destination of firms no longer in operation								
Acquired	26	7	11	8	4	0		56
Closed down**	16	7	7	4	18	8		60
Merged	1	1	1	1	0	0		4
Diversified	1	0	0	0	0	0		1
Total	44	15	19	13	22	8		121

(Includes 1 new entrant who entered and exited during the period (Baifield Productions). **Includes 2 firms who closed down c1969/70. *** Includes 3 new entrants who entered and exited during the period (Lorna Bailey, Staffordshire China and Crownford China). **** Includes 1 new entrant who entered and exited the cluster during the period in question (Pyramid Pottery).*

1960 - 1969

The overall number of firms operating during the period 1960-1969 including new entrants was 107. By the beginning of 1970, this number had reduced to 63. This represents an approximate reduction of 33% in the total number of firms over the decade. However, by subtracting new entrants (8) included in the table for 1960-69, we can see that of the original 99 firms existing prior to 1960, only 55 remained in 1969. This shows a reduction of 46% in the number of firms operating at the beginning of 1960. Of the 44 firms no longer operating in 1970: 26 firms had been acquired; 16 had closed down; 1 had merged with another firm; and, 1 had diversified into industrial ceramics.

1970 - 1979

The overall number of firms operating during the period 1970-1979 including new entrants was 70. By the beginning of 1980, this number had reduced to 55. This represents an approximate reduction of 21% in the total number of firms over the decade. However, by subtracting new entrants (7) included on the table for 1970-79, we can see that of the original 63 firms existing prior to 1970, only 48 remained in 1979. This shows a reduction of

approximately 24% in the number of firms operating at the beginning of 1970. Of the original 15 firms no longer operating in 1980: 7 firms had been acquired; 7 had closed down; and, 1 had merged with another firm. Note: of the 55 firms still operating 1 firm had changed name from Washington Pottery to English Ironstone tableware[97].

1980 - 1989

The overall number of firms operating during the period 1980-1989 including new entrants was 64. By the beginning of 1990, this number had reduced to 45. This represents an approximate reduction of 30% in the total number of firms over the decade. However, by subtracting new entrants (9) included on the table for 1980-89, we can see that of the original 55 firms existing prior to 1980, only 36 remained in 1989. This shows a reduction of approximately 35% in the number of firms operating at the beginning of 1980. Of the 19 firms no longer operating in 1990: 11 firms had been acquired; 7 firms had closed down; and, 1 firm had merged with another firm. Note: of the 45 firms still operating, 1 firm had changed name from James Broadhurst & Sons to Churchill China[98].

1990 - 1999

The overall number of firms operating during the period 1990-1999 including new entrants was 52. By the beginning of 2000, this number had reduced to 39. This represents an approximate reduction of 25% in the total number of firms over the decade. However, by subtracting new entrants (7) included on the table for 1990-99, we can see that of the original 45 firms existing prior to 1990, only 32 remained in 1999. This shows a reduction of approximately 29% in the number of firms operating at the beginning of 1990. Of the 13 firms no longer operating in 2000: 8 firms had been acquired; 4 firms had closed down; and, 1 firm had merged with another firm.

2000 - 2009

The overall number of firms operating during the period 2000-2009 including new entrants was 46. By the beginning of 2010, this number had reduced to 24. This represents a reduction of 48% in the total number of firms over the decade. However, by subtracting new entrants (7) included on the table for 2000-09, we can see that of the original 38 firms

[97] Listed from 1980s onwards as English Ironstone Tableware
[98] Listed from 1990s onwards as Churchill China

existing prior to 2000, only 17 remained in 2009. This shows a reduction of approximately 55% in the number of firms operating at the beginning of 2000. Of the 22 firms no longer operating in 2000: 4 firms had been acquired; and, 18 firms had closed down.

2010 - 2016

The overall number of firms operating during the period 2010-2016 was 24. By 2016 this number had reduced to 16. This represents a reduction of approximately 33% in the total number of firms over the decade. There were no new entrants during this period. Of the original 8 firms no longer operating in 2016, all 8 had closed down.

In summary, by adding the total number of new entrants during the period (38) to the number of firms in operation in 1960 (107), minus new entrants over that decade (8), we get an overall number of 137 firms ((107 – 8) + 38 = 137). If we then deduct the total number of firms that ceased operating in the period 1960-2016 (121), 16 firms remain. These 16 firms are the total number of firms remaining in the industry in 2016 (see Appendix 5g). Of the 121 firms no longer operating, 56 had been acquired, 60 had closed down, 4 had merged and 1 firm had diversified into industrial ceramics. Figure 4.3 shows the total number of firms including new entrants for each decade. From the chart the pattern of decline, year-on-year, over the 56 year period is determined, with the most dramatic decline taking place between 1960 and 1969, and a lesser but still significant decline during the period 2000-2009. At this stage of the research there are no explanations for the dramatic decline between 1960 and 1969. Possible reasons are explored later in this chapter. It is thought that the most likely reason for the decline during the period 2000-2009, was on-going competitive pressures from overseas along with effects of the current financial crisis (2008- date).

Figure 4.3: Number of Firms in the SOT Cluster by Decade 1960- 2016 (Including New Entrants)

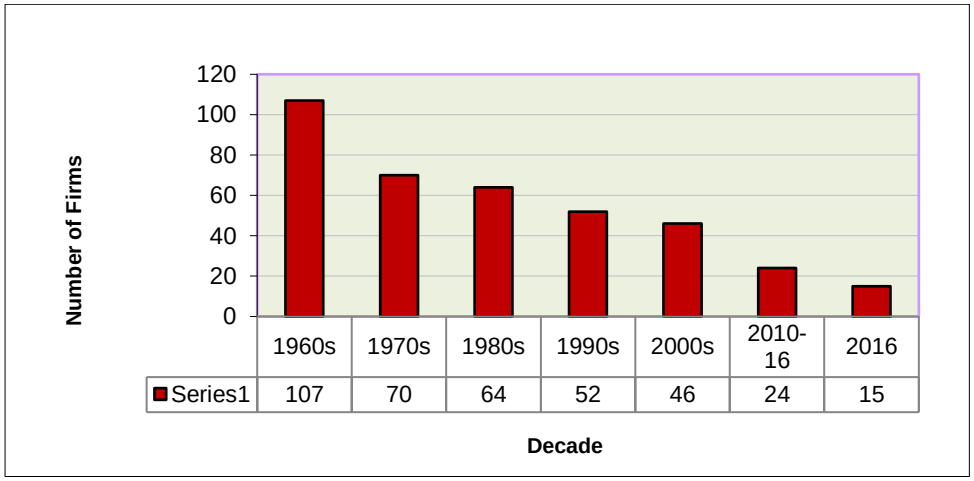
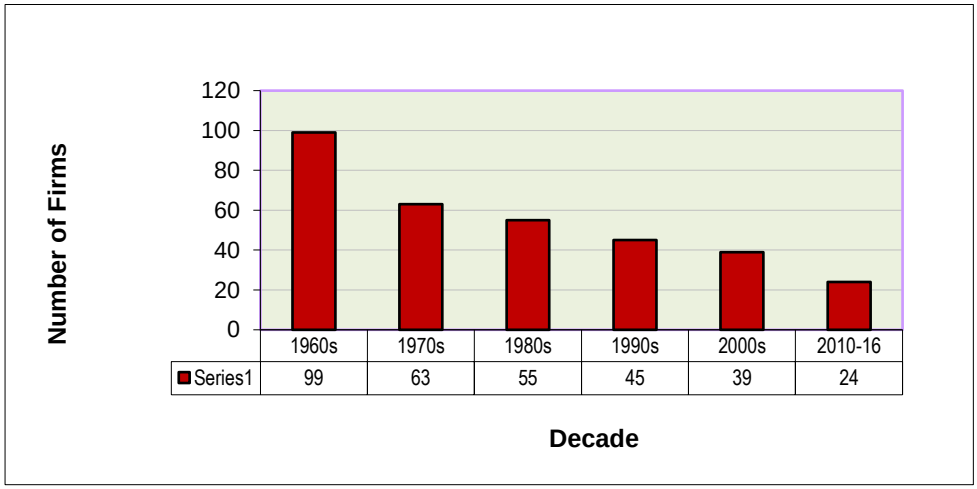


Figure 4.4 shows the total number of firms, excluding new entrants, for each decade. From the chart, the same pattern of decline can be identified. From the two charts it is possible to conclude that, despite a small but steady stream of new entrants each year, the number of firms exiting the industry was greater. Thus, overall numbers have declined year on year. According to industry life-cycle theory, this year on year decline in overall numbers indicates that the SOT cluster is in the decline phase of the industry life-cycle (Klepper, 1996; Audretsch and Feldman, 1996). However, the steady but relatively small stream of new entrants would indicate that the industry is in the mature phase of the life-cycle.

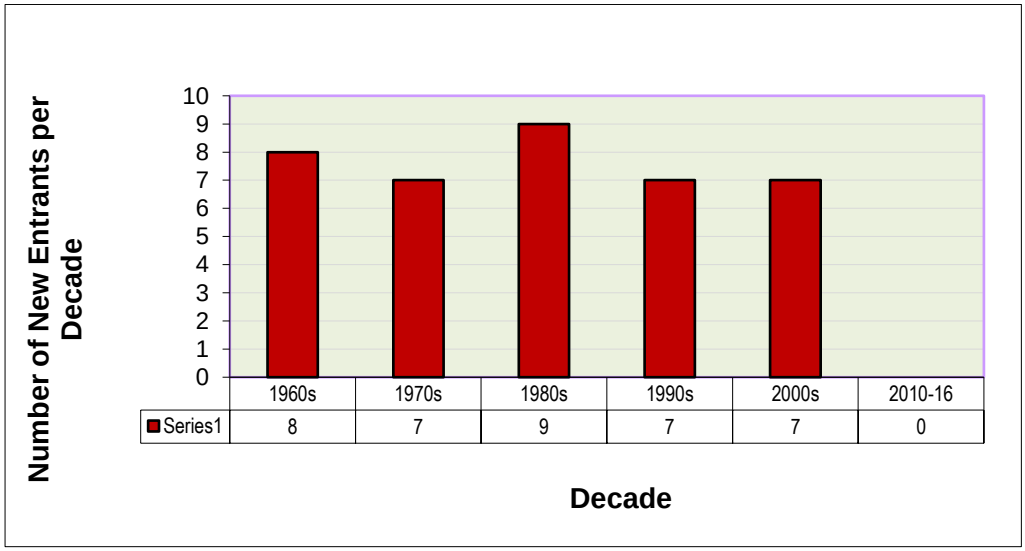
Figure 4.4: Number of Firms in the SOT Cluster by Decade 1960-2016 (Excluding New Entrants)



4.3.3: New Entrants, Acquisitions, Mergers and Closures in the SOT Cluster 1960-2016

Appendix 6 gives full listings of new entrants for each of the decades from 1960 – 2016. Figure 4.5 summarises the number of new entrants in each decade (including the firms that entered and exited the industry during the period 1960-2016). From the chart, it appears that a small but relatively steady stream of new entrants entered the SOT cluster each decade, with the exception of the 2010-2016 period when no firms entered. It is possible, however, that the 2016 figure is incorrect, as it is probable that source information is not fully up-to-date, but as the definition of new entrants has not changed between 1961 and 2016, the comparison is still valid even if the numbers may not be wholly precise.

Figure 4.5: New Entrants into the SOT Cluster by Decade 1960-2016, Broad Definition

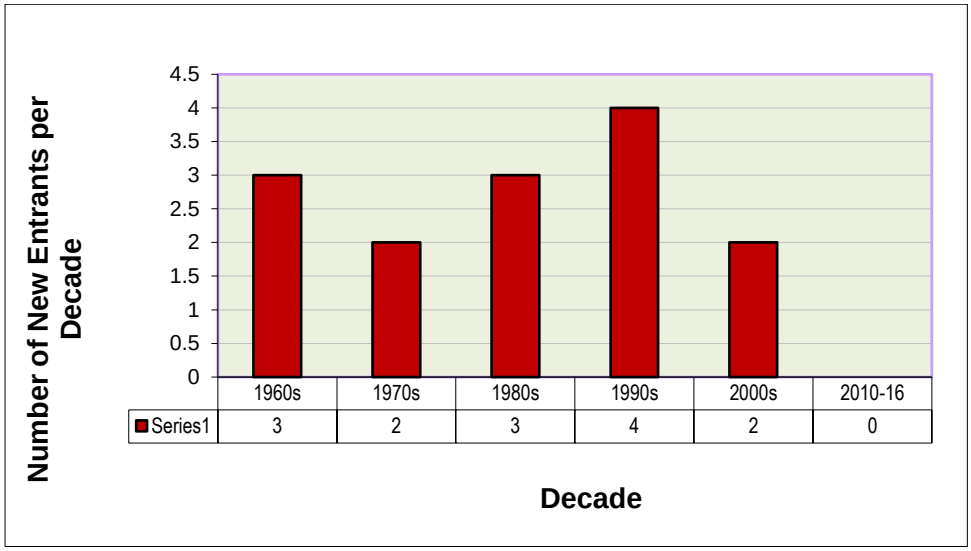


The number of new firms shown above includes all new entrants regardless of their origin, and so represents the *broad definition* of new entrants. However, by examining the origins of these new entrants (Appendix 7), it is evident that 9 firms are not 'true' new entrants, but were previously existing firms that had changed name or were new subsidiaries of existing firms. From the remaining 29 firms: 6 firms were formed as spin-offs from existing or previously existing firms; and, 8 firms are known to be true new start-ups (including one long-established Scottish pottery firm re-located to SOT). Origins are not known for the remaining 15 firms. By including only known new entrants and spin-offs, a *narrow definition* of new entrants is identified (Appendix 8). Table 4.4 summarises origins of all new entrants, Figure 4.6 shows true new entrants (narrow definition) for each decade.

Table 4.4: Origins of SOT New Entrants 1960 - 2016

Origins	Number of Firms
Pre-existing firms that changed name	5
Pre-existing firms that changed name after acquisition/merger/management buy-out	4
A spin-off from an existing or previously existing firm	6
Pre-existing pottery re-located to Stoke-on-Trent (Dunoon)	1
Known brand new entrants	7
Origin not known[99]	15
Total	**38**

Figure 4.6: New Entrants into the SOT Cluster by Decade 1960-2016, Narrow definition



From this data it is assumed that there were comparatively few new entrants (14) of any significant size entering the cluster in the period 1960-2016. Moreover, the motivations of all 'true' new entrants (firms that were not in existence in some previous form) for starting-up business are not known. It is possible that many of the spin-offs started up because their previous employer was in difficulty, *e.g.* was about to go into liquidation or be acquired, and not because the industry was thriving and growing and therefore 'attractive'. Without further

[99] Despite extensive research effort, the origins of some firms could not be determined.

research it is difficult to determine the exact nature and impact of new entrant activity on the SOT cluster during the period being studied, however this is not the main focus of this thesis.

Figure 4.7 shows the number of acquisitions taking place in the SOT cluster between 1960 and 2016. Overall, there were 60 acquisitions and mergers (56 acquisitions and 4 mergers). This is important evidence of industry consolidation and an indication that some of the firms in the cluster were growing through acquisition. Furthermore, the data derived from the source database shows that acquisitions were mostly made by the largest firms in the SOT cluster, with perhaps the largest acquisition made by Wedgwood in 2004, when they acquired Royal Doulton. The data also shows that there were 2 mergers of significant size in the 1960s, and 1980s (see Appendices 5a and 5c), and this is further evidence of consolidation.

Figure 4.7: Acquisitions and Mergers in the SOT Cluster by Decade 1960-2016

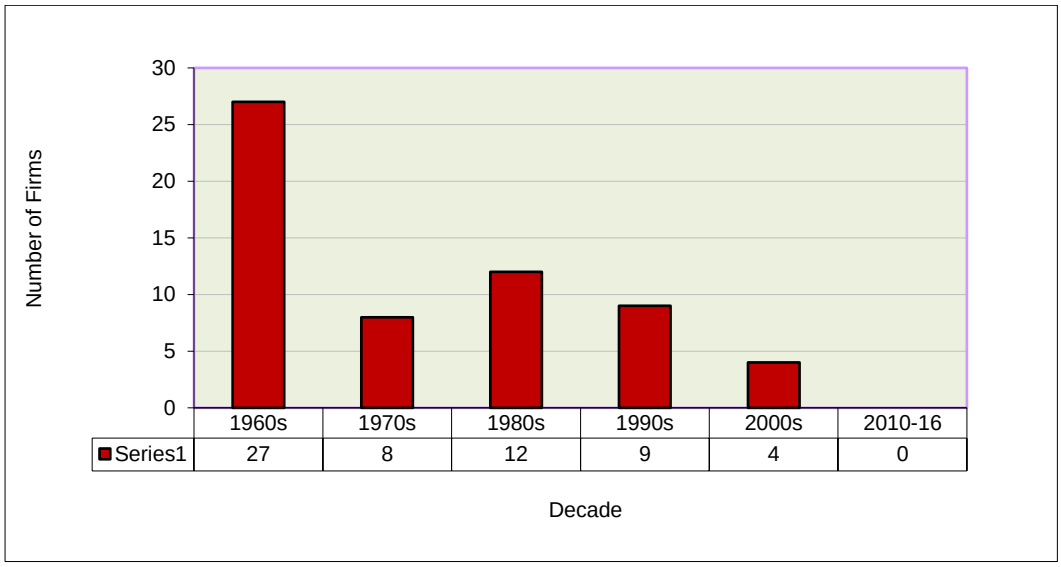
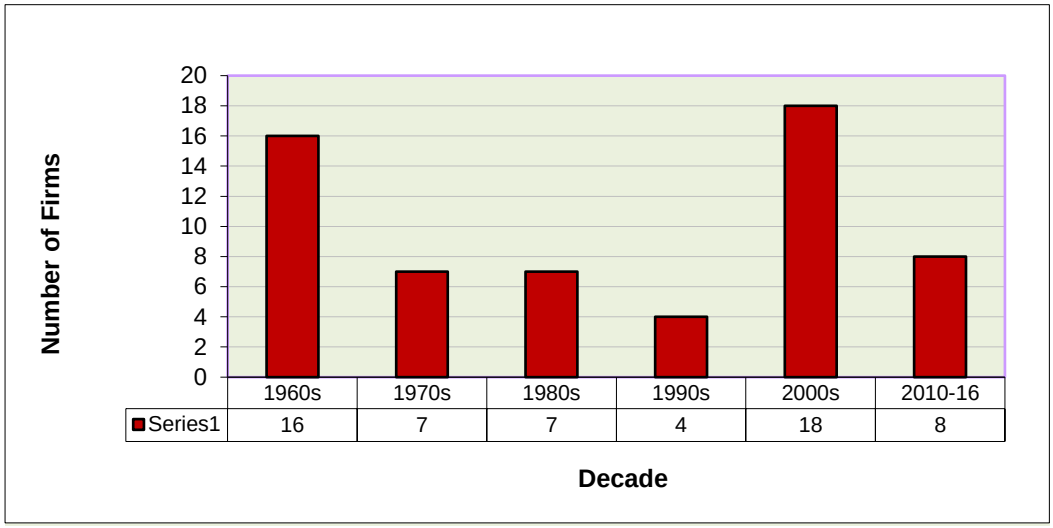


Figure 4.8 shows the number of firm closures taking place in the SOT cluster between 1960 and 2016. Overall, there were 60 closures and this provides further compelling evidence of industry consolidation and decline in the overall number of firms in the cluster. From the table, it is possible to see that the greatest number of closures occurred in the periods 1960-69 and 2000-2009.

Figure 4.8: Firm Closures in the SOT Cluster by Decade 1960-2016



4.3.4 The Emergence of Dominant Firms

Figures 4.9- 4.17 show a series of flow charts derived from the source database (Appendix 4) that trace the pattern of acquisitions and mergers from pre-1960 up to 2016. The charts demonstrate the emergence and size of some of the SOT cluster's dominant firms: Wedgwood Group; Royal Doulton; Churchill; Steelite and others.

Figure 4.9:
Development Path of Royal Doulton up to Acquisition by Wedgwood in 2005

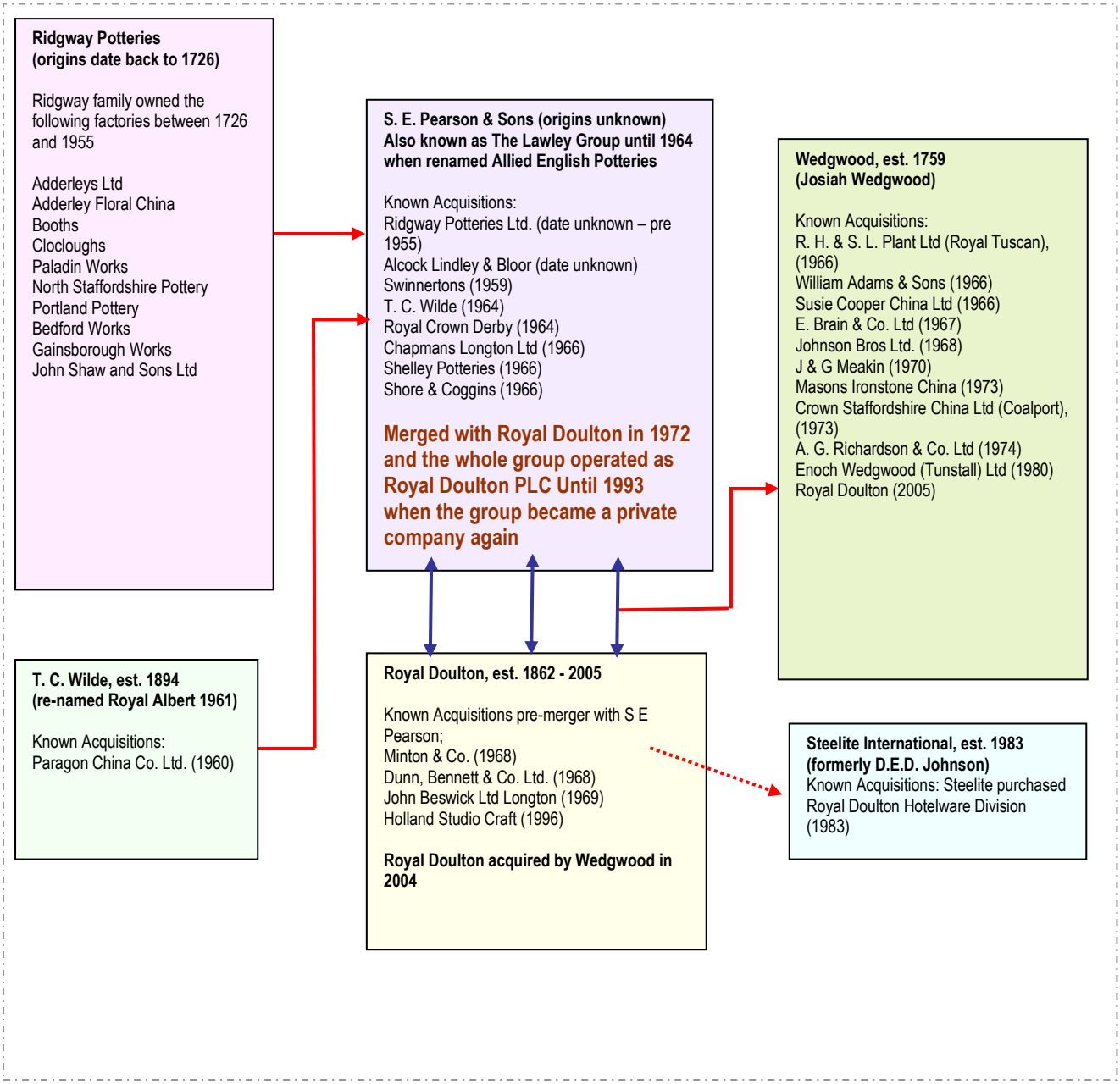


Figure 4.10:
Development Path of Wedgwood Group up to 2015

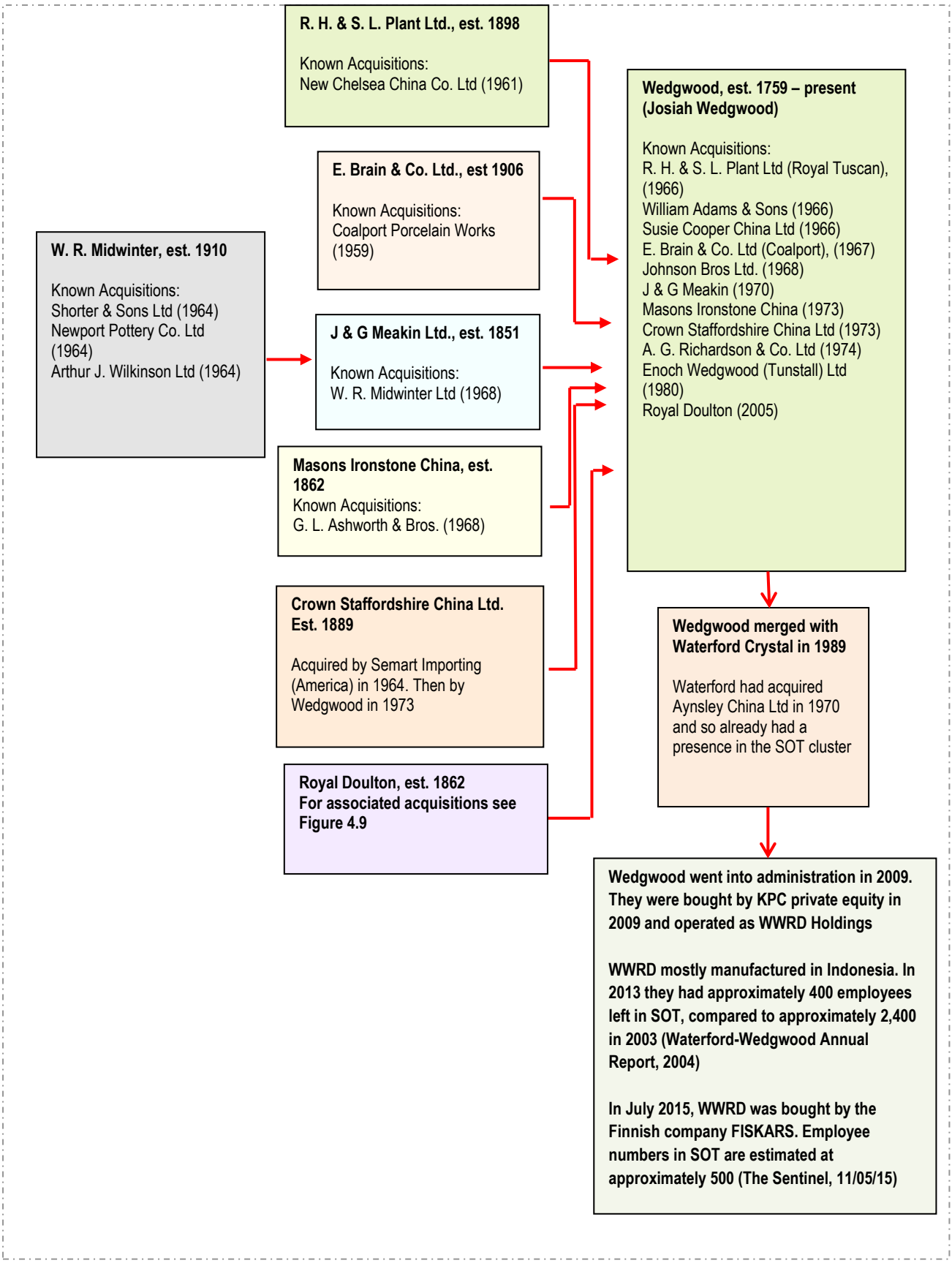


Figure 4.11: Development Path of Churchill China PLC

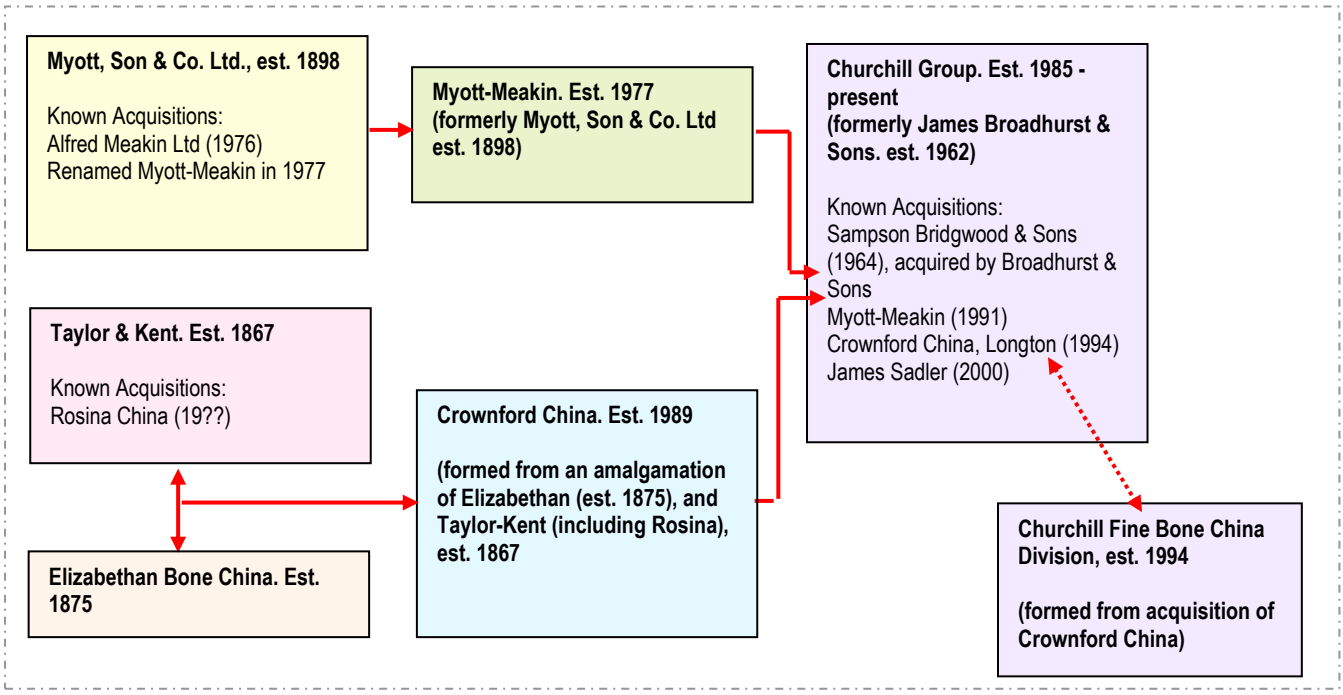


Figure 4.12: Development Path of Staffordshire Tableware Group

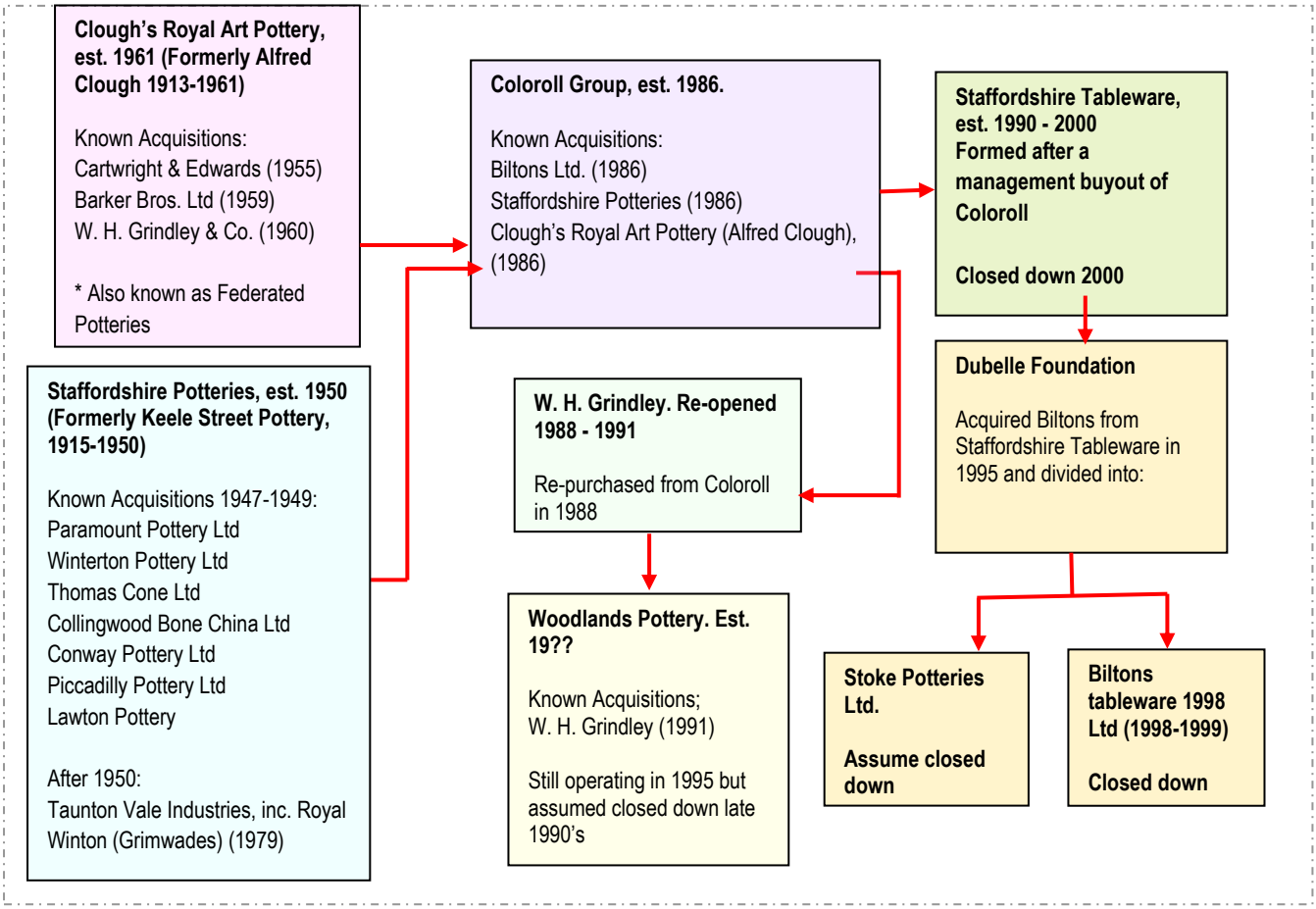


Figure 4.13: Development Path of Steelite International

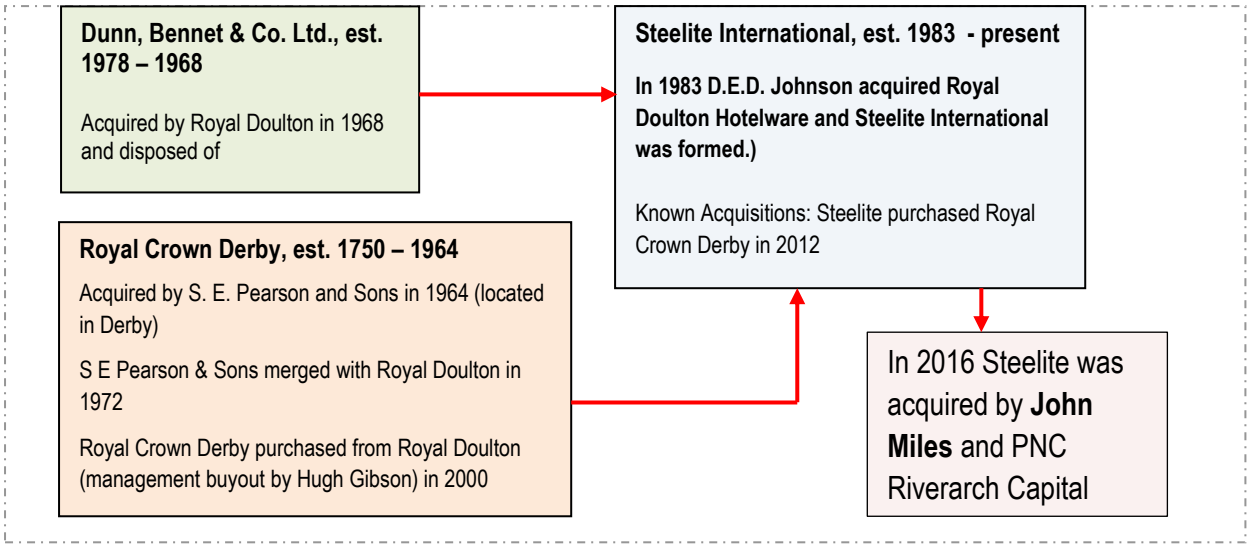


Figure 4.14: Development Path of Portmeirion Group

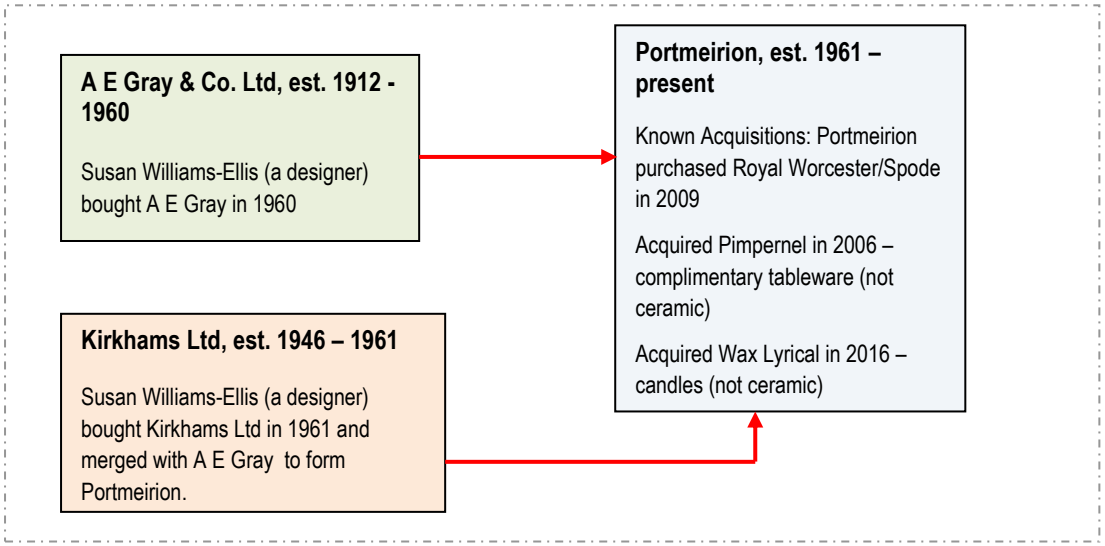


Figure 4.15: Development Path of Price & Kensington

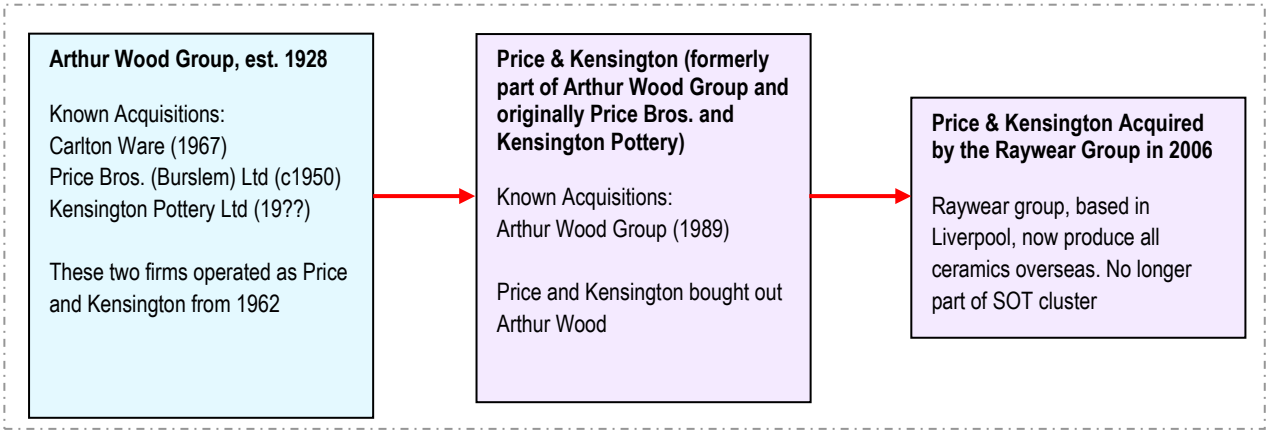


Figure 4.16: Development Path of Tams Group

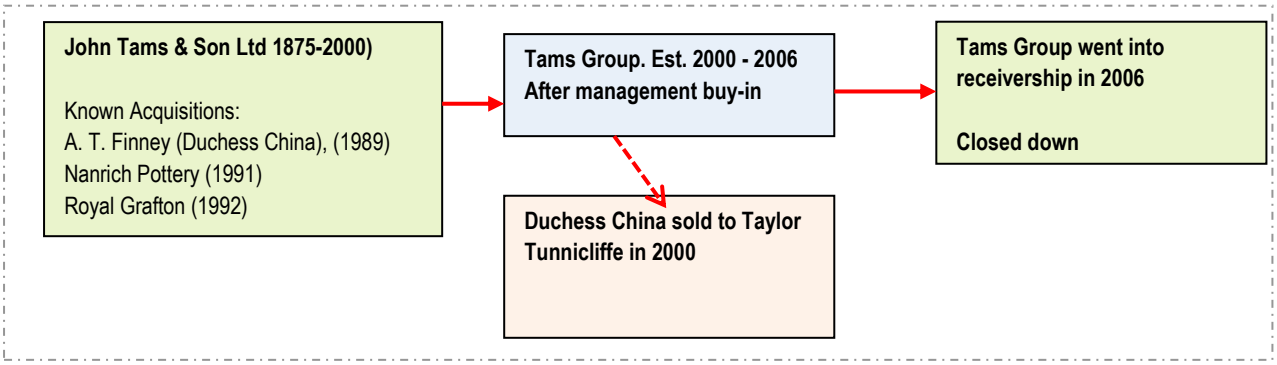
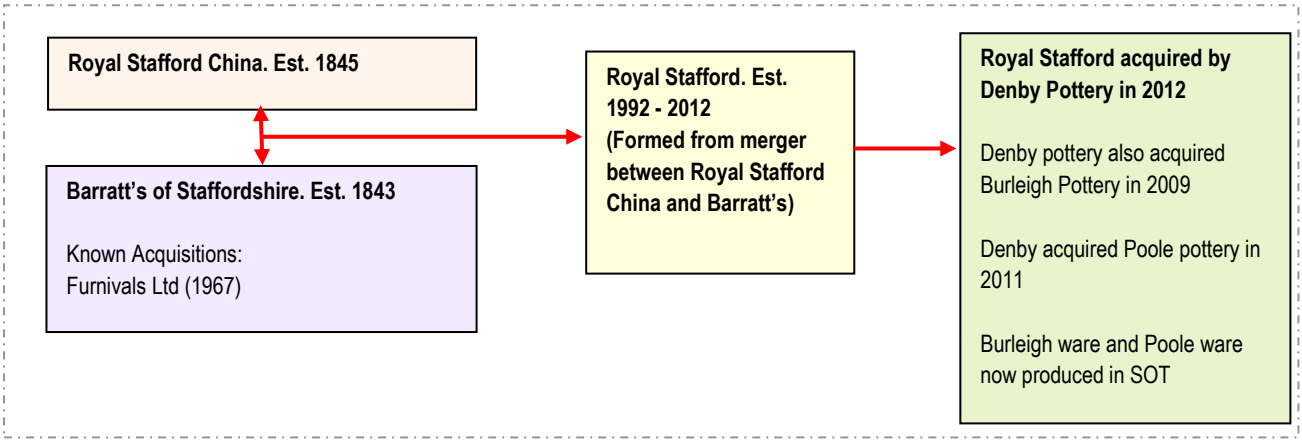


Figure 4.17: Development Path of Royal Stafford



4.4: Objective 2, Part 3; Competition and Demand in 2016

4.4.1: Demand for the SOT Cluster's Products

According to MINTEL (2004), the UK market for domestic sales of china and earthenware was worth £505 million in 2004, representing overall nominal growth of 13% since 1999 (12% in constant terms). However, in real terms this means little or no growth at all. The 2004 report also estimated that the market would grow by 6% in real terms between 2003 and 2008. MINTEL's subsequent 2008 report put the actual sales figure for 2004 at £500m. From the table we can see that, according to MINTEL, sales of china and earthenware grew year-on-year between 2005 and 2008. Unfortunately, separate sales data for china and earthenware between 2008 and 2010 is not available in MINTEL's 2010 Tableware Report[100], as the report combines the data for chinaware, glassware and cutlery. However, the 2010 report did put the value of sales of chinaware at £452m for 2007; £463m for 2008; and, £471m for 2010, thus showing year-on-year growth (MINTEL: Market Size and Forecast, p. 2). However, it is difficult to ascertain whether MINTEL's chinaware category includes ceramic kitchenware, as not all ceramic kitchenware is oven-to-tableware. Also, it is not clear from the data what proportion of sales came from imported products and what proportion came from UK produced products.

Table 4.5: UK Retail Sales of China and Earthenware, 1999-2008

Year		£m	Index	£m at 1999 prices		Year	£m	Index	£m at 2008 prices
1999		445	100	445		**2005**	512	92	541
2000		455	102	459		**2006**	525	95	548
2001		465	104	465		**2007**	538	97	549
2002		475	107	472		**2008**	555	100	555
2003		490	110	485		**2009 (est.)**	570	103	564
2004 (est.)		505	113	497		**2010 (est.)**	581	105	571

(Source: MINTEL, 2004) *(Source: MINTEL, 2008)*

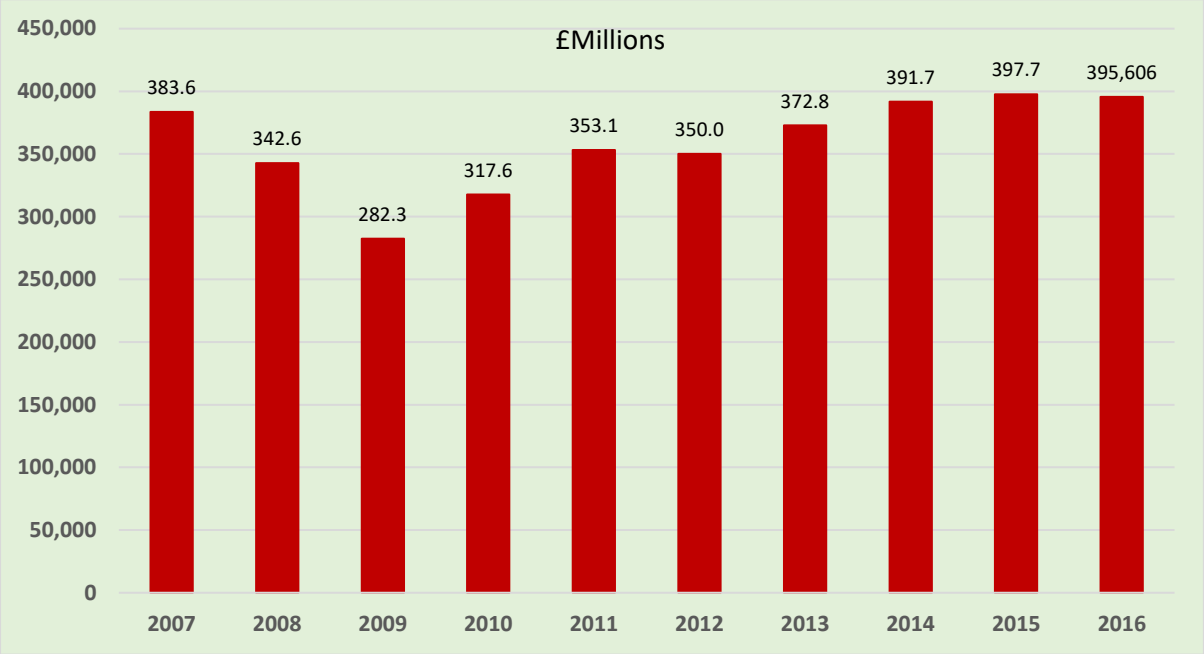
[100] Note: MINTEL's 2010 Tableware Report is assumed to not include ceramic kitchenware and/or giftware. Both of these categories are assumed to be included in MINTEL's previous reports on China and Earthenware

The problem of inconsistencies and ambiguities in the published MINTEL secondary data is further compounded when the data is compared to other sources of data on the UK China and Earthenware sector. For example, in 2010, a report by the Confederation of British Industry (CBI)[101] and the Ministry of Foreign Affairs, stated that the UK had experienced growth in consumption of ceramic kitchenware and tableware in the period 2005-2007. However, since the beginning of the financial crisis in 2008, with its negative effect on the housing market and disposable income, the market experienced a year-on-year decline up to 2010, although a slight recovery was predicted for 2011 (p. 1). It would appear that the data presented in the CBI report is fairly consistent with the data presented in KEYNOTE's 2011 report. Such inconsistencies and ambiguities in the various data are further evidence of the complexities involved in attempting to ascertain an accurate picture of demand for tableware and giftware in the UK market. However, the various reports (MINTEL and KEYNOTE), unlike the Office for National Statistics (ONS) data, do provide some data on some specific companies, *e.g.* market share and turnover, and so are of some (limited) use for that reason.

In an attempt to overcome some of the shortcomings in the various secondary data, and also to ascertain a more accurate picture of demand for the SOT ceramics manufacturers products, a series of charts have been compiled as follows: 1) Office for National Statistics data (ons.gov.uk), for sales of ceramic household and ornamental articles (SIC 2341); 2) HM Revenue and Customs import/export trade data (uktradeinfo.com), for ornamentalware (SITC 666.1) and tableware (666.2). The following charts present the data as follows: Figure 4.18, UK manufacturers total sales (prodcom); Figure 4.19, total UK exports and total UK imports; 3) Figure 4.20, total UK manufacturers sales; and, Figure 4.21, UK manufacturers key export markets (see Figures 4.18, 4.19, 4.20 and 4.21).

[101] CBI, (2010), *Exporting dinnerware to Europe,* [ONLINE]. Available at: https://www.cbi.eu/market-information/home-decoration-textiles/dinnerware/europe/. [Accessed 5 May 2016]

Figure 4.18: UK Manufacturers' Total Sales of Ceramic Household and Ornamental articles 2007-2016, (£millions)

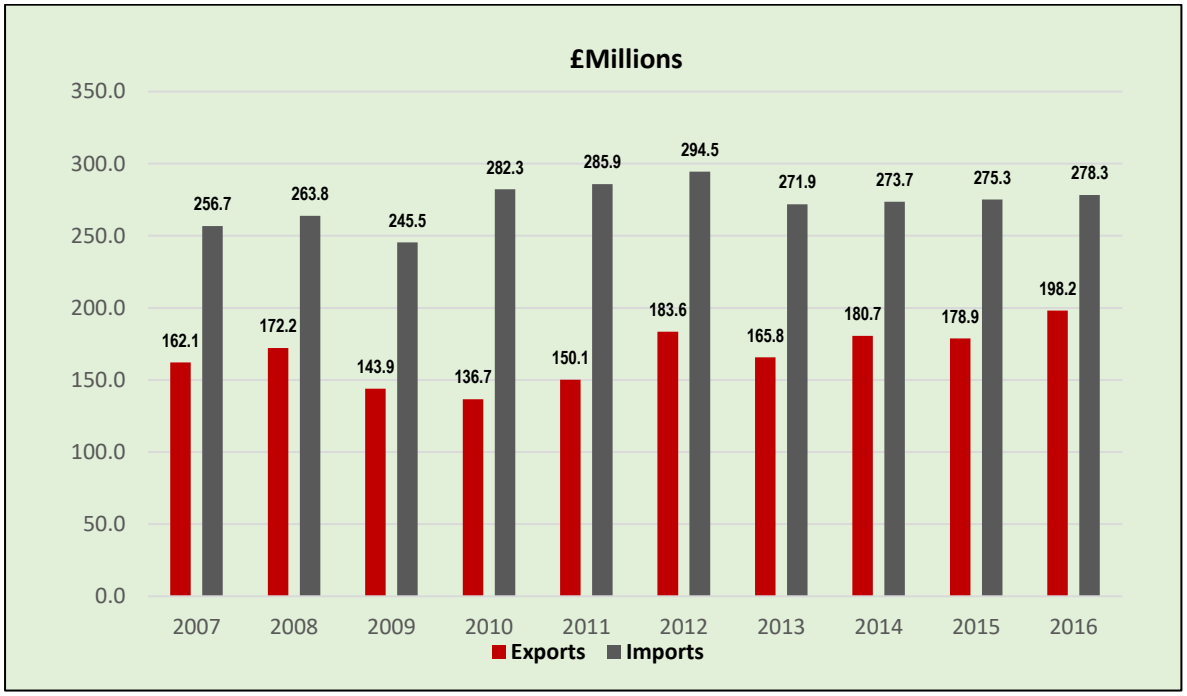


(Source: author, compiled from ONC data for SIC 26210 (2007) SIC2341 (2008-2016))

The data presented in Figure 4.18[102] shows, that apart from 2009, and two slight declines in 2012 and 2016, overall global demand for the SOT clusters products increased by 15.5% from £342.6m in 2008 to £395.7m in 2016 (current prices). However, it is not clear from the data, what percentage of sales were domestic sales, and what percentage were export sales. Figure 4.19 presents data on exports and imports for SITC codes 666.1 and 666.2 (combined). By subtracting the export data from the sales data in Figure 4.18, the SOT cluster's domestic (UK) sales have been identified. This data is presented in Figure 4.20 below.

[102] Please note that the data in Table 4.18 presents 'nominal' and not 'real' values. Nominal value is the value of a product or service quoting the money of the day, without taking into account any changes in prices, *i.e.* inflation. Nominal figures are misleading when we use them to compare values in different periods, because inflation diminishes the real value of something over time.

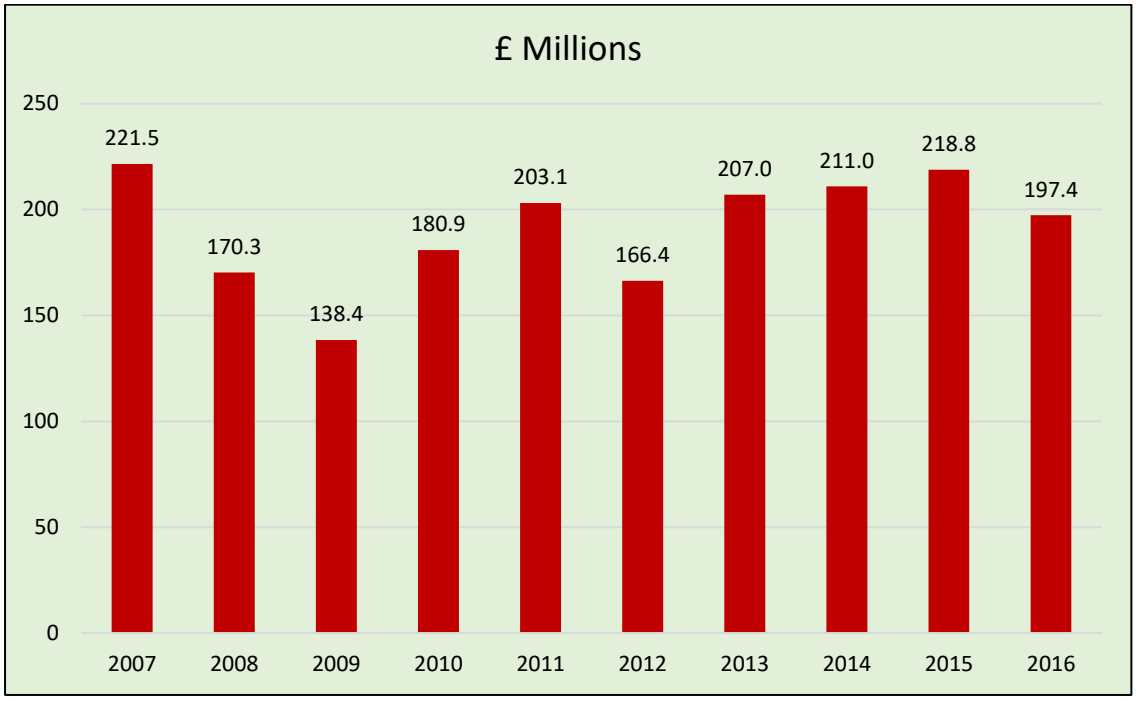
Figure 4.19: UK Exports and Imports of Ceramic Household and Ornamental articles 2007-2016, (£millions)



(Source: author, compiled from HM Revenue & Customs Trade Statistics, SITC codes 666.1 and 666.2)

The data (latest available) presented in Figure 4.19 shows that throughout the ten-year period 2007-2016, imports of ceramic goods were greater than exports. In 2007, imports of ceramic goods were 58% higher than exports of UK produced ceramics. However, by 2016 the gap between exports and imports had reduced to 40%. In 2016, imports were 8% higher than they had been in 2007 (£256.7m in 2007 to £278.3m in 2016). For the same years, exports of UK produced ceramics rose by 22%, from £162.1m in 2007, to £198.2m in 2016. This is a good situation for the SOT cluster overall as exports have risen by a greater percentage than imports. However, the situation for the SOT cluster does not appear so positive if domestic sales performance is considered (see Figure 4.20 below). From the table it is possible to see that, in 2016, UK sales of SOT produced ceramic tableware and ornamentalware were almost 11% lower than they had been in 2007 (£221.5m in 2007 and £197.4m in 2016). Overall, from the data presented above, it is clear that demand for the SOT cluster's products increased more in global markets than in the domestic market.

Figure 4.20: UK Manufacturers' Domestic Sales of Ceramic Household and Ornamental articles 2007-2016, (£millions)



(Source: author, compiled from ONC data for SIC 26210 (2007), SIC 2341 (2008-2016) and, HM Revenue & Customs Trade Statistics, SITC codes 666.1 and 666.2)

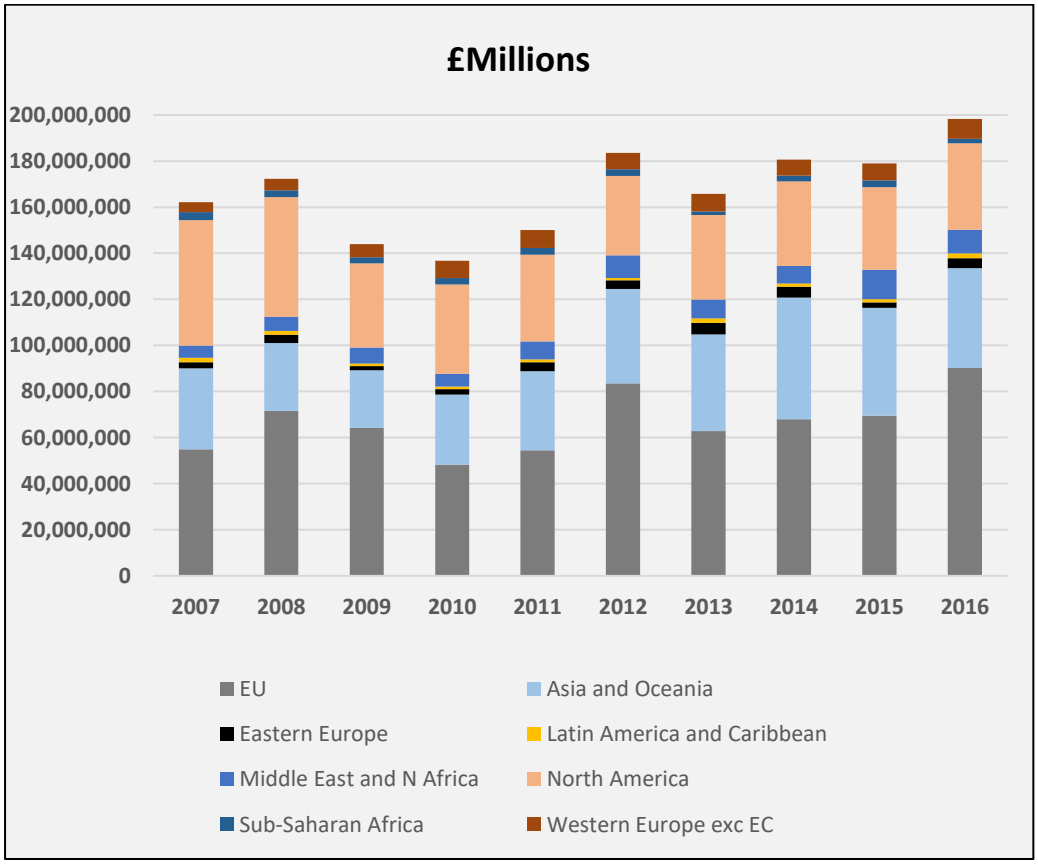
Figure 4.21 presents data on UK ceramic tableware and ornamentalware sales to specific export markets. There is some evidence that the nature of UK pottery exports has changed over the longer period of 1990-2016. In the early 1900s, around 60% of all UK pottery production was sold abroad (Ewins, 2017: 174). In 2008, UK pottery exports had reduced slightly to approximately 58% of total UK pottery manufacturers' sales, with domestic sales at approximately 42% (based on ONS sales data Figure 4.18 and HMRC export data Figure 4.19). However, by 2016, domestic sales represented approximately 50% of total sales and exports also approximately 50%. In 1991 the largest single export market for UK ceramic tableware was the United States (Ewins, 2017: 174). In 2007, sales of UK produced ceramics to the U.S. were £54.5m, but by 2016 that figure had reduced to £37.5m, a decline of approximately 32% (see Table 4.6 below). However, despite the decline, the U.S. are still the SOT cluster's biggest single market. In 2016, the largest region for exports was the European Union, with exports in 2016 significantly up on 2007 figures (from £54.9m to £90.2m). Moreover, EU exports for 2016 show a 30% increase on 2015 figures, possibly due to a weak British pound post the BREXIT referendum in June 2016. Asia and Oceana were the second largest region for UK ceramic exports in 2016, representing approximately 22% of all UK ceramic tableware and ornamentalware exports that year (also up 22% overall from 2007 figures, see Table 4.6). For details of all export markets 2007-2016, see Figure 4.21.

Table 4.6: UK Ceramic Tableware Export Markets 2007 and 2016

	2007 £millions	2016 £millions	Increase/ decrease	+/-
EU	54.9	90.2	65%	+
Asia and Oceania	35.1	43.2	22%	+
North America	54.5	37.5	31%	-
Middle East and North Africa	5.3	10.2	100%	+
Western Europe exc EC	4.2	8.6	100%	+
Sub-Saharan Africa	3.5	1.9	45%	-
Eastern Europe	2.7	4.4	65%	+
Latin America and Caribbean	1.9	2.0	11%	+

(Source: author, compiled from HM Revenue & Customs – Trade Statistics, SITC codes 666.1 and 666.2)

Figure 4.21: UK Ceramic Tableware Sales to Export Markets 2007-2016



(Source: author, compiled from HM Revenue & Customs – Trade Statistics, SITC codes 666.1 and 666.2)

4.4.2: Drivers of Demand for the SOT Cluster's Products

A number of trends for ceramic tableware and giftware products have been identified from the various reports presented above. These trends can be identified as key drivers of demand for the industry's products. For example, some of the most commonly cited drivers include: cheaper, imported tableware sold as 'own label' products by retailers such as IKEA

and Tesco (MINTEL 2004, 2008, 2010, 2014; KEYNOTE 2011); Modern consumer preferences for contemporary china over traditional British fine china (MINTEL 2004, 2008, 2014; KEYNOTE 2011; FWC 2008); increased interest in cooking and home entertaining, influenced by celebrity TV chefs (MINTEL 2008, 2010, 2014; KEYNOTE 2011); and, the positive influence of designers and celebrities on sales (MINTEL 2008, 2010, 2014; KEYNOTE 2011). More details of key UK drivers of demand for china and earthenware are presented in Appendix 17. Economic and Socio-cultural factors are identified as the key factors influencing demand for the industry's products, *e.g.* increasing imports of ceramic products, an ageing UK population, an increase in the overall number of households, including single households, and further considerations of style and fashion.

4.4.3: The Number of Product Variations and Segments in Domestic & International Markets

The china and earthenware industry does not segment sales by type of ceramic used but rather according to use or styling and price (MINTEL, 2004). For example, tableware can be divided into 'casual' and 'formal' with 'giftware' being another segment. The casual segment is experiencing healthy growth and in the formal segment demand is diminishing slowly (see Appendix 17). Within each of the main segments the market can be further subdivided into hotelware and domesticware with some overlap between these groups (*e.g.* Steelite and Churchill, see section 4.2.3). Table 4.7 presents data on the market segments of some of the SOT cluster's largest firms and is based predominantly on MINTEL data. In stage 2 of the research (questionnaire survey), these findings will be updated where possible to give a more accurate picture of segmentation in the SOT cluster.

Table 4.7: Segmentation in the SOT Ceramics Cluster 2008-2010

Company	Segment (MINTEL, 2008)	Segment (MINTEL, 2010)	Comments
Steelite (including Royal Crown Derby)	Premium + Hotelware	Premium	Royal Crown Derby produces premium porcelain gift and tableware for the retail market.
Wedgwood (including: Royal Doulton, Johnson Brothers, Coalport, Mason, Rosenthal)	Premium/Luxury	Premium/Luxury /Upper-mid	The various brands in the group's portfolio have broadened reach across the market. However, focus is still on the premium/luxury sectors. In recent years focus has been on developing casual rather than formal ranges.
Portmeirion (including Royal Worcester and Spode since 2009)	Mid-Premium	Mid	Provides a range of traditional and casual porcelain and china wares. The brands are very distinctive. In recent years focus has been on developing more giftware rages as well as new designs in dining.
Churchill China	Mid-premium + Hotelware	Upper in the Hotelware sector. Mid-market and volume in the retail sector.	Produces own-label and branded products in the retail sector.
Emma Bridgwater	Upper-Mid	Mid	Strictly casual earthenwares. Personalised tableware is also a strong selling point.
Denby (part of the SOT cluster through their acquisition of Burleigh Pottery in 2009 and Royal Stafford in 2011)	Mid-Premium	Mid/Upper-Mid	Focus is on quality casual dining.
Raywear (including: Arthur Wood, Price & Kensington, Mason Cash)	Lower /middle-Mid	Mid	Casual diningware, giftware and kitchenware. No longer produce in the SOT cluster
Aynsley Pottery	Premium	Premium	Bone china tableware and giftware, mainly formal.
Dunoon	Mid	Mid	Produces mugs, teacups and saucers.
Just Mugs	Mid	Mid	Produces only mugs.
Repeat Repeat	Upper-Mid	Upper-Mid	Tableware and mugs.
Roy Kirkham	Mid	Mid	Tableware and giftware.
Royal Winton (part of Taylor Tunnicliffe Group. Listed under Duchess China)	Premium	Premium	Specialises in chintz bone china.
Susie Watson	Mid	Upper-Mid	Country style table and kitchenware.

(Source: Author, compiled from MINTEL (2008, 2010))

The data presented in Table 4.7 is only for the SOT cluster's largest firms. According to MINTEL (2008), 'other' companies and own-label or unbranded products accounts for well over half the market value (Companies and Products, p. 5). This degree of fragmentation within the UK industry makes is extremely difficult to analyse segmentation for all SOT

cluster firms. However, with many SOT cluster's smallest firms operating in low-mid segments we can assume, at this stage of the research, that there may exist price-based forms of competitive activity in these segments or, as Porter (1990) describes, 'unhealthy forms of competition' in the SOT cluster. Moreover, in the middle and upper segments of the market, where design, quality and brand image are crucial, consumer demand for greater variety appears to be driving increasing imports, and thus increasing competition in these segments too.

The existing secondary data evidence indicates that the majority of SMEs in the SOT cluster operate in niche segments (O'Keefe, 2000; Hervas-Oliver *et al*., 2011). According to O'Keefe (2000), many SMEs (low-mid segments) niche strategies are no longer defensible as these segments are over-supplied. It is in these segments that price based competition is thought to be particularly intense. Many other SOT SMEs operate as focused differentiators who compete on factors other than price alone, such as design, variety, quality and brand. Hence, there are many market segments and a fragmented industry structure, with relatively low production economies to be gained, although opportunities do exist for economies of scale in marketing and distribution. The largest firms in the industry tend to be broad differentiators, as evidenced by Table 4.7, operating across a broad range of premium product segments.

Industry experts have predicted that the future of the SOT industry will depend on its ability to increase exports by seeking out new markets and by selling more products in growing segments, *e.g.* porcelain (Padley and Pugh, 2000). Overall, the findings clearly indicate a reduction in domestic demand for the SOT cluster's products, especially in the lower-mid priced segments. Further research is required to ascertain whether cluster firms operating in these segments have survived. Further research is also required to find out whether surviving firms have 'switched' focus to mid-upper segments of the market. Thus, one of the aims of research stage 3 (questionnaire survey) is to discover answers to these questions.

4.5: Chapter Conclusions

4.5.1: Conclusions on the Number and Size of Firms 1960-2016

The findings for this first stage of the research have fully achieved the aim of objective 1, which was to determine an accurate picture of the development of the SOT cluster over the study period, *i.e.* between 1960 and 2016.

The initial stage of the research found that the reported number of separate tableware and giftware manufacturers in the SOT cluster was thought to be 164 in 1996 (ECOTEC, 1996). However, the real number, by single ownership rather than separate SBUs, was assumed to have been much smaller than this. No accurate data was available on the actual number of firms left in 2016. Moreover, the researcher could find no comprehensive published material about the pattern of shrinkage in the SOT cluster over time. Subsequently, an in-depth longitudinal study was carried out that identified and tracked all SOT core manufacturers from 1960 to 2016. Findings from this primary research study show that the overall number of firms significantly reduced over time, from 107 in 1960, to 16 in 2016. The research also found that the number of firms operating at the end of the 1990s was only 38, thus proving that the number of business units (164) reported by ECOTEC in 1996 did not represent the true number of firms in the industry at that time. Therefore, the primary research findings presented here cast doubt on the validity of previous work on the industry. If there is such a margin of error on such a basic matter as the number of firms in the industry, or such imprecision in definition that such a huge overestimate is not challenged, it suggests that nothing in the conventional wisdom should be taken for granted. Furthermore, stage one of the research found other inconsistencies in the data on firm performance (turnover and market share), which also suggests that the conventional wisdom might be flawed. Overall, the findings clearly show a significant degree of shrinkage in the SOT cluster over the period in question.

According to Porter (1990), if there are fewer firms overall there will be less competitive rivalry[103]. This is simply because there are fewer competing firms and less intense enmity. The reduction in competitors may also result in a reduction in innovation for the same reasons, *i.e.* there are fewer firms to carry out innovation. From the literature review a number of characteristics of 'declining' or 'failing' clusters were identified. Most important was a significant reduction in competitive rivalry within the cluster which leads to a decline in innovative activity (Porter, 1990, 1998, 2000; Dei Ottati, 1994, 1996). The evidence indicates

[103] See Literature Review, chapter 2.5

that competitive rivalry within the SOT cluster has reduced significantly as the industry has consolidated. Moreover, competitive activity between existing firms is thought to be weak, as firms appear to operate in separate niche segments (see later in this chapter).

4.5.2: Conclusions on the Dominant Firm effect

Both secondary research findings and primary research evidence clearly show that many of the SOT cluster's largest firms embarked upon strategies of growth through acquisition (*e.g.* Wedgwood, Portmeirion and Steelite, also Doulton prior to 2005). The primary data shows that there were two main periods of acquisition activity: the 1960s (27 acquisitions and mergers); and, to a lesser extent, the 1980s (12 acquisitions and mergers). The first wave of acquisitions in the 1960s is thought to be mainly due to the 1957 Clean Air Act, which resulted in making the industry's coal-fired bottle kilns obsolete (Hervas-Oliver *et al*., 2011). The new tunnel kilns, which ran on gas and electricity, replaced the coal-fired bottle kilns. However, the costs of the new technology were high and larger firms in the SOT cluster embarked upon a period of rationalisation and growth to obtain the critical mass required to justify the running of the kilns (Gay and Smyth, 1974). Possible reasons for the second wave of mergers and acquisitions in the 1980s are thought to be mainly connected to the global recession of the 1980s (see Hervas-Oliver *et al*., 2011). The number of acquisitions and mergers that have taken place, when considered alongside the data in Figures 4.7- 4.17, clearly show consolidation in the SOT cluster and the emergence of the cluster's dominant firms.

From the literature review, a number of possible 'dominant firm effects' were identified that may have had an influence on the SOT cluster. For example, dominant firms can embark upon predatory practices such as eliminating competitors, possibly through forcing small firms out of business or by acquiring them to shut down the manufacturing facility (Porter, 1990; Dei Ottati, 1994; Rosenfeld, 1997), and there is some anecdotal evidence that this may have happened in the SOT cluster (Padley and Pugh, 2000). Moreover, according to Sacchetti and Tomlinson (2009), when a cluster has evolved towards a more hierarchical mode of economic governance, lead firms can have a major impact on the shape and direction of the cluster, in particular to new investment capacity and the skills base (p. 1843). Other negative effects relate to the cluster becoming 'locked in' to the objectives and strategic decision-making processes of a few firms, or even a single firm (see literature review 2.8.4). In such circumstances the cluster's outlook can become monodirectional. This can pose two related dangers for the cluster's development. First, the cluster can become

vulnerable to economic factors affecting the core firm. Secondly, the cluster's development path can become entwined with the ramifications of the core firm's strategic decisions. For instance, a strategic decision (or even a threat) by a core firm to shift production overseas and/or pursue a global outsourcing strategy will have significant repercussions for the cluster's smaller firms, workers and the skills base, which can alter the cluster's development trajectory (Sacchetti and Tomlinson, 2009: 1845). As seen from discussions in previous sections of this chapter, both Wedgwood and Doulton shifted the bulk of their ceramics production overseas between 1990 and 2009. According to Hervas-Oliver *et al*., (2011):

> *"The district's (SOT) current trajectory has largely been determined by the strategic decisions of its leading (mainly publicly owned) firms and, for most commentators, the picture is now (2007/8) one of slow entrenched decline exacerbated by globalisation"* (p. 383).

The literature also states, though, that dominant firms can also have positive effects on an industry cluster, *e.g.* leading firms can act as technological gatekeepers whose responsibility it is to share 'external' knowledge (know-how) with other cluster firms (Giuliani and Bell, 2005; Giuliani, 2009, 2011).

The roles that Wedgwood, Doulton and other large firms in the SOT cluster have taken with respect to other SOT cluster firms are not evident from the published data. Some reasons why the SOT cluster's largest firms embarked on strategies of growth through acquisition are given above. In addition, less systematic evidence suggests that a motive behind some of the acquisitions was possibly the elimination of local competitors (Padley and Pugh, 2000). According to Sacchetti and Sugden (2003), when knowledge and production become overly concentrated it may well be detrimental to the long-term development of the district (cluster). However, there may be yet other reasons for the acquisitions. For example, according to the FWC Report (2008: 46), as a response to global competition many firms have attempted to cover various segments in many markets. Large ceramic firms have tried to do this by creating divisions of firms that specialise in niche markets, or by buying SMEs that supply products to select markets (See also Tomlinson and Branston, 2017: 10). Therefore, the relationship between SMEs and large firms can be symbiotic, *i.e.* co-operative, rather than confrontational or competitive (FWC Report, 2008). According to Gemser *et al*., (1996), large core firms can act as 'lighthouses', sourcing small firms with information of foreign markets and new technologies, while the small firms should function as a production base for the large core firms (p. 445). The research findings have identified a possible 'shift' in the

balance of power between firms in the SOT cluster, from the Wedgwood and Doulton duopoly, to a post-duopoly phase involving several smaller dominant firms. Further research is needed to determine more accurately the motivations behind SOT dominant firms' acquisition strategies, and also to determine whether current dominant firm effects upon the SOT cluster are positive or negative. Thus, these are objectives of the third and fourth stages of the research.

Whatever the reasons for acquisitions by the SOT cluster's dominant firms, the outcome has been a steady reduction in the overall number of firms in the cluster. This could be a contributory factor to the decline in competitive rivalry in the SOT cluster and, possibly a corresponding decline in the potential for innovation (fewer firms leads to fewer competitors, which leads to less intense rivalry, which can result in less innovation). The relationship between the number of firms and innovation was examined in the literature review chapter of this thesis (*e.g.* Porter, 1990, 1998, 2000; Dei Ottati, 1994; Audretsch and Feldman, 1996). It was also identified in the literature that 'small firms often get a better return than large firms on investment in knowledge generating inputs such as R&D' (Acs and Audtretsch, 1990; Acs *et al*.,1994; Klepper, 1996). In a study carried out by the Tableware Strategy Group (1995), of 19 tableware firms studied in the SOT cluster, it was found that many of the small firms (approximately 50%) achieved a significantly better return on investment (ROI between 7% and 24%), than the two largest firms whose ROI was approximately 6% (*cited* in Padley and Pugh, 2000). However, there are no details of whether these investments were made in R&D. According to the FWC Report (2008), 'conventional thought and evidence highlights the importance of SMEs in being creative and innovating, and driving the sector forward' (p. 45). Moreover, it is thought that the internal organisation of SMEs tends to be simpler and that this can imbue them with greater flexibility, allowing them to respond and adapt more quickly than larger firms (Aragon-Sanchez *et al.*, 2005). Further research is needed to find out details about the innovations in the SOT cluster and their relationship with firm size, thus this is a further objective of the third stage of this research project.

4.5.3: Conclusions on New Entrants

Although, under the broad definition of entrants, the evidence shows a constant stream of new entrants into the SOT cluster (38 in total), the total number of entrants is much less than the number of firm closures (60 in total), and also much less than the number of acquisitions and mergers (61). This means that the overall number of firms in the industry has significantly declined, although a decline in the number of firms does not necessarily mean a

decline in output, due to gains in productivity and firm size. Moreover, there is nothing in the academic literature to define exactly what is meant by “a constant stream of new entrants” (Porter, 1990), relative to the overall number of firms.

It was also found that at least half of the listed new entrants were not proper new entrants in the purest sense, but were the result of name changes or were new subsidiaries of existing firms. If these firms are excluded from the total, then there have been a total of only 14 new entrants, under the narrow definition (see Appendix 8). Overall, the conclusion on new entrants is that there have been few new entrants into the SOT cluster in the last 56 years. Cluster life-cycle theory posits that regional life-cycles can be extended if regions can successfully align old and new technologies, which in turn stimulate the entry of new firms and dynamism in the region (Swann *et al*., 1998; Hervas-Oliver *et al*., 2011). However, from the available evidence, the number of new entrants into the SOT cluster has been relatively small, suggesting that the cluster has not been particularly successful at adapting to change. According to Klepper (1996), if there are fewer new entrants then eventually competitive rivalry will diminish. Moreover, a continual stream of new entrants is essential to create new competitors and to feed the process of innovation (Porter, 1990).

A number of potential barriers to entry into the UK ceramics industry have been identified from published data. For example, according to the FWC Report (2008), the most significant sunk costs for ceramics manufacturers are kilns, which are costly and have a long average life, and production technologies, which have high initial setup costs. The fact that such costs could not easily be recouped in the event of failure, can act as a significant deterrent to entry (p. 47-48). Other barriers cited in the literature include, the inability of SMEs to easily achieve economies of scale, and the prohibitive first-mover advantages of incumbent firms. However, it is not clear from the research just what the reasons were for the lack of new entrants into the SOT cluster. Moreover, it is beyond the scope of this research study to attempt to determine the reasons, *i.e*. this research is concerned with identifying the current strategic position of the SOT industry cluster only at this stage (see objectives).

4.5.4: Conclusions on Demand for the SOT Cluster’s Products

From the research findings, it is clear that the competitive environment for the UK ceramic industry’s products is becoming fiercer with the main competitive drivers being EXTERNAL to the SOT cluster (see section 4.4), *i.e.*

- Increasing foreign imports (a threat but also a driver of innovation)
- Decreasing sales in the domestic market (opportunity for innovation)
- Decline in traditional export markets (a threat)
- Growth in new export markets (an opportunity)
- Lifestyle changes are driving demand for more product variations (a threat but also an opportunity for innovation)

Demand in the UK market has grown overall and key drivers indicate that growth will continue. However, the combination of worldwide overcapacity in production, BREXIT concerns and competition from countries with lower production costs are all said to be contributors to the price pressures that the UK industry is experiencing. According to Newlands (2003), intensified global competition poses significant problems for the survival of local clusters. One response to these challenges is that clusters have attempted to avoid competing at the bottom end of the market (Porter, 1990; Pyke and Sengenberger, 1992). It is obvious from the research findings that an increase in innovative activity is required to provide the product variations demanded by UK consumers. As a result, we should expect to see more innovative activity happening in the SOT cluster not less. However, increased competition in output markets, resulting in lower profit margins, often reduces the amount of resources devoted to R&D (Beaudri and Breschi, 2003), making it even more difficult for cluster firms to focus on the higher end of the market. Although there is some evidence (below) that SOT cluster firms have been shifting focus upwards towards the upper segments of the market, it is not clear how successful they have been. Stage 3 of this research project, *i.e*. the innovation questionnaire survey, will attempt to address this issue.

4.5.5: Conclusions on Product Variations and Segments in the Domestic & International Markets

There are many segments and product variations existing in both domestic and international markets. The UK market exhibits particularly sophisticated and demanding consumers who are becoming more influenced by fashion and design. This is driving demand for more product variations. The SOT cluster's five largest firms (Steelite, Portmeirion, Churchill, Dudson and Wedgwood) operate across a broad range of premium segments. The remainder of firms in the cluster are mostly focused differentiators (Porter, 1985), operating in one/few niche segments. Firms operating in low-mid price niche segments are experiencing price-based competition, mainly from foreign imports. The literature suggests

that intense price competition may have an adverse effect on innovation (Porter, 1990). Potentially the relationship between competition and innovation is an ambiguous one. On the one hand, competition increases incentives to innovate but on the other hand, it may well decrease the means, *e.g.* cost/price pressures may reduce finance available for R&D. According to research carried out by Hervas-Oliver *et al*., (2011), SOT cluster firms, in response to global/economic pressures, have begun to establish and foster niche markets. The strategy of establishing niche markets was triggered by import penetration from the Far East. This is further evidence of how SOT firms chose not to compete head-on with each other, but rather focus on separate segments. From the findings, we can assume that these firms have no/few local competitors and hence the local stimulus for constant product innovation may be missing. In the literature a 'failure to constantly innovate' was given as one of the typical features of a failing cluster (Porter, 1990; Klepper, 1996; Audretsch & Feldman, 1996).

It would appear that although SMEs do compete specifically with each other, albeit indirectly, there are ambiguities concerning the nature of competition itself. On the one hand, even though firms are in niches, they compete with each other to persuade buyers to buy their ceramics collectible and not their competitor's. This is competition, but the evidence indicates that, due to the reduction in firms, there are less competing versions of the product on the market, hence competition is less intense. On the other hand, ceramics firms also need to persuade buyers to buy a ceramics collectible rather than another lifestyle or hobby product/service. This is not direct competition in the true sense and it cannot be said to be 'fierce' competition. There is some evidence to support the view that SMEs need to move beyond their immediate niches to address changes in the competitive environment. According to the literature, competitive rivalry should be good for innovation, but the evidence on innovative output in the SOT cluster is unclear. Moreover, the fierce protection of market niches may be a contributor towards a general 'mistrust' of other firms. As Saxenian (1994) found, the 'culture' of a region may be partly responsible for a lack of interdependence. Similarly, Rosenfeld (1997) cites 'weak social fabric' as symbolic of a latent or under achieving cluster. Conversely, positive forms of co-operation and interdependence are cited in the literature as features of successful clusters (Porter, 1990; Dei Ottati, 1994; Rosenfeld, 1997; Tassey, 1991; Midgley *et al*., 1992).

Moreover, according to a recent study on the SOT ceramics cluster (Hervas-Oliver *et al*., 2011), which examined the district's ability to withstand or survive a disturbance or series of shocks over time:

> "*There is a degree of ambivalence among district firms towards wider networking opportunities, particularly horizontal ties which may aid knowledge transfer and innovation…*" (p. 389).

However, it is not clear from the secondary data, the extent to which cluster firms do/do not partake in positive forms of co-operation and interdependence. It is also not clear from the research, so far, what effect niche strategies have had on competition and innovative output. Stages three and four of the research are designed to answer these questions, in particular the questions on competition and innovation in the innovation survey (see Appendix 9). Findings from stages three and four are presented in chapter six of this thesis.

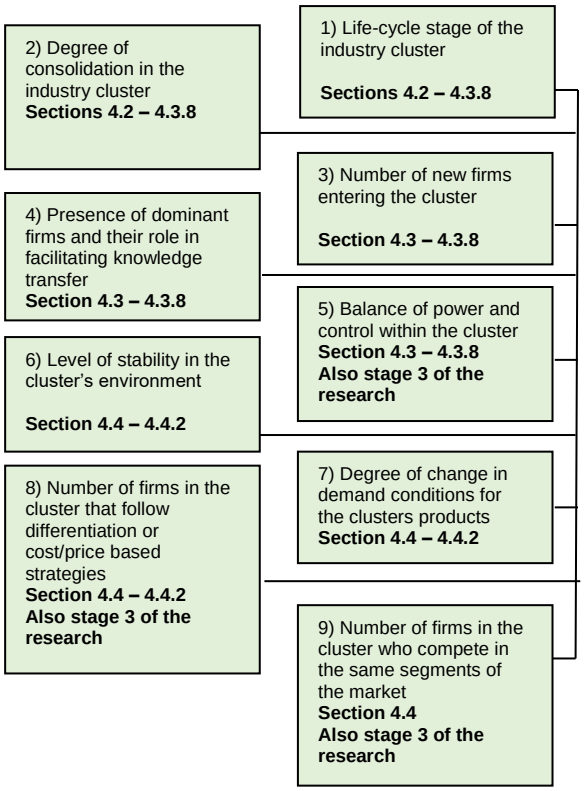
4.5.6: Chapter Findings Mapped to the Objectives and the Theoretical Framework

Overall, the research presented in this chapter fully achieves research objective 1 (i – vii), and partially achieves research objective 2 (i and iv). The remainder of objective 2 (ii – iii) will be addressed in stage three of the research. Table 4.8 below maps relevant sections of this chapter to specific objectives and Figure 4.22 below maps relevant sections of this chapter to specific sections of the theoretical framework (see chapter 1, Figure 2.4). The next chapter presents the findings for stage 3 of the research, *i.e.* identifying the 'need' for co-operation in the SOT cluster over time (objectives 3-6).

Table 4.8: Chapter Sections Mapped to Objectives 1 & 2

Stage 1 Research Objectives – Industry life-cycle, demand and competition	Link to Propositions	Link between this chapter and objectives
12. To track the development of SOT tableware & giftware manufacturers from 1960 – 2016: viii. Establish the total number of firms operating in each decade from 1960 – 2016 ix. Establish the total number of new entrants in each decade from 1960–2016 x. Establish the number of firm closures in each decade from 1960-2016 xi. Establish the number of acquisitions & mergers in each decade from 1960-2016 xii. Determine the degree of consolidation in the cluster as at 2016 xiii. Establish the life-cycle stage of the cluster as at 2016 xiv. Establish the emergence of dominant firms in the industry and their history of mergers and acquisitions 1960-2016	P6, P6a P7, P7a P10, P11	4.3 – 4.3.8
13. To examine the nature of demand for the SOT cluster's products and its effect on competition between 2000 and 2016. v. Establish whether demand is increasing or declining vi. Establish the level and sophistication of demand as evidenced by increasing segmentation and product variations vii. Establish the pattern of local competitive activity (cluster) between 2000 and 2016 viii. Establish the extent of competition from abroad, including competitors from low-cost countries	P6, P6a P7, P7a	4.4 – 4.4.2

Figure 4.22: Chapter 4 Findings Mapped to Relevant Sections of the Theoretical Framework



(Source: Author, adapted from Arikan (2009). See chapter 2, Figure 2.2)

5. Research Findings Stage 2: Historic Overview of Co-operation and Knowledge Exchanges within the SOT Cluster up to 2016

Research stage 2: Objective 3, the breadth of knowledge in the cluster; objective 4, modularity in product technologies; and, objective 5, the level of technological dynamism in the cluster

5.1: Introduction

This chapter of the research findings deals specifically with research objectives 3, 4, & 5 (stage 2 and part of stage 3). One of the key aims of this research project is to identify innovation in the SOT cluster. Considering the importance of co-operation to innovative activity and output, it is also necessary to identify and analyse the current situation regarding co-operation within the cluster (stage 3, objectives 6, 7 and 8). From this analysis, current 'opportunities for inter-firm knowledge exchanges' (Arikan, 2009), and the relationship with innovative output can be better understood (see chapter 2, Figure 2.3).

However, prior to the primary research stage and, to provide context for the findings, it is first necessary to: examine the nature and types of co-operation that have characterised the SOT cluster since its beginnings; and, determine whether the nature of co-operative relationships has changed over time. Another related aim of this chapter is to identify the possible reasons for any consequential changes, as this would aid in understanding the position of the industry regarding the need, desire and ability to co-operate, both in the past and present. This outcome is important as preliminary investigations (based on Whipp, 1990) would indicate that there was little need, or desire, for strong co-operative links within the SOT cluster prior to the late 1970s. More recently this situation appears to have changed (see 5.5.2 in this chapter), and there is some evidence (Tomlinson and Branston, 2017) of increasing co-operative activity within the SOT cluster today.

To date no previous time-series data exists that specifically examines co-operative linkages in the SOT cluster over time. However, there are a number of existing studies, books and reports that give limited or restrictive insights into co-operative activity within the SOT cluster

at various time periods. Unfortunately, the data from these sources regarding co-operation tends to be rather limited, generally comprising of only small parts of much broader industry studies. This thesis has extracted relevant data from the various secondary sources and constructed a comprehensive account of co-operative activity within the SOT cluster at various points in time. Chapter findings are mapped to the objectives and to key themes emerging from the literature review as explained further below.

The Literature Review identified positive forms of co-operation as one phenomena of successful industry clusters (see chapter 2.4). Co-operation in clusters involves linkages between similar firms within the industry, and with different agents located nearby, such as clients, suppliers and other related firms and industries. Interchanges between these agents are seen as 'cluster externalities'. Moreover, such linkages are seen as the main knowledge transmission mechanisms in clusters, *i.e.* external localisation economies are drivers of innovation in industry clusters (see chapter 2.6). The relevant academic literature also draws important distinctions between 'knowledge' and 'information' and also between different types of knowledge. This chapter will utilise Matusik and Hill's (1998) two types of organisational knowledge, 'component' and 'architectural' when analysing the type of knowledge required to produce the SOT cluster's products (see chapter 2.6.2).

As stated previously, there is a need to discover opportunities for inter-firm knowledge exchanges in the SOT cluster and to link this to co-operative activity past and present. The existing academic literature indicates that such opportunities depend upon issues such as: 1) the breadth of knowledge required to offer the products that characterise the cluster; 2) the degree of separability (modularity) of product technologies; 3) the degree of technological dynamism surrounding products and processes; and, 4) the degree of vertical integration apparent in cluster firms (see chapter 2.6.6). These four themes arising from the literature are explored in relation to the SOT ceramics cluster (5.1.2 – 5.1.4). In addition, section 5.1.5 considers 'other influences' on co-operation and knowledge transfer within the cluster. Findings in this section provide some possible explanations for attitudes towards co-operation and knowledge transfer over time.

5.1.2: Objective 3, The Breadth of Knowledge Required to Produce the Cluster's Products

A number of secondary sources (see 5.1.7) have been examined in order to identify knowledge requirements within the cluster's core manufacturing firms. Identified knowledge is classified as either 'component' or 'architectural' (Matusik and Hill, 1998). Component knowledge ranges in nature from straightforward technical (simple, tangible, explicit) know-how through to highly systemic (complex, intangible, tacit) scientific knowledge. Highly technical knowledge includes blueprints, product patents, step-by-step instructions for an operation, and so forth, in other words 'information'. Whereas, systemic component knowledge includes scientific theory, complex process patents, activities that require learning-by-doing, and organisational routines. The more technical, as opposed to systemic, a piece of component knowledge is, the faster and more coherently it will be disseminated within a regional cluster (Tallman *et al*., 2004). Architectural knowledge relates to an organisation as an entire system and to the structures and routines for co-ordinating and integrating its component knowledge for productive use, and for developing new architectural and component knowledge (Henderson and Cockburn, 1994; Matusik and Hill, 1998; McGaughey, 2002; Tallman *et al*., 2004). Architectural knowledge evolves endogenously as an inseparable part of the firm, rather than existing independently and, as no two firms are exactly the same, is highly individual, and therefore extremely difficult to diffuse outside of the organisation. Findings in this section are mapped back to the literature and conclusions drawn regarding how the SOT cluster's knowledge requirements changed over time and how knowledge requirements during different periods affected opportunities for knowledge exchanges.

5.1.3: Objective 4 (and partially objective 6), Identifying Modularity in Product Technologies, and Vertical Integration in the SOT Cluster

Both these objectives are connected as they are concerned with the separability of production processes and the potential for increasing inter-firm knowledge exchanges. According to the literature, when a cluster's product technologies are highly modular, it is possible for different firms in the cluster to specialise in different bodies of knowledge associated with different components. Under perfect modularity, each firm would be able to integrate its component into the overall product architecture, without exchanging any knowledge associated with the design and manufacture of its component, thanks to the presence of standardised component interfaces (Baldwin and Clark, 1997; Arikan, 2009). High modularity increases the number of opportunities for inter-firm knowledge exchanges.

Conversely, low modularity in product technology reduces the number of opportunities for inter-firm knowledge exchanges within the cluster.

5.1.4: Objective 5, Technological Dynamism Surrounding the Cluster's Products

Technological dynamism refers to the process of technological change. In the field of technology dynamics, the process of technological change is explained by taking into account influences from 'internal factors' as well as from 'external factors'. Internal factors relate technological change to unsolved technical problems and to established modes of solving technological problems. External factors relate to various (changing) characteristics of the social environment in which a particular technology is embedded (Bell and Albu, 1999). According to Arikan (2009), the degree of technological dynamism surrounding the cluster's products influences whether a cluster firm chooses to exploit a particular body of knowledge or not. The higher the level of technological dynamism surrounding the products that characterise the cluster, the more opportunities arise for inter-firm knowledge exchanges within the cluster (Arikan, 2009). In this section, technological developments over time within the SOT cluster are identified, along with the resultant effects on opportunities for co-operation and knowledge exchange.

5.1.5: Other Influences on Knowledge Transfer within the SOT Cluster

From a systematic assessment of the various secondary data sources, several other influences on co-operation and knowledge exchange within the SOT cluster are identified. The thesis considers these additional influences as significantly important in providing possible explanations for some of the findings on co-operation and knowledge exchange opportunities within the SOT cluster (5.2 – 5.5). These 'other' influences have been categorised by the author as: 1) Custom, Practice and Social relations in the Workplace; and, 2) The Nature and Role of Supporting Institutions in the SOT cluster. Findings have been mapped back to the academic literature and conclusions drawn regarding the effects these influences have had on co-operation and knowledge transfer opportunities within the SOT cluster.

5.1.6: Chapter Conclusions

The final section of this chapter will draw together interim conclusions from the previous sections. Findings will be mapped back to the Literature Review (theoretical framework) and weaknesses in the data highlighted.

5.2: Breadth of Knowledge Required and Knowledge-transfer Mechanisms

5.2.1: 1700s – 1960

In this section, findings are presented up to 1960, as it was around then that major technological changes began to take place in the SOT (UK) ceramics industry with resultant effects on skills and knowledge requirements in the SOT cluster. The SOT ceramics cluster started as a small community of farmer-potters in the mid-seventeenth century (Birks, 2017). Although there were other potteries in England, *e.g.* in London, Bristol, Worcester and Liverpool (Barker, 1991; Ewins, 2008), by 1740 SOT was the main production centre for England, and by 1800 it was the most important ceramic production centre in the world (Weatherill, 1971; Barker, 1991; Birks, 2017). Not only was there a greater concentration of potteries and potters in North Staffordshire than in any other part of the world, with the exception of China, most of the innovations in stoneware and earthenware manufacture appear to have taken place there (Barker, 1991:13). Throughout this period, knowledge within the cluster is identified as being highly skilled and often unique to the firm with the majority of workers employed to perform specific and skilled tasks (Nixon, 1976; Imrie, 1987; Whipp, 1990). For example, the skill and precision expected of a turner demanded a separate craft education to that of the thrower, resulting in separate apprenticeships for the two crafts (Nixon, 1976). According to Day *et al.,* (2000):

> "*the craft and artisan skills involved in some of the ceramic manufacturing process tasks is highly specialised, with a range of tasks taking many years to learn*" (p. 12).

Moreover, many skilled workers were often trained to produce a single carefully chosen product, rather than a series of articles (Nixon, 1976). In this way, very high quality could be achieved. After working for many years on specific tasks, workers would develop latent knowledge, skills and practices that were often passed down over generations (Lambert, 2010). Product specific knowledge was usually concentrated within a single pottery and thus skills were often firm specific (Nixon, 1976; Imrie, 1987; Whipp, 1990; Lambert, 2009). Moreover, the product range of even one manufacturer was often so extensive that each firm

had to carry a number of alternative manufacturing processes or sub-processes which could accommodate that variety (Whipp, 1990). The evidence clearly indicates that a wide range of specialised skills was a characteristic of the potteries' divisions of labour.

Skilled operatives were vital to every one of the seven main stages[105] in the production process (see Figure 5.1, Whipp p. 46). Most potters had to be acutely aware of the special properties of clay, *e.g.* plasticity, and it was the knowledge of the features of the raw material and an awareness of how clay behaved in differing compositions and under varying conditions, allied with extreme dexterity, which constituted the potter's main skills (Whipp, 1990). This importance of the need to understand clay was also reported by Smyth (1971):

> "*Clay is a natural and somewhat perverse raw material, it must be humoured and not abused and one must not underestimate the difficulties involved in translating the traditional skill of potters to machines*" (p. 85).

Given the specified nature of pottery production, the potter's self-image was usually one of a skilled worker and, indeed, of a craftsman. According to Whipp (1990), Staffordshire's dominance of the pottery industry relied partly on inherited advantages (see section 5.5) but predominantly on the accumulated knowledge base which its potters possessed (p. 196). From the evidence so far, it can be assumed that knowledge requirements during the period up to the mid-1900s were highly complex, specific to individual tasks and often unique to the pottery firm (Nixon, 1976). This situation is said to have continued until the mid-twentieth century when major organisational change occurred in the decorative and ancillary crafts.

Applying Matusik and Hill's (1998) typologies of organisational knowledge (see chapter 2, 2.6.2) to the SOT cluster during this period, the cluster's knowledge can be identified as highly systemic 'architectural' knowledge as opposed to mere systemic 'component' knowledge. Architectural knowledge includes scientific theory, complex process patents, activities that require learning-by-doing, organisational routines and so on. Complex, architectural systemic knowledge is thought to be difficult to transfer outside the firm, as opposed to simpler, codified, less tacit, and less path dependent knowledge which is more likely to be mobile (Tallman *et al.*, 2004). Architectural knowledge relates to an organisation as an entire system and to the structures and routines for co-ordinating and integrating its

[105] 1) Clay Department, 2) Potting, 3) Firing, 4) Printing, 5) Decorating, 6) Warehouse, 7) Packing (Whipp, 1990: 46).

component knowledge for productive use and for developing new architectural and component knowledge (Henderson and Cockburn, 1994; Matusik and Hill, 1998; McGaughey, 2002; Tallman *et al*., 2004). In such situations, architectural knowledge evolves endogenously as an inseparable part of the firm, rather than existing independently and, as no two firms are exactly the same, is highly individual. From the evidence above, it appears that this was the case for SOT firms, as knowledge was often highly tacit in nature and also firm specific.

According to the literature, bodies of architectural knowledge are not easy to coherently assemble (Tallman, 2004), and this is almost certainly likely to be the case for bodies of knowledge within SOT pottery firms as knowledge was specific to each of the many stages of production in the ceramic manufacturing process (discussed further in section 5.3). Although not readily transferable, elements of architectural knowledge may leak-out through constant interaction with other firms in the cluster. The literature claims that firms, who possess most or all of the knowledge and capabilities needed in production, may have little need for inter-firm co-ordination, and this would seem to be the case for the SOT cluster based on the evidence above. Systemic architectural knowledge is linked to the concept of 'core competencies' (Prahalad and Hamel, 1990), and 'dynamic capabilities' (Teece, *et al.*, 1997), and is widely viewed as the key to sustained competitive advantage for individual firms providing it remains private to the firm for a sustained period (Porter, 1990; Sanches *et al.*, 1996).

As a result, it can be assumed from the evidence on the SOT cluster that, despite identifying high knowledge intensity and a wide breadth of knowledge requirements, which should lead to opportunities for knowledge exchange (Arikan, 2009), the type of knowledge existing in the SOT cluster during this period appears to have been so specialised and unique to individual firms that it hindered co-operation within the cluster and thereby reduced the number of opportunities for knowledge creation. Also, it appears that cluster firms may have wanted to keep their knowledge private, uncodified or unpublished for competitive reasons, and this too may have reduced the number of knowledge creation opportunities in the SOT cluster during this period.

5.2.2: 1960 – 2016

Throughout the twentieth century, the SOT ceramics industry witnessed an extended period of consolidation, with many mergers, acquisitions and closures (see chapter 4 of this thesis for evidence). The number of core firms reduced significantly from approximately 230 firms in 1935, to 85 in 1970, and to 16 in 2016 (Gay and Smyth, 1974; Limbrick, 2017[106]). Despite the significant consolidation in the industry, methods of manufacturing ceramics goods hardly changed from the methods employed over the previous 100 years (Whipp, 1990; Warren *et al.*, 2000). However, starting at the beginning of the 1980s, many changes were made to the skill base in the SOT cluster, including restructuring of work processes and a re-composition of skills. In contrast to the old-style system (discussed in 5.2.1 and detailed in Whipp 1990, p. 46), where workers were employed on single tasks, workers were now trained to undertake a range of jobs, thus enabling workers to be used interchangeably according to pressures within the system. Moreover, the mechanisation of some tasks (see 5.4) led to the acquisition of new skills alongside the more traditional ones (Smyth, 1971; Imrie, 1987; SQW Report, 2009). Consequently, fewer employees were required, as a single employee was expected to be competent across a wider range of tasks improved by machinery (Imrie, 1987; SQW Report, 2009). This resulted in higher productivity in output per employee and the emergence of a technical elite, comprising both semi-skilled and skilled workers, with potters having to learn to work closely with machinery engineers.

These changes led to the formation of two distinct groups in the industry: a 'higher order' skills group (Imrie, 1987); and, a 'lower order' skills group (Day *et al.*, 2000). The key strategy in the industry at this time was to use semi-skilled operatives to perform a set of simplified tasks, reducing as many highly paid skilled workers as possible, *i.e.* a move away from the 'Master' potter. Consequently, after the 1970s, the industry had a greater requirement for individuals with multiple skills than previously (Smyth, 1971; Imrie, 1987; Day *et al.*, 2000; SQW Report, 2009). Moreover, the nature of skills in the SOT cluster changed to address technological advances aimed at providing more flexibility and responsiveness (FWC Report, 2008). However, it is not clear from the evidence that this was the case for all cluster firms. Section 5.4 of this chapter examines technology development and adoption. Findings in that section indicate that it was mostly the larger cluster firms that embarked upon automation of some processes.

[106] See primary research findings in chapter 4 of this thesis.

It can be assumed from the evidence that, during this later period, knowledge in the SOT cluster had become somewhat less complex in nature, *i.e.* more straightforward technical know-how (simple, tangible, explicit), resulting from some de-skilling and partial automation. For example, technical knowledge in the cluster may well have included more tangible step-by-step instructions for an operation, and so forth, in other words 'information'. According to Tallman *et al.,* (2004), the more technical, as opposed to systemic, a piece of component knowledge is, the faster and more coherently it will be disseminated within a regional cluster (Tallman *et al*., 2004). Nevertheless, component knowledge will only provide short-term competitive advantage to firms within a cluster while it remains private, and component knowledge that is public only within the cluster provides short-term competitive advantage to the cluster as a whole (Tallman *et al*., 2004). This is because simpler processes may provide conditions where different firms in the cluster can provide specialised knowledge associated with different components. Hence, increasing the number of knowledge-exchange opportunities. This is not to imply that knowledge within the SOT cluster during this later period can be identified purely as 'component' knowledge, as many of the cluster's technological processes have remained extremely difficult to automate (see sections 5.3 and 5.4). From the evidence above, and from subsequent sections of this thesis, knowledge within the SOT cluster during this period can be classified as lying somewhere between component and architectural. Overall, from the available evidence, it appears that opportunities for knowledge exchange and co-operation increased slightly in SOT cluster from the 1980s onward. However, the degree of knowledge transfer, and the degree of the cluster's propensity to co-operate, also depends on other factors such as separability of processes, technological dynamism and mechanisms for co-operation and these are discussed in sections 5.3-5.5.

5.3: Modularity in Product Technologies and Vertical Integration in the SOT Cluster

5.3.1: 1700s – 1960

According to Arikan (2009), when a cluster's product technologies are highly modular, it is possible for different firms in the cluster to specialise in different bodies of knowledge associated with different components, hence providing opportunities for co-operation. In clusters where product systems are characterised by inseparability, joint production within a single firm might be the most effective form of governance, due to the difficulty of separating production activities in a way that allows multiple firms to act in parallel (Arikan and Schilling,

2011). According to Arikan and Schilling (2011), the primary factor that leads to a high need for co-ordination is a combination of 'complexity' and 'imperfect separability' (p. 774). Complexity of knowledge has been discussed in the previous section (5.2). In this section complexity and separability of SOT cluster firms' production technologies are examined fully.

During the period 1700s-1960, the evidence indicates that most SOT cluster firms carried out most phases of the production process, including the preparation of materials (Gay and Smyth, 1974; Imrie, 1987; Whipp, 1990). This was assumed to be the case for all core manufacturers regardless of size. However, there is also evidence that it was fairly common practice for firms to produce ceramic wares for other pottery manufacturers. For example, the pottery Cork and Edge of Burslem, was well known for supplying other manufacturers and merchants in the Staffordshire region (Ewins, 2008:112). In terms of firm size, the pottery industry exhibited a wide range. At one extreme there was a group of exceptionally large firms, *e.g.* by 1920 Cauldons had fourteen factories and employed 3,000 workers (Whipp, 1990). However, the vast majority of firms in the industry were SMEs. Even in the larger factories, *e.g.* Wedgwood and Doulton, plant size was conventionally small, and production predominantly based on craft skill, hence there was no requirement or significant advantage in large unit size (Whipp, 1990).

The work itself within the cluster firms was organised around a number of distinct processes with separate places allocated for each (Nixon, 1976; Whipp, 1990). The characteristic fragmentation and separation of production processes within the cluster restricted the size of organisational departments (Lambert, 2009). Attempts to codify the diversity of activities of pottery work largely failed, due to the many complexities apparent in the way that work was structured, organised and controlled (Whipp, 1990), and also in the way that worker families 'hoarded' knowledge (see section 5.5). During this period, production processes were highly complex. The production sequence itself composed of many interdependent phases. The largest pottery manufacturers contained between 100 and 150 departments, while even the smaller banks used over thirty separate phases (Imrie, 1987; Whipp, 1990). This situation had not changed much by the 1950s. According to Imrie (1987):

> "*in the early post-war (World War Two) period it was still not uncommon for there to be at least 100 separate tasks carried out in the pottery industry*" (p. 12).

Moreover, the level of mechanisation was generally low, which meant that there were few machines that could combine or simplify tasks, and no machines could encompass the work of a whole department (Whipp, 1990). In addition, it is thought that the poor special layout of potteries inhibited the efficient transfer of the product between constituent processes (Gay and Smyth, 1974).

The evidence presented here clearly indicates high complexity but low separability of production processes in ceramics production. The cluster's products are not made of separate individual components that can be combined into the final piece. Each stage of the production process is distinct, however each of the activities in the production system are highly interdependent, and as such are not easily capable of being performed by different firms in the cluster. Moreover, as discussed in the previous section, knowledge was also highly specialised in parts, *e.g.* mould making, and firm-specific to each phase of the production processes and, again, not easily transferable outside of the firm. Hence, the need for co-ordination between SOT cluster firms is assumed to be low during this period. Consequently, the opportunities for co-operation and knowledge transfer are also assumed to be low. According to Arikan (2009), the structure of the industry plays an important role in cluster firms' willingness to engage in inter-firm knowledge exchanges (Arikan, 2009). The findings in this section provide one possible explanation for why SOT cluster firms have reputedly been unwilling to engage in co-operative activities (discussed further in section 5.5).

5.3.2: 1960 - 2016

According to Arikan and Schilling (2011), high technological complexity may require firms to break down product systems into more manageable components, leading to specialisation, and hence the need for co-ordination (p. 774). This section provides evidence of SOT cluster firms' attempts to simplify production processes.

In the SOT cluster, over 100 separate named work groups were still in evidence in 1977, related to fifteen different categories of product within the industry (Whipp, 1990). Throughout the 1960s and 1970s, in order to overcome work organisation and production discontinuities, there is some evidence that largest firms in the SOT cluster increasingly

adopted Fordist[107] methods of production in some processes (Imrie, 1987). This involved increasingly restructuring work around a series of automatic and semi-automatic machines which encouraged high volume flow-line production. In turn, model ranges were reduced to a handful of popular models (rationalisation), in contrast to the hundreds of different styles that had been produced under the previous system (Imrie, 1987). However, the evidence indicates that cluster firms never really achieved high levels of standardisation, due to the complexities of the production process that were so intricate that they rendered automation of some processes infeasible, this was even true for large firms like Wedgwood (Wedgwood, 1982, *cited in* Imrie, 1987; Day *et al.*, 2000).

During this period, in addition to streamlining production processes, cluster firms began to look outside the firm to specialist firms who could supply many pre-prepared materials, such as clays, flints, colours, glazes, *etc.* that had previously been prepared in-house, thereby reducing vertical integration (Smyth, 1971). However, vertical disintegration appears to have only taken place in the early preparation processes rather than in the key manufacturing processes (Imrie, 1987; Whipp, 1990; Day *et al.*, 2000). The majority of large firms still organised production starting with raw materials mixing through to selling the decorated product, whilst many smaller firms bought-in prepared raw materials and manufactured from clay through to the finished piece (Day *et al.*, 2000). The outsourcing of some basic preparation processes could be said to have aided knowledge transfer within the cluster, leading to more profitable opportunities for knowledge transfer within small firms.

As mentioned in the previous section, complexity can provide the motivation for firms to pool their efforts to break down that complexity into more manageable pieces, but it is the separability of activities that determines the ease or effectiveness of doing so (Baldwin and Clark, 1997; Schilling, 2000; Arikan and Schilling, 2011). The findings on the SOT cluster clearly indicate that SOT cluster firms have only been partially successful in reducing technological complexity in production processes. Moreover, the processes themselves are still highly interdependent, *i.e.* 'inseparable'. Whilst these conditions have led to some forms of co-operation with suppliers of raw materials, for some firms, the evidence indicates that specialisation of the more complex processes has not been possible. The evidence also

[107] An industrial paradigm involving mass production of standardized goods on a moving assembly line using dedicated machinery and semiskilled labour. Source: Britannica.com. (2017), Fordism, [ONLINE]. Available from: https://www.britannica.com/topic/Fordism. [Accessed 28 Feb 2017]

indicates that strong task divisions throughout the industry have gradually been broken down, and this has aided the flexible use of labour (Day *et al.*, 2000), providing more opportunities for knowledge exchange. Hence, the conclusions are that opportunities for co-operation and knowledge exchange between firms engaged in the various production processes in the SOT cluster, may have increased marginally from the position pre-1960.

5.4: Technological Dynamism Surrounding the Cluster's Products

5.4.1: 1700s – 1960

According to Arikan (2009), a cluster may originate as a specific knowledge-based area but the number of opportunities for knowledge exchanges may change over time. For example, environments surrounding the cluster's products may become more stable over time (low technological dynamism), making self-sufficiency in terms of knowledge requirements a more valued goal to pursue than flexibility. Conversely, if the environment surrounding the cluster becomes dynamic, leading to increasing technological change over time, then this may create a greater need for inter-firm co-operation, and hence create more opportunities for knowledge exchange. The idea that knowledge requirements change over time is linked to the concept of the industry life-cycle (see chapter 2.7). The academic literature suggests that firm-level innovation, and how much innovative activity is undertaken, is also closely linked phases of the industry life-cycle (Klepper, 1996, 2007; Audretsch & Feldman, 1996; Breziz and Krugman, 1997; Maskell and Malmberg, 2007; Potter and Watts, 2011). The following section identifies the key technological changes that have taken place within the SOT cluster and links them to corresponding life-cycle changes, and to opportunities for co-operation.

As discussed in the previous section, production methods employed by many firms in the UK ceramics industry up to the late 1880s, had hardly changed over the previous 100 years (Gay and Smyth, 1974). Any technological advancements that did take place tended to be small and incremental (Imrie, 1987; Whipp, 1990). For example, in the mixing and clay preparation departments, mechanical grinders, blungers and mixers gradually replaced older hand techniques, and in decorating improved transfer machines were developed. By the mid-1920s, external ceramic transfer companies were also established and they were able to supply manufacturers with ready-made transfers (Whipp, 1990). Overall, from the

evidence, technological dynamism in the SOT cluster could be described as low during this period.

However, during the period 1890-1960 there were several significant changes in the use of ceramic technology, with the two main changes taking place in the pressing and firing departments. The greatest technological change with regard to pressing was the introduction of casting. Casting involved working with a simple, liquid clay and mould that enabled complex shapes to be made in a single operation, where previously the hollow ware presser had needed several stages to make such articles (Whipp, 1990). The second type of change concerned oven design and firing techniques. A handful of firms pioneered gas firing in tunnel ovens (largely as a result of the Clean Air Act (1956), and the introduction of natural gas in 1960). However, only a few of the largest firms experimented with firing technologies during this period (Whipp, 1990).

As mentioned previously, throughout the 1900s, the SOT cluster also experienced an extended period of consolidation. However, despite the decline in the number of firms, output increased substantially over the same period (Gay and Smyth, 1974). On this evidence the industry can be placed as in the slow-growth phase of the industry life-cycle up to the end of the 1970s, when the effects of recession and globalisation sent the industry into long-term decline (Tomlinson and Branston, 2017: 5).

The evidence presented so far indicates that, apart from advances in kiln technology, there was a low level of technological dynamism in the industry during 1900s, only gaining momentum towards the end of the twentieth century. According to Gemser (1996), during the slow-growth phase of the industry life-cycle the need for horizontal linkages between competing firms is low, due to firm specialisation. At this stage of the life-cycle the focus of innovation is on the product. Within this environment, firms continue to compete by pursuing product differentiation strategies and the number of segments in the market increases. (Brenner, 2005; Belussi and Sedita, 2009). The evidence presented above on technological dynamism in the SOT cluster for this period does not indicate conclusively that cluster firms focused on product innovations. Moreover, the evidence presented in section 5.2, shows that during this time the product ranges of pottery firms were widely varied with long established production methods, thus it can be concluded that no radical product innovations took place during this period. This fact, coupled with the lack of significant advances in process technologies during the same period, leads to the conclusion that during this period

the industry's environment was stable with low technological dynamism. According to the academic literature (Arikan, 2009), low technological dynamism results in few opportunities for knowledge exchanges. Thus, the findings in this section support the results from the previous section that indicate low knowledge exchange opportunities within the SOT cluster during this period.

5.4.2: 1960 - 2016

Despite the introduction of some new technologies in the 1960s and 1970s, as detailed in section 5.3, the pace of industrial and economic change appears to have continued slowly up to the late 1970s (Smyth, 1971; Imrie, 1987; Warren *et al*., 2000; Day *et al.*, 2000). Moreover, technological change was modest; a series of piecemeal alterations rather than radical innovations (Whipp, 1990). Oven technology is one example of this. The Clean Air Act (1956) raised the need to replace the old, coal-fired bottle kilns, yet their replacement by electric and gas ovens was slow and fitful given the constraints of small scale potteries and the continued existence of the smaller potter firm (Gay and Smyth, 1974; Whipp, 1990).

During this period (1960s – 1970s) there is further evidence of the adoption of 'Fordism' principles, including attempts to standardise the product to achieve economies of scale, and the use of integrated assembly line production in an attempt to equalise conveyance times between work processes (Nixon, 1976; Imrie, 1987). However, as mentioned previously, mechanisation had only been introduced into certain pottery processes but not in all. For example, according to Imrie (1987), by the early 1980s little mechanisation had been applied to preliminary processes such as casting and moulding (p.15). There is also evidence of forced rationalisation of product lines during this period, *i.e.* fewer profiles for shapes and the standardisation of mass-market tableware, but still with a wide variety of designs and decorations (Nixon, 1976; Imrie, 1987; Warren *et al.*, 2000; Day *et al.*, 2000). The evidence can be linked to both Fordism and Flexible Specialisation[108] production models, *i.e.*, evidence of attempts to standardise some products, whilst maintaining a wide variety of designs and decorations for others. This notion of a 'dualist' structure, *i.e.* some mass production elements and some product differentiation elements, existing in the UK ceramics

[108] Flexible Specialisation: When a firm has multi use equipment and multi-tasking employees to adapt to market changes. The changes are fast and the company must change to continue to function and profit. Source: The Law Dictionary, (2017), Flexible Specialisation, [ONLINE]. Available at: http://thelawdictionary.org/search2/?cx=partner-pub-4620319056007131%3A7293005414&cof=FORID%3A11&ie=UTF-8&q=Flexible%20specialisation. [Accessed 21 July 2016]

cluster is not new and has been widely reported in various previous studies of the industry (Imrie, 1987; Rowley, 1994, 1998; Day *et al.*, 2000).

From the evidence above, the SOT cluster can be regarded as having entered the mature phase of the industry life-cycle. According to life-cycle theory, during this period a number of evolutionary changes occur that cause the industry to mature. First, because of the knowledge codification process, knowledge within the industry becomes codified and transferable across geographical space with lower transaction costs[109] (Audretsch and Feldman, 1996; Bathelt *et al*., 2004. see earlier references too). There is some evidence of this happening within the SOT ceramics cluster with the simplification of some manufacturing processes, job de-skilling and intra-firm knowledge transfer (between departments as workers become multi-skilled), plus knowledge transfer through mergers and acquisitions (consolidation effects). A second feature of an industry in the mature phase of the life-cycle is that, due to rapidly increasing demand (Brenner, 2005), a dominant design emerges within the industry that enables products to become standardised and produced using capital intensive, high-volume mass production processes rather than craft production processes (Klepper, 1996). Once more, there is some evidence of this happening in the SOT cluster through standardisation of some products. A third feature of the mature phase of the industry life-cycle is that firms begin to shift their R&D emphasis away from a product differentiation strategy that focuses on product innovation, towards a cost-saving strategy that emphasises production innovation (Klepper, 1996; Brenner, 2005). The evidence in this respect indicates that SOT firms began to re-focus on process innovations during this period.

Gemser (1996) also acknowledges a focus on cost-cutting process innovations during the maturity phase of the life-cycle, along with a decrease in the need for both horizontal and vertical linkages, mostly as a result of mergers, takeovers and vertical integration. There is evidence that although there appears to have been some increased opportunities for knowledge transfer in the SOT cluster through merger, acquisitions and codification of some knowledge, knowledge transfer seems to have mostly taken place between firms belonging to the same company, or group of companies. This leads to the assumption that it was mostly inside the large firms where knowledge transfer opportunities increased. However, what was happening with SME firms during this period cannot be clearly ascertained, as the

[109] A central premise of transaction cost theory is that transaction costs increase as transactors make greater asset-specific investments. The standard reasoning is that as asset specificity increases, more complex governance structures are required (Dyer, 1997).

data from previous accounts of the industry tends to focus mostly on the larger firms in the SOT cluster. The findings do, however, lend convincing support to Gemser's view that consolidation in the industry can lead to a decrease in the need for inter-firm linkages, as in reality there are fewer firms to co-operate with. Overall then, during the 1960s and 1970s, it appears that the number of opportunities for knowledge exchange declined in the SOT cluster.

It is evident that from the late 1970s technological dynamism appears to speed-up considerably in the UK ceramics industry. Pottery firms began to respond slowly to a series of external shocks that started in the late 1960s and adversely affected many traditional industries across the globe. These crises were caused, in part, by the saturation in world markets that rendered the mass production of standardised goods untenable (Gay and Smyth, 1976; Imrie, 1987; Warren *et al.*, 2000; Day *et al.*, 2000). According to Imrie (1987), the UK ceramics industry continued to grow in terms of output until 1978 when sales (tableware) peaked at £348m, declining to £213m by 1982 (p. 45). By the early 1980s, the UK pottery industry was in crisis, due to increasing international competition, especially from the East Asian region, and changes in consumer demand and spending. This resulted in the break-up of traditional mass markets and an increased focus on market niches (Gay and Smyth, 1976; Nixon, 1976; Whipp, 1990; Warren *et al.*, 2000; Day *et al.*, 2000; Carroll, *et al.*, 2001; Sacchetti and Tomlinson, 2009). The evidence here clearly indicates that the SOT cluster had entered the decline[110] phase of the industry life-cycle.

By the 1980s, in response to the changing external environment, many of the larger pottery companies had, in addition to continuing to invest in automating some processes, developed a series of small production innovations aimed at servicing market niches and sensitising production to switches in patterns of consumption (Imrie, 1987). Another of the responses of the UK pottery industry was that some of the larger firms began to adopt certain elements of Japanese production methods into their operations, *e.g.* hybrid versions of just-in-time (Imrie, 1987, p. 19). These firms were able to produce goods when required, to exact numbers and specifications, and with a much higher onus on quality control than previously (further evidence of flexible specialisation). As well as being a response to international

[110] For the purposes of strategic analysis the industry which is in decline can be recognised by an absolute decrease in sales over a longer period of time. It is characterised by falling profit margins, reductions in production lines, lower investments in research and development and marketing and fewer competitors (Porter, 1980, *cited in* Sabol, *et al.*, 2013).

competition, the development of mechanised production also reflected the need of the SOT cluster to respond to rapidly changing fashions in the consumer market (Nixon, 1976; SQW Report, 2008). Warren *et al.,* (2000) also acknowledge this 'second technological revolution' as taking place in industry in the 1970s, 1980s and 1990s (p. 91).

The evidence indicates that, by the end of the 1970s, it was the larger pottery companies in the SOT cluster who were investing most in more significant new technologies. For example, both Staffordshire Potteries and Wedgwood made significant investments, over £4 million combined, in new plant and mass production technologies (Imrie, 1987). The evidence for SMEs, who were not part of a larger group, would indicate that there was little large-scale investment taking place during the same period. Aside from not having the necessary resources to fund major expenditure programmes, for many SMEs large scale expenditures were not wholly appropriate for their scale of operations (Imrie, 1987). Although the switch to high quality, low volume production targeted at market niches, was largely undertaken by small firms, they were either owned by the larger firms, or did subcontract work for them. Moreover, many of these smaller firms had been acquired by larger firms in order to acquire skills in specialised areas (Smyth, 1971; Niblett, 1987). This situation led to closer relationships between the larger and smaller firms within the same group, with the former relying more and more on the latter's production technologies and expertise. In turn, the larger firms focused more on introducing and expanding technologies and forms of work organisation orientated to volume production (Imrie, 1987). Moreover, technological improvements were not uniform throughout the industry, with developments occurring fastest in the cheaper end of the industry, *e.g.* earthenware, and slower in the more expensive end of the market, *e.g.* bone china (Warren *et al.*, 2000). This supports views stated elsewhere in this chapter, *i.e.* that not all firms adopted new technologies, and this view is well documented in the literature (Imrie, 1987; Warren *et al.*, 2000). Another response by the largest firms to the industry's problems was to re-locate much of their production overseas (Imrie, 1987; Carroll *et al.,* 2002). For example, both Wedgwood and Doulton located production overseas in the 1990s (see also chapter 2, section 2.2 of this thesis). By the mid-1990s, the SOT cluster had evolved into a very dynamic sector with rapidly changing techniques and technologies (Rowley, 1996).

From the evidence above, between the late 1970s and mid-2000s, the SOT cluster is clearly placed in the decline phase of the industry life-cycle. This final stage of the industry life-cycle is characterised by a period of decline that affects the whole industry and has implications for the survival of the cluster. A number of different factors can trigger the decline stage, including a large shake out of firms, intensive price competition, market overcapacity,

disruptive innovations, product substitution, exogenous shocks, or unpredictable changes in supplier or customer markets (Porter, 1990; Klepper, 1996; Potter and Watts, 2011). It is evident that most of these factors were experienced by SOT cluster firms during the period in question. According to life-cycle theory, firms that remain within the industry during the decline phase attempt to adapt their routines and place greater emphasis on a variety of new management routines and strategies. These new routines may include geographic relocation, industry diversification, increasing plant size, business mergers and acquisitions (Swann *et al.*, 1998). Again, the evidence on the SOT industry indicates that many new routines and strategies were adopted in a response to the problems that it was facing during this period, and these fit with what the theory says about the decline phase of the life-cycle. According to Gemser (1996), firms' abilities to appropriate the profits of innovations are especially difficult at the beginning and end of the industry life-cycle because of the high costs of R&D and marketing and the high capital needs of production. Therefore, horizontal inter-firm linkages should be particularly dense at these stages. However, in the decline stage of the life-cycle they may be weak, due to negative competition or dominant firm effects that may be a feature of the cluster (Gemser, 1996; Molina-Moralez *et al*., 2015).

The evidence on the SOT cluster does not give a definitively clear picture of inter-firm co-operation during the period in question, although the evidence does indicate that there was some intra-firm co-operation taking place within large firm groupings. In addition, the overseas outsourcing of production by the largest firms should have created opportunities for knowledge exchange with firms outside the SOT cluster. The academic literature defines the transfer of knowledge from local to a global scale as 'non-cluster economies' (Yeung *et al*., 2006), 'extra-cluster linkages' (Giuliani and Bell, 2005), or 'global pipelines' (Andersen and Lorenzen, 2007). According to Hervas-Oliver *et al*., (2008), in a global economy the majority of clusters are connected in global value chains, and clusters should be open to 'newcomers' that act as knowledge diffusers and create both inflows and outflows of knowledge (p. 508). However, whether a firm chooses to make its knowledge available to other firms in the cluster is dependent on whether external exploitation of knowledge endangers the firm's competitive standing inside the cluster (Arikan, 2009; Sacchetti and Tomlinson, 2009).

Historical reasons and path dependency (discussed in 5.5 of this chapter) are another reason given in the academic literature for dominant firms' lack of co-operation (Arikan and Schilling, 2011). Dominant firms can also control the rate at which technology is upgraded or refined (Arikan, 2000), with the firm that possesses control dictating much of the behaviour in

a cluster due to their large bargaining power (Arikan and Schilling, 2011). It is not obvious from the evidence on the SOT cluster, whether the 'new knowledge' gained from new overseas linkages outside the cluster created knowledge exchange opportunities for all firms within the SOT cluster, *i.e.* there is no evidence of this in existing industry studies. Hence, one of the aims of stage 3 of the research (questionnaire and interview surveys) is to identify the extent of current internal and external cluster linkages. Overall, from the evidence presented in this chapter, it can be assumed with some certainty, that although new knowledge was developed in some of the cluster's largest firms, opportunities for knowledge exchange remained relatively low for cluster firms as a whole during this period.

As demonstrated, by the start of the twentieth century the need for new technology had become increasingly imperative to ceramics manufacturers in order to combat increasing competition in markets and from other materials such as glass and plastic. Thus, the focus of more recent innovative activity has been on making ceramic goods quicker, cheaper, more reliable and longer lasting (Warren *et al.*, 2000, p. 91). Although the recent evidence, up to the early 2000s, has indicated that it was mostly the largest firms in the SOT cluster who adopted the more radical technologies, there is evidence from recent research into the industry to show that this situation might be changing. Both the FWC Report (2008, p. 52) and the SQW Report (2009, p. 23), state that the use of automation technology had become widespread in UK ceramics manufacturing, with the majority of companies in the sector, including SMEs, having invested heavily in new technologies including new automated casting and decoration equipment. Unfortunately, no detailed evidence of innovations was provided in these reports, and so without further research (stage 3 of this research project) it is difficult to come to an overall conclusion regarding current technology adoption in the SOT cluster. It is evident though that both the level of technological dynamism and the need for innovation have grown rapidly from the 1970s onwards, particularly from the late 1980s to the present time, and this should have provided increased opportunities for knowledge transfer.

Further evidence of positive change in the SOT cluster is provided by Tomlinson (2015[111]), who reported the SOT ceramic cluster as "*looking much healthier than it did a decade ago, when it appeared in danger of collapsing altogether*". Most of the revival has been in table

[111] Tomlinson, P. (2015), *The revival of the UK's ceramic industry*, [ONLINE]. Available at: https://www.positive.news/2015/lifestyle/arts/18593/revival-uks-ceramic-industry/. [Accessed 10 July 2017]

and giftware, where exports rose 36 percent between 2009 and 2014 (see chapter 4.4.1). Another strong performance was also recorded in 2015. Tomlinson also reports that the SOT cluster has benefited in recent years from substantial new investment in both technology and factories, *e.g.* WWRD (Wedgwood), Wade and Steelite. This recent evidence on the SOT cluster indicates that the industry is coming out of the decline phase of the industry life-cycle and is experiencing a period of re-growth. The academic literature also suggests firms can rejuvenate an industry's pattern of development by adapting their co-operative and competitive behaviour with rivals and/or suppliers up and down the value chain (Gemser, 1996). There is also recent evidence to support the view that co-operation, and hence opportunities for knowledge exchange, has been increasing in the SOT cluster. For example, according to Tomlinson (2015):

> *"Local firms and institutions such as the British Ceramic Confederation, industry testing centre Lucideon and the local chamber of commerce have also made greater efforts to encourage networking and collaboration. We're seeing producers benchmarking their products and manufacturing processes and visiting one another's factories. Not only have they been sharing knowledge and ideas, some leading firms have been informally advising and supporting smaller ones. For instance, Steelite's new factory has incubator units for start-ups. There has also been greater collaboration among firms on industry-wide issues such as improving energy efficiency and local skills development"* [ONLINE].

Initial conclusions, for the period 2010 to date, are that the evidence clearly indicates a significant growth in inter-firm co-operative activity, and consequently in the number of knowledge exchange opportunities for the SOT cluster. However, more detailed evidence on co-operative activity and knowledge exchanges is required in order to meet the objectives of this research study. In stage 3 of the research (objectives 6-10), primary research is conducted in order to ascertain a more accurate account of knowledge exchange and innovative activity within the SOT cluster.

5.5: Other Influences on Co-operation in the SOT Cluster

This section examines other influences on co-operation and knowledge exchange within the SOT cluster. There are two main themes to be examined: firstly, the nature of employment in the SOT cluster over time, and how the way work was structured, organised and governed, influenced opportunities for co-operation and knowledge exchange; secondly, an overview

and discussion of related and supporting institutions and their role in creating and facilitating opportunities for knowledge exchange will be provided.

5.5.1: Custom, Practice and Social Relations in the Workplace

This section of the findings examines some key aspects of the nature of employment in the SOT ceramics cluster. Findings here are important as they indicate that, up to the early 1980s, work organisation and worker relationships were quite unique to the SOT cluster and provided significant opportunities for, and inhibitors to, co-operation and knowledge transfer, both within single firms and between firms in the cluster. It is a key characteristic of the SOT cluster that, from the early years of the industry up to the late 1970s, workers tended not to drift between jobs or factories but generally progressed in the same firm through accepted career sequences. All the departments of a pottery firm had well known patterns of career progression. Many potters, especially the more skilled, remained in one occupation for most, if not all, of their career*, e.g.* mould makers. Variations in production technique, coupled with the prevalence of traditional job progressions, made movement between pottery firms or trades difficult. Hence, workers would often remain with the same firms their entire careers (Whipp, 1990; Lambert, 2009).

Given the high degrees of permanence of employment in a company, many workgroups developed customs and continuities which augmented their social cohesion and provided an informal disciplining process (Whipp, 1990; Lambert, 2009). Each occupation generated its own commonly accepted working methods and rules, *i.e*. the pottery firms were regarded as bespoke places by themselves, with hardly any supervision. Moreover, family connections, *i.e.* inter-generations, gave many workgroups their strength. In many cases husband and wife or child worked together in the same factory. Individual families 'followed the trade' both between generations and across the family and kin network (Whipp, 1990; Lambert, 2009). Some firms employed various 'attachment devices', *e.g.* issue of shares, to tie the most skilled workers to the firm to prevent loss of company recipes and methods (Whipp, 1990). Another way of tying workers to the firm and protecting knowledge was to provide accommodation for the more skilled type of worker (Nixon, 1976). Religion was another method used by employers as a way of tying workers to firms. The Methodist revival of the last quarter of the eighteenth century had had a profound effect upon pottery workers and their employers. Some Pottery owners even built their own chapels and expected their workers to regularly attend church. One example of this is provided by Josiah Wedgwood

(1913) who, when referring to pottery owner Job Ridgway (Ridgway potteries), wrote "*if you worked for Job Ridgway, you had to attend his chapel also*" (p. 143).

According to the academic literature, one of the ways in which innovations are diffused is through inter-firm mobility of workers (Porter, 1990; Rosenkopf and Almedia, 2003; Arikan, 2009). The evidence on the SOT cluster's family-oriented work structure indicates a lack of inter-firm mobility, and hence a reduction in the number of opportunities for knowledge exchange.

It was through family and kin connections that the worlds of work and home intersected in the SOT cluster. One manifestation of the family's role was in transmitting skills and securing job inheritance. In 1924, 74% of daughters and 63% of sons worked in the same department as their parents (CATU Coll: Burslem Lodge Membership Register, 1920, *cited in* Whipp, 1990). The extent of family relations in the early twentieth century are examined in studies of the industry from the 1970s onwards. For example, Nixon (1976) mentions the family as a unit of manufacture with its own natural discipline (p. 32), and Lambert (2009) states:

> "*A traditional product associated with internal recruitment policies in the industry was the establishment of long-standing associations of worker families with particular firms. This remained a feature of the 1960s ceramic tableware cluster. Some workers could even trace successive generations of their families working within particular organisational units*" (p. 11).

During this period, knowledge, especially tacit knowledge, tended to remain in the hands of the workers and was not readily shared with management. In many instances, workers would acquire more knowledge and expertise regarding products, production processes and types of equipment and machinery, than management or specialist technologists (Lambert, 2009). This eventually led to management trying to increase control of the industrial process by attempting to reform shop-floor custom. Such changes led to worker opposition, with some workers never accepting that management had the 'right' to change them (Whipp, 1990).

From the available evidence it can be assumed that families protected knowledge of working practices, keeping it within the family and not readily sharing it outside the family group,

possibly with the aim of securing positions for future generations of successive family members. This situation is not suitable for knowledge transfer within the firm. As discussed in section 5.2, 'architectural knowledge' (Arikan, 2011), in individual SOT firms was not coherently assembled, *i.e.* tasks were distinct from each other and so not readily transferable. If knowledge is also kept exclusive to family groups this too reduces co-operation, and consequently the number of opportunities for knowledge transfer. Moreover, according to the academic literature (Becattini, 1991; Bellandi, 1992; Asheim, 1994; Boix and Trullen, 2010), the main way of diffusing innovation in a cluster is through social processes, also called 'local buzz' (Bathelt *et al.*, 2004), where there are formal exchanges of information in public spaces or in domestic life between the workforce. It would appear that in the SOT cluster, knowledge-exchange took place within family units, but not necessarily between workers in social spaces such as pubs and local community organisations, again possibly for reasons involving protecting the family. Arikan (2009) cites 'a lack of an appropriate institutional environment in the cluster for co-operative relationships' as one reason for failure in local knowledge markets (p. 15).

Another key characteristic of social relations among pottery workers was a separatism between departments that arose from the nature of pottery manufacture (Whipp, 1990). Internal workgroup independence was strong, which made factory-wide organisations unstable (Whipp, 1990). In fact, according to Whipp (1990):

> "*while the relations within the workgroup were generally cohesive, the relationship between the hierarchically ordered workgroups was competitive and often deeply antagonistic*" (p. 82).

This situation was not necessarily conducive to co-operation and knowledge transfer. According to Marshall (1890, 1920) in his work on industrial districts, the 'industrial atmosphere', inside as well as between firms, enables the transmittance of tacit knowledge with the district (see chapter 2.3). If these 'uncooperative' relationships within SOT firms were competitive, and even in some cases antagonistic, then it can be assumed that this situation reduced the number of opportunities for knowledge transfer within the firm itself. The findings here can also be linked to the concept of 'absorptive capacity' (Zahra and George, 2002; Lorentzen, 2008), which relates to the firm's ability to acquire, assimilate, adapt and apply new and improved knowledge (see 2.4.3). Industry conditions can create incentives or disincentives to invest in developing absorptive capacity. From the evidence, workplace relations in SOT cluster firms appear to be based on dominance and

independence, thus providing barriers to co-operation, and hence reducing the number of opportunities for knowledge exchange.

It was from the late 1970s that worker family units began to break-up in SOT cluster firms and this can be attributed to several factors. Firstly, because of increasing automation and streamlining of processes in the largest firms, fewer workers were needed. Moreover, many of the traditional highly specialised skills were lost through automation. Secondly, consolidation in the industry, including plant and firm closures (see chapter 4 of this thesis), resulted in a significant reduction in the number of firms, and this led to high unemployment in Stoke-on-Trent. In the 19th century the SOT ceramics industry employed more than 100,000 people, this number had reduced to 52,700 by 1979 and, by 2008, there were only around 10,000 people employed in the industry (Tomlinson, 2015). Finally, as unemployment increased, so too did worker mobility between firms, but not necessarily between towns in North Staffordshire. The implications of these changes on knowledge transfer opportunities are twofold. On the one hand, fewer firms in the SOT cluster reduces opportunities for co-operation and knowledge transfer as there are fewer firms who can take part in co-operative activity. On the other hand, increased worker mobility between firms should, according to the academic literature, have resulted in the creation of new knowledge transfer opportunities. However, overall during this period, simply due to the scale of decline in employment in the SOT cluster, it is assumed that opportunities for knowledge transfer also significantly reduced in the cluster.

Just as pottery workers organised their working lives with strong reference to family and kin, so did the pottery owners, *i.e.* there are many examples where 3-4 generations of family management are apparent within the industry, *e.g.* Allerton of Longton and Bakewell Bros. As well as ensuring a steady supply of managerial competence, there were other reasons to confine management to immediate family, *e.g.* to minimise loss of recipes and technical knowledge and to ensure the transmission of in-house trade secrets that made the ware distinctive (Whipp, 1990). As stated in section 5.2, protection of specialised systemic architectural knowledge (core competencies) can bestow competitive advantages on firms, providing that knowledge remains private to the firm. Therefore, it is assumed that this situation had a profoundly negative effect on opportunities for knowledge transfer for the SOT cluster as a whole.

Although the SOT cluster remained highly concentrated spatially up to the 1980s, it continued to exhibit a high level of fragmented ownership up until the 1960s, *i.e.* family-owned and not PLC. By the 1980s, however, due to consolidation and changes in the industry's external environment (see 5.4), some cluster firms transferred ownership to multi-product corporations from outside the region (Imrie, 1987; Day *et al.*, 2000; Sacchetti and Tomlinson, 2009), and by 1990 there were few family owned businesses left (Niblett, 1990). Despite the breakdown of family ownership in the industry there is still evidence of some knowledge transfer occurring between managers and directors in the industry. Many of the cluster's managers had developed through the ranks since joining the industry after leaving school and that led to the formation of an 'old boys network', where everybody knew everybody else (Warren *et al.*, p. 94). Carroll *et al.,* (2002) also found an 'esprit de corps' existing between owners and managers in the SOT cluster (p.12).

One of the places where pottery owners and managers used to meet on a social basis was the Potteries club[112], which was established in 1951. Most co-operation that did take place within the industry was thought to be through these types of informal inter-firm relationships and networks (Gay and Smyth, 1974; Lambert, 2009). However, the SOT managerial network did not necessarily lead to positive forms of co-operation, and this is reflected in conflicting accounts from studies of the industry. Examples include Gay and Smyth (1974), who state:

> "*It is a feature of the industry that the managers of firms which give every indication of being deadly rivals are willing and pleased to assist each other with advice or the loan of equipment or materials in an emergency*" (p. 51).

> Carroll *et al.,* (2002), also quote one interview respondent[113] as saying:
> "*I don't know what it is but I've always found in this particular industry a great deal of co-operation at one level but they'll be scratching each other eyes out in another*" (p. 12).

The idea that SOT cluster firms view each other as 'deadly rivals' is despite the fact that in the tableware sector many firms do not actually compete directly with each other (see

[112] The British Pottery Manufacturer's Federation Club, or Potters' Club as it's usually referred to, was founded in 1951 to provide facilities for the directors of local pottery companies to entertain their visitors and guests, many from around the world, including royalty and VIP's. Source: The Potters Club, 2017, *History of The Potters' Club*, [ONLINE]. Available at: http://www.thepottersclub.co.uk/about//. [Accessed 10 July 2017])

[113] A prominent figure in the British Ceramics Confederation – The UK ceramic industry's main Trade Association.

chapter 4.4 and chapter 6.5). Further evidence that SOT cluster firms do not compete directly with each other is offered by Smyth (1971), who states:

> *"Manufacturers of mass-produced cheap earthenware were not in direct competition with Doulton, Wedgwood, Spode or Royal Worcester (outside SOT cluster). Firms which produce middle range earthenware compete only indirectly with manufacturers of hotel ware and not at all with manufacturers of posies, vases or brown teapots"* (p. 93).

According to Porter (1990) and Dei Ottati (1994), constructive competition in the industry can lead to co-operation based on local customs, reciprocity and trust. If all firms agree (informally) to adhere (behave) to local norms, an environment that facilitates knowledge transfer can develop (see chapter 2, section 2.5.3). Conversely, if firms do not compete directly because of a high degree of product differentiation, knowledge transfer mechanisms will not operate effectively (Smyth, 1971). By applying these concepts to findings on the SOT cluster, it would appear that the indirect nature of competition between cluster firms (operating in separate market niches) had a negative effect on the number of potential opportunities for knowledge transfer in the SOT cluster.

Networks of the type identified between owners and managers in the SOT cluster are thought to have potentially positive and negative effects on the facilitation of innovation (see chapter 2, section 2.4.5-2.4.7). For example, networking is deemed essential for the development of a region's knowledge infrastructure (Tassey, 1991). However, it is network cohesiveness that is positively correlated to the degree of innovative success (Ebadi and Utterback, 1984; Roberts *et al.*, 1992). Close geographic proximity, or economies of location, should lead to the development of a community of collective knowledge which can be easily diffused throughout the cluster, and where collaborative activities can be easily established and organised (Porter, 1990). The idea of network cohesiveness is linked to the concept of 'social trust'. Firms within networks of trust should benefit from the reciprocal exchange of information, particularly information that cannot be codified (Brusco, 1982; Piore and Sabel, 1984). From the evidence on the SOT cluster, it would appear that, possibly due to viewing each other as deadly rivals, there was a lack of trust between owners of firms and an absence of cohesiveness in the SOT network. However, it is not clear from the available evidence on the SOT cluster whether the identified cluster network was comprised of owners and managers from all/most cluster firms, including SMEs. For example, anecdotal evidence indicates that it was mainly the largest firms in the cluster that were members of the Potters Club.

The academic literature claims that lead firms in a cluster are the dominant mechanism for inter-firm knowledge exchanges (Arikan, 2009, 2011). However, lead firms in clusters do not always share their knowledge with other cluster members (Marshall, 1890). Moreover, the SOT type of 'old boys' network can also lead to a collective, stagnant attitude towards innovative thinking, an attitude that the industry is reputed to have. For example, according to Warren *et al.,* (2000), "*the UK ceramics industry is often perceived as being unable or unwilling to germinate, develop and transfer technological innovation ideas*" (p. 86). Overall, based on the evidence here, it can be assumed that the managerial network existing in the SOT cluster up to 2000, was not based on strong co-operative linkages and thus did not provide many opportunities for knowledge transfer.

However, recent evidence on the SOT cluster indicates a 'shake up' in the cluster's managerial network. For example, Tomlinson (2015), reports a big change of attitude in the SOT cluster. Recent managerial appointments have tended to draw from across manufacturing and other sectors. As well as a shift away from the mass market, this has led to wider engagement with consumers and more emphasis on marketing and technology. Local firms and institutions such as the British Ceramic Confederation, industry-testing centre Lucideon (formerly CERAM Research) and the local chamber of commerce are also making greater efforts to encourage networking and collaboration. Moreover, there is evidence that cluster firms have been visiting one another's factories. Not only have they been sharing knowledge and ideas, some leading firms have been informally advising and supporting smaller ones. For instance, Steelite's new factory has incubator units for start-ups, although it's not clear whether these start-up firms are ceramics manufacturers. There has also been greater collaboration among firms on industry-wide issues such as improving energy efficiency and local skills development (p. 1). The evidence indicates that co-operative activity is not only taking place between cluster firms but also with related and supporting institutions (RSIs) located within the region. Related and supporting institutions are deemed extremely important in aiding and facilitating the knowledge transfer process (Porter, 1990). The next section of this chapter will identify the main SOT cluster RSIs and will examine their influence on knowledge creation opportunities within the cluster over time. Final conclusions for this section are that, using the most recent evidence, knowledge transfer opportunities have increased in the SOT cluster in recent years. However, without further evidence, clear conclusions cannot be drawn regarding current co-operative activity leading to innovative output. Therefore, a key aim of the next stage of the research is to conduct a primary research study into the current situation regarding co-operation and innovation in the SOT cluster (see objectives 6-11).

5.5.2: Related and Supporting Institutions in the SOT cluster

According to the literature review (see chapter 2.4.2), the main knowledge transmission mechanisms in clusters, apart from firm-to-firm co-operations, include linkages between the different agents located nearby, such as clients, suppliers and other related industries, through informal and formal collaboration and relationships (Becattini, 1990; Porter, 1990; Hervas-Oliver and Albors-Garrigos, 2009). Certain transactions in labour markets, *e.g.* inter-firm relations, innovation and knowledge development, require appropriate co-ordinating institutions (Storper, 1995). Linkages of this particular type can be classified as second-order embeddedness (relationships with social and economic institutions) and third-order embeddedness (firms indirectly related through social and economic institutions) (Johannisson *et al.*, 2002). Moreover, it is believed that it is the social capital and mutual trust within such networks that makes firms, associations and public agencies engage in processes of self-organised, interactive learning (Simmie, 1997; Storper, 1997; Braczyk *et al.*, 1998; Cooke and Morgan, 1998; Lorentzen, 2008). Therefore, it can be assumed that, the more information channels and knowledge brokers there are present in a cluster to establish connectivity between cluster firms, the greater the number of opportunities there will be for inter-firm knowledge exchanges.

In previous sections of this chapter some examples of co-operative activity between core firms and suppliers has been discussed. This section of the findings deals specifically with institutions located within the SOT cluster, whose key role has been to try to support the cluster with regard to co-operative activity and knowledge transfer. Firstly, Table 5.1 presents a timeline of key supporting institutions along with their role in knowledge creation and knowledge transfer (for a list of references used to compile the table see Appendix 16). The table also includes linkages to industry life-cycle stages where appropriate. Findings from the table are evaluated using relevant academic theory. The final section presents the latest findings regarding the current role of related and supporting institutions in the SOT cluster. The evidence clearly indicates increased co-operative activity, with regard to knowledge creation and knowledge transfer, taking place within the SOT cluster from the 1990s up to 2016.

Table 5.1 Related and Supporting Institutions in the SOT Cluster up to 2016

Institution	Date Established	Link to Life-Cycle	Comments & Implications for Knowledge Creation
Stoke-on Trent Chamber of Commerce - Local Government	1813	Growth Phase.	Working with industries in the region on a variety of initiatives. Not strictly focused on the ceramics industry.
St. James House	1867	Growth Phase.	Once a Victorian factory school that supported the ceramics industry. Now houses the Hothouse Centre for ceramic design (est. 1995).
The Sutherland Institute	1897	Growth Phase.	Once a technical college, intended to promote and support the industries of its day: coal, steel and ceramics. No longer operating.
British Ceramics Confederation (BCC)	Circa early 1900s (exact date unknown)	Growth Phase.	The SOT cluster's main Trade Association. However, not all SOT firms were members. Mainly the largest manufacturers are members.
Staffordshire University	1901	Growth Phase	First site was on College Road in 1901 delivering mining classes. Developed in 1907 to deliver pottery classes. Developed further in 1914 with the introduction of Cadman Building. Established as a centre to support the ceramics industry. After several stages of expansion and development became North Staffordshire Technical College in 1924. Achieved university status in 1992. Provides design, business and technological expertise to SOT cluster.
UNITY (formerly CATU – the Ceramic and Allied Trades Union)	1906	Slowing Growth Phase	Originally NASMFPW in 1906. Then NSPW in 1917. CATU from 1970. Now UNITY since 2006.
LUCIDEON (Formerly CERAM Research)	1920	Slowing Growth Phase	Research institution since 1920. Amalgamation of BRRA (1920) and BPRA (1937). The SOT cluster's main research institution. Lucideon since 2014.
Keele University	1949	Slowing Growth Phase	Formerly University College of North Staffordshire. Keele since 1962. Provides technological expertise to SOT cluster.
British Ceramic Plant and Machinery Manufacturers Association (BCPMMA)	Unknown but incorporated in 1989	Growth Phase	Manufacturers Association – suppliers of raw materials, equipment, *etc.*, to the ceramics industry.
International Clay Technology Association (ICTA)	1927	Growth Phase up to late 1970s. Decline phase from 1979 to circa 2008. Re-generation phase from circa 2008.	Specialising in clay management and production. Merged with IOM3 (Institute of Materials, Minerals and Mining) in 2006. New 'external' knowledge entering the SOT cluster from other industries.
The HOTHOUSE Ceramic Design Centre	1995	Decline Phase.	The SOT cluster's main centre for design. Government initiative.
The Ceramic Industry Forum	2000	Decline Phase	The Ceramic Industry Forum (CIF) was set up in light of competitiveness issues facing the UK ceramic industry. The CIF is supported by Government funding and the work of a wide range of partner organisations with the common objective of promoting and encouraging innovation in the design, marketing, manufacturing and development of training and skills. The services of the CIF are available to all UK ceramic companies no matter what size.
The British Ceramics Biennial	2009	Re-generation Phase.	The British Ceramics Biennial (BCB) launched in 2009 with a festival celebrating and showcasing contemporary ceramics from across the world. The Clay Foundation is a registered charity set up to deliver the British Ceramics Biennial. Comprising a year round programme of community and education work and in contemporary ceramics in Stoke-on-Trent. Organisers come from a wide range of

			backgrounds, industries and disciplines. New 'external' knowledge entering the SOT cluster.
Ceramic Skills Academy	2014	Re-generation phase.	Ceramic Skills Academy – an information hub and educational and training resource for those working in and aspiring to work within the ceramic industry. Owned and led by leading ceramics businesses, the programme has been part-funded by the UK Commission for Employment and Skills through the Growth and Innovation Fund. CSA mission is to ensure that those skills that set UK ceramics apart from the rest of the world do not become lost. Specialist knowledge and resources are maintained and passed to future generations.
DTI - Department for Business, Innovation & Skills (BIS)	N/A	Various	Involved in various initiatives from post 1950 onwards.
European Commission	N/A	Various	Involved in various initiatives from 1970s onwards, *e.g.* Ceramic Kilns Academy funding.

(Source: Author, compiled from various sources – see Appendix 16)

The findings from Table 5.1 can be clearly linked to industry life-cycle theory and to knowledge creation opportunities as follows. Findings show that the establishment of many of the SOT cluster's key supporting institutions took place during two distinct phases of the industry life-cycle. Firstly, industry specific institutions, including the BCC (est. *circa* 1900) were established during the rapid growth phase of the industry life-cycle, *i.e.* towards the end of the nineteenth century and during the first half of the twentieth century. Secondly, several new research and development institutions, *e.g.* the Hothouse (est. 1995), The Ceramic Industry Forum (est. 2000 but ended circa 2014) and the Ceramics Skills Academy (est. 2014), were established during the late decline phase of the industry life-cycle, *i.e.* from the mid-1990s up to circa 2008. These findings appear to fit with the academic literature on the industry life-cycle. For example, according to Boschma and Frenken (2006), it is during the early growth stage of the industry life-cycle that institutional investors, trade associations, supportive institutions, universities, and professional gatherings become involved with the industry, often choosing to collocate in close proximity to the firms within the cluster to ensure network centrality and connectivity (p. 6). The evidence on the SOT cluster shows that many supporting establishments were established during the growth phase of the industry life-cycle, and this clearly supports Boschma and Frenken's theory. Moreover, Gemser *et al.,* (1996) also take the view that firms' abilities to appropriate the profits of innovations are especially difficult at the beginning and end of the industry life-cycle because of the high costs of R&D and marketing and the high capital needs of production and, therefore, horizontal inter-firm linkages should be particularly dense at these stages. However, in the decline stage of the life-cycle such linkages may be weak, or undermined, due to negative competition or dominant firm effects that may be a feature of the cluster.

Gemser *et al.,* (1996) also suggest that firms can rejuvenate an industry's pattern of development by adapting their co-operative and competitive behaviour with rivals and/or suppliers up and down the value chain. The evidence from Table 5.1 indicates that this is happening in the SOT cluster, as new supporting institutions, such as the Ceramics Skills Academy, have established in recent years. Moreover, the evidence on the SOT cluster also indicates that new 'external' knowledge has entered the SOT cluster through the British Ceramics Biennial and from the amalgamation of traditional ceramics institutions with institutions from other non-ceramic industries, *e.g.* ICTA merging with IOM3 (see Table 5.1). New external knowledge is deemed extremely important in the academic literature in avoiding 'technological lock-in' (Bell *et al*., 2009; Lorentzen, 2008; Hervas-Oliver *et al.*, 2011). As Lorentzen (2008) purports, "*close networks must be supplemented by loose networks, with odd partners, if knowledge leading to innovation is to be sourced*" (p. 542). Furthermore, according to Hervas-Oliver *et al*. (2008), "*newcomers' can act as knowledge diffusers and create both inflows and outflows of knowledge*" (p. 508).

In this final section, some examples of recent co-operative activity within the SOT cluster are covered in detail. As mentioned earlier in this chapter (5.3 and 5.4), many of the current SOT cluster's SMEs did not tend to have the resources to innovate beyond incremental improvements in products and processes. Consequently, some SMEs sought help from supporting institutions in the form of funding, project management and technology development. External organisations that have helped the UK ceramics industry in recent years include the government, the Department of Trade and Industry (DTI) and the European Commission. These external funding bodies tend to work closely with industry specific supporting institutions, such as the British Ceramics Confederation (BCC), UNITY Trade Union (formerly CATU) and LUCIDEON (formerly CERAM Research), as well as working with the innovating organisations. One example of such a joint project is development of 'Airless Drying' and 'solid oxide fuel cells' (Warren *et al.*, 2000, p. 93). There is also evidence of increasing co-operation from the 1990s onwards between engineers, potters and specialist companies financed by industry (Niblett, 1990; Warren *et al.*, 2000; Day *et al.*, 2000). LUCIDEON is identified as a key player in aiding and facilitating innovation amongst members of the industry and in managing collaborative research, development and technology transfer projects.

Some examples of technological innovations led by LUCIDEON are in the development of firing techniques and granular pressing. However, the adoption of these new technologies

and innovations are mostly thought to have taken place outside the UK industry, *e.g.* by firms in Germany and Italy, rather than by firms in the SOT cluster (Warren *et al.*, 2000). Therefore, evidence of the adoption of innovative products and processes appears to be low in the SOT cluster, with mainly the largest firms adopting new innovations (Warren *et al.*, 2000). Moreover, there is evidence from the literature that the more complex or innovative the technology is, the more reluctant firms are to adopt. These firms appear to be risk averse[114], often interested in the new technology but not wanting to be first movers in adopting the technologies (Warren *et al.*, 2000). However, as mentioned earlier, many SMEs were not financially, or logistically, big enough to warrant the adoption of such large-scale technologies. Moreover, they did not have the resources to complete this task.

An example of co-operative activity is given by Day *et al.,* (2000), who report a 'mixed' relationship existing between the UK ceramics industry and local government. For example, the City Council has helped with setting up some projects, such as the HOTHOUSE, but at other times there have been conflicts with ceramics firms on other issues, such as environmental and health and safety issues (p. 14). Another example of recent co-operative activity is the Ceramic Development Group, which was established in 2010. This is a collective body of stakeholders from the local institutions (the BCC, the North Staffordshire Chamber of Commerce and Lucideon (CERAM Research), and district ceramic manufacturers (both large and small), which meets regularly and acts as the focal point for discussing district issues and co-ordinating responses to industry challenges (including EU and government policy directives). It has also become a forum for co-ordinating and managing collaborative bids for district wide funding relating to skills development, energy efficiency and marketing (Tomlinson and Branston, 2014, 2017). However, Tomlinson and Branston (2017), also found that, although some firms in the ceramics cluster exhibited a degree of apathy in relation to policy issues, 'active' members of industry associations were often able to exert influence over cluster wide policy initiatives (pp. 9-10). Moreover, as identified earlier, the evidence indicates that it was mostly the larger firms in the cluster who were active members of these associations.

[114] Investor attitude according to which the value (utility) of a sure chance (certain prospect) with a lower yield is considered higher than the utility of an unsure chance (uncertain prospect) with a higher yield. Source: Business Dictionary, 2017, *Risk Aversion,* [ONLINE]. Available at: http://www.businessdictionary.com/definition/risk-aversion.html. [Accessed 11 July 2017]

From the evidence presented above, it is not clear as to how many of the SOT cluster's firms actually took part in co-operative activities. Moreover, despite there being some evidence of recent SME co-operation with supporting institutions and external organisations, the evidence (see 5.4) indicates that it was mostly the largest firms in the SOT cluster who took part in large-scale technology developments. Certainly up to the late 1990s, and despite the presence of many supporting institutions, the UK ceramics industry was still often regarded as being unable or reluctant to successfully embrace innovation and transfer technology (Warren *et al.*, 2000). Evidence from a more recent report indicates that SOT cluster firms were still facing issues around technology and knowledge transfer in 2009 (Lambert, 2009, p. 3). Moreover, the evidence on co-operation in the industry is often conflicting. For example, Day *et al.* (2000), state that "*companies (in the cluster) feed off each other in terms of goodwill, co-operation and innovation*" (p. 13). However, Day *et al.* also acknowledge that:

> "*inter-firm relations both between competitors and the firms that supply them, on the whole, are characterised by an adversarial approach. There are strong links between manufacturers and suppliers in the area of technical support, but more integrative activities such as joint R&D are not a feature of these relationships*" (p. 13).

Although the evidence on co-operation between SOT cluster firms and supporting institutions clearly indicates that it was the largest firms who mainly took part in collaborative projects, the evidence on whether the knowledge gained from resulting technology developments was shared with other cluster firms is not clear. Chapter four of this thesis clearly identified the emergence of dominant firms in the SOT cluster (see 4.2.2). The SOT cluster's dominant firms can be classed as 'old', *e.g.* Wedgwood and Doulton and 'new', *e.g.* Steelite, Portmeirion and Churchill[115]. Wedgwood and Doulton were dominant firms in the SOT cluster up to 2009, and after their decline (see 4.2.2) Steelite and Portmeirion became the Cluster's dominant firms. The academic literature indicates that lead firms in an industry may have little interest in sharing new knowledge, preferring to keep such knowledge hidden so as to strengthen its hold over its strategic options and capabilities, particularly in relation to technological change (Sacchetti and Tomlinson, 2009). This concept can be linked to the Networks of Direction theory (Sacchetti and Sugden, 2003), where the governance system in a cluster has evolved into a hierarchical form led by one or few dominant firms. In networks of direction, core firms independently pursue their own strategic objectives, often with little consultation with their trading partners and/or other stakeholders in the locality (p. 684).

[115] Churchill China is still classed as a 'new' dominant firm as, although the company established in 1795, they were not one of the cluster's largest firms during the reign of Wedgwood and Doulton. They are now one of the largest firms in the cluster, hence considered as a new dominant firm.

Networks of direction have both positive and negative implications for clusters. On the positive side, the presence of dominant firms can lead to new investments in technology on a scale which might not be undertaken by smaller firms (Lazonick, 1993; Belso, 2010). However, as stated earlier, this does not necessarily lead to knowledge sharing with other cluster firms, *i.e.* there are new opportunities for knowledge creation but they do not benefit the whole cluster. Hence, networks of direction may result in the cluster becoming 'locked-in' to the objectives and strategic direction of a few or even a single firm. From the findings in this chapter, and in chapter two of this thesis, it can be assumed that this was the situation during the time period when Wedgwood and Doulton were the SOT cluster's dominant firms. This view that dominant firms can undermine the value and sustainability of clusters is quite common across the academic literature (Porter, 1990; Bianchi, 1993; Rosenfeld, 1997; Audretsch, 1997; Schilling, 2000; Brusoni *et al*., 2001; Sacchietti and Sugden, 2003; Sacchetti and Tomlinson, 2009; Bell *et al.*, 2009; Arikan, 2009; Belso, 2010; Arikan and Schilling, 2011). Furthermore, according to Gemser (1996), dominant firms can also change the dynamics of a cluster's competitive environment in a positive way, with large core firms acting as 'lighthouses' by sourcing small firms with information of foreign markets and new technologies. However, there is no certain evidence that this is happening in the SOT cluster. Hence, one of the aims of the primary research stage (see chapter six) is to investigate the role of the cluster's new dominant firms.

The most recent evidence on co-operation with supporting institutions is given by Tomlinson (2015), who reports local firms and institutions in the SOT cluster, such as the British Ceramic Confederation, LUCIDEON and the local chamber of commerce are making greater efforts to encourage networking and collaboration, with cluster firms, even visiting one another's factories. Not only have firms been sharing knowledge and ideas, some leading firms have been informally advising and supporting smaller ones. For instance, Steelite's new factory has incubator units for start-ups. There has also been greater collaboration among firms on industry-wide issues such as improving energy efficiency and local skills development (p1). Another recent (2014) development that benefits the cluster is the new Ceramic Skills Academy, which has Steelite, Portmeirion and Churchill on its Board of Directors (ceramicskillsacademy.co.uk). Overall, from this evidence, it would appear that in recent years knowledge creation opportunities have increased in the SOT cluster, *i.e.* many more firms are now taking part in co-operative activities, both with each other and with supporting institutions in the cluster. However, the evidence on the role of dominant firms within the SOT cluster is limited, and so without further research an accurate picture cannot be ascertained. Therefore, two objectives (objectives 9 & 10) of stage 4 of this research

study are to: 1) carry out primary research to establish the balance of power and control in the SOT cluster in 2016; and, 2) to determine whether dominant firms are having a positive effect on competition and co-operation in the SOT cluster in 2016.

5.6: Chapter Conclusions

This chapter of the research findings has dealt specifically with research objectives 3, 4, & 5 (stage 2 and part of stage 3). The key aim at this stage was to provide context for subsequent primary research findings by identifying opportunities for knowledge exchange within the SOT cluster at different periods of the cluster's evolution, and then by linking the opportunities to co-operative activity within the SOT cluster. Detailed conclusions have already been drawn at various sections throughout this chapter. This next section summarises the key findings in Appendix 15, and presents a related discussion below. Findings are then mapped the theoretical framework identified in chapter two (Figure 5.1), and finally to the objectives (Table 5.3).

5.6.1: Opportunities for Knowledge Exchange in the SOT Cluster 1700s – 1960

The evidence presented in this chapter, and summarised in Appendix 15, indicates that, during this period, opportunities for knowledge exchange, both inside the firm and externally, were low. Knowledge within the SOT cluster during this time was highly systemic, architectural knowledge that was often firm specific. This type of knowledge cannot be easily transferred, thus there was little need for inter-firm co-operation. The family ownership structure of many pottery firms is another possible reason for lack of inter-firm co-operation, there is some evidence that the family protected knowledge to prevent the loss of recipes and other technical knowledge. Knowledge at this stage was also difficult to transfer inside the firm due to the task specific nature of knowledge and possibly also due to localised protectionism by worker families. As well as families protecting knowledge, power and knowledge were also kept within distinct workgroups, *i.e.* in separate departments or workshops. There was also little mobility of labour during this period and this also reduces the number of opportunities for knowledge exchange. The evidence also indicates that most of the SOT cluster's firms tended to carry out all/most phases of production processes and, although highly complex and distinct, those phases were inseparable. Although there were some attempts by owners to codify the diversity of production activities, these attempts mostly failed. Codified knowledge can be more easily transferred, and this should lead to more opportunities for knowledge exchange but, as most attempts failed, it is thought that opportunities for knowledge exchange remained low.

Technological dynamism was also relatively low at this stage of the cluster's development, as the evidence indicates that there were only small and incremental advances taking place. Low technological dynamism reduces the need for inter-firm co-operation and consequently reduces the number of opportunities for knowledge exchange. There is limited evidence that there were many supporting institutions during this phase, and this should mean opportunities for knowledge exchange, however it remains unclear how many of the SOT cluster's firms were using their services. The evidence also indicates that at this stage the SOT cluster was in the 'rapid growth' phase of the industry life-cycle, where the focus of innovation should be on the product. There is evidence to support that this was happening in the SOT cluster as there were many product variations and there were many market niches.

5.6.2: Opportunities for Knowledge Exchange in the SOT Cluster 1960s 2008

During this period the evidence indicates that although there were some new opportunities for internal knowledge exchange, overall the number of opportunities for intra-firm knowledge exchange were fairly low at the start of the period, but increased towards the end. One reason for low intra-firm knowledge exchange could possibly be the existence of family protectionism. The idea of protecting knowledge can be linked to the theory of 'knowledge hiding', which is defined as "*an intentional attempt by an individual to withhold or conceal knowledge that has been requested by another person*" (Connelly *et al.*, 2012: 65). Moreover, according to Černe *et al.,* (2014), knowledge hiding prevents colleagues from generating creative ideas, it can also trigger a reciprocal distrust loop in which co-workers are unwilling to share knowledge with them (p. 173). According to Connelly *et al.*, (2012), distrust is a key predictor of knowledge hiding in organisations (p. 65). Knowledge hiding theory is also connected to 'psychological ownership theory' (Pierce *et al.,* 2001, 2003), which purports that individuals can easily form an ownership feeling over a target if they have constant control over it, invest much time or energy on it, or are familiar with it (Peng, 2013: 399). In addition, individuals may be unwilling to share the target of ownership with others because they fear they will experience loss of control and negative emotions if they share with others (Pierce *et al.*, 2003; Peng, 2013; Huo *et al.*, 2016). Since knowledge is acquired, controlled or created by 'them', individuals may easily feel that knowledge is their personal psychological property, and subsequently want to withhold it. From the evidence presented in this chapter, it would appear that SOT workers have had a long history of protecting knowledge, mistrust and a lack of co-operation. However, the current situation regarding these issues is not clear at all and, therefore, the current situation regarding trust and co-operation will be explored further in stages 3 and 4 of this research study.

The evidence indicates that the number of opportunities for inter-firm knowledge exchange also remained fairly low during the start of period, despite several significant technological advances, but increased towards the end. The increased number of intra-firm opportunities are due to the attempts by some SOT cluster firms to reduce the number of tasks and increase automation. Simplification of tasks and automation resulted in some knowledge being codified, and thus capable of being more easily transferred. In addition, there is evidence of some vertical disintegration taking place at this time, *e.g.* some outsourcing of early production processes. However, only a few processes were automated and/or outsourced in the early part of this stage, mostly in the larger firms, and so although there were new opportunities for knowledge exchange, they are considered to be fairly limited overall. There is evidence too at this stage of the multi-skilling of some employees, along with evidence of some job losses due to automation. Consequently, worker mobility increased as workers who had lost their jobs sought work in other pottery firms. This increase in worker mobility led to an increase in opportunities for knowledge exchange between firms. Moreover, it is in the early part of this period too that the worker family structure began to break down (late 1970s), resulting in knowledge no longer being protected within the family, as members of one family could now be employed at several firms within the SOT cluster. Family ownership of firms also began to break down during this period too, with some firms transferring ownership to multi-product organisations from outside the region. Consequently, the breakdown of worker-family and family-owner structure is likely to have led to an increase in the number of opportunities for knowledge exchange.

It is from circa 1980 that the SOT cluster begins to suffer several 'external' shocks,[116] *i.e.* the external environment becomes more unstable due to globalisation and recession effects, the industry is also adversely affected by changes in consumer spending and demand. The evidence shows that there were many acquisitions and mergers during this period, as well as many firm closures. Consolidation effects reduced the overall number of opportunities for knowledge exchange between cluster firms as there were fewer firms in the cluster overall. It is assumed that the overall consolidation effects outweighed the small increase in opportunities for knowledge exchange, *e.g.* through increased worker mobility, resulting in an overall reduction in inter-firm opportunities.

[116] See chapter 4 of this thesis.

Two big influences on technology in the SOT cluster during this period were the introduction of the Clean Air Act (1956), and the introduction of natural gas in 1960, which was subsequently used to fire kilns. These factors led to significant changes in firing and pressing technologies, resulting in the first technological revolution in the SOT cluster. Thus, technological dynamism increased, which in turn increased the number of opportunities for knowledge exchange, albeit mostly with suppliers. The evidence indicates though, that it was only the cluster's largest firms who adopted the new technologies during this phase, and thus whilst the number of opportunities for knowledge exchange increased, they remain fairly limited. The evidence also indicates that during this period the SOT cluster was in the 'slowing growth/mature/decline[117]' phases of the industry life-cycle, where the focus of innovation should be on process technologies (slow growth and mature phases) and then the product (decline phase). There is evidence to support that this was happening in the SOT cluster as process innovations focused on increasing automation, including the introduction of flexible specialisation methods, and product innovations focused on developing products to serve market niches.

5.6.3: Opportunities for Knowledge Exchange in the SOT Cluster 2008- 2016

During this period, the evidence indicates that the number of opportunities for internal and external knowledge exchanges increased, but it remains unclear as to the extent. Intra-firm opportunities increased further due to the continued streamlining and automation of more production processes, this resulted in more knowledge becoming codified and capable of being easily transferred, *e.g.* knowledge becomes more technical (mechanised) and tangible (through routines and instructions). However, the majority of pottery production processes remain interdependent and highly inseparable, and thus the increase in opportunities for internal knowledge exchange are constrained. Consolidation effects for some firms (largest) also increased opportunities for knowledge exchange during this period, *e.g.* increased firm size (groups of firms), resulting from acquisitions, increased internal knowledge exchange opportunities between firms in the same group. However, the evidence indicates that most of the changes discussed in this section refer mainly to the SOT cluster's largest firms, and so it is not certain whether knowledge exchange opportunities increased also for the SOT cluster's SMEs.

[117] SOT Cluster's sales peaked in 1978 then declined (Imrie, 1987).

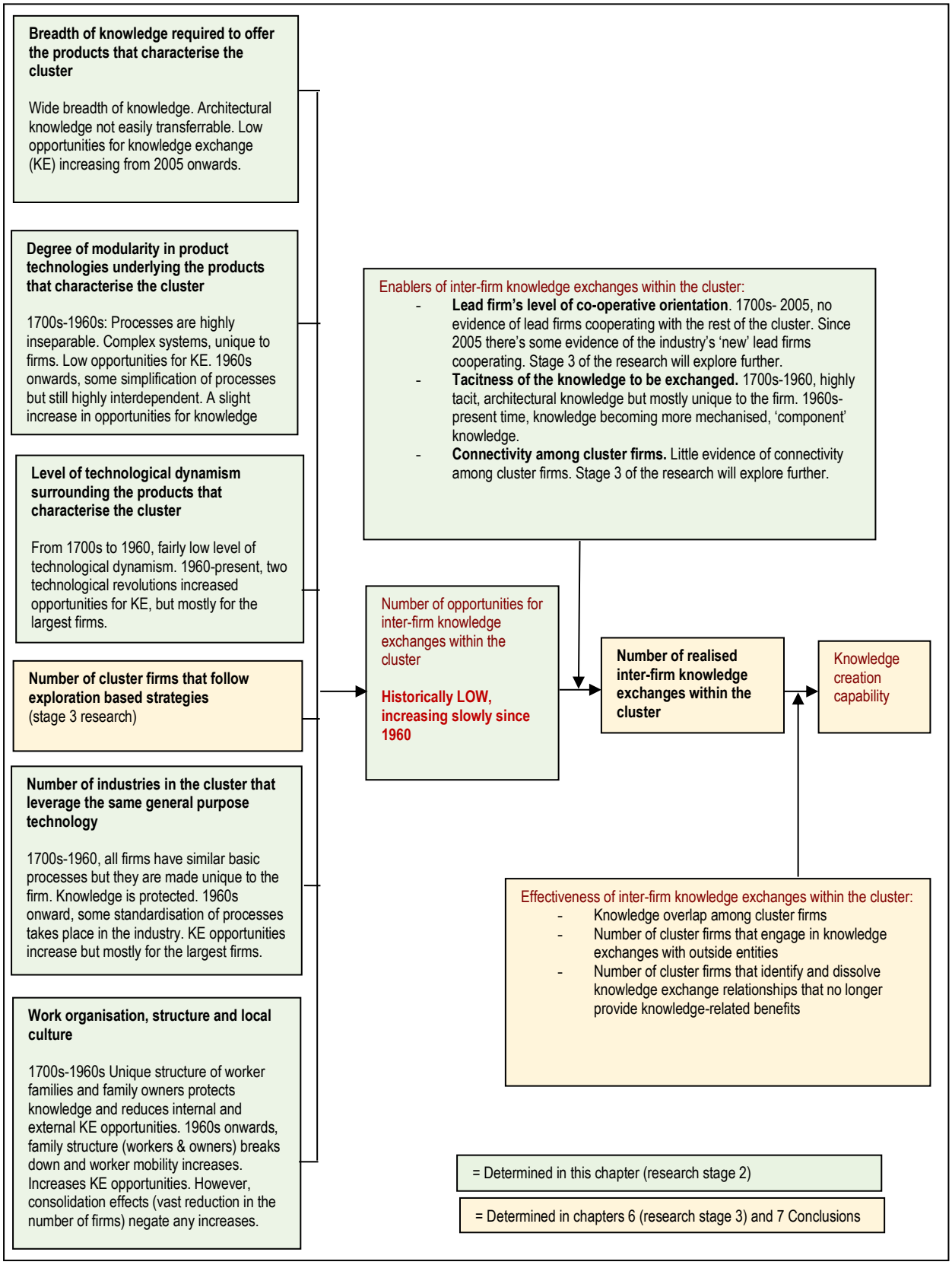
There is also some evidence of increasing investment in technology, factories and marketing during this period, as well as evidence of some new firm start-ups. New firms in the SOT cluster should provide new opportunities for knowledge exchange. However, chapter four of this thesis (4.2.3) identified only a few new firms during this period, and so the number of new opportunities for knowledge exchange arising from new firms is deemed low. It is also unclear as to which firms are making investments in new technologies and other forms of innovation.

The evidence indicates that the SOT cluster has entered a 're-generation' phase of the industry life-cycle, where the focus should be mainly on product innovation. Further research is needed, however, to gain a more accurate picture of innovation in the SOT cluster, and thus a key aim of stage 3 of this research is to identify, analyse and evaluate the level and types of innovative activity taking place in the SOT cluster between 2010 and 2015. Other evidence that opportunities for knowledge exchange in the SOT cluster may be increasing is: 1) greater efforts are being made by cluster firms to encourage networking and collaboration; 2) there has been a shift in management recruitment from inside the cluster to outside (from across other manufacturing and other sectors); and, 3) there are new supporting institutions who are working with SOT cluster firms. Overall, the evidence indicates that the number of opportunities for knowledge exchange have increased and that conditions in the SOT cluster now appear to be more conducive to co-operation. Again, further research is needed to establish whether SOT cluster firms are actually co-operating more with each other and with supporting institutions and other non-cluster firms. Therefore, another key aim of stages 3 and 4 of this research is to identify, analyse and evaluate the levels and types of co-operative activity taking place in the SOT cluster between the period 2010 and 2015.

5.6.4: Chapter Findings Mapped to the Objectives and the Theoretical Framework

This chapter set out to establish the 'need' for co-operation in the SOT cluster (objectives 3-5) and all objectives have been fully achieved in that a context has been provided for the subsequent primary research stages (stages 3 and 4). Some findings from the primary research will also be used to update the final period examined in this chapter (2016), they will be presented and discussed in chapter six of this thesis. Figure 5.1 below maps the findings from this chapter to relevant sections of the theoretical framework. Table 5.3 maps findings to the research objectives. Chapter six presents the primary research findings (questionnaire and Interviews) regarding recent innovative and co-operative activity and the past/present influences of the cluster's dominant firms.

Figure 5.1: Chapter Findings Mapped to the Theoretical Framework



(Source: Author, adapted from Arikan (2009))

Table 5.2: Chapter Findings Mapped to Objectives 1 & 2

Stage 2 Research Objectives – Establishing the 'Need for Co-operation'	Link to Propositions	Data Requirements	Link between this chapter and objectives
3. To determine the breadth of knowledge required to offer the products that characterise the cluster iii. Is a wide breadth of knowledge required? iv. Is a narrow breadth of knowledge required?	P4, P4aa P9, P9a	**Secondary Data (examples)** Rowley (1994, 1996, 1998), Manufacturing and Flexible Specialisation in the British ceramics Manufacturing Industry (academic papers). Gay & Smyth (1974), The British Pottery Industry (Book). Imrie (1989), Industrial Restructuring in the British Pottery Industry (book).	**5.2**
4. To determine the degree of modularity in the product technologies underlying the products that characterise the cluster iv. Are product technologies separable? v. Are product technologies inseparable? vi. Is knowledge within the cluster mostly 'component' knowledge or 'architectural'?	P4, P4a P9, P9a	Niblett (1990), The British Pottery Industry 1940-1990 (Book). Day et al. (2000), A case study of British ceramics Production (Academic paper). Warren et al. (2000), Technological Innovation in the UK Ceramics Industry (Book).	**5.3**
5. To determine the level of technological dynamism surrounding the products that characterise the cluster iii. Is the industry's technology highly dynamic? iv. Is the industry's technology slow changing?	P4, P4a P9, P9a	Caroll et al. (2001), Outsourcing in the UK Ceramics Industry (Academic paper). Whipp (1990), Patterns of Labour, Work and Social Change in the Pottery Industry (Book).	**5.4**
Additional – To determine other influences on Co-operation in the SOT cluster			**5.5**

6. Research Findings Stages 3 & 4: Innovation, Co-operation and Dominant Firm Effects in the SOT Cluster

Research stages 3 & 4: objectives 6–8, innovation and co-operation 2010-2015; objectives 9-10, the role of dominant firms past and present

6.1: Introduction

The key aim of this research study is to determine the current strategic position of the SOT cluster. Chapters four and five of this thesis contributed towards achieving this aim by: 1) partially identifying the development and performance of the largest SOT tableware and giftware manufacturers, from 1960 up to the present time; 2) providing an initial analysis of the role and effects of the cluster's dominant firms, past and present; and, 3) providing an historical overview of past co-operative behaviours and opportunities for knowledge transfer in the SOT cluster over time. However, an accurate assessment of the current strategic position of the SOT cluster could not be determined due to gaps and inconsistencies in the secondary data (see chapters 4 and 5). Hence, primary research is required in order to answer fully the research question.

This chapter of the research findings deals specifically with research objectives 6-10 (stages 3 and 4), and presents the findings of the primary research study. The main aim of the primary research stage was to determine recent (2010–2015) innovation and co-operation activities of firms in the SOT cluster (objectives 6, 7 and 8). A further aim was to develop the discussion and analysis of the role of the cluster's dominant firms past and present and to determine their part in the current competitive position of the SOT cluster (objectives 9 and 10). The primary research involved a questionnaire survey (see Appendix 9) and semi-structured, in-depth interviews (see Appendix 12 for the schedule of questions). The questionnaire and interviews were conducted between October 2016 and April 2017 on six of the SOT cluster's core manufacturing firms. The original plan was to administer the questionnaire survey to the total population, *i.e.* all sixteen of the SOT cluster's core manufacturing firms (see chapter 4.3.2 for population identification) then, based on questionnaire responses, to select seven or eight of those firms for semi-structured, in-depth interviews. However, despite exhaustive efforts made in contacting the sixteen firms (see

Appendix 20), only six firms agreed to take part in the survey, and this may be further evidence, in itself, of a reluctance on the part of cluster firms to co-operate, either with each other, or with external organisations. Subsequently, the questionnaire survey and interviews were conducted on all six of the firms that responded. The six firms are considered to be truly representative of the whole industry (*i.e*. the total population of sixteen firms) because they: 1) represent 38% of the total population of 16 firms; 2) include the two biggest firms in the SOT cluster in terms of employees, sales turnover and profit; 3) include both domesticware and hotelware manufacturers; 4) include small, medium and large firms; and, 5) represent approximately 60% of the total number of employees in the total population. A full description, rationale and justification for the questionnaire and interview methodology is provided in the methodology chapter of this thesis (see chapter 3.7.15).

As discussed extensively in the Methodology chapter (see chapter 3.7.14), the innovation questionnaire for this study was adapted from a questionnaire previously used by the European Union GPrix project[118]. The results of the GPrix survey are available in a variety of reports[119] and relevant findings from the reports are utilised in this chapter as a comparator for the SOT cluster survey results. The researcher acknowledges that any comparisons made between the GPrix survey data and the SOT survey data cannot be strictly reliable, given the differences between the two samples in terms of size and the range of industries involved. However, the GPrix data is considered useful in this research as it provides a benchmark against which to measure the performance of the SOT respondent firms.

6.1.1: The Respondents: Company profiles

In order to convince companies to participate in the survey a covering letter was provided ensuring anonymity of the company data. All firms agreed to take part providing they were not identified (also the case for the interview stage of the research). The researcher consequently provided a confidentially agreement and agreed to make the research findings available to participants. Table 6.1 presents company profile data for all six respondents (see Appendix 13 for more details) and is compiled from general company information provided in section 1 of the innovation questionnaire survey. The data clearly shows the representativeness of firms taking part in the survey in terms of size, sales turnover, main

[118] GPrix, (2012), *GPrix innovation policy support survey*, [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/en/survey.htm. [Accessed 30 June 2017]
[119]) GPrix, (2011), D1.7 *Impact Assessment of Measures on SMEs*, [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/docs/Del_1_7_Impact_Assessment.pdf. [Accessed 30 June 2017]

activity, employee numbers, *etc*. For example, the respondents consist of two very large firms (A and B), two medium sized firms (C and D) and two small firms (E and F). Firm 'A' operates in the hotelwares sector, firms 'B', 'C' and 'F' in domesticwares, firm 'E' operates in both domesticwares and hotelwares, and firm 'D' operates in domestic and commercial wares.

By analysing the data in table 6.1, it can be evidenced that only one company (F) increased sales turnover (Q1.2) over the five years, from less than £500,000 in 2010 to between £0.5m and £1.0m in 2015. One other company (C) increased employees (Q1.3) from between 50 and 249 in 2010, to over 249 in 2015. Two companies (D and E) entered new markets (Q1.6) between 2010 and 2015 (mostly in Europe). All other firms and categories remained the same between 2010 and 2015. Although the questionnaire provides some useful information about turnover and employees for SOT respondents, the data is quite vague in some sections due to the size of the category bands. For example, the highest band for turnover is over £20m, which is very low considering that there are firms in the SOT cluster who have turnover of over £100m. In addition, the highest band for employees in the questionnaire is over 249, when there are firms in the SOT cluster who have over 1,000 employees (see chapter 4.2.3 for more accurate data on SOT firms). Hence, large band sizes are considered a partial limitation of the questionnaire.

Table 6.1: Questionnaire & Interview Company Profiles (Q1 – Q1.9)

		Company 'A'	Company 'B'	Company 'C'	Company 'D'	Company 'E'	Company 'F'
Q	Company ownership	Private	Publicly quoted	Private	Private	Private	Private
1	Part of a group	YES	YES	NO	NO	YES	NO
1.1	Head office location	UK (Stoke)	UK (Stoke)	UK (Stoke)	UK (Stoke)	UK	UK (Stoke)
1.2	Turnover 2010	£20,000,000 +	£20,000,000 +	£10,000,000 - £20,000,000	£20,000,000 +	£500,000 - £1,000,000	Less than £500,000
1.2	Turnover 2015	£20,000,000 +	£20,000,000 +	£10,000,000 - £20,000,000	£20,000,000 +	£500,000 - £1,000,000	£500,000 - £1,000,000
1.3	Employees 2010	249 +	249 +	Between 50 - 249	Between 50 - 249	Between 10 - 49	Between 1 - 9
1.3	Employees 2015	249 +	249 +	249 +	Between 50 - 249	Between 10 - 49	Between 1 - 9
1.4	Does your firm undertake all phases of production?	YES	YES	YES – except slips	YES – except slips & glazes	YES	YES
1.5	Which geographic markets do you operate in?	ALL - Regional/national/Europe and other	ALL - Regional/national/Europe and other	ALL - Regional/national/Europe and other	ALL - Regional/national/ Europe and other	ALL - Regional/national/Europe and other	National
1.6	Where any of these new markets between 2010-2015?	NO	NO	NO	YES – Germany, France, Australia, Japan	YES – EU and other countries	NO
1.7	Your main activity?	Hotelwares	Domesticwares	Domesticwares	Domesticwares & commercial	Domesticwares & hotelwares	Domesticwares
1.8	Your market positioning?	ALL – low/medium/premium	Medium	Premium	ALL – low/medium/premium	Premium	Premium
1.9	Change in market positioning 2010-2015	NO	NO	NO	NO	NO	NO

6.1.2: How Objectives 6–10 Will be Achieved

Objectives 6 and 7 are aimed at identifying the current situation in the SOT cluster regarding innovation across a range of activities. Firstly, objective 6 determines the number of core firms in the SOT cluster in 2015 that leverage the same general purpose technology. Q1.4 (section 1) in the questionnaire is specifically aimed at fulfilling this objective. The reason why it is important to discover whether firms in 2015 are all utilising the same general purpose technologies is because this outcome affects opportunities for collaboration, which in turn may lead to an increase in innovative output. This question is also linked to the concept of 'modularity' and 'opportunities for knowledge exchange' (Arikan, 2009) as previously examined in chapter five of this thesis (see chapter 5.3). Objective 7 is aimed at determining the output of innovative activity in the SOT cluster between 2010 and 2015. Mostly quantitative data (questionnaire data) will be utilised to achieve this objective (sections 2, 3, 4, 5 and 7). Section 2 examines product innovation, section 3 examines process innovation, section 4 examines other organisational innovations, section 5 examines the effects of innovation on the organisation, and section 7 (Q7.2) of the questionnaire is aimed at identifying factors hampering innovation activities. In addition to the quantitative findings on innovation, the qualitative interview data also provides further findings on innovation activities in the SOT cluster, and these are integrated into the questionnaire analysis and evaluation where appropriate.

Objective 8 is aimed at determining the number of inter-firm knowledge exchanges, *i.e*. co-operative activities taking place within the SOT cluster between 2010 and 2015. Co-operation and knowledge exchanges are identified in the academic literature as a key characteristic of successful industry clusters (*e.g.* Porter, 1990; Arikan, 2009; Hervas-Oliver and Albors-Garrigos, 2009). Hence, an important aim of this research is to ascertain an accurate picture of co-operative activity in the SOT cluster. A further related aim is to determine whether the presence or absence of co-operative activity is a factor in the cluster's current competitive position. Answers to section 6 of the questionnaire provide quantitative data on the quantity and type of collaborative relationships existing in the SOT cluster between 2010 and 2015. They also provides data on knowledge exchanges, over the five years, between firms and with institutions and other entities from outside the SOT cluster. In addition, the qualitative interview data provides further details of whether firms and other entities co-operate with each other and, if they do, what it is they co-operate on. The qualitative data also provides valuable insights into respondents' perceptions of competition, co-operation and trust in the SOT cluster. The findings on competition in the SOT cluster are linked to earlier findings in chapter four of this thesis. The findings on co-operation also build

on the secondary data findings in chapter five of this thesis, *i.e*. on opportunities for co-operation and knowledge exchanges throughout the development of the SOT cluster.

Objective 9 is aimed at determining the level of power and control in the SOT cluster in 2015. According to the academic literature (Sacchietti and Tomlinson, 2009; Bell *et al.*, 2009; Belso, 2010; Arikan and Schilling, 2011), if there is an imbalance between power and control, *e.g.* where one or more parties have disproportionate authority or influence on a cluster, there may be negative effects on other firms within the cluster and on the cluster's overall strategic position. Chapter four of this thesis presented findings based on secondary data regarding the SOT cluster's dominant firms past and present (see chapter 4.2.4). In this chapter, balance and control are explored further and findings are linked to chapter four findings where appropriate.

Objective 10 is aimed at determining the role of dominant firms in the SOT cluster past and present. Chapter four of this thesis provided some evidence that the cluster's previous dominant firms, Wedgwood and Doulton, had not been beneficial for the SOT cluster overall (see 4.2.4). However, no up-to-date published evidence could be found on the role of the cluster's new dominant firms[120]. Hence, another important aim of the primary research is to ascertain a more accurate picture of balance and control in the SOT cluster in 2015, and the role of the cluster's dominant firms past and present. The role of the cluster's dominant firms is considered an important factor in determining the current strategic position of the SOT cluster, *i.e.* do they help or hinder other firms in the cluster? Hence, qualitative data from the interviews will be utilised to achieve this objective and findings are analysed and evaluated in light of chapter four findings on dominant firms.

6.2: The Primary Research Findings

The rest of this chapter is presented in five main sections: 6.3) analysis and evaluation of innovation in the SOT cluster (questionnaire data, objectives 6 and 7); 6.4) analysis and evaluation of co-operation in the SOT cluster (questionnaire and interview data, objective 8); 6.5) analysis of other factors influencing innovation and co-operation in the SOT cluster (interview data); 6.6) analysis and evaluation of power, control and the role of dominant firms

[120] A search of Staffordshire University's library resources, plus extensive internet searches, did not identify any previous studies on the SOT cluster's new dominant firms.

in the SOT cluster (interview data, objectives 9 and 10). Chapter conclusions are presented at the end of the chapter (6.7).

6.2.1: How the Questionnaires and Interview Transcripts Were Analysed

Full details and justification for how the completed questionnaires and interview transcripts were analysed is presented in the methodology chapter of this thesis (chapter 3) and, subsequently, a brief summary only is presented here. Due to the small size of the population (16 firms in total) and the small number of questionnaires completed (*i.e*. 6), it was not possible to conduct a full statistical analysis of the data as there were not enough data points. Consequently, a series of simple, one-way frequency tables were utilised to present the data question by question. Companies are identified in the tables as either A, B, C, D, E or F (see table 6.1) and are allocated to one of the answer options according to their response. Some of the tables are further analysed by identifying clear groupings or clusters of respondents and then by drawing a circle around them. Findings are evaluated in light of theory and in light of findings from previous chapters if relevant. The chapter conclusions identify and evaluate patterns, connections and relationships in the responses to various questions. The interview responses were audio recorded and professionally transcribed. Various elements of answers were then 'pattern-matched' (Campbell, 1966; Yin, 1984; Hak and Dul, 2009) to themes identified from the academic literature. A full set of pattern matched interview responses is available in appendix 19. In this chapter, the interview responses are further broken down, analysed and integrated with questionnaire findings where appropriate, and with findings from previous chapters. Findings are also mapped to relevant academic literature.

6.3: Innovation in the SOT Cluster between 2010 and 2015

6.3.1: Product Innovations

Table 6.2 presents the answers to Q2.1 - Q2.3, which ask whether firms had introduced new or significantly improved product innovations between 2010 and 2015. All six firms answered 'yes' to this question. Five out of the six firms answered that all of the product innovations during this period were developed in-house, only one firm (D) had co-operated with other enterprises or institutions on their product developments. When asked whether their product innovations were new to their market and/or firm, five firms (A, B, C, D and F) answered that they had introduced product innovations that were new to their market, and four firms (B, C, D and E) answered that they had introduced product innovations that were new to their firm

only. This evidence indicates a high degree of product innovation taking place in 38% of all SOT core cluster firms (6 out of 16 firms in the population). This is compelling evidence of differentiation, and in addition supports the positioning of respondents, *i.e.* all firms are positioned in mid-premium segments (see table 6.1, Q1.8). According to Porter (1990), Innovation is a function of the strength of a cluster, thus the evidence here indicates that strong product innovation is a strength for the SOT cluster, especially through the significant number of firms who introduce new-to-market products. However, the evidence here also indicates that the majority of SOT respondents tend not to co-operate with other ceramic manufacturing firms in the cluster on product innovations. Moreover, evidence from the interview responses on co-operation in the SOT cluster (see 6.4) also shows that there is very little co-operation between SOT ceramics manufacturers on product innovations and this is possibly a weakness of the cluster.

Table 6.2: Q2.1–Q2.3 Product Innovations Taking Place in the SOT Cluster 2010 - 2015

Section 2, Q 2.1 – Q 2.3 Product Innovation			
		YES	**NO**
Q 2.1 During the five years 2010 to 2015, did your enterprise introduce new or significantly improved goods?		A B C D E F	
Q 2.2 Who developed these product innovations?			
Mainly your enterprise or enterprise group	A B C D E F		
Your enterprise together with other enterprises or institutions	D		
Mainly other enterprises or institutions			
Q 2.3 Were any of your product innovations during the five years 2010 to 2015?			
New to your market?		A B C D F	E
New to your firm?		B C D E	A F

Table 6.3 presents answers about the percentage of turnover that SOT respondent firms attributed to product innovations between 2010 and 2015 (Q2.4). Note: only five out of the six firms answered this question. Responses to this answer were varied with no apparent correlation between firm size and percentage of turnover. For example, firms ‘B’ and ‘D’ (one large firm and one medium sized) claimed that between 1% and 10% of sales turnover had come from new product innovations over the five years, whilst firms ‘C’, ‘E’ and ‘F’ (one medium and two small) claimed that between 16% and 50% of sales turnover came from their product innovations over the period. It is not clear from the responses, however, whether the percentages of sales turnover for firms ‘D’ and ‘B’ apply to each category, *i.e.* ‘market’ and ‘firm’, or whether the new product innovations were the same products that

were both new to their markets and new to their firms. Four of the five respondents said that the majority of their sales turnover (76-100%) came from existing products that were unchanged or marginally modified over the period. The results on product innovation for SOT respondent firms can be compared to the results of the GPrix innovation survey (2005 – 2009) for the same question, where 70% of the GPrix sample said that they had introduced product innovations in goods over the five-year period[121], compared to all of SOT respondent firms. The results show that a higher percentage of SOT respondent firms carried out product innovations than GPrix firms[122].

Table 6.3: Q2.4 Percentage of Turnover from Product Innovation Taking Place in the SOT Cluster 2010 - 2015

Q 2.4 Using the definitions above, please give the percentage of your total turnover in 2015 from:								
	0%	1-5%	6-10%	11-15%	16-25%	26-50%	51-75%	76-100%
Product innovations introduced during 2010 to 2015 that were new to your market		D	B		F	C		
Product innovations introduced during 2010 to 2015 that were only new to your firm		D	B		E			
Products that were unchanged or only marginally modified during 2010 to 2015						C		B D E F
Note: Company A did not answer this question								

6.3.2: Process Innovations

Table 6.4 presents the answers on whether SOT firms introduced new or significantly improved process innovations between 2010 and 2015 (Q3.1-Q3.2). Five out of six respondents (A, B, C, D and F) said that they had introduced new manufacturing processes. Three firms (A, B and C) had also introduced new logistics processes, and four firms (A, B, C and E) had introduced new supporting activities for processes. The three largest firms (A, B and C), including the two largest firms in the SOT cluster, had introduced new innovations in all three categories, *i.e*. manufacturing, logistics and support for processes. The three smallest firms (D, E and F) had carried out fewer process innovations, especially in logistics. When asked who had developed their process innovations (Q3.2), three firms (B, C and E) responded that they had been developed in-house, and three firms (A, D and F) answered

[121] GPrix, (2011), D1.7 *Impact Assessment of Measures on SMEs,* [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/docs/Del_1_7_Impact_Assessment.pdf. [Accessed 30 June 2017]

[122] Unfortunately, no other GPrix results data is provided for other questions on product or process innovations or for questions on organisational innovations (Q2.2-Q2.3, Q3.1-Q3.2 and Q4.1), and therefore no comparisons could be made between results for these specific questions.

that they had developed their process innovations with other enterprises or institutions. The evidence indicates that a significant number of SOT cluster firms carry out manufacturing process innovations and innovations to support manufacturing, and this is seen as another strength for the cluster. The evidence also indicates that cluster firms may be more willing to co-operate with external firms and institutions on process innovations than they are on product innovations, *e.g.* three out of six firms said they had co-operated on process innovations, compared to only one firm who said they had co-operated on product innovations. The evidence here is supported by evidence from the interview survey, which also shows that some SOT respondent firms do co-operate with suppliers and supporting institutions on some of their process innovations (see 6.4.4).

Table 6.4: Q3.1–Q3.2 Process Innovation Taking Place in the SOT Cluster 2010 - 2015

Section 3, Q 3.1 – Q 3.2 Process Innovation			
Q 3.1 During the five years 2010 to 2015, did your enterprise introduce?		**YES**	**NO**
new or significantly improved processes for manufacturing your goods		A B C D F	E
New or significantly improved logistics, delivery or distribution processes		A B C	D E F
New or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, computing and marketing planning		A B C E	D F
Q 3.2 Who developed these process innovations?			
Mainly your enterprise or enterprise group	B C E		
Your enterprise together with other enterprises or institutions	A D F		
Mainly other enterprises or institutions			

6.3.3: Other Innovation Activities

Table 6.5 presents the answers to whether firms introduced new organisational and/or marketing innovations between 2010 and 2015 (Q4.1-Q4.2). The circles on the table indicate the activities where the majority of respondent firms did/did not innovate. The activities in which firms innovated the most were in marketing (Q4.2), where all six firms had introduced new media techniques and/or product promotions over the period, and in organisational activities, where five out of six firms had introduced new practices for organising procedures. Only firm ‘F’, the smallest respondent firm, had not introduced any new organisational or marketing innovations during the period in question. The area where the least amount of innovative activity had taken place was in introducing new methods of organising external relations with other firms and institutions, where five out of the six firms responded that they

had not taken part in that activity over the five years. This is further evidence of a possible lack of co-operation between manufacturers and other firms/institutions in the SOT cluster.

Table 6.5: Q4.1–Q4.2 Other Innovation Activities Taking Place in the SOT Cluster 2010 - 2015

Section 4, Q 4.1 – Q 4.2 Other Innovation Activities & Expenditures		
Q 4.1 During the Five years 2010 to 2015, did your enterprise engage in the following ORGANISATIONAL innovation activities?	**YES**	**NO**
New business practices for organising procedures (*e.g.* supply chain management, business re-engineering, knowledge management, lean production, quality management, *etc.*)	A B C D E	F
New methods of organising work responsibilities and decision making (*e.g.* first use of a new system of employee responsibilities, team-work, decentralisation, integration or de-integration of departments, education/training systems, *etc.*)	A B C E	D F
New methods of organising external relations with other firms or public institutions (*e.g.* first use of alliances, partnerships, outsourcing or sub-contracting, *etc.*)	B	A C D E F
Q 4.2 During the Five years 2010 to 2015, did your enterprise engage in the following MARKETING innovation activities?	**YES**	**NO**
Significant changes to the aesthetic design or packaging of a good or service	A B C E	D F
New media or techniques for product promotion (*e.g.* first use of a new advertising medium, introduction of loyalty cards, *etc.*)	A B C D E F	
New methods of pricing goods or services (*i.e.* first time use of variable pricing by demand, discount systems, *etc.*)	B	A C D E F
New methods for sales channels (*i.e.* first time use of franchising or distribution licenses, direct selling, exclusive retailing, new concepts for product presentation, e-commerce facilities, *etc.*)	B E	A C D F
= main areas of innovation = evidence of a lack of co-operation		

Comparisons between the GPrix survey results[123] and the SOT survey results for marketing innovations show that: 41% of GPrix firms had introduced design or packaging innovations, compared to 66.6% of SOT firms; 40% of GPrix firms had introduced promotion innovations, compared to 100% of SOT firms; 32% of GPrix firms had introduced sales innovations, compared to 33.3% of SOT firms; and, 26% of GPrix firms had introduced pricing innovations, compared to 16.6% of SOT firms. The comparisons show that a significantly higher percentage of SOT survey firms had introduced design, packaging and promotion innovations over the five-year period than had GPrix survey firms.

[123] GPrix, (2011), D1.7 *Impact Assessment of Measures on SMEs,* Page 30, [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/docs/Del_1_7_Impact_Assessment.pdf. [Accessed 30 June 2017]

6.3.4: The Effects of Innovation on the Organisation

This next section presents a series of tables that give responses to questions asked about the effects of innovation on SOT survey firms over the five-year period (Q4.3, Q4.4 and Q5.5). Table 6.6 presents responses about the amount of turnover and resources dedicated to innovation activities in 2015, and about the percentage of sales value from product and process innovations. Table 6.7 presents responses about the innovation capabilities of firms in 2010 and 2015 (Q5.4). Table 6.8 presents responses about the importance of innovation to cluster firms (Q5.1). Table 6.9 presents responses about: abandoned or delayed innovation activities over the five years and factors influencing them (Q7.1-Q7.2); and, whether SOT firms had received public support for any of their innovation activities (Q5.6).

The evidence in table 6.6 shows that four out of five respondents (A, B, C, and D) spent between 1% and 5% of turnover on innovation activities in 2015. The two smallest firms in (E and F) spent between 6% and 10% of their turnover on innovation activities in 2015. This is interesting, as there is evidence in the academic literature that small firms tend to spend more on R&D activities than their larger counterparts (*e.g.* Acs *et al.*, 1994; Audretsch, 2002; Hall *et al.*, 2009). Comparing the results for SOT survey firms (for 2015) with the results of the GPrix innovation survey (for 2009), 66.6% of SOT firms spent between 1% and 5% of turnover on innovation, compared to 37% of GPrix firms, and 33.3% of SOT firms spent between 6% and 10% of turnover on innovation compared to 25% of GPrix firms[124]. Moreover, none of the SOT survey firms spent more than 10% of turnover on innovation, whilst 23% of GPrix firms said they spent between 11% and 50% of turnover on innovation. From the results, it appears that SOT cluster firms spend less overall on innovation than GPrix firms. However, the GPrix data is not broken down into high-tech and low-tech industries and therefore it is not certain that the comparisons are reliable here.

With regard to resources devoted to innovation, three firms (A, D and E) responded that they had devoted more resources to innovation in 2015 than they had five years earlier, and three firms (B, C and F) said that they had devoted about the same amount of resources to innovation in 2015 as they had done five years earlier. When asked about the proportion of current sales by value, that came from both product and process innovations since 2010, three firms (B, E and F) said that between 16% and 25% of their current sales came from

[124] GPrix, (2011), D1.7 *Impact Assessment of Measures on SMEs*, [ONLINE.] Available at: http://business.staffs.ac.uk/gprix/docs/Del_1_7_Impact_Assessment.pdf. Page 31. [Accessed 30 June 2017]

new product and process innovations, and two firms (A and C) said it was over 50%. This is further supporting evidence that the innovations taking place in the industry contribute to the competitive advantage of the cluster as, by comparing the amount of expenditure on innovation with the percentage of sales by value, it appears that all cluster firms are receiving a high return on their investment, with firms 'A' and 'C' receiving the highest return. However, these findings may not be strictly accurate as the questionnaire did not ask for average expenditure on innovation over the five-year period, therefore it is not clear whether expenditure was higher in any of the years between 2010 and 2014.

Comparing the results for SOT survey firms (2015) to results of the GPrix Innovation Survey (2009) for the percentage of sales (by value) that GPrix firms stated came from product and process innovations:[125] 12% of GPrix firms and 16.6% of SOT firms stated between 11% and 15%; 18% of GPrix firms and 50% of SOT firms stated between 16% and 25%; and, 17% of GPrix firms and 33.3% of SOT firms stated over 50%. The results show that SOT firms were getting a higher percentage of sales by value from their new product and process innovations than the GPrix firms. Another positive point for the SOT cluster is that in 2015, none of the six firms had devoted fewer resources to innovation than they had in 2010 (see Table 6.6). This result also compares favourably with the GPrix findings.[126] 52% of GPrix firms and 50% of SOT firms had devoted the same amount of resources to innovation at the end of the five years as they had done five years earlier. 9% of GPrix firms and 50% of SOT firms had devoted more resources to innovation at the end of the five years than they had done five years earlier. The evidence shows that many of the SOT survey firms had significantly improved the resourcing of innovations over the five-year period and this is another potentially important strength for the SOT cluster.

[125] GPrix, (2011), D1.7 *Impact Assessment of Measures on SMEs,* Page 35 [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/docs/Del_1_7_Impact_Assessment.pdf. [Accessed 30 June 2017]
[126] GPrix, (2011), D1.7 *Impact Assessment of Measures on SMEs,* Page 32 [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/docs/Del_1_7_Impact_Assessment.pdf. [Accessed 30 June 2017]

Table 6.6: Q4.3, Q4.4 & Q5.5 Turnover and Resources Devoted to Innovation Activities and Percentage of Sales by Value from Innovation in the SOT Cluster 2010 – 2015

Q 4.3 Please estimate (approximately) the total amount of expenditure on all of your innovation activities as a share of turnover in 2015:						
0%	1-5%	6-10%	11-15%	16-25%	26-50%	>50%
	A B C D	E F				
Q 4.4 Five years ago did you devote....?						
Fewer Resources to Innovation		About the same resources to innovation			More resources to innovation	
A D E		B C F				
Q 5.5 What proportion of your current sales by value comes from new or substantially improved products or processes introduced since 2010?						
0%	1-5%	6-10%	11-15%	16-25%	26-50%	>50%
			D	B E F		A C

Table 6.7 shows that all six respondents made improvements to their innovation capabilities over the five-year period. The biggest improvements were made by the two smallest firms (E and F), who moved from 'lagging' to 'above average' positions in product innovations, and from 'lagging' to 'average' in process and marketing innovations. The three largest SOT firms (A, B and C) claimed to be the industry leaders in product innovations in 2015, and company 'D' claimed to be the industry leader in process innovations in 2015. Again, the results for SOT survey firms (2015) compare favourably with the results of the GPrix survey (2009) for product and process innovation capabilities[127].

For product capabilities at the start of their respective five-year periods: 72% of GPrix firms and 33.3% of SOT classed themselves as 'lagging' or' average'; and, 28% of GPrix firms and 66.6% of SOT classed themselves as 'above average' or 'leading'. Five years later the results were: 52% of GPrix firms and 0% of SOT firms classed themselves as 'lagging' or 'average'; and, 48% of GPrix firms and 100% of SOT firms classed themselves as 'above average' or 'leading'. For process innovation capability at the start of their respective five-year periods: 78% of GPrix firms and 50% of SOT firms classed themselves as 'lagging' or 'average'; and, 22% of GPrix firms and 50% of SOT firms classed themselves as 'above average' or 'leading'. Five years later the results were: 54% of GPrix firms and 50% of SOT firms classed themselves as 'lagging' or 'average'; and, 46% of GPrix firms and 50% of SOT firms classed themselves as 'above average' or 'leading' (although one SOT firm did move from lagging to average over the period).

[127] GPrix, (2011), D1.7 *Impact Assessment of Measures on SMEs*, Page 36 [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/docs/Del_1_7_Impact_Assessment.pdf. [Accessed 30 June 2017]

From the comparison, it is apparent that SOT firms outperformed GPrix firms in terms of enhancing their product innovation capabilities over their respective five-year periods but did not progress as much as GPrix firms in enhancing their process innovation capabilities. However, firms in the SOT survey were already starting from a significantly higher capability level at the start of the five-year period than firms in the GPrix sample. Improvements made in product and process innovation capabilities are seen as a strength of the SOT cluster.

For marketing innovation capability at the start of their respective five-year periods: 86% of GPrix[128] firms and 50% of SOT firms classified themselves as 'lagging' or 'average'; and, 14% of GPrix firms and 50% of SOT firms classified themselves as 'above average' or 'leading'. Five years later the results were: 72% of GPrix firms and 33.3% of SOT firms classified themselves as 'lagging' or 'average'; and, 28% of GPrix firms and 66.6% of SOT firms classified themselves as 'above average' or 'leading'. The comparisons indicate a higher percentage of GPrix firms (50%) moved into 'above average' and 'leading' categories over the five years than did SOT firms. However, the SOT cluster firms were positioned at a much higher capability level than GPrix firms at the start of their five-year period. Overall, the results show that marketing innovation capabilities are much higher in the six SOT firms than in GPrix firms and this is another potential strength for the SOT cluster.

For organisational innovation capability at the start of their respective five-year periods: 83% of GPrix firms[129] and 83.3% of SOT firms classified themselves as 'lagging' or 'average'; and, 17% of GPrix firms and 16.6% of SOT firms classified themselves as 'above average' or 'leading'. Five years later the results were: 70% of GPrix firms and 50% of SOT firms classified themselves as 'lagging' or 'average'; and, 30% of GPrix firms and 50% of SOT firms classified themselves as 'above average' or 'leading'. The comparison here shows that although both GPrix and SOT firms started at similar capability levels at the beginning of their respective five-year periods, a much higher percentage of the SOT sample firms progressed into the 'above average' and 'leading' categories over the five years (from 16.6% of firms to 50%). Overall, the results show that SOT firms improved organisational innovation capabilities more than any other innovation capabilities over the five-year period and this is another strength for the SOT cluster.

[128] GPrix, (2011), D1.7 *Impact Assessment of Measures on SMEs*, Page 37 [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/docs/Del_1_7_Impact_Assessment.pdf. [Accessed 30 June 2017]
[129] GPrix, (2011), D1.7 *Impact Assessment of Measures on SMEs*, Page 37 [ONLINE]. Available at: http://business.staffs.ac.uk/gprix/docs/Del_1_7_Impact_Assessment.pdf. [Accessed 30 June 2017].

Table 6.7: Q5.4 Innovation Capabilities of SOT Firms in 2010 and 2015

Q 5.4 How would you judge your firm's innovation capabilities within your industry in the past and now, regarding?				
	Lagging	Average	Above average	Leading
In the past (2010)				
Product innovation	E F		B D	A C
Process innovation	E	C F	A B	D
Marketing innovation	D E F		C	A B
Organisational innovation	D E	B C F	A	
Now (2015)				
Product innovation			D E F	A B C
Process innovation		C E F	A B	D
Marketing innovation		D F	C E	A B
Organisational innovation		C D E	A B F	

Table 6.8 presents the results of the importance of innovation to SOT cluster firms (Q5.1). Responses show that most of the SOT survey firms consider innovation to be 'essential' or 'highly important' across a range of activities. The activity that appears to be least important to respondents (D, C and E) is reducing materials and energy per unit costs. An interesting response was given to the question about the 'importance of developing knowledge sharing capabilities inside and outside the firm'. Four firms responded that this was either 'essential' (A, C and F) or 'highly important' (B), yet earlier answers have shown little evidence of cluster firms co-operating with each other, or with other firms and institutions (see tables 6.2, 6.4 and 6.5). Furthermore, the interview findings (see 6.4.2-6.4.6.) also strongly indicate that cluster firms do not co-operate that much with each other.

Comparisons between the GPrix survey results[130] and the SOT survey results on the importance of innovation show that at the end of their respective five-year periods: 32% of GPrix firms and 33.3% of SOT firms thought that product innovation was 'highly important'; and, 32% of GPrix firms and 66.6% of SOT firms thought that product innovation was 'essential'. For process innovation at the end of their respective five-year periods: 32% of GPrix firms and 40% (approximately) of SOT firms thought that process innovation was 'highly important'; and, 14% of GPrix firms and 50% of SOT firms thought process innovation 'essential'. These comparisons indicate that SOT survey firms think that both product and

[130] Gprix, (2012), *Deliverable 1.7 - Impact assessment of measures on SMEs (30th November 2011)* [Online]. Available from: http://business.staffs.ac.uk/gprix/reports/impact.htm [Accessed 2 July 2017]

process innovations are more essential than GPrix firms and this is considered to be a further likely strength of the SOT cluster.

Table 6.8: Q5.1 Importance of Innovation to SOT Cluster Firms 2010 - 2015

Q 5.1 How important were each of the following effects on your product, process, organisational and marketing innovations introduced during the five years 2010 to 2015?				
	Essential	Highly Important	Slightly Important	Not Important
Product Oriented Effects				
Increased range of products	A B C F	D E		
Entered new markets or increased market share	A B F	D C E		
Improved quality of products	A B C F		D E	
Process Oriented Effects				
Improved flexibility of production	A C F	D B E		
Increased capacity of production	A B C F	D E		
Reduced labour costs per unit output	A F	D B	E	C
Reduced materials and energy per unit output	A B F		D C E	
Other Effects				
Reduced environmental impacts or improved health and safety	A B C F	D	E	
Met regulatory requirements	A B C F	D	E	
Speeded up decision making	A F	B C E	D	
Developed knowledge sharing capabilities (inside and outside your enterprise)	A C F	B	D E	

Table 6.9 presents answers about abandoned or delayed innovation activities (Q7.1) and factors influencing them (Q7.2), and about public financial support for innovations (Q5.6). The responses show that it was mainly the two largest firms (A and B) in the SOT cluster who experienced the most problems with abandoned or delayed innovation activities. Company 'D' had abandoned projects at the concept stage and company 'E' had experienced serious delays with projects. When asked about the importance of factors hampering innovation the majority of firms stated that they had not experienced any of them. However, it is the two smallest firms (E and F) who appear to have had the most problems, *e.g*. lack of qualified personnel, lack of information on technology/markets and financing/cost issues. Only one respondent (B) identified market factors as being an important factor in hampering their innovations. When asked whether they had received any financial support from local/national/European government, the majority of respondents stated that they had not. The only firm that had received financial support from all three levels of government was firm 'A'. Whilst this information is useful, it would have been even more insightful to discover

whether the other five respondents had applied to any level of government for financial help and, if they had, whether their applications had been rejected, or not. Overall, from the evidence available, it appears that relatively few firms in the SOT survey experience factors that hamper their innovation activities, and this can be seen as another strength for the SOT cluster.

Table 6.9: Q7.1-Q7.2 and Q5.6 Abandoned or Delayed Innovation Activities: Influencing Factors

Q 7.1 During the five years 2010 – 2015, were any of your innovation activities or projects?				
			YES	NO
Abandoned in the concept stage			A B D	C E
Abandoned after the activity or project was begun			A B	C D E
Seriously delayed			A E	B C D
Q 7.2 During the five years 2010 – 2015, how important were the following factors for hampering your innovation activities or projects or influencing a decision not to innovate?				
	High	Medium	Low	Factor not experienced
Cost factors				
Lack of funds within your enterprise or group		E		A B C D F
Lack of finance from sources outside your organisation			E F	A B C D
Innovation costs too high		E	F	A B C D
Knowledge factors				
Lack of qualified personnel	E			A B C D F
Lack of information on technology	E		F	A B C D
Lack of information on markets		B E		A C D F
Difficulty in finding co-operation partners for innovation		B	A	C D E F
Market factors				
Market dominated by established enterprises		B		A C D E F
Uncertain demand for innovative goods or services		B		A C D E F
Reasons not to innovate				
No need due to prior innovations			E	A B C D F
No need because of no demand for innovations			E	A B C D F
Q 5.6 During the five years 2010 to 2015, did your enterprise receive any public financial support for innovation activities from the following levels of government?				
			YES	NO
Local or regional authorities			A E	B C D F
Central government (including central government agencies or ministries)			A D	B C E F
The European Union (EU)			A	B C D E F

6.4: Co-operation in the SOT Cluster between 2010 and 2015

This next section presents questionnaire and interview responses to questions about co-operation in the SOT cluster as follows: 1) the questionnaire responses about co-operation on innovation in the SOT cluster[131] (Q6.2-Q6.4); and, 2) the interview responses about co-operation on innovation in the SOT cluster (Q1-Q5). The questionnaire responses are presented as a series of tables with accompanying discussion and evaluation. The interview responses are presented as synthesised and summarised responses discussed under various themes on co-operation, along with examples of supporting quotes from the interview transcripts. The full set of pattern-matched responses is available in Appendix 19.

6.4.1: Questionnaire Responses on Co-operation on Innovation Activities in the SOT Cluster

Table 6.10 presents the answers to section six of the questionnaire survey, *i.e*. co-operation on innovation activities in the SOT cluster between 2010 and 2015. The table combines the answers about co-operation on activities at regional, other UK and overseas locations. The circles on the diagram identify groupings of responses that indicate areas where there are high degrees of co-operation and areas where there is little or no co-operation.

[131] Note: GPrix data on co-operation was not included in the GPrix reports.

Table 6.10: Q 6.2 – Q 6.4 Level of Co-operation on Innovation Activities in the SOT Cluster 2010 - 2015

Q 6.2, 6.3, 6.4 - From 2010 to 2015 did your enterprise co-operate on any of your innovation activities with other enterprises or institutions?	Degree of co-operation in you region				Degree of co-operation other UK locations				Degree of co-operation overseas			
	High	Medium	Low	Not used	High	Medium	Low	Not used	High	Medium	Low	Not used
Internal												
Within your enterprise or enterprise group	A B C E F			D				C E F	A B			C D E F
Market Sources												
Suppliers of equipment, materials, components, or software	A B C F	D E			B	D	A	C E F	A B D			C E F
Clients or customers	A B C E	D F			A B	D		C E	A B D			C
Competitors or other enterprises in your sector			D	A B C E F				A B C D E F				A B C D E F
Consultants, commercial labs, or private R&D institutes	B		A	C D E F	B		A	C D E F	B		A	C D E F
Institutional Sources												
Universities or other higher education institutions		D F	A C E	B				A B C D E F			A	B C D E F
Government or public research institutes		A F		B C D E				A B C D E F				A B C D E F
Other Sources												
Conferences, trade fairs, exhibitions	A F	D		B C E	A	D		B C E F	A	D		B C E F
Scientific journals and trade/technical publications	A		D	B C E F	A			B C D E F	A			B C D E
Professional and industry associations			D A F	B C E			A	B C D E F	A			B C D E F

= High co-operation

= No co-operation

Responses to the question with respect to the degree of co-operation on innovation activities between 2010 and 2015 regionally (Q6.2) show that the area where respondents replied they co-operated the most (high degree for A, B, C, E and F) was within their own enterprise or group. Other areas where respondents replied they co-operated to a high degree were with suppliers (A, B, C and F) and with customers (A, B, C and E).Two respondents replied that they co-operated to a medium degree with suppliers (D and E) and with customers (D and F). The areas where firms co-operated the least were with competitors and/or other enterprises in their sector, (no co-operation for 5 firms, low for firm D). The results here support the findings in earlier sections of this chapter (see 6.3), where firms had replied that they innovated mostly 'within their own enterprise or group', or possibly with suppliers on some process innovations, and are further evidence of a lack of co-operation in the SOT cluster. Other areas where the majority of respondents (A, B, C, E and F) replied that they did not co-operate at all, or only to a low degree, were with consultants, private and public research and development institutes, scientific journals, trade publications and professional/industry associations.

Responses to the question about the degree of co-operation with firms and enterprises in other UK locations (Q6.3) show that the majority of firms in the SOT survey do not co-operate with other enterprises and institutions in other UK locations. The exceptions are firms 'A' and 'B', the two largest firms in the SOT cluster, and firm 'D' who all appear to co-operate, to a greater or lesser extent, with suppliers, customers, trade fairs and conferences in other UK locations. Similar to responses for regional co-operation, all firms stated that they did not co-operate with competitors or other firms in their sector in other UK locations. However, this last response is not entirely unexpected as the majority of UK ceramics production, *i.e.* approximately 80%, takes place in the SOT area.

When questioned about the degree of co-operation with firms and enterprises in overseas locations (Q6.4), only three respondents (A, B and D), including the two largest firms again, answered that they co-operated with firms and enterprises in overseas locations. The main areas of co-operation were within their own enterprise or group, and with suppliers and customers. These areas of co-operation support other findings in this chapter, where some SOT survey firms said that they did develop some process innovations with their suppliers (see tables 6.4 and 6.12) and with customers (see section 6.4.3). From the results in this section, firm 'A' stands out from the other cluster firms in that they appear to co-operate more with firms and enterprises in overseas locations, and across a wider range of

innovation activities, than any of the other respondents. The following two tables (6.11 and 6.12) present the responses to questions about specific areas where firms have collaborated (Q6.5), and on the nature of current collaborative relationships in the SOT cluster (Q6.6). The nature of relationships is important in the academic literature and relates to the concept of 'weak' and 'strong' ties (Julien *et al*., 2004; Tallman *et al*., 2004; Lorentzen, 2008). Strong ties are intense relations between agents of great similarity and offer a great depth of knowledge but little diversity. Weak ties are seen as more beneficial to knowledge creation as they call into question existing knowledge (Julien, *et al.*, 2004: 266-267). The academic literature purports that successful clusters have extensive networks involving both strong and weak ties (Julien *et al*., 2004; Tallman *et al*., 2004; Lorentzen, 2008) and, therefore, an important assessment of the SOT cluster's competitive advantage would be evidence of extensive strong and weak ties.

Table 6.11: Q 6.5 Areas Where SOT Cluster Firms Have Collaborated

Q 6.5 Please indicate the areas where you have collaborated			
	Type of co-operation		
	Information only	Product design and materials	Process developments
Internal			
Within your enterprise or enterprise group	E	A B	A
Market Sources			
Suppliers of equipment, materials, components, or software		A B D E F	A B C D
Clients or customers	B	A B C D E	
Competitors or other enterprises in your sector			A B
Consultants, commercial labs, or private R&D institutes	B	B	A B
Institutional Sources			
Universities or other higher education institutions	A C E		
Government or public research institutes	E		A
Other Sources			
Conferences, trade fairs, exhibitions	E F	A E	
Scientific journals and trade/technical publications	E	A	
Professional and industry associations		A	

Table 6.11 shows that respondents co-operate most with suppliers and with customers (5 out of 6 firms). The areas where they tend to co-operate the most with suppliers (A, B, D, E and F) and customers (A, B, C, D and E) are on product design and materials. Another area where respondents stated that they co-operated was with suppliers on process developments (A, B, C and D). Interestingly, the two smallest firms (E and F) appear not to co-operate with suppliers on process developments. However, this could be due to their size

and, thus, the fairly low-tech nature of their processes (for evidence see chapter 5.4.2). The two largest firms in the cluster (A and B) also answered that they co-operated with competitors and/or other enterprises in their sector on process developments. This result supports the findings from the innovation responses presented earlier (see Table 6.4). Three respondents (A, C and E) stated that that they co-operated with universities and other higher education institutes, but only for information purposes. From the evidence, it appears that the largest firm in the SOT cluster (A) co-operates across a wider range of activities, more than any other firm in the SOT survey. Furthermore, from the evidence presented so far, co-operation appears to be non-existent between the ceramics manufacturers themselves in terms of product development. Overall, the evidence presented here indicates that co-operation is low in the SOT cluster.

Table 6.12 shows that many respondents have a range of formal and informal relationships with their suppliers and customers (weak ties), and the majority of these relationships are long term in nature. Relationships with universities and other research institutes tend to be informal and mostly short-term in nature (weak ties). Whilst relationships at conferences, trade fairs, scientific and trade journals tend to be both formal and informal, and a mix of long and short term in nature (weak ties). Only firm 'A' answered that they had a range of relationships with professional and industry associations (both weak and strong ties). Interestingly, the interview results presented later in this chapter (see 6.4.2 - 6.4.4) conflict somewhat with the findings presented here. Several interviewees stated no co-operation was taking place between ceramics manufacturing firms in the SOT cluster, whilst several other interviewees gave good examples of how firms did co-operate with each other, *e.g.* through membership of the BCC (British Ceramics Confederation) and other professional associations (strong ties), and also by visiting each other's factories (strong ties). It appears that SOT cluster firms may co-operate more than they think they do, but so far, the evidence is not clear. The implications for competitive advantage, based on the evidence here, are that co-operation with the BCC and other supporting institutions could be an influencing factor in the innovative activity apparent in the SOT cluster and, as a result, this is a potential strength for the cluster.

Table 6.12: Q 6.6 The Nature of Collaborative Relationships in the SOT Cluster

Q 6.6 Please indicate the nature of the collaborative relationship				
	Type of relationship			
	Formal contractual relationship	Informal relationship	Long-term relationship (more than 1 year)	Short-term relationship (less than 1 year)
Internal				
Within your enterprise or enterprise group	A	B	A E	
Market Sources				
Suppliers of equipment, materials, components, or software	A B D E	A C E F	A C D E F	A
Clients or customers	A B C D E	A E F	A C E F	A E
Competitors or other enterprises in your sector			D	
Consultants, commercial labs, or private R&D institutes	A B	A	A	A
Institutional Sources				
Universities or other higher education institutions		A C D E F		A D E
Government or public research institutes		A E		A E
Other Sources				
Conferences, trade fairs, exhibitions	A D	A E F	A D E F	A
Scientific journals and trade/technical publications	A	A E	A	A E
Professional and industry associations	A	A	A	A

Table 6.13: Q 6.8 Participation in Collaborative Projects

Q 6.8 Five years ago did your enterprise engage in....?		
Fewer collaborative projects	About the same collaborative projects	More collaborative projects
A	B C D E F	

6.4.2: Interview Findings on Co-operation on Product Innovations (see Appendices 12 (Q1) and 19)

When asked whether SOT ceramics manufacturers co-operate with each other on product innovations, four respondents (A, C, E, and F) replied that they did not think that firms co-operated, or that co-operation was very limited. Two respondents (B and D) stated that firms did work together, but not as well as they could. Another respondent (F) gave a conflicting response, he said that firms did co-operate but also said there wasn't a lot of collaboration or co-operation. Respondent (E) said that he had not seen much co-operation in the industry over the 32 years he had been in it:

"My experience is no, very, very limited. They always talk. They kind of talk but then I've never seen it in my 32 years I've been in the ceramic industry. No, I've never seen it (E).

Interviewees were asked to give reasons why they thought ceramics manufacturers did not co-operate on product innovations. Four firms said that it was because ceramics firms are very protective of their intellectual property and they don't want to share their ideas or innovations with other ceramics firms (A, D, E and F). Two firms said it was because of a fear of other firms 'stealing' their ideas. Examples include:

"We will innovate something new and it becomes massively successful and everybody obviously wants a piece of that success and they just do very poor knock-offs of the same thing" (A).

"Because potters have been stealing off each other for 250 years" (B).

The second reason for firms not co-operating on product innovations was because firms wanted to maintain their own sense of identity and independence. For example:

"I think that's actually healthy not to [co-operate] because ways that companies actually maintain their own sense of identity purposes is to keep everything kind of very tight and secret" (A).

"I think the nature of being an entrepreneur and setting up a business is probably you're quite independent" (C).

The findings here have implications for the competitive advantage of the SOT cluster. For example, protection of intellectual property is a key factor in innovation and differentiation. If firms in the SOT cluster view each other as rivals, then this is in line with the academic literature that purports vigorous domestic rivalry is a key motivator for innovation (*e.g.* Porter, 1990; Dei Ottati, 1996). Moreover, the findings here could also partially explain why SOT cluster firms appear to innovate so much.

Interviewees were also asked to identify ways that they thought ceramics manufacturers co-operated on product innovations. It appears that one of the main ways that firms co-operate

is by manufacturing ceramic items for each other. Firms 'B', 'C', 'D' and 'F' all replied that other ceramics manufacturers made products for them. The main reasons for outsourcing to other firms in the cluster were because of capacity issues and, for some of the larger firms, flexibility issues, *e.g.* small one-off orders of something unusual for existing customers. Although, strictly speaking, these examples are not co-operation on product innovations, *i.e*. working together to create a new product, they are evidence of knowledge exchanges and of knowledge-creating opportunities (Arikan, 2009). Other ways that ceramic manufacturers co-operate with each other are by visiting each other's factories, and by visiting each other's stands at trade fairs (B, D and F). Although this type of co-operation is 'informal' and again not focused on product innovation, it is further evidence of potential knowledge exchanges between cluster firms. However, there is also some evidence that, in recent years, some firms (*e.g.* F) may have become less inclined to show other ceramics manufacturers around their factories, possibly due to contraction of the local industry, overseas competitors or possibly due to perceptions about who competitors are. Examples of responses include:

> *"We do co-operate with (anonymous company), now I think about it. So, we make some of our pottery at (anonymous company). I think there is a little bit of co-operation there because they make for us, and I think we have had some decorations as well" (C).*
>
> *"We've all been around each other's factories. I've been around every pottery in Stoke except (anonymous company). So there is co-operation there, or at least it's not hidden" (B).*
>
> *"They [Mfs.] would arrange for instance, factory tours so you would have gone and visited (anonymous company and anonymous company).You wouldn't show anybody around the factory now from within the industry. Simply due to what you think is competition" (F).*

As in the previous section, this is evidence of co-operation, albeit informal. This kind of informal co-operation is another example of a 'strong tie', *i.e*. ties between agents of great similarity, such ties can lead to an increase in opportunities for knowledge exchange (Arikan, 2009). It is also evidence of knowledge-creating opportunities, which may lead to innovation. However, according to the academic literature, strong ties offer a great depth of knowledge but little diversity (Lorentzen, 2008). It is weak ties that are thought to be more valuable, *i.e.* they call existing knowledge into question and add new elements leading to innovation (Julien et al., 2004). Consequently, based on the academic literature, relationships that can

be classed as strong ties in the SOT cluster are assumed to provide only low-medium benefits with regard to innovation.

6.4.3: Interview Findings on Co-operation on Process Innovations (see Appendices 12 (Q2) and 19)

When asked about co-operation on process innovations (Q2) the responses varied. Three interviewees (D, F and B) stated that firms did co-operate on process innovations, and two interviewees (A and C) stated that firms didn't co-operate on process innovations. Interviewees were asked to give reasons why they thought ceramics manufacturers did not co-operate on process innovations. The main reason given was that ceramics firms prefer to 'do their own thing', because what they do is different to what everybody else does. These findings support the results of the innovation questionnaire (see Table 6.4), where three respondents stated that they did work with other firms on their process innovations and three respondents stated that they developed their process innovations alone. Examples of interview responses include:

> *"There's a mad scramble at the moment for entry into digital direct printing. I was at Ambiente[132] in February and we [ceramics mfs.] were all on the same stand looking at the same kind of products. But, we are not talking to anybody, you know, any of our competitors about it, we are doing our own thing with it and suspect that they do the same thing as well" (A).*

> *"We are more inclined to do our thing ourselves. It's not through a kind of isolationist approach, it's just because what we do is so different from what everybody else does" (C).*

The available evidence here supports the earlier findings (see 6.4.3) that SOT ceramics manufacturers possibly view themselves as close competitors and, whilst this may be beneficial for innovation, it may not be that beneficial for co-operation in the SOT cluster.

[132] Ambiente is an annual leading international trade fair for consumer goods, held in Frankfurt, Germany. Source: Ambiente. (2017), *Ambiente The Show,* [Online]. Available from: http://ambiente.messefrankfurt.com/frankfurt/en/besucher/messeprofil.html [Accessed 2 July 2017]

When asked to identify ways that they thought ceramics manufacturers co-operated with other firms on process innovations, several interviewees replied that the main way firms co-operate is with suppliers (B and F). Individual firms work with suppliers and technology and knowledge transfer takes place indirectly from natural diffusion within the cluster, *i.e.* through contact with those same suppliers over time. The evidence indicates that, although SOT ceramic manufacturers do not work with each other on process technologies, they may benefit over time from each other's technology investments. Examples of responses include:

> *"Because we are a cluster, most of the pieces of machinery are from local firms, e.g. kilns. For example, last year we put in a new kiln, the new technology put into that will get transmitted elsewhere, and you know it will" (B).*

> *"This company I'm working with now on producing this new body. It's a stronger body so the benefit for this guy working with me is that as a small company I might not be going to be buying big volumes of it, but if that system works, he's then got a fantastic opportunity to market that to loads of people. So, the benefits are there, it's a win-win for both of us, that's why it works" (F).*

These examples are possible evidence of 'weak ties' (Lorentzen, 2008) that, according to the strategic management literature, may lead to knowledge creation. Moreover, the evidence also indicates possible knowledge exchange opportunities (Arikan, 2009) and cluster/agglomeration benefits (Porter, 1990; Dei Ottati, 1994; Camagni, 2002). Hence, co-operation with suppliers is seen as another possible strength of the SOT cluster.

6.4.4: Interview Findings on Co-operation With Other Non-ceramic Manufacturers and Other Institutions (see Appendices 12 (Q3) and 19)

When asked about co-operation in general with other non-ceramic firms and other institutions, five out of six interviewees replied that co-operation was taking place between ceramics manufacturers and other firms and institutions. It appears that the main way firms co-operate is through membership of various trade associations, *e.g*. the BCC (formerly called BCMF), and with industry specific local research companies, *e.g.* Lucideon (formerly CERAM). These types of ties can be classed as 'strong', *e.g.* the BCC is an agent of great similarity as their sole purpose is to support the ceramics industry. However, it is not disclosed how many SOT cluster firms are members of these various trade/research associations. The evidence from the secondary data, presented in chapter five of this thesis (see chapter 5.5.2), indicates that it is mostly the largest firms in the SOT cluster who are

members of these associations. Overall, the evidence indicates that many of the SOT cluster's ceramic manufacturers take part in knowledge exchange activities with non-ceramic firms and institutions that benefit at least the largest firms in the cluster. However, the evidence here also conflicts somewhat with evidence from the questionnaire responses (see table 6.12), where only one respondent (A) answered that their company engaged in formal and informal relationships with trade and other professional associations. Interestingly, this may be because other respondents may not perceive such relationships as co-operation. Examples of responses include:

> *"Well, we're all part of the BCMF (BCC) which is a good talking shop and where it benefits us we will co-operate" (B).*

> *"Yes, at the confederation BCMF (BCC). This again, you know, these people who sit on the board at BCMF, I'm not one of them but they are from different companies….there was a meeting last Friday…..and (anonymous company and anonymous company) also had people walk in for the actual meeting, so they're all there together in a common room, talking about common interests. They [ceramics mfs.] all sit on various committees, I just think they have never really understood what they're doing is co-operating. The same goes for Lucideon, which used to be called Ceram, and Ceram was basically kept going by the industry. We paid the membership fee, you got 70 days of their time and ideas, that were shared, and so I just think the industry is always as they used to be. I myself used to be a director at ACTD [Association for Ceramic Training Development] as it was called, the ceramic training center" (D).*

The second example of how cluster firms co-operate with other firms and institutions is co-operation with suppliers. This is not the same co-operation with suppliers on process innovations as mentioned previously (see 6.3.2 and 6.4.2), here co-operation is mainly on developing inputs, such as glazes and decorations, and on purchasing. Some cluster firms buy inputs together, *e.g.* clay, there are even some cluster firms who own a clay/milling company between them. Co-operation of this type is identified in the academic literature as beneficial to cluster firms, *i.e.* they can gain early access to inputs, and this is an important cluster benefit (Porter, 1990), or agglomeration benefit (Glaeser, 2010). The third example of co-operation between cluster firms and other firms and institutions is co-operation with universities, *e.g.* on digital printing technologies (company A), albeit mostly for information purposes (see also tables 6.10 and 6.11). This is another example of a 'weak' tie (Lorentzen, 2008). These three examples provide good evidence of knowledge creating opportunities

and potential knowledge exchanges within the SOT cluster. Moreover, this type of knowledge is what Porter (1990) calls 'advanced factor conditions' and can contribute significantly to competitive advantage, providing firms continue to invest in and upgrade their advantages. The final example is co-operation with overseas manufacturers of ceramics products, mainly resulting from some SOT cluster firms outsourcing production overseas. This is evidence of external (outside the cluster) knowledge exchange and possibly 'new' knowledge entering the cluster, which is viewed as important to the survival of a cluster in the academic literature (see chapter 2.4.8). However, whilst this should bring about more opportunities for knowledge exchange, it appears that more knowledge may have left the SOT cluster than entered it, as evidenced by the significant loss of jobs in the industry due to some of the largest firms relocating production (see chapter 4.2.1). Examples of interview responses include:

> *"You know, I've been here for 20 something years and when the market changes you might need some input in that area, you go and seek it out and those relationships are formed and I think that's happened fairly recent with digital printing. You know, because it's a new exciting innovative area. So, we've kind of engaged with universities that are actually doing research projects in that area, just so we understand what's going on" (A).*
>
> *"I know people who buy together. There are some people [ceramics mfs.] who own one of the clay companies together. We are neither of those… but there are, I know, people doing both of those things" (C).*
>
> *"I think, you know, in the last 20 years, there has been enormous co-operation with overseas manufacturers. Because people like Doulton, and Wedgwood in particular, who were seen as the kind of policy, you know. So they co-operated with lots of manufacturers and basically exported that expertise and where has it got them" (F).*

As previously identified, the evidence indicates both strong and weak ties, including possible new 'external' knowledge which is said to be beneficial to innovation and knowledge creation in clusters (Martin and Sunley, 2006; Sacchetti and Tomlinson, 2009; Lorenzen and Mudambi, 2013). However, the evidence also indicates that knowledge is leaving the SOT cluster, and this is possibly detrimental to the cluster as it reduces cluster/agglomeration benefits.

Interviewees were asked to give examples of ways or reasons how/why firms might not co-operate with other firms and institutions. One interviewee (D) stated that "*the industry won't get together for more training*". Apparently, the need for co-operation on training arises because most firms do not have enough trainees to run their own training course. Most local universities, and further and higher education colleges, require an approximate number of 15 students per cohort to make delivering a course viable. Thus, the evidence indicates that this is an area where cluster firms could co-operate with each other and, collectively, with local educational institutions. The implications are that there is potential demand for training in the SOT cluster, and perhaps too for a coordinator (possibly from a university or college) to work with cluster firms in this respect. As mentioned in the academic literature (chapter 2, Table 2.1), training and education are considered as 'higher order' skills (Porter, 1990) and can contribute towards a cluster's competitive advantage and, therefore, this is seen as an opportunity for the SOT cluster. Another example given by interviewees for not co-operating is firm size, *i.e.* small firms tend to do most things in-house. One small firm (F) said that they had used a research company in the past, but the technology hadn't worked for them and that it had cost too much. Examples of responses include:

> *"I'm frustrated at it, as a matter of fact, that the industry won't get together for more training. Because we've all got similar issues……..we've all got our own personal recipes, we're all using slightly different bodies and different mixtures and different whatevers, but the bottom line is, clay is clay. The techniques are almost exactly the same. There's nobody big enough in the city, I believe, that could put 15 people on a course like that. So we should co-operate" (D).*

> *"You know, we've not used outside resources because when I have used it in the past, I found that the actual technology and processes didn't work for us. At one time I used Ceram, good people, you know, the expert of ceramic industry, we used them to develop an angle and it was useless. Yes, it didn't work, they didn't do the job. They never came back and never followed it through. For them, they'd be getting paid so much for doing it" (F).*

The evidence indicates that, although there is some evidence of co-operation and thus cluster benefits, there are further opportunities for cluster firms to co-operate, *e.g.* in organising collective training that would provide additional cluster benefits (Porter, 1990). In addition, such collective initiatives could also possibly help to build trust between firms in the cluster, as well as potentially lowering transaction costs (Glaser, 1992; Rosenfeld, 1997; Bianchi, 1993).

6.4.5: Interview Findings on Whether SOT Manufacturers Co-operate More or Less Now than they did 10 Years Ago (see Appendices 12 (Q4) and 19)

When asked whether SOT manufacturers co-operate more or less now than they did 10 years ago, five out of six interview respondents replied less and only one firm (B) replied more. Firm 'B' stated that the reason why firms co-operated more now was "*because Wedgwood has gone and now the BCC pulls us together more tightly*" and that helps co-operation. Apparently, the main reason why firms co-operate less now is because of increased competition, globally and locally (A and E). Local competition is considered to be intense, mainly due to the difficult times the industry has been through over recent years, and because cluster firms may now perceive each other as competitors (E). Other reasons given for not co-operating are a general lack of trust between cluster firms (A) and to protect ideas and innovations (A, E and F). One respondent implied that it was the family ownership structure of some firms, which may have led to mistrust (E), although the evidence presented in chapter five of this thesis indicates that family ownership in the SOT cluster is much lower now than it was in the 1960s and 1970s (see chapter 5.5). Examples of responses include:

> *"Less local competitors but you know on the global stage, there's many more people entered the industry. You know, from lots of different countries that weren't even on the radar before. You know, these countries are making quality products. So I think competition's actually increased and I think that's forced people into being much more protective about letting their competitors see what their activities are and what their…" (A).*
>
> *"I think nobody trusts anybody basically. I think there's just been a long history of, you know, general mistrust of anybody else's activity and you know and a rise to kind of steal" (A).*
>
> *"I think it was as if the shrinking of the industry almost made you just kind of close your ranks in effect because, you know, it was just your business that wanted to survive and it was very much - if we are surviving, it's only about surviving"* (E).
>
> *"It's always described as a peculiar industry and I don't know whether it might be the fact as well, that it was very much owned by families. So, you know, it was the Dudson's, the Ropers at Churchill…and it was almost like, you know, it's the case of 'I know I'm better than you'….and, you know, they were almost like kids at times"* (E).

The evidence presented here links to a previous section in this chapter, where competitive rivalry is discussed (see 6.4.2), and further supports the view that SOT ceramics manufacturers see themselves as competitors. Whilst this may be good for product innovation, the evidence also indicates that ceramics firms do not trust each other, and this is not thought to be beneficial to the competitive advantage of the cluster as a whole. According to the strategic management literature, trust is important in creating and sustaining collaboration between economic actors within clusters (Maskell, 2001; Newlands, 2003). Moreover, social trust is more likely to be sustained in geographically concentrated networks than more dispersed ones (Belussi, 1996; Lorenzen, 2002; Newlands, 2003). However, as identified, the evidence gathered from the interviews clearly indicates that SOT firms do not trust each other and, therefore, a lack of trust is identified as a possible weakness of the cluster.

6.4.6: Interview Findings on Areas Where SOT manufacturers could Co-operate (See Appendix 19)

Interviewees were asked to identify areas where they thought they could work more closely together. Interestingly, only one interviewee (E) answered this question. This is possibly a further indicator of a lack of co-operation in the cluster. In addition to co-operating on training (see 6.4.3), the respondent said that he thought they could work more closely together in the supply chain, *e.g.* to possibly backward integrate elements of the supply chain by manufacturing some equipment together, and by getting together to promote 'made in Stoke-on-Trent' (E). Examples of responses include:

> "*Yeah, definitely, it's the supply chain, so that's the glaze manufacturers, refractory manufacturing, colour supply, colour technology, because all of that supply chain's just disappeared. Things like ceramic and kiln furniture, what used to be five or six manufacturers in Stoke-on-Trent, there are none now, it's all imported by one firm. I'm sure there's an opportunity, if we did get together, to set up manufacturing in Stoke-on-Trent of ceramic and kiln furniture, by all of us putting some money in. We could see benefits from that ship by being in control over what they sell rather than the third party being in control only to put their margin on"* (E).
>
> *"But you see, I think, I do believe that the industry would be stronger if we all got together and did a big thing about making in Stoke-on-Trent. But, you know, there's got to be strength in made in Stoke-on-Trent. Stoke-on-Trent likes to sell itself as a city as the world capital of ceramics. If that's the situation shouldn't we all be singing from the rooftops that we're in Stoke-on-Trent?"* (E).

The implications here are that SOT cluster firms and related/supporting firms have an opportunity to co-operate more on the issues identified above. For example, greater co-operation in supply chain initiatives, and in promoting the 'made in Stoke-on-Trent' brand, would not only increase opportunities for knowledge exchange (Arikan, 2009), it would also increase cluster benefits (Porter, 1990). Opportunities for the SOT cluster are discussed further in the conclusions section of this chapter, and also in the main research conclusions chapter of this thesis where they are linked to recommendations (see chapter 7.4-7.5).

6.4.7: Interview Findings on Whether SOT Manufacturers see Themselves as a Cluster (see Appendices 12 (Q5) and 19)

The final question on co-operation asked whether interviewees thought that SOT ceramics manufacturers saw themselves as a whole industry cluster. Only three interviewees answered this question. Two respondents (A and D) thought that firms did see themselves as belonging to one industry cluster, and one firm (E) said no, "*definitely not*". When asked for reasons why some firms may not see themselves as part of a cluster, two interviewees replied:

> *"It's like there's not enough companies to achieve critical mass….I think companies tend to work much more in isolation now than they have in the past"* (A).

> *"You see, they see themselves certainly as individuals and 'we are going to do better than (anonymous company)' or 'better than (anonymous company)' or 'better than (anonymous company)', they definitely see themselves as that*" (E).

The evidence indicates that some SOT cluster firms do not see themselves as part of an industry cluster, possibly because the industry is below critical mass. Identity as part of an industry cluster is similar to the concept of 'shared vision' (Exposito-Langa *et al.*, 2015; Tomlinson and Branston, 2017), whereby cluster members who share a vision are more likely to influence local industry issues and initiatives, and are possibly more likely to co-operate. The lack of shared vision in the SOT cluster is seen as a potential weakness of the cluster and a possible threat to the cluster's future survival. Later in this chapter, some possible reasons, linked to dominant firm effects, are given for why SOT firms may not see themselves as part of a cluster (see 6.6.1-6.6.3).

6.5: Interview Findings on Views on Innovation Opportunities and other Success Factors for SOT Firms (See Appendices 12 (section 3) and 19)

From the interview responses to various questions, several areas were identified as future knowledge creating opportunities for SOT cluster firms. The first area is product innovation, as materials that are required to make ceramics are capable of being combined in many different (new) ways to produce new product ideas. Innovation is viewed in the strategic management literature as a key contributor to sustained competitive advantage (*e.g.* Porter, 1990; Sanches *et al.*, 1996). One interviewee said:

> *"The great thing about ceramics is just how much you can push the material. You know, it's a fantastic medium for constant innovations, there are always new ways of doing things, different combinations of things that can come together. There's always a chance you'll steal a march on your competitors by coming up with some magic formula, not just in terms of chemistry but in terms of you know, shape and design innovation"* (A).

Another area where SOT firms contribute towards knowledge creation is by having a strong individual identity and by focusing on a specific niche in the market. As previously stated in chapter 4 (see 4.4.3) SOT cluster firms tend to operate in separate market niches and they innovate within those niches. Further evidence that SOT cluster firms follow niche strategies was found in interview responses. For example:

> "*I think that is indicative of the people that survived because they found a niche. They stuck to it and they fine-tuned it, they've honed it and they've innovated within that niche. They've got a strong identity and it's the thing that people buy into. I think the companies that survive are the ones that have had a very strong sense of self and purpose and that's something, people don't buy pots, they buy a dream or they buy, you know, the romance of the product, they buy the sizzle not the sausage*" (A).

> "*We're still here today, particularly in niche companies like the table work, the hotel work, companies who still choose particular countries that really have a huge market to go at. It is a growing market, you know. They get fantastic margin off the product. They are not dealing directly with retail because that's hard, you've got to make sure that retail has a good margin. So, that is the difference between their business and ours and that's why they have enormous success, when that's finally done really well, you know*" (F).

Niche strategies are further evidence of differentiation for cluster firms. According to the strategic management literature, differentiation strategies enlarge local capabilities and pave the way for new development and growth trajectories (Brenner, 2005; Belussi and Sedita, 2009). Overall, innovation, differentiation and niche strategies are identified as strengths for the SOT cluster.

6.5.1: Competition in the SOT Cluster

Niche strategies are evidence that cluster firms do not necessarily compete directly with each other. This is an important point as strong local competition is seen as a driver of innovation in the academic literature. For example, according to Porter (1990), strong domestic rivalry (competition) promotes upgrading of the entire cluster through new entrants and innovation. Not only does the increased number of firms provide greater competition for new ideas, greater competition across firms can facilitate the entry of new firms specialising in particular product niches (Jacobs, 1969; Dei Ottati, 1996). However, in addition to providing evidence of cluster firms niche strategies, chapter four of this thesis also found that there had been very few new entrants into the SOT cluster since 1960 (see 4.3.5), and this is not seen as beneficial for the long-term survival of the cluster.

Further supporting evidence that SOT cluster firms do not compete directly with each other is provided by the interview responses. Only one interviewee (A) stated that their key competitors were local, but they also stated that they had many overseas competitors too. The majority of interviewees stated that they were mainly competing with overseas competitors (A, B, D, E), and also with firms in other industries for consumer disposable income, *e.g*. holiday companies or electronics companies (A). Examples from interview responses include:

> "*Less local competitors but you know on the global stage, there's many more people entered the industry. You know, from lots of different countries that weren't even on the radar before. You know, these countries are making quality products, so I think competition has actually increased, and I think that has forced people into being much more protective about letting their competitors see what their activities are. A lot of pottery manufacturers are actually competing with holiday companies or electronics companies, their biggest competitor problem is Apple or Samsung. You know, that is the reality of it"* (A).

"*No, we don't really compete with any them (other SOT ceramics firms) much. They're bigger and more mechanised than us. So, we're both kind of non-competitive or committed that easily to each other*" (C).

"*We don't have any competitors in the UK, we've got one in Germany, one in France. You know, we don't really compete with anybody in Stoke*" (D).

"*We haven't got a lot of competition because we are kind of in a niche with our supply really, but we've got (anonymous company) which I think is another small business. They import product from China and they decorate in the UK*" (E).

The evidence indicates that SOT cluster firms do not directly compete with each other and, according to the academic literature (Porter, 1990), this is not good for innovation. However, the evidence from the interviews also indicates that, whilst SOT cluster firms clearly state that their main competitors are not local, they do appear to view each other as competitors. This is evident from responses made in earlier sections of this chapter regarding cluster firms general mistrust of each other and reluctance to co-operate (see 6.4.2, 6.4.5 and 6.4.6). It is also evident from the responses that cluster firms fiercely protect their intellectual property from each other to avoid having their ideas stolen or copied. According to the academic literature, "*rivals located close to each other often tend to be jealous and emotional competitors*" (Porter, 1990: 157). Consequently, from the evidence, whilst cluster firms acknowledge that they are not competing directly with each other, they do behave as if they are in fierce competition with each other. This factor could be a key driver of product innovation in the SOT cluster, and an explanation for the high levels of product innovations made by cluster firms (see 6.3.1). Further examples from interviewee responses include:

"*I think nobody trusts anybody basically. I think there's just been a long history of, you know, general mistrust of anybody else's activity and you know a rise to kind of steal*" (A).

"*That culture is there, that by sharing, you almost say well, I don't want them to have my ideas because my ideas made me survive, I don't want to pass them on or show people*" (E).

6.6: Interview Findings on Power, Control and the Role of Dominant Firms in the SOT Cluster

The next section is presented in two parts: first, the interview responses to questions about the role of the SOT cluster's past dominant firms, specifically Wedgwood and Doulton, are presented[133] (Q6 and Q7); second, the interview responses to questions about the role of the SOT cluster's current dominant firms are presented (Q9). Accompanying examples of responses are integrated throughout.

6.6.1: Interview Findings on the Effects of the Cluster's Past Dominant Firms (Wedgwood and Doulton) on the rest of the SOT Cluster (Q6)

Interviewee responses to this question were expressed as advantages or disadvantages that Wedgwood and Doulton brought to the rest of the SOT cluster. Two interviewees responded that by having such large companies in the locale everybody benefited, *i.e.* because it was good for service industries, *e.g.* clay suppliers, glaze suppliers, colour suppliers and machinery suppliers (A and D). Similarly, another interviewee replied that having such a heavy ballast to the cluster made it a cluster because of the gravitational pull, and other firms (potters and suppliers) would come and set up there (B). Wedgwood and Doulton were also thought to be very good for employment and skills in the industry (A and D), *e.g.* Doulton employed approximately 3,000 people in its Nile Street factory at its peak. Training is stated as another advantage that Wedgwood and Doulton brought to the cluster, *e.g.* because they had large training budgets they could afford to put on training courses and other pottery firms could send some of their employees to join those courses (C). According to one interviewee (E): "*they trained a lot of people and we have all benefited. They probably kept the college courses going*". This view was supported by another respondent (C) who commented "*Well, at least they trained brilliant craftsmen. So, yes, they were very, very useful*".

Another advantage that Wedgwood and Doulton brought to the SOT cluster is that they set industry standards, *e.g*. levels of productivity and quality that gave the rest of the industry something to aspire to (E). Wedgwood and Doulton are also said to have been innovators in the industry and that their innovations brought benefits to other cluster firms (E). For example, they would work with institutions like CERAM (now Lucideon), or with machinery manufacturers, on innovations such as printing processes and pressure casting, eventually

[133] Note: although, in a sense, the role of the SOT cluster's past dominant firms no longer matters to the assessment of the cluster's current competitive position. However, it may help in explaining the previous situation and in charting a way forward.

the new innovations would be available to other cluster firms (E). A final advantage that interviewees stated was 'reputation', both for the industry and for Stoke-on-Trent (B and E). Examples of responses include:

> "*Well, I suppose a heavy ballast to the cluster makes it a cluster because of the gravitational pull. It's like, I'm here, I'm big, I'm important, I can employ these people, come in and set up then. You can steal employees off that, or maybe processes or ideas, or the same supply chain. So, it's important to have the heavyweight ones in the middle. They bring that benefit, they bring the reputational benefit, but really, they bring the supply chain and the skill base benefit more than anything*" (B).
>
> "*They used to do a lot of training in the old days, we used to get everyone really trained by them. Because they had huge training budgets…..you know, Nile Street had 3,000 people working there*" (C).
>
> "*They are a brand. If somebody says Royal Doulton, or Wedgwood, people know that straight away don't they. Whether people would know straight away they're from Stoke-on-Trent, I don't know. If it was in the internet, if you put Wedgwood in Google say, it would say Stoke-on-Trent wouldn't it*" (E).

The advantages stated above all appear to have happened prior to the period of consolidation that happened in the industry and can be linked to cluster/agglomeration benefits (Porter, 1990). Although Wedgwood was established circa 1770s and Doulton circa 1880s, both firms would have contributed to the stock of cluster benefits that would have built up in the cluster over time. The strategic management literature also provides evidence that the emergence of large dominant firms within a cluster can lead to new investment in technology on a scale which might not have been undertaken by smaller firms (Lazonick, 1993; Belso, 2010), and this is what appears to have happened in the SOT cluster.

In addition to the advantages stated above, all interviewees stated a number of disadvantages that they thought Wedgwood and Doulton brought to the SOT cluster. The biggest disadvantage is that Wedgwood and Doulton are thought to have done significant damage to the industry (cluster) by eliminating all of their own major competitors, *i.e.* by acquiring them or shutting them down (B, C, D, F). According to one interviewee (D), "*after acquisition 'they' sold the land, then liquidised assets and they moved the production to Wedgwood [or Doulton] or to overseas*". Similarly, interviewee (B) stated "*Wedgwood*

swallowed up 54 brand names. So that was a disadvantage". Another interviewee could see no benefits to ceramic firms who were not part of the two big groups (D). One of the outcomes of Wedgwood and Doulton's huge size was that they became too big and too inflexible and "*they didn't spot the changes in habits and tastes because they were too big to notice*" (C). With reference to outsourcing of production, one interviewee (A) stated Wedgwood and Doulton had "*taken the manufacturing heart out of the UK and put it somewhere else*". Moreover, it is when the industry started to struggle, that Wedgwood and Doulton are thought to have been particularly detrimental to the industry because they were "*too long waking up to the fact that the industry had changed*" (D). It is also thought that the management made many wrong decisions that ended up costing the industry a lot of jobs (D). Further examples of responses include[134]:

> "*There were no advantages, they had a negative effect. Because what you got is two big players, and they were both vying with each other for dominance. What they did was, any small independent company that came up for sale or they wanted to buy, they would buy them. As a consequence, the whole of Stoke-on-Trent was either owned by Doulton or Wedgwood. All these great little companies became part of the overall Wedgwood brand, or the overall Doulton brand. Often they just destroyed them really and of course, you know, they [acquired firms] were not independent anymore. They were not making their own decisions so, as a consequence, you get a pretty bland environment, and non-competitive, and it just wasn't healthy for Stoke. Not innovative enough you know, because often those factories had their very own fashion as well*" (F).
>
> "*And then you know, taking the manufacturing heart out of the UK and putting it somewhere else. People buy the history and the romance around the product rather than the product itself, and if you have not got that anymore, you haven't really got a product and I think that was something that got lost in that era*" (A).

The evidence above clearly indicates that Wedgwood and Doulton were responsible for a significant reduction in the number of firms in the SOT cluster. According to Porter (1990), a reduction in the number of firms in a cluster results in a reduction in competition, and thus reduces the overall innovative capacity of a cluster (Porter, 1990). Consequently,

[134] Note: the responses in these two quotes could indicate potential interviewee bias. However, the two firms 'A' and 'F' are the largest and the smallest in the survey and, although they are not examples of deliberate 'extreme' or 'deviant case' sampling (Patton, 1990), as originally intended (see chapter 3.6.4), they are examples of extremes and thus potential interviewee bias should be minimal.

consolidation and firm closures in the SOT cluster are viewed as a reduction in knowledge creating opportunities and therefore are considered as a weakness of the cluster.

6.6.2: Interview Findings on Reasons Why Wedgwood and Doulton Acquired so many Pottery Companies between 1960 and 1990.

This section explores further possible reasons why Wedgwood and Doulton acquired so many local companies between 1960 and 1990 (Q7). The main reason given by interviewees for the many acquisitions during the period in question is 'elimination of their competitors' (C, D, F), *i.e.* Wedgwood and Doulton bought firms to shut them down (C and F). Another reason was that motives for the acquisitions could have been profit led, *i.e.* a way of investing surplus funds with the aim of making cost savings (E). In addition, by picking well-known brands, Wedgwood and Doulton could extend their range and increase their sales without having to invest a lot of money in new product development (B, D and E). Furthermore, because Wedgwood and Doulton were competing against each other, each vying for dominance, making acquisitions was a way of getting more market share. Consequently, much of the SOT ceramics cluster was owned, eventually, by either Doulton or Wedgwood (F). Examples of responses include:

> "*It was a campaign to get rid of competition and simultaneously they then put in the hands of too few players some decision making, like outsourcing manufacturing to Indonesia and Malaysia, all those places that basically completely trashed the jobs here*" (C).

> "*Because they could. I think it was driven by cost efficiency, which is to feed the big factory. Also, taking the brand names, because they didn't want other people to do it and because they wanted to put the volume production through. Nowadays the same reasons would apply but I think the profit motive would be stronger*" (B).

As mentioned previously, the strategic management literature identifies positive and negative implications of dominant firms within a cluster (*e.g*. Porter, 1990; Sacchetti and Sugden, 2003; Sacchetti and Tomlinson, 2009). For example, the networks of direction model (Sacchetti and Tomlinson, 2009) raises particular concerns for clusters, primarily relating to a cluster becoming locked-in to the objectives and strategic direction of a few or even a single firm and, from the evidence, this appears to be the case with Wedgwood and Doulton. Moreover, the findings here can possibly be linked to earlier evidence of mistrust between firms in the SOT cluster, as Wedgwood and Doulton's dominance over the industry

may possibly have been a contributing factor, given the damage they appear to have caused the SOT cluster. Overall, the net effect was to leave the cluster in a much weakened state.

6.6.3: Interview Findings on the Effects of Wedgwood and Doulton's Acquisitions on Acquired Firms and on the rest of the SOT Cluster.

This section examines the effects of Wedgwood and Doulton's acquisition strategies on the acquired firms, and on the rest of the SOT cluster (Q7). Although there is some overlap between the effects of acquisitions and the disadvantages that Wedgwood and Doulton brought to the SOT cluster (discussed in the previous section), the intention here is not to repeat material but rather to build upon the argument that the two firms, in later years, were not good for the SOT ceramics cluster.

The common view from the interviewees is that Wedgwood and Doulton's acquisition strategies did a significant amount of damage to the industry overall. One of the biggest effects was the elimination of competition in the SOT cluster (C, E and F). A consequence of less competition locally is a "*bland environment that is not innovative enough*" (F). In addition to damaging the SOT cluster overall, two respondents (A and F) also thought that Wedgwood and Doulton had damaged the firms that they acquired by diluting their brands, *e.g.* the acquired firms could no longer make their own decisions, they lost their own identities and became weaker for it. Moreover, Wedgwood and Doulton shut down many of the companies that they acquired, *e.g.* Masons and Enoch Wedgwood, thus further reducing competition in the cluster. A further significant negative effect on the cluster was identified as the loss of many jobs and specialised skills within the SOT cluster when Wedgwood, who had acquired Doulton in 2005, went into receivership in 2009. It also appears that any knowledge that Wedgwood and Doulton obtained from the firms that they acquired, was not shared with the rest of the SOT cluster. For example:

> "*I will say no, they didn't share knowledge. They were incredibly protective, you know. It was like a closed shop really*" (F).

From the evidence, it appears that Wedgwood and Doulton, who were once two strengths of the SOT cluster had, in later years, become a weakness of the cluster through negatively affecting competition, innovation, skills (knowledge) and the supply base. The overall result was a reduction in knowledge creating opportunities in the cluster. Thus, the findings presented here support the findings in chapter five of this thesis (see chapter 5.6.2).

In addition to the negative effects of Wedgwood and Doulton's acquisition strategies, interviewees did identify some positive effects for acquired firms. Firstly, by being part of a group, acquired firms who performed badly in any given year, *e.g.* they didn't make a profit, were supported by Wedgwood or Doulton (D). However, this advantage is considered to have been only a short-term benefit, given the demise of Wedgwood and Doulton and the loss of thousands of jobs in the two companies. Another benefit was the investment that Wedgwood and Doulton made into their factories and into new technologies (D) which, as mentioned previously, may have resulted in knowledge eventually spilling out to other firms in the SOT cluster. Finally, when asked whether they thought Wedgwood and Doulton had been good for the SOT ceramics cluster overall, the majority of interviewees said that they didn't think that they had been good for the cluster (A, C and F). One firm (D) said "*in some ways, yes. In some ways, no*". Only one firm (E) thought that Wedgwood and Doulton had definitely been good for the SOT cluster. Further examples of responses include:

> "*We know that both did huge damage to the industry. Wedgwood and Doulton got rid of all of the major competitors and did massive damage of shutting down companies like Mason's or like that. So I think, you know, very bad*" (C).

> "*Wedgwood did invest a lot of money into the factories that probably wouldn't have happened without them. You know, new technology back then, I mean, it wasn't a very technological industry back then and it still isn't now, really. But where there were opportunities, Wedgwood invested in all the factories, not just in Barlaston*" (D).

> "*There's less competition. Competition can be a good thing and a bad thing, can't it? It would've been less competition but certainly they should've taken advantage of that being a big manufacturer. They should've been able to really drive efficiency*" (E).

The evidence presented above is strongly linked to earlier sections in this chapter, *i.e.* to the findings on positive and negative aspects of dominant firms in clusters. For example, Wedgwood and Doulton's contribution to cluster/agglomeration benefits has been discussed in section 6.6.1 and some effects on competition, innovation and knowledge creating opportunities are discussed in 6.6.1 and 6.6.2. The conclusions section of this chapter provides a more detailed discussion, in light of theory, of the positive and negative aspects of Wedgwood and Doulton's reign over the SOT cluster. The overall conclusion in this section though is that Wedgwood and Doulton provided many cluster benefits to the SOT cluster in the early part of their reign, but also were responsible for a significant reduction in cluster benefits in their latter years up to 2009.

6.6.4 The SOT Cluster's New Dominant Firms

Interviewees were asked for their views on the role of the SOT clusters 'new' dominant firms (*e.g.* Steelite, Portmeirion, Churchill and Dudson. See chapter 4.2.3). From the responses, the main role identified for the cluster's largest firms is to bring strength and stability to the cluster (A, B, C and D), which can be achieved by firms being successful and, as a result, confidence in the industry will rise, along with the reputation of Stoke-on-Trent and its ceramic brands (A and E). Confidence in the industry would also ensure that suppliers would remain in business and their products and services would then be available to everyone in the cluster (A). One interviewee said "*we've tried to be good neighbours*" (A). Another (B), said that they take a "*paternal*" role as an employer and also an "*ambassadorial*" role in that they spend a great deal of time talking to the City about various industry issues, the outcomes of which may benefit the whole cluster. Firm 'B' also said that they saw their role in the industry as more of a "*lighthouse and a gatekeeper"* but that didn't mean "*keeping others [ceramics firms] out*". It would also appear from the responses that the current large ceramics firms in the SOT cluster have less control over the rest of the industry than Wedgwood and Doulton had in the past (B). Further examples of responses include:

> "*The biggest thing we can bring to the industry is again stability. You know, the more successful we are the more successful everybody around us will be which just brings more confidence and stability and if everybody kind of grows along with us, that brings other people into the periphery as well*" (A).

> "*Of course, if they've kept the industry going in Stoke-on-Trent they've done something right, and they're hopefully now becoming more profitable. If then they can invest their profits into the business and, whether that be training, marketing their businesses, marketing the made in Stoke-on-Trent ceramic brands, that's going to be good, isn't it? It's going to be good*" (E).

From the evidence, it now appears that power and control are much more balanced in the SOT cluster, with no one/few firms having control. This can be viewed as a potential strength of the current SOT cluster. Moreover, SOT cluster firms also have the opportunity to move towards a 'network of mutual dependence' structure (Sacchetti and Tomlinson, 2009), whereby cluster firms can engage in a series of ongoing economic relationships with each other that support and re-enforce co-operation, reciprocity and mutually supportive actions across the cluster.

6.7: Chapter Conclusions

This chapter of the research findings has dealt specifically with objectives 6, 7, 8, 9 and 10. The key aim of this primary research stage was to determine recent innovation and co-operation activities of firms in the SOT cluster. Another aim of this stage of the research was to determine the role of the SOT cluster's dominant firms past and present. The primary research findings have been presented and interim evaluations and conclusions drawn at various sections throughout this chapter. The next section provides more detailed conclusions and a summary of strengths, weaknesses opportunities and threats, based on the primary research findings. Finally, findings are mapped to relevant sections of the theoretical framework (Figure 6.1) and to the objectives (Table 6.14).

6.7.1: Conclusions on innovation in the SOT Cluster 2010-2015

The questionnaire findings, and the evidence from comparisons with the GPrix survey, clearly show that SOT survey firms are carrying out high levels of product, process, marketing and organisational innovations. The results also show that some SOT firms are investing more resources into innovation today than they did in the past, and that they have significantly improved their innovation capabilities in recent years. Moreover, the questionnaire results on co-operation support the earlier questionnaire findings on product and process innovations, where firms replied that they innovated mostly within their own enterprise or group on product innovations and only co-operated with suppliers on process innovations.

From the interview responses it appears that, although SOT cluster firms do not compete directly with each other and, as this potentially reduces the intensity of rivalry this may not be good for innovation, they actually do see each other as competitors and they fiercely protect their innovations and ideas from each other. Thus, the evidence shows that SOT cluster firms 'act' like close competitors and, providing that their product innovations remain "*private to the firm for a sustained period*" (Porter, 1990; Sanches *et al.,* 1996), this has the potential to ensure the long-term success of the cluster. Consequently, strong innovation capabilities and output are a key strength of the cluster.

Whilst the results of the questionnaire survey show that the largest of the SOT firms spent between 1% and 5% of turnover on innovation activities over the period in question, the smallest firms spent more, typically 6% to 10% of turnover. The findings here give some

weight to the argument that smaller firms often carry out more product innovations than larger firms (Acs and Audretsch, 1990; Acs *et al.,* 1994; Klepper, 1997; OECD, 2000; Audtretsch, 2002; Hall *et al*., 2009). Another strength for the SOT cluster is that SOT cluster firms appear to be receiving a higher return on their investments, in comparison to GPrix survey firms.

One relevant finding that emerged from the questionnaire results for innovation is that the smaller firms appear to carry out less process innovation than the larger firms, this is potentially a weakness for the cluster. However, as discussed in chapter five of this thesis (see chapter 5.4.2), smaller firms may not need to carry out significant process innovations due to their small size and the low-level technologies that they employ. For example, even Emma Bridgewater, who is a relatively large ceramics manufacturer, differentiates on the 'hand-made, hand-finished' nature of their products[135].

The evidence from the research shows that the majority of SOT survey firms did not experience many factors to hamper their innovation activities, and this is viewed as a strength of the cluster. However, the evidence also shows that the two smallest firms in the survey experienced the most problems with factors delaying innovation. The main factors were lack of qualified personnel, lack of information on technology/markets, and financing/cost issues. Linked to factors delaying innovation is access to financial support for innovation activities. The questionnaire evidence shows that half of the SOT survey firms had not received any financial support from government for their innovation activities. Nevertheless, it is not clear whether these firms had applied for financial support. Lack of financial support for innovation could be a potential weakness for the SOT cluster. However, it is also an opportunity for cluster firms, government and other interested parties to co-operate on identifying potential sources of financial support and in helping with applications.

6.7.2: Conclusions on Co-operation in the SOT Cluster 2010-2015

Overall, from the questionnaire responses on co-operation, it can be assumed that the level of co-operation between SOT survey firms and other enterprises and institutions, be it regional, other UK or overseas, is relatively low. The main areas where firms co-operate locally are within their own enterprise or group, and with suppliers and customers. Only the

[135] Source: interview with Emma Bridgewater representative. January 2017.

largest two firms (A and B) and firm ‘D’ appear to co-operate in other UK locations and overseas. Moreover, there appears to be more co-operation happening overseas than in other UK locations. The main areas of co-operation, regionally and overseas, appear to be with suppliers and customers. From the questionnaire responses, the main areas where firms do not co-operate are with competitors and other enterprises in their sector, this applies to regional, other UK and overseas. However, the interview responses have shown that, whilst ceramic firms do co-operate with each other on product innovations, they frequently manufacture products for each other when needed, and this is co-operation and opportunity for knowledge exchange. Another way that SOT firms appear to co-operate is by visiting each other’s factories, although there appears to be less inclination to do this currently. Whilst this type of co-operation is informal and ad-hoc, it does provide some opportunities for knowledge exchange.

Another area where co-operation appears to be fairly low is co-operation with research institutes, trade associations and other professional bodies. However, the interview findings apparently contradict this result as many interviewees said that they did co-operate with trade associations. From the interview evidence, though, it appears to be the biggest firms who co-operate more with trade associations. Hence, this is another opportunity for SOT cluster firms and trade/professional associations to get together to identify ways to support and encourage the cluster’s smaller firms to co-operate more. From the questionnaire findings it is also possible to interpret that cluster firms had not increased co-operation over the five-year period. For example, when asked if they had engaged in more, the same amount, or fewer collaborative projects in 2015 than they had in 2010, five out of six respondents said that they had engaged in about the same number. Only firm ‘A’ said that they had engaged in more collaborative projects in 2015 than they had done in 2010 (see table 6.13).

From the questionnaire and the interview findings, it is clear that SOT survey firms are involved in a range of formal and informal relationships, that are both long-term and short-term in nature, and that the majority of those relationships are with suppliers and customers (product and process innovations) and, to a much lesser extent, with trade associations, research institutions and others (mostly for information). These types of relationships can be

classed as 'strong ties', *e.g.* with trade associations[136], and 'weak ties', *e.g.* with suppliers, customers and research institutions. According to the strategic management literature on networks, weak ties trigger technological innovation, whereas strong ties offer great depth but little diversity of knowledge (Julien *et al*., 2004; Tallman *et al*., 2004). Hence, based on the academic literature, the SOT cluster has a further opportunity to: strengthen their existing weak ties, *e.g.* for other than information seeking purposes; and, to establish new weak ties with the aim of creating new knowledge exchange opportunities for the SOT cluster.
From the interview responses, it was also apparent that a lack of trust exists between firms in the SOT cluster. Although interviewees were not asked specific questions about trust, several of them brought up trust as an issue. According to the strategic management literature on networks, it is the social capital and mutual trust within networks (clusters) that makes firms, associations and public agencies engage in processes of self-organised, interactive learning (Simmie, 1997; Storper, 1997; Braczyk *et al*., 1998; Cooke and Morgan, 1998; Lorentzen, 2008). On the one hand, the lack of trust between cluster firms, evidenced by the way they keep their product innovations secret, can be viewed as a strength of the cluster as it is a driver of innovation (discussed earlier, see 6.7.1). On the other hand, it can also be viewed as a weakness of the cluster as firms are reluctant to co-operate in other ways that may benefit the whole cluster, *e.g.* supply chain and process innovations.

One area where interview respondents said that they would like to see more co-operation is employee training, *i.e.* because no one firm is big enough to provide enough employees to make their own training course viable. Lack of sufficient training in the industry is a weakness of the SOT cluster. However, it is also an opportunity for cluster firms to co-operate with each other and with local colleges and universities, possibly through a co-ordinator, *e.g.* from the BCC, to establish training needs and to organise training programmes that will benefit the whole cluster. Other areas where firms said they would be willing to co-operate are in the supply chain, *e.g.* purchasing and producing inputs, and in promoting the 'made in Stoke-on-Trent' brand. These are further opportunities for the SOT cluster to co-operate, possibly again through third-party organisations such as the BCC and the local Chamber of Commerce. Third party organisations such as the BCC also have an opportunity to 'pull' SOT cluster firms more closely together to share a common vision, as the interview evidence shows that SOT cluster firms do not see themselves as part of a cluster and, therefore, this is a weakness of the SOT cluster. According to Lorenzen (2002),

[136] Strong ties are intense relations between agents of great similarity. In the case of the SOT cluster, strong ties would include industry trade associations, such as the BCC, and other ceramics manufacturers.

when firms refrain from networking, it is often because of misaligned expectations about each other, and this, it seems, is the current situation regarding SOT cluster firms.

6.7.3: Conclusions on the Effects of the Cluster's Past Dominant Firms

The evidence from the interviews indicates that, whilst Wedgwood and Doulton brought many benefits to the SOT cluster during their existence, they also brought many disadvantages in the latter years of their reign over the industry that left the SOT cluster in a weakened position. The benefits to the cluster are thought to have been in attracting and developing the supply base and in innovating in both product and process technologies. They also brought 'reputation' to the industry, and that, in turn, attracted new firms to come and set up in SOT. Wedgwood and Doulton also set industry standards that other cluster firms aspired to, as well as providing excellent training opportunities for other ceramic firms in the SOT cluster. They were also good for employment in the region with thousands of employees between them. It is clear from the evidence that during their heyday both firms brought many 'cluster benefits' (Porter, 1990), or 'agglomeration benefits' (Audretsch, 1998; Feldman, 1994) to the SOT cluster and they provided many 'knowledge creating opportunities' (Arikan, 2009).

In summary, the general opinion of interviewees was that Wedgwood and Doulton were not good for the SOT cluster overall, for the following reasons. Firstly, they were not good for competition as their acquisition strategies significantly reduced the number of local competitors in the SOT cluster, thus negatively affecting the clusters innovation capacity. The common view from interviewees was that Wedgwood and Doulton acquired firms to deliberately eliminate their competitors. Secondly, towards the end of their dominance, they were not good for employment in the cluster as, aside from closing down many of the acquired firms, their own eventual decline resulted in thousands of job losses in the SOT cluster. Thirdly, the significant number of job losses in the industry resulted in the loss of specialised skills in the cluster, *i.e.* many employees looked for work in other industries and other places outside the cluster (see also chapter 5.5.1). This is evidence of a loss of 'architectural' knowledge (Matusik and Hill, 1998) from the cluster (see chapter 5.2.1). The loss of such knowledge that takes many decades to accumulate, no doubt left the SOT cluster in a very weakened state. Finally, consolidation in the industry, along with the eventual disappearance of Doulton (acquired by Wedgwood in 2005) and then the decline of Wedgwood (in receivership in 2009), affected both competition and the supply base in the SOT cluster as many suppliers closed down or moved out of the region.

The effect on competition was to significantly reduce the number of competing firms in the cluster and this was not good for the innovative capacity of the cluster overall (see also chapter 4.5.1). Thus, consolidation in the industry is seen as another weakness of the SOT cluster from the 1960s[137] up to the end of the 2000s. Moreover, the loss of much of the supply base in the SOT cluster is further evidence of a loss of knowledge and knowledge creating opportunities in the cluster. The loss of ceramics firms and suppliers are seen as a loss of cluster benefits, therefore this is another weakness of the cluster during the latter part of the 2000s. According to Porter (1990) national competitive advantage in an industry is lost when conditions in the national diamond no longer support and stimulate investment and innovation to match the industry's evolving structure, *i.e.* loss of cluster benefits. Moreover, Rosenfeld (1997) identifies a 'latent or underachieving cluster' as one where scale and geographic concentration exist but the potential is not fully realised, generally because the economic and social fabric is weak. Interaction among workers and employees is weak and the businesses involved neither share a vision of the future nor think of themselves as a cluster. According to Rosenfeld, one reason for this may be because the cluster is dominated by branch plants and large corporations (p. 9), and the evidence indicates that this may have been the case in the SOT cluster prior to 2009. Dominant firm effects on the SOT cluster are discussed further in the conclusions chapter of this thesis.

6.7.4: Conclusions on the Role of the Cluster's New Dominant Firms

From the interview evidence, it appears that the SOT cluster's new dominant firms are taking very different, more inclusive, roles in the cluster than the previous two dominant firms. For example, power and control appear to be more balanced in the cluster today as the four largest SOT cluster firms are of a similar size, although they are nowhere near as big as Wedgwood and Doulton were. According to the academic literature (Lorentzen, 2008; Bell, 2009; Belso, 2010), the balance among actors depends on the governance structure of the network (cluster). In the past, the SOT cluster was governed by Wedgwood and Doulton, who may have had disproportionate authority or influence over which interactions took place and how they were carried out (Sacchetti and Tomlinson, 2009). Thus, based on the evidence from the interviews, control in the SOT cluster appears to be less hierarchical today than it was pre-2009, when Wedgwood was still the dominant firm in the industry, and this is identified as a strength of the cluster.

[137] When Wedgwood and Doulton started their acquisition strategies (see also chapter 4.3.6).

However, the new large firms in the cluster have only been in a dominant position, in terms of size, for a relatively short period of time. Thus, their impact on the current competitive advantage of the whole SOT cluster can only be based on their performance over recent years, which is quite impressive (see chapter 4, Table 4.2), and on what the interviewees said their role is or should be in the SOT cluster. For example, 'paternalistic', 'ambassadorial', 'gatekeeper' (Giuliani, 2002) and 'lighthouse' (Gemser, 1996) are all terms that the interviewees used to describe their roles in the cluster. Nevertheless, there is no further evidence to support these claims. Consequently, the role of current dominant firms in the SOT cluster is identified as a topic for further research in the future, *e.g*. in 5-10 years time. However, based on the evidence from interviews, and also from chapter 4 (see 4.2.3), the cluster's new dominant firms can be identified as a strength of the SOT cluster. These new dominant firms also have an opportunity to work together more with other cluster firms, *i.e.* to co-operate for the benefit of the whole cluster.

6.7.5: Chapter Findings Mapped to the Objectives and the Theoretical Framework

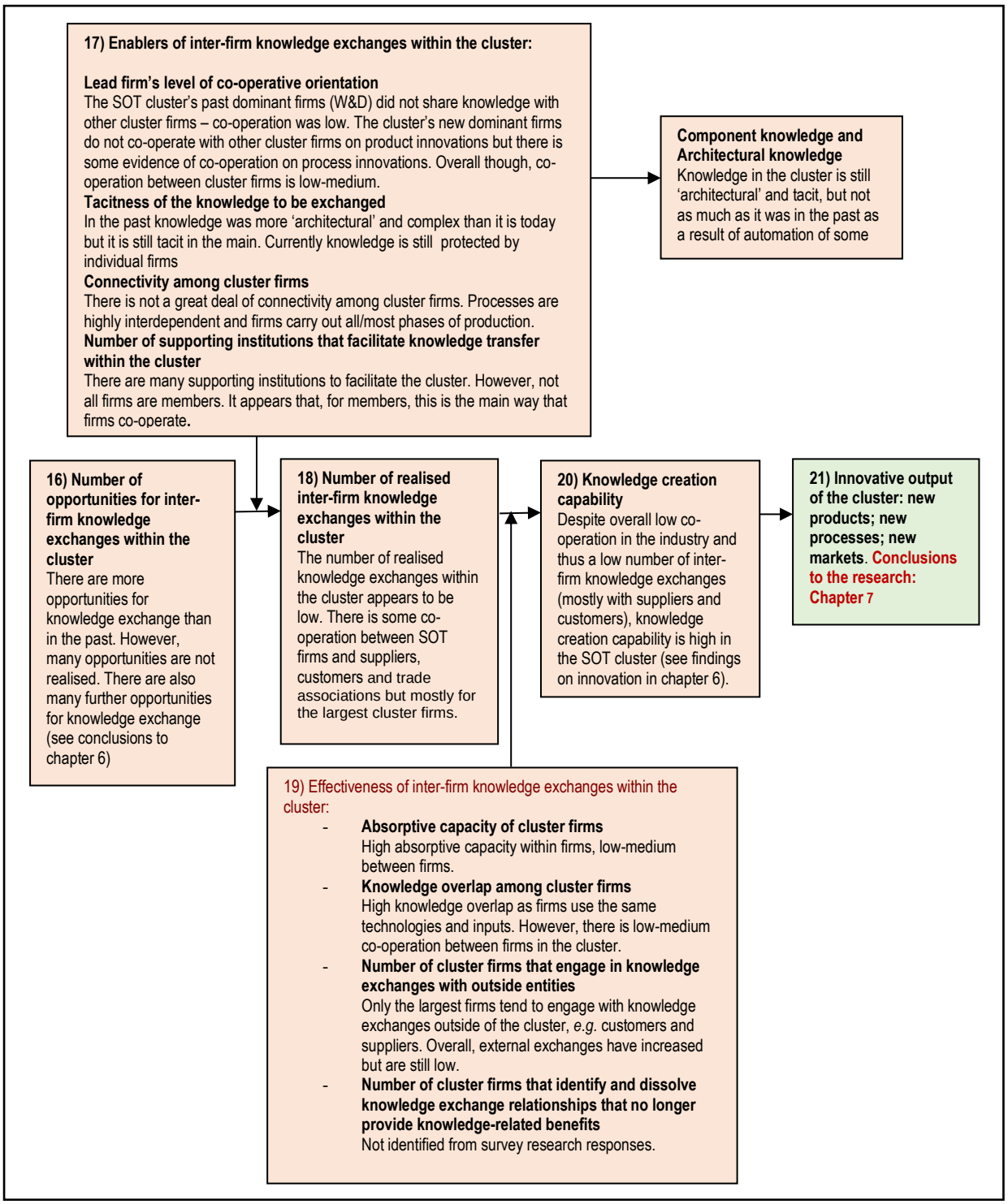
This chapter set out to determine the situation regarding innovation and co-operation in the SOT cluster in 2015 (objectives 6-8) and all three of the objectives have been fully achieved. This chapter also set out to determine the role of the SOT cluster's dominant firms past and present (objectives 9-10) and these two objectives have also been fully achieved. Table 6.14 maps chapter six findings to the research objectives. Figure 6.1 below maps chapter six findings to relevant sections of the theoretical framework.

The next chapter, chapter seven, provides detailed conclusions on all three chapters of the empirical findings, drawing together the strengths, weaknesses, opportunities and threats and linking the findings to the research propositions. It also makes recommendations to interested parties, as well as providing a discussion of the research contribution to knowledge and a reflection on the methodologies used in the research study.

Table 6.14: Chapter Findings Mapped to Objectives 6 – 10

Stage 3 Research Objectives – Continuing to Establish the 'Need for Co-operation' and Establishing Levels of Innovative and Co-operative Activity	Link to Propositions	Data Requirements	Link between this chapter and objectives
6. To determine the number of core firms in the cluster in 2015 that leverage the same general purpose technology vi. Are all core firms fully vertically-integrated? vii. Is there any evidence of specialisation?	P4, P4a	**Primary Research** Questionnaire on Innovation: 1. Q1.5 2. Q1.5	Section 6.1
7. To determine the output of innovative activity in the cluster between 2010 and 2015. i. Establish whether product innovation has increased/decreased ii. Establish whether process innovation has increased/decreased viii. Establish whether other forms of innovative activity have increased/decreased, *e.g.* markets and marketing ix. Identify the main reasons why some firms innovate and others don't. x. To determine the success of the cluster's innovative activities	P8, P8a	Questionnaire on Innovation: 1. Q 2.1 – 2.4 2. Q 3.1 – 3.2 3. Q4.1 – 4.4 4. Q7.1 – 7.2 + Interview question 5. Q5.4 – 5.5	Section 6.2 – 6.3
8. To establish the degree of inter-firm knowledge exchanges within the cluster between 2010 and 2015. i. Establish the existence and nature of horizontal co-operation & collaboration ii. Establish the existence and nature of vertical co-operation and collaboration iii. Establish the presence of formal and informal institutions that support the SOT industry cluster iv. Establish lead firm's level of co-operative orientation v. Identify the number of knowledge exchanges within the cluster vi. Identify the type and depth of knowledge exchange relationships within the cluster vii. Identify the main reasons why some firms co-operate and others don't. viii. Identify the number of firms who exchange knowledge with outside (the cluster) entities	P1, P1a P2, P2a P3, P3a P10, P11	Questionnaire on Innovation and other sources: 1. Q 6.1 – 6.4 2. Q 6.1 – 6.4 3. Secondary research (data exists) 4. Primary research interviews 5. Q 6.1 – 6.4 plus interviews 6. Interview question 7. Interview question 8. Interview question	Section 6.4 – 6.5
Stage 4 Research Objectives – Power & Control and The role of Dominant Firms	**Link to Propositions**	**Data Requirements**	**Link between this chapter and objectives**
9. To establish the balance of power and control within the SOT cluster in 2016 iii. Is power and control balanced across firms? iv. Is balance and control hierarchical, *i.e.* do dominant firms have more control?	P3, P3a	**Primary Research** 1. Interviews 2. Interviews 3. Builds on findings from Chapter 4 of this thesis (objective 1 (vii))	Section 6.6
10. To determine whether dominant firms have had a positive or negative effect upon competition and co-operation in the SOT cluster between 1980 and 2016. i. Ascertain the motivations behind dominant firm strategies and their effects upon competition and co-operation in the cluster ii. Establish whether dominant firms have taken a prominent role in facilitating knowledge exchange within the cluster iii. Establish whether dominant firms have established linkages outside the cluster	P10, p11	**Primary Research** 1. Interviews 2. Interviews 3. Interviews and questionnaire Q 6.2	Section 6.6

Figure 6.1 Chapter Findings Mapped to the Theoretical Framework



7. Overall Research Conclusions, Contribution to Theory and Reflection on Methodologies

7.1: Introduction

The main aim of this research study was to determine the strategic health, *i.e*. competitive advantage, of the SOT ceramics cluster, tableware and giftware sector. According to Porter (1998), competitive advantage depends on making more productive use of inputs, which requires continual innovation (p.78). The competitive advantage situation of the SOT cluster is determined in this chapter by further analysing and evaluating the research findings on the impact that co-operation, competition, path-dependence and dominant firms' decisions have had on evolutionary processes and innovative output in the SOT industry cluster. Chapter four of this thesis presented and evaluated findings on the evolution of the SOT cluster from 1960 to up to 2016, it also identified demand conditions, competitive factors and the cluster's dominant firms past and present. Chapter five of this thesis presented and evaluated findings on opportunities for knowledge creation, throughout the cluster's evolution and development. Chapter six of this thesis presented and evaluated primary research findings on more recent innovative activity and co-operation, as well as new findings on the roles of the cluster's dominant firms past and present. Throughout each of these three chapters detailed conclusions were drawn in light of the academic literature and findings were clearly mapped to the research objectives (see tables 4.8, 5.3 and 6.14). The findings provide evidence that all of the research objectives have been achieved.

In this chapter conclusions from all three empirical chapters are gathered together and are presented as follows: first, a SWOT[138] analysis is performed to determine the strengths, weaknesses, opportunities and threats facing the SOT cluster (7.2); second, the research findings are mapped to each of the propositions identified in the literature review and further conclusions are drawn (7.3); third, an overall conclusion is made on the current strategic position of the SOT cluster (7.4); finally, recommendations are made to SOT cluster firms, policy makers and other interested parties (7.5).

[138] SWOT is an acronym for Strengths, Weaknesses, Opportunities and Threats. By definition, Strengths (S) and Weaknesses (W) are considered to be internal factors over which you have some measure of control. Also, by definition, Opportunities (O) and Threats (T) are considered to be external factors over which you have essentially no control. SWOT Analysis is the most renowned tool for audit and analysis of the overall strategic position of the business and its environment. Source: Management Study Guide, [ONLINE]. Available from: http://www.managementstudyguide.com/swot-analysis.htm. [Accessed 14 June 2017]

In addition to the main conclusions this chapter also presents, a discussion of the researcher's contribution to knowledge (7.6), a reflection on the primary research methodologies employed (7.7), and identification of areas for future research (7.8).

7.2: SWOT Analysis of the SOT Cluster

This section presents a SWOT analysis of the SOT ceramics cluster based on the collated research findings from all three empirical chapters. SWOT analysis is an appropriate tool to analyse the cluster findings as it is a popular strategic framework that has been used many times before to assess local economies. For example, Ivano Frankivska in the Ukraine (citiesalliance.org) and the CLUSTERS3 Project in Europe (tci-network.org). Other reasons for using SWOT are that it requires limited quantitative/statistical data input, and it is relatively easy to understand and deploy. Appendix 18 presents the full SWOT analysis for the SOT cluster and content is referenced to relevant sections in each of the three empirical chapters. In this section, the SWOT findings are summarised.

7.2.1: Summary of SWOT analysis

From the SWOT analysis many strengths have been identified for the SOT cluster. A key strength is that the cluster has a very long history of success and a good reputation that is recognised globally. Despite experiencing a severe and prolonged decline in the industry (circa 1979-2010[139]), the industry has survived and is currently undergoing a period of rejuvenation. The majority of the SOT cluster's firms appear to be performing well and have increased sales, profits and employees steadily over the last seven years. Another key strength is that cluster firms are highly innovative, they follow niche strategies in mid-premium segments and they compete on the basis of differentiation. Moreover, the findings indicate that the largest cluster firms innovate across a wide range of product, process, marketing and organisational activities. Despite the fact that the cluster was dominated in the past by Wedgwood and Doulton, who may have not always acted in the best interests of the cluster, power and control appear to be more evenly balanced across the cluster's five current largest firms, and this is possibly another strength. There are also many suppliers still located in the SOT cluster, albeit not as many as in the past, and these firms provide cluster benefits such as rapid and easy access to inputs and new technologies. Whilst the presence of local suppliers is a strength for the SOT cluster, this is an area that could be strengthened further. There are also many related and supporting institutions in the cluster,

[139] The industry's sales peaked in 1978 and then declined (Imrie, 1987).

and their number appears to have increased over recent years. These supporting institutions provide cluster benefits to firms who are members, *e.g.* knowledge creation and knowledge exchange opportunities, and thus they are another strength of the cluster.

In addition to strengths the SOT cluster also has several weaknesses. Consolidation and decline in the cluster, between 1960 and 2008[140] (see chapter 4.3.2), led to the demise of many firms and well known pottery brands. In addition, as a result of the decline in the industry (see above) coupled with the demise of the cluster's two largest firms, many supply firms left the cluster. Moreover, firm closures in the cluster resulted in the loss of many jobs and the loss of tacit knowledge from the cluster. Overall, the effects of consolidation and decline led to a significant decrease in cluster benefits that left the cluster in a much weaker state. Furthermore, there have been very few new entrants into the cluster since 1960 and this is a significant weakness for the cluster and a threat to its long-term survival. Another key weakness for the cluster is that cluster firms (ceramics manufacturers) appear not to co-operate that much with each other, or with external firms and /or supporting institutions, this is especially true for smaller firms. There also appears to be no differences in co-operative behaviour across segments, i.e. firms across all sectors (domesticware, hotelware, giftware, etc.) appear not to co-operate with each other. The findings indicate that it is the smallest firms in the cluster who appear not to take advantage of cluster benefits that are available to them, *e.g.* membership of trade and professional institutions and financial support that may be available to them. The findings also indicate that SOT cluster firms do not trust each other and this is not good for co-operation and knowledge creating opportunities and, therefore, this is another weakness of the SOT cluster.

Several opportunities have been identified for the SOT cluster and these are presented in more detail in the recommendations section of this chapter (see 7.5). In this section the key opportunities are briefly summarised. Moreover, the key opportunities presented here are closely linked to some of the weaknesses discussed in the previous section, *i.e.* they are all connected to the apparent lack of co-operation that appears to be deeply embedded in the culture of the cluster. In summary, SOT cluster firms have many opportunities to co-operate more with each other, and with supporting firms and institutions, across a wide range of issues and areas. The outcomes of increased co-operative activity could significantly

[140] According to Tomlinson and Branston (2017), "During the late 20th century, the district (i.e. SOT cluster) entered a 'long decline' (1979–2008) as firms struggled to adapt to the challenges posed by globalization and other exogenous shocks…..Since 2008, there have been signs of a potential renaissance in the fortunes of the district" (p. 5).

strengthen whole SOT cluster, *i.e*. there would be a significant increase in cluster benefits, such as shared training, skills development, shared purchasing and other supply chain initiatives. An increase in cluster benefits could benefit all firms in the SOT cluster, especially the smaller firms who appear to co-operate the least. For example, an increase in cluster benefits could provide small firms with access to information, new technologies and finance. Improved benefits for smaller firms may also stimulate new firm entrants into the cluster.

In addition to opportunities, a number of threats were identified which, if unaddressed, could significantly weaken the SOT cluster. Firstly, it has already been established that the SOT cluster is under constant threat from global competition. If global competition increases, cluster firms could choose to embark upon price-based competitive strategies. Not only might this not be good for cluster firms' profits, in the long term it may not be good for innovation in the SOT cluster, as firms will have fewer financial resources to invest in new products, processes and other innovations. Secondly, the general mistrust that cluster firms appear to have in each other is another threat as, at a time when the industry is facing growing global competition, cluster firms appear not to be working collectively to promote the 'made in Stoke-on-Trent' brand, or to develop new technologies that could benefit the whole cluster. Finally, as stated in the previous section, the lack of new firm entrants in the SOT cluster is seen as a significant threat to the long-term survival of the cluster. New firms are needed to replace firms who inevitably exit the industry over time. Without new entrants, the SOT cluster is likely to shrink further and eventually die altogether.

7.3: The Empirical Findings Mapped to the Research Propositions

This section maps the research findings from various chapters to the research propositions. Conclusions are drawn throughout and are made in light of academic theory.

7.3.1: Propositions 1 and 1a

Proposition 1. Successful industry clusters will exhibit a strong network of cluster interrelationships involving both strong and weak ties.
Proposition 1a. Failing industry clusters will exhibit a weak network of cluster interrelationships.

The findings from chapters five and six provide evidence of a limited number of both strong and weak ties existing in the SOT cluster. Strong ties are more formal relationships, such as

alliances and some contractual agreements, weak ties offer access to diverse information and are thought to be of higher value than strong ties (Julien *et al.*, 2004; Tallman *et al.*, 2004). In the SOT cluster there is evidence of strong ties between cluster firms and the industry's trade association, the BCC, and with other supporting institutions, *e.g.* Lucideon, and the Ceramic Skills Academy. However, it appears to be mostly the largest firms in the SOT cluster who partake and work with these organisations. Another strong tie is between ceramics manufacturers themselves who often manufacture ceramics products for each other, this is assumed to be a contractual arrangement. In addition to strong ties, there is also evidence of weak ties existing in the cluster, *e.g*. between ceramics firms and suppliers, customers, other trade associations and research institutes. From the evidence though, it appears that SOT cluster firms, in the main, mostly co-operate with their suppliers and customers. Moreover, it appears to be mostly the largest cluster firms who co-operate with the BCC and other supporting institutions. Linked to network strength is the concept of 'trust', which is considered important in creating and sustaining collaboration between economic actors in clusters (Maskell, 2001; Newlands, 2003). The evidence in chapter six of this thesis indicates that SOT cluster firms do not trust each other. Based the evidence, the conclusion is that, although SOT cluster firms do have a network consisting of strong and weak ties, that network of cluster relationships is not as strong as it could be. However, the SOT cluster cannot be classed as a failing cluster either as, based on conclusions drawn earlier (SWOT), the SOT industry is much stronger now than it was pre-2009, and is experiencing a period of rejuvenation. Consequently, neither proposition 1, nor 1a, are acceptable to explain the SOT cluster's current situation regarding the strength of its network ties as the cluster appears to lie somewhere in-between the two propositions, *i.e*. *the SOT cluster appears to be a successful cluster, but it has a weak relationship network comprising of a limited number of strong and weak ties*.

7.3.2: Propositions 2 and 2a

Proposition 2. Firms in successful industry clusters will demonstrate strong absorptive capacity as evidenced by a significant number of inter-firm linkages.
Proposition 2a. Firms in failing industry clusters will demonstrate weak absorptive capacity as evidenced by few (no) inter-firm linkages.

Absorptive capacity is the ability of the firm to acquire, assimilate, adapt and apply new knowledge, that is 'to learn' (Zahra and George, 2002; Lorentzen, 2008; Grandinetti, 2016). Absorptive capacity depends on a firms internal resources, *i.e.* capabilities to exploit external resources. Investing in developing internal resources can lead to greater success in

exploiting external resources and the effects can positively influence a firm's innovative performance in clusters. From the evidence presented in chapter six, it is clear that absorptive capacity in SOT cluster firms is high, *i.e.* SOT survey firms are all highly innovative in product, process, marketing and organisational activities. However, as discussed in the previous section (7.3.1), whilst absorptive capacity might be high, there is little evidence of a significant number of inter-firm linkages existing in the SOT cluster. According to the academic literature, participation in a cluster network may provide access to external resources, but it can also involve relations of dominance and dependence that may prevent firms from co-operating (Lorentzen, 2008; Bell, 2009; Belso, 2010). From the findings in chapters four, five and six of this thesis, it appears that this was the case for the SOT cluster during the era when Wedgwood and Doulton were the two dominant firms in the cluster. Since 2009, and the demise of these two dominant firms, the cluster has evolved into a less hierarchical structure, comprising five large firms of roughly similar size. Consequently, there should currently be more opportunities for cluster firms to build network relationships, *i.e*. to increase their absorptive capacity. However, based on the questionnaire and interview findings, there is little evidence of extensive co-operation taking place in the SOT cluster. Consequently, neither proposition 2, nor 2a, are acceptable to explain the SOT cluster's current situation regarding absorptive capacity evidenced by strong inter-firm linkages as the SOT cluster appears to lie somewhere between the two propositions, *i.e*. *the SOT cluster has strong absorptive capacity but weak inter-firm linkages*.

7.3.3: Propositions 3 and 3a

Proposition 3. In successful industry clusters, control will be equally balanced across firms, if there are dominant firms they do not abuse their powerful positions.
Proposition 3a. In failing industry clusters, control will be concentrated into the hands of a few dominant firms who use their power to exert control over other cluster firms.

Arikan and Schilling (2011), in their work on governance structures in industrial districts, contend that different governance types in clusters can lead to radically different types of interactions inside clusters (p. 774). In some clusters, one or more large firms can have disproportionate authority or influence over which interactions take place and how they are carried out (Sacchetti and Tomlinson, 2009). From the findings in chapters four, five and six of this thesis, it is clear that this was the case up to 2008, when Wedgwood and Doulton (up to 2005) were the two dominant firms in the SOT cluster. In the latter years of their dominance it appears that Wedgwood and Doulton were disadvantageous for the SOT cluster, *e.g.* they did not share knowledge with the rest of the cluster and they were

responsible for the loss of many firms, brands, suppliers and employees in the industry. These findings support the findings of Sacchetti and Tomlinson (2009) who also carried out research in the SOT cluster and found:
"*the larger ceramics firms have neglected the cluster's longer-term development, in particular in relation to new investment capacity and the skills base*" (p. 1854).

Furthermore, it appears that balance and control were concentrated into the hands of Wedgwood and Doulton, and that they may have used their power to exert indirect control over other cluster firms, *e.g.* they could dictate much of the behaviour in the cluster due to their large bargaining power (Belso, 2010; Arikan and Schilling, 2011). Governance in the cluster during this era can also be likened to a 'network of direction' (Sacchetti and Sugden, 2003), as the evidence indicates that Wedgwood and Doulton may have pursued their own strategic objectives, often with little consultation with their trading partners and/or other stakeholders in the cluster.

Since 2009, *i.e.* since the decline of Wedgwood, the situation in the SOT cluster has changed and, as found in chapters four and six of this thesis, the SOT cluster now has several new dominant firms who, although much smaller than Wedgwood and Doulton, are of similar size to each other. Therefore, it now appears that power and control are much more balanced in the SOT cluster, with no one/few firms having control. Consequently, SOT cluster firms now have the opportunity to move towards a 'network of mutual dependence' structure (Sacchetti and Tomlinson, 2009), whereby cluster firms can engage in a series of ongoing economic relationships with each other that support and re-enforce co-operation, reciprocity and mutually supportive actions across the cluster. Based on these findings proposition 3a is accepted, *i.e. the SOT cluster appears to be a successful industry cluster, where power and control are equally balanced across firms, and where the largest firms do not abuse their powerful positions*.

7.3.4: Propositions 4 and 4a

Proposition 4. Firms in successful industry clusters are more likely to have a higher need for co-ordination as evidenced by high technological complexity and highly separable processes.
Proposition 4a. Firms in failing industry clusters are more likely to have a little need for co-ordination as evidenced by low technological complexity and inseparable processes.

From the literature review it was established that the 'need' for co-ordination is an important factor to be taken into consideration when examining co-operation within a cluster. Factors influencing the need for co-ordination are the technological complexity of the cluster's production processes and the separability of those processes (Arikan and Schilling, 2011). According to Arikan and Schilling, the primary factor that leads to a high need for co-ordination is a combination of complexity and imperfect separability (p. 3). Conversely, a low need for co-ordination would be evidenced by low technological complexity and inseparability of processes. Chapter five of this thesis provided definite evidence that, up until 1960, the SOT cluster's technological complexity, *e.g.* equipment and the processes themselves, was low, but knowledge complexity was high, *e.g*. tacit knowledge that was 'owned' by individuals and groups and was highly protected (invisible to others) and often unique to the firm. Moreover, the findings also show that production processes were inseparable due to the interdependent nature of the processes and the difficulty in separating cluster firms' production activities. Since 1960 technological complexity increased slightly, *e.g.* there was some automation of processes but mainly by the larger firms. However, the industry is still considered to be a fairly low-technology industry today. Also, since 1960 the findings show that, despite some automation of processes and some codification of knowledge, SOT cluster firms' processes remain highly interdependent, *i.e.* inseparable.

Furthermore, the findings presented in chapter six also show that cluster firms still carry out all/most phases of the production process. Therefore, based on the findings, there are two conclusions that can be drawn: 1) pre-1960 the SOT cluster had little need for co-ordination (co-operation) due to high complexity and inseparable processes; 2) post-1960, despite the automation of some processes and the codification of some knowledge, the SOT cluster's knowledge remains highly complex and processes remain mostly inseparable. Consequently, the overall conclusion that can be drawn is that, although the need for co-operation may have increased slightly, it still remains low in the cluster. These findings may also partially explain the cluster's historical reluctance to co-operate with each other. Based on these findings, neither proposition 4, nor 4a, are acceptable to explain the situation regarding the need for co-ordination in the SOT cluster, *i.e. the SOT cluster appears to be a successful industry cluster that has little need for co-ordination due to high technological complexity and inseparable processes.*

7.3.5: Propositions 5 and 5a

Proposition 5. Successful clusters facing the challenges of globalisation will have adopted global/local strategies, characterised by a strong global network of agents from the core industry, plus related and supporting industries.
Proposition 5a. Failing clusters, facing the challenge of globalisation, will not have made new linkages with firms and institutions outside the cluster. Moreover, the number of inter-cluster linkages will have reduced.

An emerging theme in the literature on clusters and networks is one that acknowledges the need, in response to changing technological and global economic conditions, for non-local knowledge relations in order to maintain and vitalise the local characteristics of clusters (Belussi and Asheim, 2003; Bathelt *et al*., 2004; Cooke, 2005; Giuliani and Bell, 2005; Anderson and Lorenzen, 2007; Hervas-Oliver *et al*., 2011; Li *et al*., 2013; Boschma, 2015). For example, according to Hervas-Oliver *et al.,* (2011), one way of overcoming negative lock-in effects is to develop a cluster's external ties, *i.e.* to develop relationships with agents outside the cluster or with foreign firms. From the findings presented in chapter six of this thesis it is evident that some SOT cluster firms have developed co-operative relationships with agents overseas. However, it is mainly the larger firms in the SOT cluster who have formed relationships outside the cluster, and these relationships are mainly with suppliers and customers. Several of the cluster's firms also outsource some of their production overseas. There is also evidence in chapter five that new knowledge has entered the cluster from elsewhere in the UK in the form of management appointments from other industries in other UK locations. However, many of the cluster's smaller firms have not formed relationships with other firms and institutions from outside the cluster. Moreover, there is little compelling evidence of SOT cluster firms forming new relationships with supporting institutions from outside the SOT cluster.

Consequently, whilst the findings provide some evidence of 'new' knowledge entering the SOT cluster, the number of new relationships with external firms and institutions is deemed relatively low. The SOT cluster has an opportunity to strengthen their external ties and to possibly become a 'node of a global network', keeping their historical and social identity but absorbing knowledge and technologies developed somewhere else (Belussi and Pilotti, 2002; Simmie, 2002; Belussi and Sedita, 2009; Boschma, 2015). Based on the findings, neither proposition 5, nor 5a, are acceptable to fully determine the situation in the SOT cluster regarding the adoption of global/local strategies, *i.e. the SOT cluster appears to be a*

s*uccessful cluster that has faced the challenges of globalisation by adopting some global/local strategies, however their global network of agents is weak.*

7.3.6: Propositions 6 and 6a

Proposition 6. Successful industry clusters will demonstrate vigorous competition between cluster firms as evidenced by a large number of firms in the industry and a constant stream of new entrants.
Proposition 6a. Failing industry clusters will demonstrate vigorous competition between cluster firms as evidenced by a declining number of firms in the industry and few (no) new entrants.

According to Porter (1990), one of the main elements of the National Diamond system is domestic rivalry, as it promotes the upgrading of the entire diamond system through new entrants and innovation. The relationship between competition and new entrants can be viewed as a virtuous circle, *i.e.* new entrants increase the number of firms in an industry and thus provide greater competition for new ideas, and greater competition across firms can facilitate the entry of new firms specialising in new product niches (Jacobs, 1969; Dei Ottati, 1996). Diminished competition, on the other hand, perhaps as a result of industry consolidation, is cited as one of the most common and most fatal reasons for loss of cluster competitive advantage (Porter, 1990). Consolidation leading to a reduction in the number of firms in a cluster can stifle innovation, as rivals are no longer aggressive due to a lack of pressure and challenge (Porter, 1990; Dei Ottati, 1994).

From the findings in chapters four, five and six of this thesis, it is clear that competition has reduced in the SOT cluster due to severe consolidation since 1960, *i.e*. there are significantly fewer firms in the cluster now than in 1960. Consequently, there is significantly less local competition. Moreover, the findings indicate that there have only been three new entrants in the SOT cluster since 1960 that have grown to any significant size. The first is Emma Bridgewater, a ‘true’ new entrant, *i.e.* brand new start up firm and now the sixth largest firm in the cluster (see chapter 4, Table 4.2). The second is Steelite, the cluster’s current largest firm, who was a spin-off from Doulton and so not a ‘true’ new entrant. The third is Portmeirion, another ‘true’ new entrant and currently the second largest firm in the SOT cluster. Nevertheless, the findings from chapter six clearly indicate, that despite operating in different market niches, and so not directly competing with each other, vigorous domestic rivalry is taking place between cluster firms, evidenced by high levels of product,

process, marketing and organisational innovations. The findings also indicate that SOT cluster firms view each other as close competitors and they fiercely protect their innovations and new product ideas from each other. Moreover, intense global competition in all key markets has been shown to be another driver of competition between SOT cluster firms (see chapter 4.4.1 and SWOT). Based on the findings, neither proposition 6, nor 6a, are acceptable to fully determine the situation in the SOT cluster regarding vigorous competition, evidenced by a large number of firms and a constant stream of new entrants, *i.e. the SOT cluster appears to be a successful cluster, demonstrating vigorous competition between cluster firms, evidenced by strong innovative output, despite a significant decrease in the overall number of firms and very few new entrants*.

7.3.7: Propositions 7 and 7a

Proposition 7. In successful industry clusters firms compete mostly on the basis of differentiation.
Proposition 7a. In failing industry clusters firms compete mostly on the basis of low-cost/price.

According to Sacchetti and Tomlinson (2009), in many European regions the growth in international competition, mainly from low-cost operators in the Far East, along with the increased use of global outsourcing by cluster firms, "*has often had a painful impact upon local industry and employment levels, raising serious concerns of industrial hollowing-out*" (p.1837). The findings in chapters four and six of this thesis have shown that growth in international competition, mainly from low-cost operators in the Far-East, has had a negative impact on the SOT cluster. Moreover, the problems are thought to have been compounded by the increased use of global outsourcing by some of the SOT cluster's firms. The findings indicate that SOT cluster firms have reacted to these challenges by focusing on niche strategies at the premium end of the market, and by adopting differentiation and higher value added activities (see chapter six, Table 6.1). The strategic management literature also cites focusing on the higher end of the market as a strategy for dealing with low-cost competition from abroad (Porter, 1990; Pyke and Sengenberger, 1992; Sacchetti and Tomlinson, 2009). Thus, based on the findings, proposition 7 is accepted as the situation existing in the SOT cluster, *i.e. the SOT cluster is a successful cluster where firms compete mostly on the basis of differentiation*.

7.3.8: Propositions 8 and 8a

Proposition 8. In successful industry clusters there will be evidence of strong innovative output as measured by the adoption of new technologies, new markets and new product developments.

Proposition 8a. In failing industry clusters there will be evidence of weak innovative output as measured by the lack of adoption of new technologies, new markets and new product developments.

As discussed previously, from the literature review and from chapter six of this thesis, innovation is widely viewed as a driver of competition and *vice versa*. Innovation can be linked to the ability to come up with new and better ways of organising the production and marketing of new and better products (Porter, 1990; Lundvall, 1992; Malmberg and Power, 2005). Linked to innovative activity is industry life-cycle theory, which suggests that the focus of innovative activity can vary across different life-cycle stages. For example, Product innovation should be stronger at the beginning and end of an industry's life-cycle, whilst process innovation is often the focus during the rapid growth stage (Gemser, 1996; Giuliani, 2013; Sabol *et al*., 2013). In chapter five of this thesis, it was identified that the SOT cluster had progressed away from a period of maturity and decline into a period of rejuvenation (see chapter five, 5.5.2 and 5.6.3) where, according to the literature, innovative activity should be focused on product innovations. The findings in chapter six of this thesis (also see SWOT analysis) clearly indicate that SOT survey firms exhibit strong innovative output in all categories of innovative activity, *i.e.* product, process, marketing and organisational activities. SOT survey firms were particularly strong in product and organisational innovations over the five-year period of investigation.

In addition, they also significantly improved their innovation capabilities over the same period. Furthermore, when compared to the GPrix survey results, the findings indicate that a higher percentage of SOT survey firms carry out innovation activities. The findings also indicate that SOT firms improved their innovation capabilities more than GPrix firms over similar five-year periods. However, the evidence for SOT cluster firms entering new markets is less convincing (see chapter six, Table 6.1), as only two of the six questionnaire respondents indicated that they had entered new markets over the five-year period. Nevertheless, based on the findings for all other innovative activity, proposition 8 is accepted as the situation existing in the SOT cluster, *i.e. the SOT cluster is a successful industry cluster with evidence of strong innovative output as measured by the adoption of new technologies, new markets (by some firms) and new product developments.*

7.3.9: Propositions 9 and 9a

Proposition 9. In clusters where there is high modularity in product technology, there will be a high number of opportunities for inter-firm knowledge exchanges.
Proposition 9a. In clusters where there is low modularity in product technology, there will be a low number of opportunities for inter-firm knowledge exchanges.

Propositions 9 and 9a are linked to propositions 4 and 4a and the evaluation of complexity and imperfect separability. The conclusions for proposition 4 and 4a are that production processes are still mostly interdependent and inseparable in the SOT cluster, thus there is low modularity in product technology. Chapter five findings clearly indicate that, although the SOT cluster had historically had little need for co-operation in the past, the situation had changed a little over recent years due to consolidation effects (job losses), automation of some processes (some codification of knowledge) and global competition. Consequently, opportunities for inter-firm knowledge exchanges have increased slowly over recent years. However, the findings from chapter six of this thesis also clearly indicate that SOT cluster firms engage in a low number of inter-firm knowledge exchanges. Thus, it appears that, whilst more knowledge exchange opportunities exist in the cluster today, SOT firms do not take full advantage of those opportunities, possibly due to path-dependency and historical antecedents (see chapter 5.5.1).

According to the literature on clusters and governance systems (Bell *et al*., 2009; Belussi, and Sedita, 2009), initial governance choices made by transacting firms within clusters can enable and constrain the design of future transactions between these firms owing to path dependencies that reside in the governance devices themselves. Such path dependencies influence firms' ability to adapt to new circumstances. From the findings it appears that historically, SOT cluster firms have had little need to co-operate with each other, and that might partially explain their behaviour regarding co-operation. Competition is another factor that can influence the likelihood of firms engaging in co-operative activities (knowledge exchanges). According to Newlands (2003), when a cluster experiences mounting pressures of competition it may have a negative effect on the creation and maintenance of trust within the cluster, as firms may choose to trade-off between the benefits of mutual collaboration and the potential loss of competitive advantage. The interview findings in chapter six strongly indicate that cluster firms do not trust each other, and one of the reasons for this may be because they view each other as competitors. Therefore, based on the findings neither proposition 9, nor 9a, are accepted to explain the current situation in the SOT cluster regarding inter-firm knowledge exchanges, *i.e. in the SOT cluster, although there is mostly*

low modularity in product technology, the number of opportunities for inter-firm knowledge exchanges are increasing slowly. However, many SOT cluster firms do not take full advantage of these opportunities.

7.3.10: Proposition 10

Proposition 10. Failing industry clusters will have undertaken a significant process of consolidation resulting in a reduction in the number of firms and, in the emergence of one/few dominant firms who do not act in the best interests of the cluster as a whole.

The findings from chapter five of this thesis clearly identified that the SOT cluster experienced a severe process of consolidation and firm closures between 1960 and circa 2010 (see chapter 4.3). The number of SMEs (tableware and giftware ceramics manufacturers) in 1960 was 107, by 2010 this number had reduced to 24, and by 2016 it had reduced further to 16. The findings from chapter five also established the emergence and growth, mostly through acquisition, of the SOT cluster's two former dominant firms, Wedgwood and Doulton. Chapter five and chapter six also found that Wedgwood and Doulton, whilst providing many benefits to the cluster (agglomeration benefits) in the earlier part of their development paths, had not always acted in the best interests of the SOT cluster. The effects on the industry were particularly damaging to the cluster in the latter years of their dominance over the industry (see chapter 6.7.3). Moreover, the findings also indicate that Wedgwood and Doulton were mainly responsible for much of the consolidation that took place in the SOT cluster. The strategic management literature on networks of direction (Sacchetti and Sugden, 2003; Sacchetti and Tomlinson, 2009) identifies positive and negative implications of dominant firms within a cluster. On the positive side, the emergence of large dominant firms within a cluster can lead to new investment in technology on a scale which might not have been undertaken by smaller firms (Lazonick, 1993; Belso, 2010), and this appears to have been the case with Wedgwood and Doulton. On the other hand, the networks of direction model raises particular concerns for clusters, primarily relating to a cluster becoming locked-in to the objectives and strategic direction of a few or even a single firm (Sacchetti and Tomlinson, 2009). Based on the findings, this also appears to be the case with Wedgwood and Doulton (see chapter 6.6.1).

However, chapters five and six also identified that, since the decline of Wedgwood and Doulton (mid-late 2000s), the cluster has seen the emergence of five new dominant firms (currently the largest firms in the cluster) of approximately similar size. Moreover, the

evidence, whilst limited, indicates that the cluster's new dominant firms are taking more positive roles within the cluster (see chapter 6.6.4). Power and control also appear to be more balanced across the cluster with no one/few firms having disproportionate control. Therefore, based on the findings, proposition 10 is not accepted to explain the current situation in the SOT cluster regarding dominant firms, *i.e. the SOT cluster appears to be a successful cluster that has undergone a significant process of consolidation and now has a more balanced industry structure led by five large firms of roughly equal size. Moreover, early indications are that these firms are acting in the best interests of the cluster as a whole.*

7.3.11: Proposition 11

Proposition 11. Failing industry clusters are dominated by a few large firms who engage in competitive strategies resulting in a reduction in co-operation and innovation.

The findings from chapter six indicate that the cluster's past dominant firms appear to have engaged in competitive strategies that resulted in a reduction in co-operation and innovation in the SOT cluster (see chapter 6.6.1-6.6.3). As noted previously, Wedgwood and Doulton are thought to be responsible for much of the consolidation that significantly reduced the number of firms in the cluster which, in-turn, also reduced competition in the cluster. A reduction in competition, simply because there are fewer firms, reduces the overall innovative capacity of the SOT cluster (Porter, 1990). Moreover, the findings indicate that a major motive for Wedgwood and Doulton's acquisition strategies was deliberate elimination of competition. The findings also indicate that Wedgwood and Doulton did not share their knowledge with the rest of the SOT cluster, and this would have affected opportunities for knowledge exchange (co-operation) within the cluster. According to Sacchetti and Tomlinson (2009), lead firms might prefer their knowledge to remain hidden since it strengthens its hold over its strategic options and capabilities, particularly in relation to technological change (p. 1843), and this appears to be the case with Wedgwood and Doulton.

According to life-cycle theory (Gemser,1996), horizontal inter-firm linkages should be particularly dense at the beginning and end of the industry life-cycle (p.445). However, in the decline stage they may be weak due to negative competition or dominant firm effects that may be a feature of the cluster. It has been established in chapter five of this thesis that the SOT cluster was in the decline phase of the industry life-cycle from circa 1980 until circa 2005, thus horizontal linkages should have been strong during this period. However, the findings in chapters five and six indicate that there were few linkages between cluster firms

during this period and, that Wedgwood and Doulton may have been partially responsible for that. The view that dominant firms can have negative effects on co-operation and innovation in clusters is also noted in the strategic management literature. For example, according to Rosenfeld (1997), it is not uncommon for a regional cluster to be dominated by a small number of very large companies and they can wield considerable power over smaller subordinate suppliers (p.16). Such a situation can undermine reciprocity and trust and may partially explain why SOT survey firms appear to exhibit a general mistrust of each other. Based on the research findings, proposition 11 is not accepted to explain the current situation in the SOT cluster regarding dominant firm effects on co-operation and innovation, *i.e. the SOT cluster appears to be a successful cluster that was once dominated by two large firms who engaged in competitive strategies that resulted in a reduction in co-operation and innovation in the cluster*.

7.4: The Research Conclusions – the Current Strategic Position of the SOT Cluster

The conclusions drawn from earlier sections of this chapter clearly indicate that the SOT cluster exhibits many of the characteristics of a successful industry cluster. However, the findings have also identified several areas of weakness that need addressing to ensure the continuing success and long-term survival of the cluster.

Firstly, the SOT cluster has many key strengths that contribute towards its competitive advantage. One key strength for the cluster is its strong locational benefits that have developed over the several hundred years of its existence, despite the recent period of consolidation and decline. Locational benefits include access to suppliers and other related and supporting industry, such as the BCC, Lucideon and CATU. These benefits can be linked to the 'related and supporting industry determinant' in Porter's Diamond (1990). Another locational benefit for the cluster is that all core ceramic manufacturers are co-located near to each other and, whilst the evidence shows that SOT cluster firms do not compete directly with each other, they behave as if they are close competitors and this has resulted in strong innovation in the SOT cluster, this is evident across all innovative activities for the larger firms, and mainly in product innovation activities for smaller firms. Strong domestic rivalry is part of the 'firm strategy, structure and rivalry' determinant of Porter's Diamond (1990). Innovation is seen a key strength of the SOT cluster and an indicator of the cluster's competitive advantage. Another key strength for the SOT cluster is that the skills base in the cluster is still strong, despite many traditional skills having left the cluster after

the decline of the industry. Moreover, knowledge in the cluster is still highly systemic, architectural knowledge (Arikan and Schilling, 2011) that bestows higher-order factor advantages on the cluster (Porter, 1990 – factor conditions).

A further key strength for the SOT cluster is that the cluster has evolved into a less hierarchical mode of governance with power and control appearing to be more balanced between the cluster's largest firms (linked to 'firm strategy and structure' in Porter's Diamond (1990)). This was not the case in the past as, up until 2009, power and control were concentrated into the hands of Wedgwood and Doulton who may not have always acted in the best interests of the cluster. The cluster's new dominant firms are performing well, their success is seen as a strength of the cluster as they raise the profile of the whole industry. Potentially, their success may attract new suppliers, customers and, hopefully, new firm entrants. Another key strength for the SOT cluster is that demand for the cluster's products has grown, both at home and abroad and cluster firms are experiencing strong growth in domestic sales and exports. This can be linked to 'demand conditions' in Porter's Diamond (1990). Moreover, new export markets have been targeted by many of the cluster's largest firms. Overall, from the evidence, it appears that the SOT ceramics 'local diamond' has been significantly strengthened over recent years.

As identified in the strategic management literature (Porter, 1990; Dei Ottati, 1994; Newlands, 2003; Belussi and Sedita, 2009), the two key elements of successful industry clusters are competition and co-operation, and these two elements need to be balanced in order to ensure the long-term stability of the cluster. From the findings, it is reasonably clear that whilst overall competition appears to have declined in the SOT cluster due to consolidation, innovation is a key feature of the cluster and as such is responsible for much of the cluster's competitive advantage. However, in addition to the strengths identified in the cluster, several weaknesses were also identified, the most significant of which appears to be the low level of co-operative activity taking place in the cluster. In other words, co-operation appears to be out of balance with competition in the SOT cluster, despite their being many opportunities for knowledge creation and knowledge sharing. From the findings, it also appears to be the largest firms in the cluster who co-operate the most, but co-operation is mostly with suppliers and customers and with the BCC and a few other supporting institutions, *e.g.* Lucideon. It is the cluster's smallest firms who appear to co-operate the least and, although there is some evidence of co-operation with suppliers and customers, there is little evidence of small firms co-operating with supporting institutions. There is also

little evidence of cluster firms co-operating with each other on projects that may benefit the whole industry, *e.g.* on promoting the 'made in Stoke-on-Trent' brand and on joint supply chain initiatives such as purchasing groups. A further weakness that was identified for the cluster was the general atmosphere of mistrust that appears to exist between cluster firms, and this may partially explain cluster firms' unwillingness to co-operate with each other. There is some evidence in the literature that differences in the cultures of regions may contribute to differences in attitudes towards co-operation (Saxenian, 1994). From the evidence it would appear that the SOT cluster has historically had a low 'need for co-operation' (Arikan, 2011) and a long history of not co-operating, and this is deeply embedded in the culture of the cluster. A final weakness of the SOT cluster is that there have been very few new entrants into the cluster since 1960 and this is seen as a key threat to the long-term existence of the cluster.

Overall, based on all of the research findings, the final conclusion for the SOT cluster is that it is a relatively successful industry cluster, with strong competitive advantages based on innovation, niche strategies and differentiation. However, there are also weaknesses regarding cluster firms' propensity to trust each other, and to co-operate for the overall benefit of the cluster. Several opportunities were identified from the findings and are presented as recommendations in the following section.

7.5: Recommendations

1. The findings indicate that it is the smallest SOT cluster firms who appear to conduct low levels of co-operation on their process innovations. It is recommended that smaller cluster firms identify ways to co-operate more with suppliers on their process innovations, possibly through working with third party co-ordinators, *e.g.* the BCC and the local Chamber of Commerce in North Staffordshire.

2. The findings indicate that SOT cluster firms appear to be weak at developing external networks/linkages. It is recommended that all cluster firms investigate new methods for organising external relations, this applies to local/national/overseas partners. Again, possibly through working with third party co-ordinators, *e.g.* Lucideon.

3. The findings indicate that it is the smallest firms in the SOT cluster who appear to experience the most factors hampering their innovations, *e.g.* lack of qualified personnel, lack of information on technologies and financing/cost issues. It is

recommended that small firms investigate ways of working with organisations, such as the local Chamber of Commerce, the BCC and other supporting institutions, to identify ways of overcoming factors hampering innovations, *e.g.* Staffordshire University.

4. The findings indicate that SOT cluster firms may be willing to co-operate on promoting the 'made in Stoke-on-Trent' brand. It is recommended that SOT cluster firms investigate ways of collaborating to promote 'made in Stoke-on-Trent'. Again, possibly through third party co-ordinators, *e.g.* The City of Stoke-on-Trent Council.

5. The findings indicate that many SOT cluster firms appear not to take advantage of financial support that may be available to them. It is recommended that SOT cluster firms investigate ways of co-operating with policy makers and supporting institutions to take advantage of any government financial support that may be available to them.

6. The findings indicate that many of the smallest SOT firms do not take advantage of the available support from the BCC and other supporting organisations. It is recommended that smaller SOT cluster firms negotiate membership terms with the BCC and other supporting institutions, possibly at reduced membership rates based on firm size.

7. The findings indicate that SOT cluster firms may be willing to co-operate on the provision of training courses to develop employee skills. It is recommended that cluster firms and educational/training institutions act collectively (co-operate) to recruit the number of employees required to run industry training courses. Again, possibly through third party co-ordinators, *e.g.* Stoke-on-Trent FE/HE Colleges and/or Staffordshire University.

8. The findings indicate that some SOT cluster firms may be willing to co-operate on supply chain initiatives. It is recommended that cluster firms, suppliers and supporting institutions work together to investigate ways to purchase inputs together and also to possibly backward integrate elements of the supply chain.

9. The findings indicate that there is a lack of new firms entering the SOT cluster. It is recommended that policy makers and other interested parties investigate ways of stimulating new firm entry into the SOT cluster, possibly by offering incentives and other attractors, *e.g.* low rents and business loans. This recommendation is linked to

several other recommendations (1, 3 and 6) aimed at improving a range of conditions for small firms.

7.6: Review of the Applied Theory and Contribution to Knowledge

The main aim of this thesis was to determine the 'strategic health' of the SOT ceramics industry cluster (tableware and giftware sector). According to Porter (1990), the strategic health of a cluster depends on the competitive advantage of the cluster as a whole. Thus, the starting point for this research study was a review and evaluation of Michael Porter's National Diamond framework model (Porter, 1990), which had previously been applied by several policy makers to determine competitive advantage in industry clusters (see chapter 2.1). From Porter's studies of industry clusters two key elements were identified as being crucial to the success or failure of an industry, or region, *i.e*. the roles of 'co-operation' and 'competition' in industry clusters. In addition to Porter, other cluster theories have also identified co-operation and competition and their effects on innovation as important factors influencing the competitive advantage of clusters (*e.g.*, Audretsch and Feldman, 1996; Lorentzen, 2008). Other research studies identified that co-operation and competition can vary across different stages of the industry life-cycle (*e.g.*, Klepper, 1996; Swann *et al*., 1998; Potter and Watts, 2011, 2014). Furthermore, many of these studies, from across the different academic literatures, identified common reasons why clusters decline or fail. For example, over consolidation in an industry (Porter, 1990; Dei Ottati, 1994; Rosenfeld, 1997), and negative dominant firm effects (Lorenzen, 2009; Bell *et al.*, 2009; Sacchetti and Tomlinson, 2009; Tomlinson and Branston, 2017). Thus, considering the many different factors to be examined in determining a cluster's competitive advantage, it was decided to incorporate as many of these as possible into a testable theoretical framework. However, no one existing framework incorporating all of these factors was identified from a review of the relevant literatures.

As part of the literature review process, however, the research did identify one theoretical framework that, whilst including many factors relevant to competitive advantage, could be further adapted and developed to include other important factors that were missing. The original framework was developed by Andac Arikan (2009) to identify contributors to a cluster's knowledge creation capability, *i.e.* innovative output (see chapter 2, Figure 2.2). Many of Arikan's contributing factors had also been identified from the literature review as being important factors in determining competitive advantage in clusters. Consequently, the researcher adapted Arikan's framework to include, for example, industry life-cycle stages,

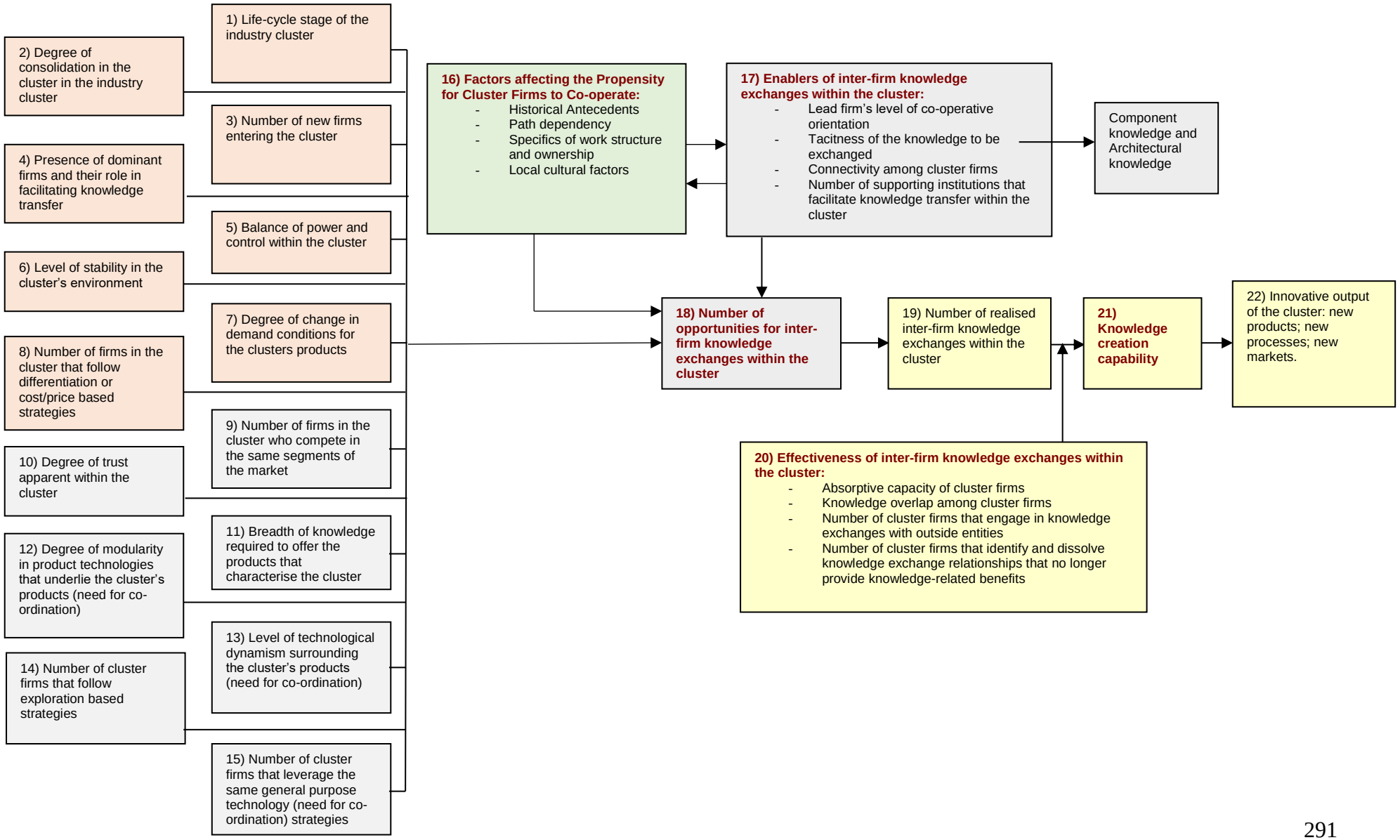
demand conditions, absorptive capacity, historical antecedents and other influences on innovative output (see chapter 2, Figure 2.5). However, the newly adapted framework, upon application, was found to be missing two important factors influencing competitive advantage. This is not because the researcher had missed identifying these factors in the literature, but because they were either already missing or only superficially reported in the extant literature. Subsequently, the already adapted framework was further refined and is presented in figure 7.1 at the end of this section. This final framework is new and is, therefore, a development of existing cluster theory and, similar to Porter's Diamond Framework (1990), it can be utilised by practitioners as a template for future cluster studies.

This next section provides a critique of the theoretical framework adopted for this research study, it explains why/how the adapted Arikan framework was further refined after application to the SOT cluster and it identifies further contributions to the existing body of knowledge on industry clusters.

Arikan's original framework was initially considered useful to identify the current situation, *i.e.* what currently exists in the SOT cluster with regard to knowledge creation opportunities and actual innovative output. However, the framework was found to be limited as it does not consider historical antecedents and path dependency factors on a cluster's knowledge creating abilities. These were found to be extremely important influences on the SOT cluster's propensity to co-operate. For example, whilst Arikan's original framework does attempt to identify the 'need for co-operation' that exists in a cluster at the time of analysis, it does not consider a cluster's historical need for co-operation. Thus, the research considers this an important omission as the historical need for co-operation in a cluster may be identified as low, as in the case of the SOT cluster, yet the cluster may have been and may still be very successful. This was also found to be the case with the SOT cluster. Moreover, in other academic literature on clusters the 'need' for co-operation is either completely ignored, or only superficially acknowledged, with the focus instead on expounding how co-operation is 'essential' to cluster success. For example, co-operation is viewed as marginally more important than competitive forces for competitive advantage (*e.g.* Porter, 1990; Dei Ottati, 1994; Hervas-Oliver and Albors-Garrigos, 2009). Moreover, the researcher could not find any examples in the extant literature of clusters who had been, or who were, successful and who did not co-operate, *i.e.* did not have extensive networks of external and internal linkages comprising both weak and strong ties. Consequently, it appears that the existing academic literature does not fully acknowledge that clusters can be successful without

having strong co-operative linkages. As identified previously in this chapter, the SOT ceramics cluster was, and still is, a very successful industry cluster, despite apparently low levels of co-operation. These findings somewhat contradict the findings from previous cluster studies as mentioned above. Thus, this research study has contributed to the extant literature by providing new knowledge and new perspectives on the importance of co-operation in industry clusters. Moreover, the researcher has developed Arikan's original model (see chapter 2, Figure 2.2) which is aimed at identifying knowledge creating opportunities, to not only include other factors identified in the various literatures as important to knowledge creation and competitive advantage (see chapter 2, Figure 2.4 for an extension of Arikan's original model), but has, in light of the empirical research findings, developed the model further to include a new determinant, 'factors affecting the propensity to co-operate'. The new determinant examines other historical antecedents not included in Arikan's original model. Figure 7.1 Presents the new model for analysing industry clusters and the new addition to the model is seen in box 16.

Fig. 7.1: New Theoretical Framework for Analysing Industry Clusters *(Source: Author, originally based on Arikan (2009))*



A second gap in the literature, and where the researcher has also made a contribution, is in developing the literature on dominant firm effects on the competitive advantage of clusters. Although some previous cluster studies have acknowledged that dominant firms in clusters can have both positive and negative effects, the literature is limited in that dominant firm effects appear to be somewhat under reported in the literature. For example, dominant firm effects appear mostly in cluster studies under the headings of 'cluster failure' or 'negative effects' (*e.g.* Sacchetti and Tomlinson, 2009; Tomlinson and Branston, 2014) or 'when the cluster stops working' (*e.g.* Porter, 1990). There is little mention of positive dominant firms effects on clusters, with the exception of a few examples (*e.g*. Giuliani, 2002, 2005; Grandinetti, 2016). Moreover, there appear to be very few specific examples, *i.e.* documented case studies where actual dominant firms have had either a positive or negative influence on a cluster. In this research study, dominant firms in the SOT cluster, both past and present, have been focussed on. The research findings on the SOT cluster's past dominant firms, in the main, support previous cluster studies regarding possible negative effects of large dominant firms. Therefore, this research contributes to the existing body of knowledge on the negative effects of large dominant firms in clusters, it also provides a case study example that can be utilised as a comparison case study for other cluster studies.

A third and final contribution to the theory on industry clusters, and also to the theory on evolutionary economics, are the findings of the longitudinal study of the SOT cluster's development between 1960 and 2016. The study documents the birth, growth and decline of many of the cluster's ceramics manufacturing firms. It also details the acquisition paths of many of the SOT cluster's largest firms. Thus, it provides a unique historical account of the evolution of the SOT cluster over a 56-year period. To the best of the researcher's knowledge, no previous similar longitudinal studies of industry cluster evolution exist, either for the SOT cluster, or for any other mature industry cluster. Therefore, the research findings fill a gap in the extant literature on the SOT ceramics cluster, and also contribute to overall cluster theories.

7.7: Reflection on Methodologies

In this section the researcher provides a reflection and review of the research methodologies adopted for this research study.

7.7.1: Reflection and Review of the Adopted Research Philosophy

As discussed in the methodology chapter of this thesis (see chapter 3.2), the research matched ontological and epistemological stances to the proposed research task and then selected a variety of appropriate methods to best achieve specific aims and objectives. After careful consideration of research paradigms, a post-positivist/critical realist approach was selected as the core paradigm for this research study. However, as the research objectives were linked to several competing paradigm approaches, elements of other paradigms were incorporated into the overall research design and a 'mixed paradigms approach' (Onwuegbuzie and Johnson, 2006) was adopted to take account of the different quantitative and qualitative elements of the research (see chapter 3.3). Upon reflection, the carefully constructed research framework was found to be appropriate for the research, as the researcher was successful in combining the various quantitative (*e.g.* longitudinal study and questionnaire) and qualitative (*e.g.* interviews) elements to meet the research objectives (see Tables 4.8, 5.3 and 6.14). Moreover, the mixed paradigm and mixed/multiple methods approaches applied in this research are in line with a critical realism paradigm as they involved both deductive and inductive elements (Saunders *et al*., 2003).

As previously discussed in this chapter, from an extensive review of the literature on industry clusters, industrial districts, production, systems and networks, and other associated literatures, a theoretical framework for the research was constructed (see chapter 7.6 and Table 2.4). The theoretical framework was tested through a case study of the SOT ceramics cluster. In addition, causal relationships between some of the variables were explained, *e.g*. the relationship between firm size and innovative output was analysed and evaluated (see chapter 6.3). This deductive approach (theory testing) was particularly successful in achieving objectives 1-5, and partially successful in achieving objectives 6-8. An inductive approach was applied to complete objectives 6-8 and to fully achieve objectives 9-11. The inductive approach was found to be particularly suitable in determining the reasons and motivations for why SOT firms did/did not co-operate (objectives 6-8), and in determining SOT firms views on advantages, disadvantages and motivations of dominant firms. By adhering strictly to the theoretical framework, and evaluating the research findings in light of findings from previous cluster studies, the researcher attempted to minimise researcher bias as much as possible, *i.e.* the researcher was careful not to attach personal values to the interpretation and evaluation of the research findings. However, as Guber and Lincoln (1994) state, "*facts determined by the theory window will be subject to value-ladenness*" (p.107), and therefore the researcher acknowledges that some bias may have unintentionally occurred in interpreting the findings.

7.7.2: Reflection and Review of the Adopted Mixed/multi Method Approach

As previously noted, a mixed/multiple method approach was adopted for this research study. Mixed and multi-method approaches (*e.g*. Tashakkori and Teddlie, 2003; Johnson and Onwuegbuzie, 2004; Yin, 2006; Onwuegbuzie *et al.*, 2009; Bryman, 2009; Sandelowski *et al*., 2009; Small, 2011) were fully discussed and evaluated in chapter three of this thesis (see chapter 3.4). In this research study, the multi/mixed methods approach involved employing different methods to achieve different objectives and the resultant data was analysed using integrated data analysis techniques, *e.g*. integrating multiple sources of secondary data into a longitudinal study, and data combining techniques, *e.g.* combining questionnaire data with interview data. By using a mixed/multi methods approach the researcher was able to verify the findings derived from one type of data with those derived from another. For example: the longitudinal study findings were compared to data from previous SOT cluster reports; the historical review of the cluster's 'need for co-operation' was integrated and compared to the questionnaire and interview data on co-operation; and, the questionnaire and interview datum were integrated and/or compared with each other. Thus, the 'integrated analysis' approach (Small, 2011) was very useful for the research in verifying or refuting findings from each single source. This is evidence of 'triangulation' where different kinds of data are collected to measure the same phenomenon (Yin, 2006; Kadushin, *et al.*, 2008). Consequently, the integrated research findings provided a more compelling argument than evidence from any single method employed. Moreover, the interview findings on co-operation compensated for potential weaknesses in the questionnaire data by providing further explanation, examples and reasons why firms did/did not co-operate, and the interview findings on dominant firm effects re-enforced the findings in chapter four on dominant firms.

7.7.3: Reflection and Review of the Case Study Design

A single case study was adopted as the research design for this study. The single case was identified in the methodology chapter (see chapter 3.5) as the Stoke-on-Trent (SOT) ceramics industry cluster, tableware and giftware sector. The single case study approach has been the adopted research strategy for many previous cluster studies where the cluster has been considered as one single case (*e.g*. Porter, 1990; Dayasindhu, 2001; Richardson, 2010; MirHosseini and Ghanbari, 2011). Therefore, the approach for this research was in line with the approach taken by previous cluster studies. The single case study approach is also in line with the critical realist approach (Robson, 2002). Moreover, the case study approach applied to this research study supports a mixed/multi methods approach (De Vaus, 2001; Robson, 2002) as it involved empirical investigation of a contemporary phenomenon

i.e. the SOT cluster within its real life context using multiple sources of evidence. The case study approach also enabled the researcher to carry out a 'historical review' (Jankowicz, 1995) of the SOT cluster, *i.e.* what happened to the SOT cluster in the past was described and then the identified issues were developed further through the primary research.

7.7.4: Reflection and Review of the Adopted Sampling Methods

As discussed in the methodology chapter of this thesis (see chapter 3.6), only manufacturers who carry out all/most phases of production, i.e. core manufacturers (SMEs) of tableware and giftware in the SOT cluster, were selected as the total population for this research study. The rationale for selecting only core manufacturers for the study supports Michael Porter's technique for cluster identification (Porter, 2000b) where he advocates starting with a large firm or concentration of like firms at the core of the industry. The total population for this research was identified from the longitudinal study presented in chapter four of this thesis (see chapter 4.3). The findings from the study identified sixteen core manufacturing SMEs (tableware and giftware) existing in the cluster in 2016. The researcher's original intention was to survey all sixteen firms, *i.e.* the total population. Unfortunately, despite exhaustive efforts in contacting all sixteen firms, only six firms agreed to take part in the questionnaire and interview surveys and this is a limitation of the research. However, the six firms that did take part in the two surveys represent 38% of the total number of firms in the population, and over 60% of sales turnover and employees in the whole ceramics manufacturing cluster (see chapter 6.3). Therefore the number of responses, despite not capturing all sixteen firms in the population, was still deemed large enough to represent the SOT cluster and for confident generalisations to be made. Moreover, as this stage of the research involved integrating qualitative data with quantitative data, a relatively small sample size is deemed acceptable as, according to Patton (1990), qualitative studies tend to focus in-depth on relatively small samples (p.169). The difficulty in persuading SOT firms to take part in the surveys also affected the approach taken for selecting respondents for interview. It was originally intended to use stratified purposeful sampling techniques (Patton, 1990) to select, from the questionnaire responses, a number of firms suitable for interviewing (see chapter 3.6). However, due to the small number of questionnaire responses (six), it was decided to interview all six firms. The six firms were deemed truly representative of the SOT cluster as they comprised two small firms, two medium sized firms and two large firms. Moreover, these firms operate in either the domesticwares or hotelwares sectors, or in a combination of both (see chapter 6, Table 6.1). Consequently, the sample of interviewees still accounted for 'maximum variation' (Patton, 1990). Unfortunately, it was not possible to undertake 'extreme' or 'deviant case' sampling (Patton, 1990) as also intended (see chapter 3.6.4) due

to the small number of responses, this is a further limitation of the research. The research did, however, attempt to present opposing views, and also to identify possible interviewee bias, and these are acknowledged accordingly in chapter six findings.

7.7.5: Reflection and Review of the Adopted Data Analysis Methods

In line with the critical realist and mixed/multi method approach taken for this research study, a number of different analytical techniques were utilised to analyse the different sets of data. For example: Microsoft Excel quantitative techniques were used to analyse the longitudinal study data and produce charts and tables; simple one-way frequency Microsoft Word tables were used to present the questionnaire data, as there were too few data points for a more sophisticated statistical analysis; data reduction techniques with descriptive statistics and narrative were used in chapter five to provide a historical analysis of co-operation in the SOT cluster; and, data reduction, pattern matching, descriptive statistics and narrative in light of theory were used in analysing interview data. The limitations of the secondary data have already been acknowledged in the methodology chapter of this thesis (see chapter 3.7) and limitations have also been identified in the primary data collection and analysis, *i.e.* small number of respondents and lack of data points for statistical analysis. However, whilst statistically significant results could not be obtained from the data, the researcher did identify relationships between several of the variables, *e.g.* firm size and levels of innovation and co-operation. Moreover, the questionnaire results were invaluable in determining the questions for the qualitative investigation. Overall, the researcher attempted to overcome the weaknesses of the small number of responses by integrating the findings from the questionnaires with the findings from the interviews, and also with findings in other chapters where possible. This is further evidence of nesting and triangulation.

7.7.6: Reflection and Review of Validity and Reliability of the Research Process

The researcher has ensured validity and reliability in the research instruments, sources of data and in the research findings in several ways throughout this research study. Firstly, multiple secondary data sources were utilised in chapters four and five of this thesis to construct the longitudinal study and historical analysis of the SOT cluster. Triangulation was achieved by cross-referencing these sources. Secondly, by adapting a tried and tested research instrument, *i.e.* the GPrix innovation questionnaire, the researcher achieved ‘content validity’ (Saunders and Lewis, 2012). Thirdly, the questionnaire and interview questions were carefully matched to the objectives and to the theoretical framework, thus achieving ‘construct validity’ (Saunders and Lewis, 2012). Fourthly, a pilot study was

conducted to ensure response and recording accuracy (see methodology chapter, 3.7.16). The pilot study took place between October 2015 and October 2016. Firstly, two academics with knowledge of the SOT ceramics industry, including one who had been involved in the GPrix innovation survey, appraised the questionnaire. After making adjustments to several questions the questionnaire was administered to one SOT cluster firm (company 'D', see Appendix 13 for company profiles). The pilot study respondent is a senior manager of a medium sized ceramics firm who has been employed in the industry for many years. As a result of this final pilot, one question was refined further to enhance validity. Finally, findings from all stages of the research were integrated, cross-referenced and synthesised wherever possible. These approaches taken by the researcher are appropriate in mixed methods research as they involved combining the complementary strengths and non-overlapping weaknesses of the quantitative and qualitative research (Onwuegbuzie and Johnson, 2006). The approach taken by the researcher is also in line with 'legitimisation' of the research findings (Tashakkori and Teddlie, 2003, 2006; Onwuegbuzie and Johnson, 2006) as detailed in the methodology chapter (see chapter three, table 5.3). One limitation in the research instrument (questionnaire) was identified (see chapter 6.1.1), *i.e.* where, upon reflection, some of the category bands were deemed to be too broad, *e.g*. firm turnover and number of employees. In future studies the questionnaire will be adapted to include more category bands for respondents to select from.

7.7.7: Reflection and Review of Generalisability and Replication of Findings

As previously mentioned in this chapter, existing cluster studies have used a variety of methods to study different populations. Also, as stated in the methodology chapter of this thesis (see chapter 3.9), it was never the intention in this research study to closely follow specific procedures of other cluster studies. However, by collating and repeating elements of past studies on a different population, the researcher was able to identify that the results of these previous studies were mostly generalisable to the SOT cluster. However, there were some exceptions, *e.g.* co-operation appears not to have been a key success factor in the competitive advantage of the SOT cluster and, therefore, co-operation in this case is not as important as cluster theory indicates. Consequently, for this research study, the researcher designed a theoretical framework based on findings drawn from previous studies of clusters, industrial districts, networks and production systems (see Figures 2.2 and 2.4). The resultant framework is something new to cluster studies and can be likened to a 'multi focal pattern' (Tsang and Kwan, 1999). Moreover, the researcher's theoretical framework was further refined and adapted through application to the SOT cluster (see Figure 7.1). According to Tsang and Kwan (1999), researchers' do frequently introduce new concepts or conceptual

relations that help to develop theories (p.771). The researcher is not suggesting, however, that the research findings on the SOT cluster are generalisable to all other industry clusters, as every industry cluster is different. However, the researcher does put forward the newly adapted and refined theoretical framework as an alternative model to analyse and evaluate industry clusters and, therefore, it is the new model that is generalisable and capable of being replicated in other situations.

7.8: Areas for Future research

A number of areas for future research have been identified as a result of the research process and are identified in order of importance as follows:

1) continue to track the evolution of the SOT cluster, *i.e*. continue the longitudinal/historical study by regularly updating the primary database (Appendix 4) and by extracting charts and tables as with chapter four of this thesis;

2) extend the cluster analysis by expanding the unit of analysis from core ceramics manufacturers to include, decorators, suppliers and related/supporting institutions, this is in line with Porter's view on analysing clusters, *i.e*. start with core firms and then expand outwards (see chapter 3.5);

3) replicate the interview survey questions for the role of dominant firms in five years-time, with the aim of analysing and evaluating the cluster's new dominant firms;

4) replicate the interview survey questions for co-operation in the SOT cluster in five-years time, with the aim of identifying any improvements in co-operative activity.

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Appendix 1: The Four Main Determinants of the National Diamond System

Factor Conditions	Demand Conditions
Factor conditions are the basic inputs necessary to compete. Categories include: human resources, physical resources, knowledge resources, capital resources, and infrastructure. Factors can be divided into 2 main types: **Basic factors** – bestow only lower-order advantages because they are unlikely to provide sustainable long-term competitive advantage. Examples include: natural resources, location, climate, low-cost unskilled and semi-skilled labour. **Advanced factors** – necessary to achieve higher-order competitive advantages. Examples include: technical communication systems, educated personnel, and R&D into advanced technologies. **The more specialised factors are linked to innovation** and therefore are necessary at a firm's home base. The most significant and sustainable competitive advantage arises when a nation possesses factors that are **both specialised and advanced** but there must be **continual investment** in developing/upgrading of advantages.	There are 3 broad attributes of home demand that are significant to competitive advantage: 1. Composition of home demand. Home demand must give local firms a faster, clearer picture of buyer needs than foreign firms can obtain. Home buyers must pressure firms to innovate. Buyers in the home market must be sophisticated and demanding as this forces **innovation**. Home needs must not be specific to the nation. 2. Size and Pattern of growth. Economies of scale leading to national competitive advantage are more likely within large home markets. The greater the number of independent buyers in a nation, the better the environment for **stimulating innovation and competition**. Rapid domestic demand growth stimulates faster investment, innovation and adoption of new technologies. Slower growth leads to incremental investment in innovation and upgrading facilities. Home market saturation leads to internationalisation efforts. 3. Mechanisms for Internationalisation Foreign buyers in the home country can pull demand abroad; Home grown multinationals take suppliers abroad; domestic buyer lifestyles are pulled abroad by foreign customers wishing to emulate.
Related & Supporting Industries	**Firm: Strategy, Structure & Rivalry**
Internationally competitive suppliers in a nation can create advantages in downstream industries by providing **efficient, early and rapid access** to the most cost-effective inputs. A more **significant advantage is home-based co-ordination**, which exploits linkages in the value chain and can be strengthened by having suppliers nearby. The most important benefit is in the process of **innovation and upgrading**. Competitive advantage emerges from **close working relationships** between world-class suppliers and the industry. **The pace of innovation within the entire national industry is thus accelerated and transaction costs reduced**. Related Industries - Related industries are those in which firms can **co-ordinate or share activities** in the value chain when competing, or those involving products that are complementary, *e.g.* sharing of technology development through to sharing of distribution channels that are used for similar products. Proximity and cultural similarity is also important in related industries as **information flows and technical interchanges are made easier**. Related industry can also provide a source of **new entrants.**	National circumstances affect the way in which firms are created, organised, managed and choose to compete. There are 2 areas where important national differences occur: *1. Firm strategy and structure.* Relates to the **cultural** aspects of a nation and their influence on management practices & approaches and on the attitudes of workers. There are distinct national differences in areas such as training, background and orientation of leaders, group versus hierarchical style, firm ownership and the orientation of firms toward **competing globally.** *2. Domestic Rivalry (DR)* There is a strong link between **vigorous DR** and the creation/persistence of competitive advantage. This applies to fragmented and concentrated industries. DR **pressures firms to continually improve and innovate** to upgrade higher-order advantages. Strong DR promotes a wider range of products/ services covering many segments of the market. This acts as a defence against foreign penetration. In addition, the **stock of knowledge and skills in the industry accumulates** as firms imitate each other and personnel move among firms in the industry. **Geographic concentration of rivals in a single city or region reflects and magnifies these benefits - information flows with enormous speed and the effects upon the industry are dynamic.** Intense DR depends on **new business formation** to create new competitors and to **feed the process of innovation.** Entirely new firms can be formed through: spin-offs from firms in the industry; from supplier & related industries; from internal diversification into new industries. One spin-off encourages another, this dynamic creates more rivalry, more innovation and leads to new segments.

(Source: Author, compiled from Porter, M. E., 1990)

Appendix 1a: The Two Variables that Influence the National Diamond

The Role of Government	The Role of Chance
The government's role in national competitive advantage is in **influencing** the four determinants of the diamond. Such influences can be either **positive or negative upon the industry**. Examples of how government can influence the diamond are: • Factor conditions – provision of subsidies, policies toward capital markets, and education policy. • Demand conditions – setting of local product standards and regulations that influence buyer needs. The government is also a major buyer in many industries. • Related and supporting industries – government bodies regulate supporting services and provide controls over advertising. • Strategy, structure and rivalry – capital market regulations, tax policy, anti-trust laws, corporate governance standards, *etc.* Government policy can also *be* influenced by the determinants. For example: choices about where educational investments are to be made will be affected by the number of local competitors; strong home demand for a product may lead to the early introduction of government safety standards.	In the histories of most of the successful industries studied, Porter found that chance events could **alter conditions in the diamond**, which in turn could nullify advantages of established players. For example, major shifts in input costs or exchange rates can create factor disadvantages. However, **chance events can also act as a catalyst for innovation** to overcome disadvantages, perhaps resulting in higher-order advantages being gained. The nation with the most favourable diamond will be the most likely to convert chance events into competitive advantage.

(Source: Author, compiled from Porter, M. E., 1990)

10. Appendix 2: The Inter-Play Between The Determinants Of The Diamond

Determinant	Influence of other Determinants	Cluster Effect
Factor Creation	***Domestic Rivalry***: Vigorous competitive rivalry stimulates rapid development of human resources, related technologies, market specific knowledge and specialised infrastructures. Through sustained investment by firms or in association with Trade associations. A group of domestic rivals can also trigger special programmes in local schools, universities, *etc.* ***Related and Supporting Industries:*** Related and supporting industries create and upgrade their own specialised factors. Some of these are transferable. ***Demand Conditions:*** High levels of demand and sophisticated demand can stimulate social and private investment into factor creation.	These effects will be most pronounced if the rivals are all located in one city or region. Local firms must perceive the need for constantly upgrading the pool of factors and work to stimulate investment in them. Joint projects by Trade Associations involving all firms in the cluster are common. Clusters of industries draw on common inputs, *e.g.* skills. Specialised infrastructure is enlarged and whole new industries spring up to supply specialised infrastructure.
Demand	***Domestic Rivalry:*** Demand is stimulated by local rivals investing in marketing, aggressive pricing, new product development, *etc.* Early saturation in the home market can lead to efforts to internationalise. Foreign demand is also stimulated by vigorous domestic rivalry through national image/reputation of the industry. ***Related and Supporting Industries:*** International demand can be enhanced through transferability of reputation from related industries. ***Factor Conditions:*** A nation with sophisticated factor creating mechanisms in an industry will attract foreign students and firms. This helps to internationalise demand.	The quality of related and supporting firms, and proximity to the cluster, enhances industry competitiveness, *i.e.* the industry will challenge suppliers to develop, innovate and improve, thus improving image/reputation and stimulating demand.
Related and Supporting Industries	***Domestic Rivalry:*** Aggressive domestic rivalry by a group of internationally successful domestic firms (selling worldwide), channels global demand to the domestic supplier industry. ***Demand Conditions:*** Where home demand is significant more and more specialised suppliers emerge. ***Factor Conditions:*** Skills, knowledge and technology 'spill-over' to benefit related and supporting industries	The proximity of suppliers facilitates inter-change and collaboration. Information flows freely and innovations diffuse rapidly. Firms in one industry can enter a supplier industry (spin-offs). This raises the level of competition in the supplier industry, thus triggering investment, innovation, *etc.*
Domestic Rivalry	***Demand Conditions:*** Buyers can backward integrate and enter an industry thus increasing competition. Early market penetration can also stimulate entry. ***Related and Supporting Industries***: Firms can forward integrate into downstream or related industries. Resources and competences are transferred into the new industry forming interrelationships and linkages that are hard to copy. Higher order advantages can be achieved. Firms from supplier industries can also enter base industry. In either case competition increases.	Aggressive rivalry in one industry in the cluster spreads to others. Entry from other industries within the cluster stimulates diversity in research and development and provides the means of introducing new strategies and skills. This leads to new ways of competing and new opportunities.

(Source: Author, based on Porter, M. E., 1990)

Appendix 3: Key Issues Relating to Co-operation in Clusters

Key issues relating to co-ordination in clusters:	Implications for the thesis
(COOP1) (P1, P1a) Linkages in clusters consist of strong ties and weak ties. Strong ties are more formal relationships, such as alliances and formalised contractual agreements. Strong ties have benefits but are not as valuable as weak ties. Strong ties can also lead to technological lock-in under certain conditions. Weak ties are those involving tacit knowledge that is difficult to codify. These ties can lead to innovation and competitive advantage for cluster firms.	Examine the nature, pervasiveness and frequency of both strong and weak ties within the Stoke-on-Trent ceramics cluster. Is there any evidence of technological lock-in? If so, what are the causes? For example, historical reasons and/or path dependence.
(COOP2) (P1, P1a, P4, 4a) Trust is an important feature of successful industry clusters, especially when sunk-costs are high, *i.e.* transactions involving the developing of tacit knowledge and innovation. Trust is dependent on the cluster's previous need for co-ordination and on the industry structure and governance system. In clusters where trust is high, members are bound by rules of obligation.	Determine the degree of trust within the Stoke-on-Trent cluster. The conclusion will be based on the outcome of (COOP1). The need for co-ordination can be assumed on the basis of responses to (COOP 4,5) If it is found that trust is high in Stoke-on-Trent, what kind of formal and informal rules exist?
(COOP3) (P2, P2a) Firms in successful clusters have a high absorptive capacity. Absorptive capacity is determined by the level of investment in internal resources, *i.e.* resources to develop intra-cluster linkages. Absorptive capacity is also dependent upon the industry structure and governance system.	Investigate how much time/money is invested by Stoke-on-Trent firms in forming knowledge-exchange relationships. Consider the answers to (COOP1,2,4,5) before drawing any conclusions about absorptive capacity of Stoke-on-Trent firms.
(COOP4) (P3, P3a) In successful industry clusters the structure will be either: - Control balanced across firms of roughly equal size. No one firm has dominance. - Control concentrated into the hands of dominant firm(s), who act as 'lighthouses' within the cluster by facilitating knowledge transfer. In failing industry clusters, control is concentrated into the hands of dominant firm(s) who: - Do not act as facilitators for knowledge transfer (keeping new-knowledge private). - Use their position in other ways to the detriment of the cluster, *e.g.* bargaining power.	Determine the structure of the Stoke-on-Trent ceramics cluster , *i.e.* the number and size of firms; consolidation within the industry. A longitudinal study will be carried out to track the industry's development and to identify existing firms. If dominant firms are a feature of the Stoke-on-Trent cluster. What has been their role with regard to knowledge transfer within the cluster?
(**COOP5) (P3, P3a)** Firms in successful industry clusters have a high need for co-ordination.	Determine whether the technological processes in the Stoke-on-Trent cluster are high-tech or low-tech as well as the degree of separability within the production system.
(COOP6) (P5, P5a) Successful industry clusters will be supported by a sophisticated network of formal and informal supporting institutions such as trade associations, universities, R&D facilities, *etc.*	Identify the evolution of supporting industries and institutions over time. (links to life-cycle analysis) Identify the degree of interrelatedness between these institutions and the Stoke-on-Trent cluster firms.
(COOP7) (P5, P5a) In successful industry clusters there will be evidence of extra-cluster linkages that may involve national/international/global networks.	IIentify if any Stoke-on-Trent cluster firms and/or supporting institutions have extra-cluster linkages

Appendix 3a: Key Issues Relating to Competition in Clusters

Key issues relating to competition in clusters:	Implications for the thesis
(COMP1) (P6, P6a) Vigorous domestic competition is a feature of successful industry clusters.	Determine the number of firms in the Stoke-on-Trent cluster. Has the number of firms increased/decreased over time? How many new-entrants have there been over time? Assumption: more firms = more competition; fewer firms = less competition. Assumption: the greater the number of new firms the greater the potential for innovation (links to COOP4 and innovation). Determine the nature of competition in the Stoke-on-Trent cluster. Are firms in direct competition, *i.e.* do firms compete in the same segments with the same products?
(COMP2) (P7, 7a) Positive forms of competition (innovation based) are a feature of successful industry clusters.	Determine the bases of competition within the Stoke-on-Trent cluster, *i.e.* differentiation based competition or cost/price based competition? Need to link this answer to the outcomes of the research on innovation and co-operation. Consider other influences on positive competition such as: the role of the dominant firm (see other sections); demand conditions and how they have changed over time (including: changes in consumer preferences; global competition)
(COMP3) (P7, 7a) Negative forms of competition (cost/price based) are a feature of failing or declining industry clusters. .	Determine the bases of competition within the Stoke-on-Trent cluster, *i.e.* differentiation based competition or cost/price based competition? Link this answer to the outcomes of the research on innovation and co-operation. Consider other influences on negative competition such as: the role of the dominant firm (see other sections); demand conditions and how they have changed over time (including: changes in consumer preferences; global competition)

Appendix 3b: Key Issues Relating to Innovation in Clusters

Key issues relating to innovation in clusters:	Implications for the thesis
(INOV1) (P8, P8a) Strong innovative ouptut is a feature of successful industry clusters.	Measure innovative output in the Stoke-on-Trent cluster. How many firms innovate? What is the nature of innovation, *e.g.* processes, products, markets? What is the degree of innovation, *e.g.* small investment, significant investment, incremental, radical? What is the frequency of investment? Measuring investment will include both input and output indicators, such as R&D investments, employment, new products and new markets.
(INOV2) (P9,9a) In clusters where there is high modularity in product technology, the need for co-ordination will be high and there will be a larger number of opportunities for knowledge transfer. In clusters where there is low modularity in product technology, the need for co-ordination will be low and there will be a low number of opportunities for knowledge transfer.	Identify whether the production processes within the Stoke-on-Trent cluster are highly modular or not (COOP5). Determine whether specialisation is a feature of the Stoke-on-Trent cluster.
(INOV3) (P2, P2a Knowledge transfer within the cluster will also depend on firms' absorptive capacities.	Absorptive capacity will be determined by COOP3, P2, P2a.
(INOV4) (P3, P3a) Knowledge transfer within the cluster will also depend on the balance of power and control in the cluster.	Power and control will be determined by COOP4, P3, P3a.
(INOV5) (P5, P5a) Knowledge transfer within the cluster will also depend on the number and role of knowledge transfer facilitators within the cluster.	The number and role of knowledge transfer facilitators will be determined by COOP6, P5, P5a.

Appendix 3c: Key Issues Relating to Life-cycle Theories

Observations drawn from the literature work:

For all stages of the life-cycle:

- The type of innovative activity changes at different stages of the life-cycle - from product (introductory and rapid growth) to process (slowing growth) then back to product (stagnant growth/maturity).

During the embryonic stage:

- There will be high rates of new start-up firms, spin-off firms and firm entry.
- Competition begins to grow and is based on product innovation.
- Tacit knowledge is uncodified and therefore difficult to transfer outside the cluster.
- Firms begin to develop cluster linkages.
- The returns from clustering are high (increasing agglomeration returns).

During the rapid growth stage:

- The rates of firm entry, start-ups and spin-offs increases rapidly (by 30% or more).
- Competition is becoming more intense and, although still mostly based on differentiation. However, the largest firms in the industry begin to focus on process technologies.
- Processes are still labour intensive during this stage. Thus, labour mobility is high and facilitates knowledge transfer.
- Elements of knowledge becomes codified and more easily transferable within the cluster – further facilitating knowledge transfer.
- Cluster linkages grow rapidly and involve investors, trade associations and other supporting institutions. At this stage the cluster may resemble the 'network of mutual dependence' model.
- Clustering economies are very high and are place specific.

During the slowing growth (maturity) stage:

- More knowledge becomes codified and more easily transferable across geographic space – possibly outside the cluster through the largest firms.
- Due to the emergence of a dominant design, products become more standardised and produced using more capital intensive, mass production processes.
- Consequently, employment reduces during this stage – reducing the opportunities for knowledge transfer
- Some firms leave the industry (shake-out) and are not replaced by new entrants. The number of firms reduces.
- The process of consolidation continues through acquisitions, mergers, *etc.*
- The reduction in the number of firms reduces the number of competitive opportunities within the cluster. This has a negative effect on innovation.
- For remaining firms competition is fierce within the smaller cluster and cluster firms may engage in price-based competition. This has a negative effect on Innovation.
- Cluster linkages may decline or grow, depending on local competitive strategies, path-dependence, *etc.*
- Many firms experience decreasing returns from clustering economies.
- The larger firms may experience increasing returns from dispersion (outside the cluster) economies.

During the decline stage:

- A large shake-out occurs, 50-80% of firms may leave the industry. This has a further negative effect on competition within the cluster.
- The reduction in competitors in the cluster will result in a reduction in innovation because there are fewer potential sources of new ideas and innovation.
- Surviving firms continue grow through mergers and acquisitions.
- As incumbents continue to grow, economic power and decision-making becomes more concentrated within the leading firms. At this stage the cluster may resemble the 'network of mutual dependence' model.
- Agglomeration economies will decrease the economic performance of firms, create a negative 'lock-in' effect and generate diminishing returns for cluster development.

Appendix 3d: Key Issues Relating to Failing Clusters

Key issues relating to failing clusters:	Implications for the thesis
(FAIL1) (P5, P5a) Successful clusters, facing the challenges of globalisation, will have adopted global/local strategies characterised by a strong global network of agents including global agents from the core industry plus related and supporting industries. Failing clusters, facing the challenges of globalisation, will not have adopted global/local strategies.	The challenges of globalisation with respect to global/local networks will be determined by COOP7, P5, P5a.
(FAIL2) (P4, P4a, P9,P9a) In failing clusters the need for co-ordination has historically been low, therefore fewer few opportunities for knowledge transfer.	The need for co-ordination will be determined by COOP5, INOV2, P4, P4a, P9, P9a.
(FAIL3) (P5, P5a) In failing clusters opportunities for knowledge transfer are low because there are few mechanisms to facilitate knowledge exchange and transfer.	Opportunities for knowledge transfer will be determined by INOV5, P5, P5a.
(FAIL4) (P2, P2a, P6, P6a, P7,7a) Successful clusters, facing the challenges of increasing low-cost competition from abroad, will have made the transition from lower-end segments of the market to upper-end. Failing clusters, facing the challenges of increasing low-cost competition from abroad, will have failed to make the transition from lower-end segments of the market to upper-end.	Cluster firms' bases for competing will be determined by COOP4, COMP 1,2,3, P2, P2a, P6, P6a, P7,7a.

Appendix 3e: Key Issues Relating to Dominant Firms in Clusters

Key issues relating to dominant firms in clusters:	Implications for the thesis
(DOM1) (P6, P6a) Failing clusters will have gone through a process of consolidation leading to the emergence of one/few dominant firms.	The development of the SOT cluster with respect to consolidation and dominant firms will be determined by COMP1, P6, P6a.
(DOM2) (P6, P6a, P7, P7a) Failing clusters are dominated by a few large firms who engage in competitive strategies resulting in a reduction in co-operation and innovation.	If dominant firms within the SOT cluster are identified, their competitive strategies will be determined by COOP4, COMP 1,2,3, P3, P3a P6, P6a, P7, P7a.

Appendix 4
Primary Database: Firms in the SOT Ceramics Manufacturing Cluster (Tableware & Giftware) – 1960 - 2016

	Name	Additional details	Acquired/merged/closed	Date of Establishment	Still operating	Original location
1	**William Adams & Sons Ltd** Earthenwares, Jasper, Basalts, Parian, etc. **(Listed in 1960s table. See Wedgwood)**	After acquisition Adamsware was still manufactured on a different site within the Wedgwood group	Acquired by Wedgwood in 1966	Est. 1769 - 1966	No	Tunstall & Stoke
X	**Adderley Floral China** **(See S. Pearson & Sons)**	Originally a branch of Ridgway Potteries Ltd S. Pearson & Sons acquired Royal Doulton in 1972 Doulton independent again in 1993	Acquired by S. Pearson & Sons in 1952 (see Allied English Potteries)	Est. 1945 - 1952	No	Longton
X	**Adderleys Ltd** China, earthenwares **(See S. Pearson & Sons)**	Renamed Ridgway & Adderley in 1952. Then merged with Booths & Colclough in Jan 1955 and continued as Ridgway, Adderley, Booth & Colclough for a short time then in Feb 1955 renamed Ridgway Potteries	Acquired by Ridgway Potteries in 1947 Ridgway acquired by Allied English Potteries in 1964 who merged with Royal Doulton in 1972	Est. 1906 - 1947	No	Longton
X	**Alcock, Lindley & Bloore (Ltd)** Earthenwares (mainly teapots) **(Listed under S. Pearson & Sons in 1970s table)**	Swinnertons became part of Lawley Group (S. E. Pearson & Son) who merged with Royal Doulton 1972	Acquired by Swinnertons in 1959?	Est. 1919 - 1959	No	Hanley
2	**Allied English Potteries:** **(known as Lawley Group until 1964)** **(See also S. Pearson & Sons)** **(listed in 1960s, 1970s tables)**	Holding Company S. E. Pearson & Son who merged with Royal Doulton in 1972 and kept the Royal Doulton name	Acquired by Royal Doulton 1972	Est.1964 - 1972	No	Various
X	**Alton Towers Handcraft Pottery Ltd** Earthenwares	Possibly called Alton China Co Ltd No further information available so assume closed down before 1960	Closed down	Est. 1950 – 1957?	No	Stoke
3	**Amber China Ltd.** **(listed in 1980s, 1990s and 2000s tables)**	Phoenix Works, 500 King Street, SOT, ST3 1EZ 01782 326304	Dissolved (see DueDil website)	Est. 1983 - 2005	No	Hanley
4	**Charles Amison & Co. Ltd**		Closed down	Est. 1889 - 1962	No	Longton

	Porcelains **(listed in 1960s table)**					
5	**Aristocrat Florals & Fancies** Giftware **(listed in 1960s table)**	Pencilled into Goddens but can't find any further details of this firm. No further information available so assume closed down by the end of 1960s	Closed down	Est. 1958 – 1969?	No	Longton
6	**Artone Pottery** Mostly teapots **(listed in 1960s, 1970s, 1980s, 1990s tables)**	Set up on an old (original) Wood & Sons teapot site	Closed down	Est. 1946 – 1993	No	Burslem
7	**Ashley Ceramics Ltd** Tableware **(listed in 1970s, 1980s, 1990s, 2000s tables)**	Webberley Lane, ST3 1RJ Pencilled into Goddens but no further details	Dissolved (see DueDil website)	Est. 1975 - 2007	No	Longton
8	**G. L. Ashworth & Bros** Earthenwares & Ironstone **(listed in 1960s, 1970s tables under Masons Ironstone)**	Renamed Masons Ironstone in 1968	Masons Ironstone in 1968 Masons Ironstone acquired by Wedgwood in 1973	Est. 1862 - 1968	No	Hanley
9	**Astbury Fine Bone China of Staffordshire Ltd** **(listed in 1960s, 1970s, 1980s, 1990s tables)**	Can't find when established – possibly 1800s Assume present in 1960	Dissolved (see DueDil website)	Est. 1800? – 1995	No	Tunstall
10	**Avon Art Pottery Ltd** Earthenwares **(listed in 1960s table)**	Pencilled into Goddens Listed by Potteries.org as existing in 1954? May have been less than 10 employees but no details found.	Closed down	Est. 1930 - 1968	No	Longton
11	**H. Aynsley & Co. Ltd** Tablewares **(listed in 1960s and 1970s tables)** **Also listed again 2002 – 2013 (see DueDil website)**	Part of the famous Aynsley family. See www.aynsley.info/worldpress	Closed down Dissolved	Est. 1873 – c1961 Est. 2002 - 2013	No	Longton
12	**Aynsley China Ltd**	John Aynsley & Sons Ltd	Acquired by Waterford in 1970.	Est.1775 - 1970	No	Longton

	(listed in 1960s and 1970s tables) **(listed as part of Wedgwood since 1970)**		Then Acquired by Belleek Pottery Group Ireland 1997			
13	**Baifield Productions** **(listed in 1960s table)**	Set up by S. Fielding & Co. Ltd Pencilled into Goddens no other information so assume closed down late 1960s	Closed down	Est.1964 – c1969	No?	?
14	**Lorna Bailey Artware** **Formerly LJB Ceramics** **(listed in 1990s table)**	Small pottery/decorator. Approximately 7-10 employees	Closed down	Est. 1995-1998	No	Burslem
15	**Bairstow Manor Pottery** **Formerly P. E. Bairstow & Co** Collectables **(see Fancies Fayre)** **(listed in 1960s, 1970s, 1980s, 1990s, 2000s, 2010s, tables)**	Formerly Fancies Fayre Pottery Renamed Bairstow Manor Pottery in 1979 Incorporated 1982 Liquidator appointed Jan 2013	In liquidation	Est. 1938 - 2013	No	Hanley
X	**Barker Bros Ltd** China & earthenwares	Part of Alfred Clough Ltd till c1960	Alfred Clough	Est. 1876 – c1960	No	Longton
16	**Barratt's of Staffordshire Ltd** **(see Royal Stafford)** **(listed in 1960s, 1970s, 1980s, 1990s tables)**	Renamed Royal Stafford Tableware Ltd 1994 after merger with Royal Stafford in 1992	Merged with Royal Stafford 1992	Est. 1943 - 1992	No	Burslem
17	**Belvedere China** Incorporated 2002 but probably existed before. No details found other than DueDil website. **(listed in 2000s table)**	Normacot Road, Stoke. Approximately 12 employees 01782 330899	Dissolved	Est. 2002?- 2007	No	Stoke
18	**Berkshire China Co. Ltd** Collectables **(listed in 1970s, 1980s, 1990s, 2000s tables)**	Changed name to Staffordshire Fine Bone China in 2004 Assume present in 1970, possibly under another name?	Acquired by Hugh Padley in 1986 sold in 1997 to Mark Dicken. Dissolved in 2007	Est. c1970 - 2007 Closed down	No	Fenton

19	**John Beswick Ltd** Collectables **(listed in 1960s table)**	Beswick brand now produced by John Sinclair Ltd., Sheffield.	Acquired by Royal Doulton & Co. in 1969 Doulton acquired by Wedgwood 2004.	Est. 1936 - 1969	No	Longton
20	**Biltons Ltd** Earthenwares (**listed in 1960s, 1970s, 1980 tables)**	Coloroll acquired by Staffordshire Tableware in 1990 following a management buy-out of Coloroll. Another management buy-out from ST in 1995, then sold to Dubelle Foundation in 1998 and split into Stoke Potteries Ltd and Biltons Tableware 1998 Ltd. In 1999 dissolved.	Acquired by Coloroll in 1986 Acquired by ST in 1995 Acquired by Dubelle 1998 Dissolved 1999	Est. 1912 – 1999	No	Stoke
21	**Birchcroft Fine Bone China Co. Ltd** Collectables **(listed in 1980s, 1990s, 2000s, 2010s, tables)**	See internet sales site Sutherland Works, Beaufort Road, Stoke-On-Trent, Staffordshire, ST3 1UB	Could not be found in 2016. Assume closed down.	Est. 1980 – c2015?	No	Longton
22	**Blakeney Pottery Ltd** **(listed in 1960s, 1970s, 1980s, 1990s, 2000s, 2010 tables)**	Site Closed in 1999 but reopened in 2000 by Bernard Meakin	Acquired by Bernard Meakin in 2000 Listed as DORMANT company by DueDil in 2012	Est. 1968 – 1999 And 1999 - 2012	No	Stoke then Tunstall
23	**Blue John Pottery Ltd** Earthenwares **(listed in 1960s, 1970s, 1980s tables)**	No further information available so assume closed down.	Dissolved (see DueDil website).	Est. 1886 - 1989	No	Hanley
X	**Booths & Colclough** **(see S. Pearson & Son)**	Colclough China Ltd. 1937-1944 who were acquired by S Pearson & Son 1944 who also owned Booths. 1948 Colclough merged with Booths to become Booths & Cloclough but still owned by S. Pearson so not listed.	S Pearson acquired by Royal Doulton 1972	Est. 1948 - 1972	No	Longton
24	**E. Brain & Co. Ltd** **(see Wedgwood)** **(listed in 1960s table)**	Took over Coalport 1958 continued in Coalport name until acquired by Wedgwood. Coalport ware is still produced	Acquired by Wedgwood in 1967	Est. 1903 - 1967	No	Fenton then Barlaston
25	**Sampson Bridgwood & Son Ltd** Earthenwares (see Churchill) **(listed in 1960s table**)	JAS Broadhurst renamed Churchill Hotelware 1985	Acquired by J A S Broadhurst 1964	Est. 1805 - 1964	No	Longton

26	**Emma Bridgewater** **Bridgewater Pottery Ltd** **Earthenwares** **(listed in 1980s, 1990s, 2000s, 2010s, 2016 tables)**	250 employees in 2016 Lichfield Street, Hanley, Stoke-on-Trent, ST1 3EJ, 01782 201328		Est. 1984 - present	Yes	Hanley
27	**British Anchor Pottery** Earthenwares **(listed in 1960s and 1970s tables)**		Closed down	Est. 1884 – c1970	No	Longton
28	**James Broadhurst & Sons Ltd** Earthenwares **(listed in 1960s, 1970s, 1980s tables then under Churchill Tableware from 1990s onward)**	Roper family acquired half share in 1922 then renamed Churchill Tableware in 1984/5	Renamed Churchill Tableware 1984/85	Est. 1862 - 1984	No	Longton then Fenton
29	**Broadhurst Bros.** Earthenwares **(Argyle China Co.)** **(listed in 1970s, 1980s, 1990s, 2000s tables)**	Known as Argyle China Co. Listed as dissolved by DueDil	Dissolved	Est. c1977 – 2007	No	Burslem
30	**Burgess & Leigh Ltd** **(became Burleigh Pottery)** **(see Burleigh/ Burgess, Dorling & Leigh Ltd)** **(listed in 1960s, 1970s, 1980s, tables then under Burleigh onwards)** **(see Denby Pottery Group)**		Acquired by Dorling 1999 Now part of Denby Pottery Group since 2009	Est. 1867 - 1999	No	Burslem
31	**Burleigh Pottery. Formerly Burgess Dorling & Leigh Ltd** Earthenwares **(operating as Burleigh Pottery)** **(listed in 1990s table)**	Formerly Burgess & Leigh. Renamed Burgess, Dorling and Leigh in 1999 Then Burleigh Pottery Listed here under Denby since 2009	Acquired by Denby Pottery from Derbyshire in 2009. Ownership is now outside the SOT cluster.	Est. 1999 - 2009	No	Burslem

32	**Cameleon China Ltd.** **(listed in 1990s, 2000s tables)**	Boundary Works 492-500, King St Longton Stoke-On-Trent Staffordshire ST3 1EZ **Tel: 01782 321332 (no longer in service)** Decorators only since 2000. May have had less than 10 employees.	Closed down	Est. 1998 - 2004	No	Longton then Trentham
33	**Cara China Co** Jewellery, collectables **(listed in 1960s, 1970s, 1980s, 1990s, 2000s, 2010s tables)**	01782 642973 May be too small? Previously owned by Bridgwood family.		Est. 1945 – c2015	No	Longton
34	**Carlton Ware Ltd** Earthenwares **(listed in 1960s table)**	Carltonware name acquired by Grosvenor Ceramic Hardware	Acquired by Arthur Wood Group 1967	Est. 1958 - 1967	No	Stoke
35	**Caverswall China** **Previously owned by Thomas Goode (manufacturing) Co. Ltd** Fine Bone China **(listed in 1970s, 1980s, 1990s, 2000s, 2010s, 2016 tables)**	Caverswall China (Brand Name) Thomas Goode is a retailer based in Mayfair London. Trevor Johnson (worked for Thomas Goode) bought out business from Thomas Goode…year? Berryhill Road, SOT. 01782 652800		Est. 1973 - present	Yes	Stoke
36	**Chapmans Longton Ltd** China **(see S Pearson & Sons)** **(listed in 1960s table)**		Acquired by Allied English Potteries 1966 (S Pearson & Sons) S Pearson & Sons merged with Royal Doulton 1972	Est. 1916 - 1966	No	Longton
37	**Churchill China PLC** **Hotelwares** Earthenwares **(listed under James Broadhurst in 1980s table then as Churchill onwards)** **(listed in 1990s, 2000s, 2010, 2016 tables)**	Formerly called Sampson Bridgwood who were acquired by J A S Broadhurst in 1964. Named changed to Churchill Hotelware in 1985. 1994 Churchil Fine Bone China Division created. 500 employees		Est. 1985 - present	Yes	Longton then Tunstall and Sandyford
38	**Clough's Royal Art Pottery** Earthenwares	Formerly Alfred Clough Est.1913 – 1961 Part of Federated Potteries with W. H. Grindley	Acquired by Coloroll in 1985	Est. 1961 - 1985	No	Longton

	(see Federated Potteries) **(listed in 1960s, 1970s, 1980s tables)**					
X	**Cartwright & Edwards Ltd** Earthenwares and Bone China **(see Federated Potteries)**	Subsidiary of Alfred Clough (Federated Potteries) but still produced under the Cartwright & Edwards name. Federated Potteries acquired by Coloroll in 1985	Acquired by Alfred Clough in 1955	Est. 1859 - 1955	No	Longton
X	**Coalbrook Potteries**	Pencilled into Goddens. Possibly part of Coalport?		Est. 1937 – 19??	No	Shelton
X	**Coalport Porcelain Works** Porcelains **(see E. Brain & Sons and Wedgwood)**	At SOT from 1926 – 1959. Coalport (Shropshire) was acquired in 1926 by Cauldon Potteries who were subsequently acquired by E. Brain & Sons in 1959. E. Brain & Sons acquired by Wedgwood in 1967. Coalport was still produced at Wedgwood	Cauldon Potteries 1926	Est. 1795 - 1926	No	Shelton then Stoke, Fenton then Barlaston
X	**Cobridge Stone** Stoneware **(listed under Moorcroft)**	Part of Moorcroft Group	Moorcroft group	Est. 1997 - 2005	No	Cobridge
39	**Collectible World Studios** Giftwares **(listed in 1990s, 2000s tables)**	Formerly Lilliput Lane Collectible World since 1993. 50-99 employees.	Production shifted overseas	Est.1993 - 2008	No	Hanley
X	**Coloroll Ceramics Division** **(see Staffordshire Tableware Ltd)** **(listed in 1980s tables under Biltons)**	Formerly Biltons Ltd prior to 1986 Management Buyout of Biltons from Coloroll in 1990 renamed Staffordshire Tableware Ltd	Acquired by Staffordshire Tableware 1990	1986 - 1990	No	Stoke
X	**Thomas Cone Ltd** Earthenwares **(see Keele Street Pottery)**	Keele Street Pottery name changed to Staffordshire Potteries Ltd in 1950 who were renamed Staffordshire Tableware in 1990	Acquired by Keele Street Pottery Co. Ltd. c1948	Est. 1892 - c1948	No	Longton
X	**Conway Pottery Co. Ltd** Earthenwares **(see Keele Street Pottery)**	Keele Street Pottery name changed to Staffordshire Potteries Ltd in 1950 who were renamed Staffordshire Tableware in 1990	Acquired by Keele Street Pottery Co. Ltd. c1948	Est. 1930 - c1948	No	Fenton
40	**Susie Cooper China Ltd**	Susie Cooper name continued till 1980	Acquired by Wedgwood 1966	Est. 1950 - 1966	No	Longton

	Earthenware & China **(see Wedgwood)** **(listed in 1960s tables)**	Part of Wood & Sons Group. Previously called Bursley Ltd.				
41	**Co-operative Wholesale Society Ltd** **(listed in 1960s, 1970s, 1980s tables)**	Included Windsor Pottery from 1911 and Crown Clarence pottery from 1946. Acquired Longton Ceramics (formerly Shaw & Copestake) in 1984. Subsequently operated as Crown Winsor	Name changed	1911 - 1989	No	Longton
42	**W. T. Copeland & Sons** Porcelain, Parian, Earthenwares **(listed in 1960s and 1970s tables)**	Formerly Spode 1784-1833 Then part of Copeland & Garrett 1833 -1932 W T Copeland & Sons from 1932 Merged with Royal Worcester in 1970 and name changed to Spode.(Royal Worcester was not part of SOT cluster so not included here after 1970) Then part of Royal Worcester known as The Porcelain & Fine China Co's. Ltd Now owned by Portmeirion.	Merged with Royal Worcester 1970 Then London International 1980s Then Derby International late 1980s Acquired by Portmeirion 2008	Est. 1932 – 1970	No	Stoke then moved to Worcestershire
43	**Elijah Cotton (Lord Nelson Pottery)** Earthenwares **(listed in 1960s, 1970s, 1980s tables)**		Closed down	Est. 1880 – 1981	No	Hanley
44	**Crownford China** **(See Taylor & Kent and Elizabethan)** **(listed in 1980s and 1990s tables)**	A merger between Taylor & Kent Ltd and Rosina China resulted in a new company name - Crownford China. Acquired by Churchill China in 1994.	Acquired by Churchill China in 1994.	Est. 1989 – c1994	No	Longton
X	**Crown Staffordshire Porcelain Co. Ltd** Bone China	Previously T. A. & S. Green Subsequently Crown Staffordshire China Co. Ltd	Name changed	Est. 1889 - 1948	No	Fenton
45	**Crown Staffordshire China Co. Ltd** Bone China **(see Wedgwood)** **(listed in 1960s table)**	Crown Staffordshire name not used after 1985 – Coalport name used instead.	Acquired by Semart Importing (America) 1964 Acquired by Wedgwood in 1973	Est. 1948 - 1964	No	Fenton
46	**Crown Trent China Ltd** China	Crown Trent specialises in manufacturing and decorating china and glass for retailers and individuals, and also sells white bone china which can be decorated by others.	In 2006 the company was sold to a newly-formed firm, Crown Trent UK.	Est. 1980 - 2011	No	Longton

	(listed in 1980s, 1990s, 2000s and 2010 tables)	50-99 employees In 2006, Ransat called the administrators into Crown Trent China after seeing its losses rise from £140,000 in 2004 to £275,000 the following year. Crown Trent UK became part of the Ransat Group again in 2009 but only import and then decorate in SOT. Now operate under the name of Buttercup China.	Crown Trent UK became part of the Ransat Group again in 2009 but do not manufacture ceramics in SOT (overseas production), they only decorate. See http://www.stokesentinel.co.uk/30-jobs-risk-firm-seeks-buyer/story-12569658-detail/story.html [Accessed 20 March 2017]			
X	**Crown Winsor** **(listed under Co-operative Wholesale Society)**	Originally Shaw & Copestake until 1982 when company went into liquidation 1982-1984 workers co-operative bought the company and traded as Longton Ceramics Acquired by United Co-op in 1984. Traded as Crown Winsor	Acquired by United Co-op in 1984. Traded as Crown Winsor Closed down	Est. 1984 – 1989	No	Fenton
47	**Peggy Davies Ceramics Ltd** **(listed in 1980s, 1990s, 2000s, 2010s, tables)**	Less than 10 employees in 2016 (Peggy Davies previously worked for Doulton) Went into administration in 2009 but re-opened in 2010.		Est. 1981 – present	Yes but not included as too small	Hanley
48	**Denby Pottery Group** **Owner Hilco** **Also owns Burgess and Leigh, Poole Pottery and Royal Stafford** **(only listed in 2000s, 2010s, 2016 tables, as not present in SOT cluster before then)**	Acquired Burgess and Leigh 2009 Acquired Poole Pottery and Royal Stafford 2011 Entered the SOT cluster in 2009 after acquiring Burleigh. Burleigh – Port Street, ST6 3PE 01782 525510		Est. 1809 - present	Yes	Denby and Stoke
49	**Denton China (Longton) Ltd.** China **(listed in 1960s table)**		Acquired by John Aynsley & Sons 1968	Est. 1945 - 1968	No	Longton
50	**Doulton (Royal) & Co. Ltd** Earthenwares & Porcelains **(see S. Pearson & Son and Wedgwood)**	From 1972 operated as Royal Doulton. Doulton became independent again in 1993	Merged with S. Pearson & Son (Allied English Potteries) in 1972 Acquired by Wedgwood in 2005	Est 1862 - 2005	No	Burslem

	(listed in 1960s, 1970s, 1980s, 1990s, 2000s tables)					
51	**Duchess China Ltd** **Owned by Taylor Tunnicliffe Group** **(listed under A T Finney & Sons in 1960s, 1970s, 1980s tables then under Crownford in 1990s table and under Duchess China in 2000s, 2010s, 2016 tables)**	Duchess china first produced in 1888. New company formed 2000, formerly A. T. Finney & Sons Ltd. Who were acquired by John Tams in 1989 then by Taylor Tunnicliff in 2000 and renamed Duchess China. Taylor Tunnicliffe name changed in 1989 to Crownford China. Uttoxeter Works, ST3 1PH. 01782 313061	Acquired John Tams 1989	Est.1947- present	Yes	Longton
52	**Dudson Bros. Ltd** Hotelware Earthenwares & Jaspers/China **(listed in 1960s, 1970s, 1980s, 1990s, 2000s, 2010s, 2016 tables)**	Incorporating Dudson Hotelware and J E Heath 600 employees in 2012 200 Scotia Rd, ST6 4JD. 01782 819337		Est. 1898 - present	Yes	Hanley then Tunstall
53	**Dunn, Bennett & Co. Ltd** Earthenware **(listed in 1960s, tables)**	Site now used by Steelite International after disposal by Doulton	Acquired by Royal Doulton 1968 Disposed of by Doulton in c1998	Est c1878 - 1968	No	Burslem
54	**Dunoon Ceramics Ltd** China & Stoneware (mugs only) **(listed in 1980s, 1990s, 2000s, 2010s, 2016 tables)**	Established in Scotland first in 1974 then opened a facility in Staffordshire in 1980 Closed operations in Scotland and moved to Staffordshire c2002. ST15 0RY, 01785 812322		Est. 1980 - present	Yes	Stone
55	**Elektra Porcelain Co. Ltd** Earthenwares **(listed in 1960s tables)**		Closed down	Est. 1924 – 1969	No	Longton
56	**Elizabethan Bone China** Porcelains **(see Taylor & Kent and Crownford)** **(listed in 1960s, 1970s, 1980s tables)** **Listed under Crownford from 1990**	Merged with Taylor Kent in 1989 and renamed Crownford China	Merged	Est 1875 - 1989	No	Longton
X	**Ellgreave Pottery Co. Ltd**	Founded by Wood & Sons in 1921	Closed down	Est. 1921 – 1981	No	Burslem

	Earthenwares **(subsidiary of Wood & Sons Ltd. So listed as part of that group**)					
57	**Empire Porcelain Co. Ltd** Earthenwares **(listed in 1960s tables)**		Acquired by Qualcast Ltd 1958 Closed down in 1967	Est. 1896 – 1967	No	Stoke
58	**Empress Pottery** **(listed in 1960s tables)**	No further information available so assume closed down in 1960s		Est. 19?? - 1969?	No	Hanley
59	**English Ironstone Tableware** Earthenwares **(see Washington Pottery Ltd.)** **(listed in 1970s, 1980s, 1990s tables)**	Formerly Washington Pottery Ltd. 1946 – 1973 then renamed	Closed down	Est. 1973 – 1994	No	Shelton
X	**Fancies Fayre Pottery** Earthenwares **(see P. E. Bairstow)**	Continued as P E Bairstow & Co after 1954	Name changed	Est. 1946 - 1954	No	Hanley
X	**Federated Potteries Co. Ltd** **(listed under Wh. H. Grindley)**	With: Cartwright & Edwards Ltd; W. H. Grindley Ltd Renamed Grindley of Stoke Ltd until 1984 when name changed to Federated Potteries	Repurchased by W. H. Grindley 1988	Est. 1984 - 1988	No	
60	**Fielding & Co. Ltd** Earthenwares, Majolica, etc. **(listed in 1960s, 1970s, 1980s tables)**	http://www.fieldingscrowndevonclub.co.uk/history.html	Closed down	Est. 1878 – 1982	No	Stoke
61	**A T Finney & Sons Ltd** Bone China **(listed in 1960s, 1970s, 1980s tables then under Crownford in 1990s table and Duchess China in 2000s)**	Includes the name Duchess China and Diamond China Renamed John Tams Fine Bone China Division in 1995 following amalgamation with Royal Grafton China. John Tams went into receivership in 2000 but management buyout formed Tams Group and Duchess China sold to Taylor Tunicliffe in 2000. Taylor Tunnicliffe operates as Crownford China. Crownford acquired by Churchill China in 1994.	Acquired by John Tams 1989 Then by Taylor – Tunnicliffe (Crownford) in 2000. Trading as Duchess China	Est. 1947 - 1989	No	Longton

X	**Finsbury China Ltd.** **Thimbles and china collectibles** **Too small**	01782847979 3 employees EXCLUDE	SIC 2621	Est. 1977- present	Yes	Fenton
62	**Five Towns China Co. Ltd** Porcelains **(listed in 1960s tables only)**	Listed in Goddens but no information available.	Assume closed down	Est. 1957 – 19??	No	Middleport
63	**Ford & Sons (Crownford) Ltd** Earthenwares **(listed in 1960s tables)**	Formerly Ford & Sons Ltd 1893-1938	Closed down	Est. 1938-1965	No	Burslem
64	**J Fryer & Son Ltd.** Earthenwares **(listed in 1960s, 1970s, 1980s, 1990s tables)**		Acquired by Cortman Ltd and LJB Ceramics in 1998	Est.1945 - 1998	No	Tunstall
65	**Furnivals Ltd** **(listed in 1960s tables)**	Barratts name changed to Royal Stafford Tableware after acquisition of Royal Stafford in 1994	Acquired by Barratts of Staffordshire Ltd in 1967	Est. 1890 – 1967	No	Cobridge
X	**Gift Match China Ltd.** **Too small**	Now called Foley China, Decorators only. TOO SMALL	SIC2621	Est. 2003 – 2013	No	Tunstall
66	**Gladstone China (Longton) Ltd** China **(listed in 1960s and 1970s tables)**	Called Thomas Poole and Gladstone China from 1952	Closed down	Est. 1939 – c1971	No	Longton
67	**Grenville Pottery Ltd** Earthenwares **(listed in 1960s table)**	Last known date of production 1964	Closed down	Est. 1946 – c1964	No	Tunstall
68	**Grimwades Ltd** Earthenwares, Majolica, jet, etc. **(listed in 1960s table)**	Acquired by Howard Pottery in 1963 Howard Pottery was acquired by Taunton Vale in 1974. They were subsequently acquired by Staffordshire Potteries in 1979 who in turn were taken over by Coloroll in 1986. Became independent again in 1990 as 'Royal Winton'. Acquired by current owners in 1995	Acquired by Howard Pottery in 1963	Est. 1900 -1963	No	Hanley

		Trading as Royal Winton from 1995				
X	**Grindley Hotel Ware Co. Ltd** Earthenwares & Ironstone	Part of W.H. Grindley & Co. Ltd	Acquired by Dudson Bros. in 1953	Est. 1908 – 1953	No	Tunstall
69	**W H Grindley & Co. Ltd.** Earthenwares & Ironstone **(listed in 1960s, 1970s, 1980s, 1990s tables)**	In 1982 became part of Federated Potteries until 1988 when repurchased by W H Grindley. In 1991 in hands of receivers and acquired by Woodlands Pottery (?) (still operating in 1995)	Acquired by Alfred Clough in 1960 and renamed Grindley of Stoke (Ceramics) Ltd.	Est. 1880 – 1960 And 1988 - 1995	No	Tunstall
70	**Hammersley & Co. Ltd** China **(listed in 1960s table)**	Trade name continued to be used by Copeland until 1982, then by Palissy until 1989 and afterwards by Aynsley Pottery	Acquired by W T Copeland in 1966	Est. 1887 - 1966	No	Longton
X	**J E Heath Ltd** Earthenwares		Acquired by Dudson Bros. in 1951	Est. 19?? – 1951	No	Burslem
X	**Heron Fine China** **Too small**	Small pottery	Could not find this firm. Assume closed down.	Est. 1979 – ?	No	Fenton
71	**Holland Studio Craft Ltd** **(listed in 1980s, 1990s tables)**		Acquired by Royal Doulton in 1996	Est. 1986 - 1996	No	Fenton
72	**Howard Pottery Co. Ltd** Earthenwares **(see Staffordshire Potteries)** **(listed in 1960s, 1970s tables)**	Previously Howard Group bought Gibson & Sons in 1949 and Grimwades in 1963 Howard acquired by Taunton Vale in 1974 Taunton Vale acquired by Staffordshire Potteries in 1979	Acquired by Taunton Vale in 1974	Est. 1925 – c1974	No	Shelton
73	**Hudson & Middleton Ltd** China **(listed in 1960s, 1970s, 1980s, 1990s, 2000s, 2010s, 2016 tables)**	Previously William Hudson (1889 – 1942) and J. H. Middleton (1889 – 1941) Went into Administration in 2009. Management buyout by new company (Mike Shirley new owner) Hudson's Fine Bone China in 2009 22 employees in 2009.	Closed down 2016. See: The Sentinel, (2017), *25 jobs lost after historic Longton pottery firm Hudson and Middleton shuts suddenly – again*, [ONLINE]. Available at: http://www.stokesentinel.co.uk/25-jobs-lost-after-historic-longton-pottery-firm-hudson-and-middleton-	Est. 1941 - 2017	No	Longton

		Closed down June 2017.	shuts-suddenly-again/story-30374667-detail/story.html. [Accessed 16 July 2017]			
74	**Johnson Bros. (Hanley) Ltd** Earthenwares **(see Wedgwood)** **(listed in 1960s table)**		Acquired by Wedgwood in 1968	Est. 1883 - 1968	No	Hanley and Tunstall
75	**A B Jones & Sons Ltd** China & Earthenwares **(see Royal Grafton and John Tams)** **(listed in 1960s, 1970s, 1980s, 1990s tables)**	Acquired by Crown House Glass in 1966 Known as Royal Grafton China from 1985 Crown House Glass acquired by Crown Lynn New Zealand in 1971. Management Buy-out in 1985, name changed to Royal Grafton China. Acquired by John Tams in 1992	Acquired by Crown House Glass in 1966	Est. 1900 - 1992	No	Longton
X	**Keele Street Pottery Co. Ltd** China & Earthenwares **(see Staffordshire Potteries and Staffordshire Tableware)**	**1947-1949 Acquisition of other companies:** *Paramount Pottery Ltd* *Winterton Pottery Ltd* *Thomas Cone Ltd* *Collingwood Bone China Ltd* *Conway Pottery Ltd* *Piccadilly Pottery* *Lawton Pottery, Tunstall*	Name changed to Staffordshire Potteries in 1950	Est. 1915 - 1950	No	Tunstall
76	**James Kent Ltd** Originally China & Earthenwares **(listed in 1960s, 1970s, 1980s tables)**	Still trading as James Kent but now producing specialist (commercial) ceramics	Acquired by Hadida Fine Bone China in 1989 Now commercial ceramics	Est. 1897 - 1989	No	Longton
77	**William Kent (Porcelains) Ltd** Earthenwares **(listed in 1960s table)**	Formerly William Kent 1894 – 1944. After 1962 continued to produce commercial ceramics only	Now commercial ceramics	Est. 1894 - 1962	No	Burslem
78	**Kirkhams Ltd** Porcelains **(see Portmeirion)** **(listed in 1960s table)**	Portmeirion acquired A. E. Grey (pottery decorators) in 1961, they merged A. E. Grey with Kirkhams to form Portmeirion	Acquired by Portmeirion in 1961	Est. 1946 - 1961	No	Stoke
79	**Roy Kirkham & Co Ltd** China	Incorporated in 1976 Call to see how many employees.		Est. 1970? - present	Yes	Tunstall

	(listed in 1970s, 1980s, 1990s, 2000s, 2010s, 2016 tables)	ST6 5DB. 01782 837065				
80	**Lancaster & Sandland Ltd.** Earthenwares **(listed in 1960s table)**	Formerly Lancaster & Sons Ltd. 1899-1944	Closed down	Est. 1944 – 1968	No	Hanley
81	**Lingard Webster & Co. Ltd** Earthenwares **(listed in 1960s, 1970s tables)**	Formerly Colclough & Lingard 1887 - 1900	Closed down	Est. 1900 – c1972	No	Tunstall
82	**Little Acorns Pottery** *Studio Potter* **(listed in 1980s, 1990s, 2000s tables)**	Founded around 1980 May be too small but no details found.	Closed down in 2009	Est. 1980-2009	No	Hanley
83	**Longton New Art Pottery Co. Ltd** Earthenwares **(listed in 1960s table)**	Still operating in 1962 May be too small but no details found.	Closed down	Est. 1932 – c1965	No	Longton
84	**John Maddock & Sons Ltd** Earthenwares, Ironstone, etc. **(listed in 1960s, 1970s, 1980s tables)**	Maddox Genealogy, (2017), John Maddock, [ONLINE]. Available at: http://www.maddoxgenealogy.com/famous/fam_john_maddock_c1807.htm. [Accessed 20 July 2017]	Closed down	Est. 1855 – c1987	No	Burslem
85	**Mason's Ironstone China** **(see Wedgwood)** **(listed in 1960s, 1970s tables)**	Formerly G. L. Ashworth & Bros 1862 - 1968	Acquired by Wedgwood in 1973	Est. 1968 - 1973	No	Shelton
86	**Alfred Meakin Ltd** Earthenwares **(see Myott, Son & Co.and Churchill)** **(listed in 1960s, 1970s tables)**	1976 renamed Myott-Meakin Churchill acquired Myott-Meakin in 1991	Acquired by Myott Son & Co. Ltd in 1976	Est. 1875 - 1976	No	Tunstall
87	**J & G Meakin Ltd** Earthenwares & Ironstones **(see Midwinters and Wedgwood)** **(listed in 1960s and 1970s tables)**	1968 Meakin acquired Midwinters	Acquired by Wedgwood 1970	Est. 1851 - 1970	No	Hanley

88	**Melba Wain Ltd** Earthenwares **(listed in 1960s, 1970s, 1980s, 1990s tables)**	Formerly H A Wain & Sons Ltd - renamed Melba-Wain Ltd Still operating in 1998, assume closed down c2000	Closed down	Est. 1946 – c2000	No	Longton
89	**W R Midwinter Ltd** Earthenwares **(see J & G Meakin)** **(listed in 1960s table)**	Midwinter acquired Arthur J. Wilkinson Ltd in 1964 J & G Meakin acquired Midwinter in 1968 Wedgwood acquired Meakin in 1970	Acquired by J & G Meakin in 1968	Est. 1910 - 1968	No	Burslem
90	**G E Milner** China **(listed in 1960s table)**	No further information available so assume acquired in 1960s	Acquired by Allied Insulators in 19??. Now called Fairey Industrial Ceramics Ltd	Est. 1957 – 19??	No	Burslem
91	**Minton & Co** Earthenwares **(see Royal Doulton)** **(listed in 1960s table)**		Acquired by Royal Doulton in 1968	Est. 1793 - 1968	No	Stoke
92	**W Moorcroft PLC** Earthenwares **(see Cobridge Stone)** **(listed in 1960s, 1970s, 1980s, 1990s, 2000s, 2010s, 2016 tables)**	Sister company: Cobridge Stoneware ST6 2DQ. 01782 820500		Est. 1913 - present	Yes	Burslem then Cobridge
93	**Moorland Pottery** Earthenwares **(listed in 1960s, 1970s, 1980s, 1990s, 2000s, 2010s, 2016 tables)**	Site was formerly Studio Szeiler Ltd Small studio potter. SIC 3663		Est. 1960 - present	Yes Not included. Too small.	Burslem
94	**Myott-Meakin Ltd** Earthenwares **(see Churchill)**	Formerly Myott, Son & Co. Ltd - renamed Myott-Meakin following acquisition of Alfred Meakin in 1977	Interpace USA then Churchill Tableware in 1991	Est. 1898 - 1991	No	Stoke then Cobridge then Hanley

	(listed in 1960s, 1970s, 1980s, 1990s, tables)					
95	**Nanrich Pottery** Earthenwares **(listed in 1960s, 1970s, 1980s, 1990s, tables)**	Assume present in 1960	Acquired by John Tams in 1991	Est. ? - 1991	No	Longton
96	**New Chelsea China Co. Ltd** China **(see R. H. & S. L. Plant and Wedgwood)** **(listed in 1960s, table)**	RH & SL Plant acquired by Wedgwood in 1966 – renamed Royal Tuscan in 1971 – renamed Wedgwood Hotelware in 1980s	Acquired by R H & S L Plant in 1961	Est. 1912 - 1961	No	Longton
97	**Newport Pottery Co. Ltd** Earthenwares **(see Midwinter)** **(listed in 1960s, table)**	Midwinter subsequently acquired by Meakin in1968 who was later acquired by Wedgwood in 1970	Acquired by W R Midwinter in 1964	Est. 1920 - 1964	No	Burslem
98	**Paragon China Co. Ltd** Earthenwares **(see T. C. Wilde and S. Pearson)** **(listed in 1960s, table)**	S Pearson & Son Holding Company for Allied English Potteries (known as Lawley Group until 1964) S Pearson & Son acquired by Royal Doulton in 1972	Acquired by T C Wilde in 1960. T C Wilde merged with Lawley Group in 1964 to form Allied English Potteries (S. E. Pearson)	Est. 1920 - 1960	No	Longton
X	**S. E. Pearson & Son:** **(see Allied English Potteries and Royal Doulton)** **(listed under Allied English Potteries 1960s, 1970s tables)**	Known as Lawley Group until 1964. Merged with T C Wild in 1964 to form Allied English Potteries. Merged with Royal Doulton in 1972 ***Lawley Group/Allied English Potteries:*** *Adderleys Ltd* *Alcock, Lindley & Blore Ltd* *Booths & Colclough Ltd* *Lawleys (retailers)* *Paragon China Co. Ltd* *Ridgway Potteries Ltd* *Royal Albert Ltd* *Royal Crown Derby Ltd* *Swinnertons* *T. C. Wilde*	Merged with Royal Doulton 1972	Est. 19?? - 1972	No	Various
99	**R. H. & S. L. Plant Ltd** China	Renamed Royal Tuscan in 1971 Renamed Wedgwood Hotelware in 1980s	Acquired by Wedgwood in 1966	Est. 1898 - 1966	No	Longton

	(see Wedgwood) **(listed in 1960s, table)**					
100	**Polyanna (Walpole Fine Bone China)** **Too small**			Est. ? - Present	Yes but not included. Too small.	
101	**Portmeirion Potteries Ltd** Earthenwares **(listed in 1960s, 1970s, 1980s, 1990s, 2000s, 2010s, 2016 tables)**	Susan Williams-Ellis (a designer) bought A E Gray & Co. Ltd in 1960 and Kirkhams Ltd in 1961 and merged to form Portmeirion. ST4 7QQ. 0182 744721		Est. 1961 - present	Yes	Stoke
102	**Price and Kensington Potteries Ltd** Earthenwares **Brand is now part of the Rayware Group, includes Arthur Wood and Mason Cash** **(listed in 1960s, 1970s, 1980s, 1990s, and 2000stables)**	Price Brothers from 1896 Price Bros. (Burslem) Ltd. From 1903 – 1961 Amalgamation of Price Bros. and Kensington Pottery in 1962 In 1989 Price & Kensington bought Arthur Wood.	Price Bros. became part of Arthur Wood Group c1950.	Est. 1962 -2009	Yes	Burslem then Longport
103	**Pyramid Pottery Co. Ltd** **(listed in 2000s table)**	SIC2625 May have had less than 10 employees – details not known.	Closed down	Est. 2005-2009	No	Tunstall
104	**Ravensdale Pottery Ltd** Earthenwares **(listed in 1990s, 2000s tables)**	Liquidator 2006. (duedil.com) Dissolved 2008 May have had less than 10 employees – details not known.	Closed down	Est 1999 - 2006	No	Tunstall
105	**Raywear Group** **(entered SOT cluster in 2009 after acquiring Price Kensington brand. Listed in 2000s, only as not producing in SOT now)**	Acquired Price and Kensington brand in 2009. Also own Mason-Cash brand. Production is in SOT cluster – unknown?		Est. 2009 - present	Yes but not included as not producing in SOT	?
X	**Repeat-Repeat** **Small pottery** **(less than 10 employees so exclude)**	Crown House, Old Mill St Stoke-On-Trent Staffordshire ST4 2RP Tel: 01782 845870	Too small to include	Est. 1984 - present	Yes but not included. Too small	Stoke
106	**Regency China Ltd** China	Liquidator 2004 Dissolved 2007	Closed down	Est. 1953 – 2007	No	Longton

	(listed in 1960s, 1970s, 1980s, 1990s, 2000s tables)					
107	**A. G. Richardson & Co. Ltd** Earthenwares **(see Wedgwood)** **(listed in 1960s, 1970s tables)**		Acquired by Wedgwood in 1974	Est. 1915 - 1974	No	Tunstall and Cobridge
108	**Ridgway Potteries Ltd** **(subsidiary of Allied English Potteries)** **(see S. E. Pearson and Royal Doulton)** **(listed in 1960s table under Allied English Potteries)**	**Potteries in the Ridgway Group included:** *Booths, Church Bank Pottery, Tunstall.* *Colcloughs, Regent Works, Longton* *Paladin Works, Fenton* *North Staffordshire Pottery, Cobridge (previously the Globe Pottery)* *Portland Pottery, Cobridge* *Bedford Works, Shelton* *Adderly Floral China, Longton* *Gainsborough Works Longton*	Part of Lawley Group until 1964 when they merged with T.C. Wilde to become Allied English Potteries (S. Pearson & Sons) who subsequently merged with Royal Doulton in 1972	Est. 1955 - 1964	No	
109	**Rosina china** China **(see Taylor & Kent, Crownford and Elizabethan)** **(listed in 1960s, 1970s, 1980s tables)**	Merged with Elizabethan Fine Bone China in 1989 and renamed Crownford China	Merged	Est. 1941 - 1989	No	Longton
110	**Roslyn China** **(listed in 1960s table)**	Formerly Reid & Co.	Closed down	Est. 1946 - 1963	No	Longton
X	**Royal Crown derby** **(see S. Pearson, Royal Doulton, Steelite)** **Not listed as independent SOT pottery.**	Became part of S. Pearson & Son in 1964 Then part of Royal Doulton Group Then part of Steelite International in 2012?	Acquired by S, Pearson 1964 Then acquired by Steelite 2000	Est. 1964- 2012	Yes	Various
X	**Royal Grafton China** **(listed under A. B. Jones until 1992 then John Tams)**	Formerly A. B. Jones & Sons Ltd.	Acquired by John Tams 1992	Est. 1985 - 1992	No	Longton
111	**Royal Stafford China** **(see Royal Stafford Tableware)** **(listed in 1960s, 1970s, 1980s and 1990s the under Royal Stafford)**		Acquired by Barratt's of Staffordshire in 1992 and renamed Royal Stafford Tableware.	Est. 1845 - 1992	No	Longton

112	**Royal Stafford Tableware Ltd** **(see Barratts of Staffordshire and Royal Stafford China)** **(listed in 2000s, 2010s tables)**	Formed after acquisition by Barratts in1992 Renamed Royal Stafford Tableware Ltd in 1994	Acquired by Denby	Est. 1992 - present	Yes	Burslem
113	**Royal Stratford** **(listed in 1970s, 1980s, 1990s, 2000s tables)**	Sold in 1999 to ?	Closed down	Est. 1976 - 2005	No	Longton
X	**Royal Winton** Earthenware **(see Grimwades Ltd)** **(listed with Duchess China)**	Previously Grimwades Ltd. Still owned by Grimwades but trading as Royal Winton. Sister company is Duchess China and is part of the Taylor Tunnicliffe Group. Listed under Duchess China.	Listed under Duchess	Est. 1995 - 2005	Yes	Longton
114	**James Sadler & Sons Ltd** Earthenware **(see Churchill)** **(listed in 1960s, 1970s, 1980s, 1990s and 2000s tables)**		Acquired by Churchill in 2000	Est. 1899 - 2000	No	Burslem
115	**Salisbury China Co. Ltd** Bone China **(listed in 1960s and 1970s tables)**	Formerly Wild Bros. In 1961 the company was taken over by Thomas Poole and moved to Chadwick Street, Longton - finally closed c.1970 Wild Bros 1904-1927	Closed down	Est. 1954 - 1970	No	Fenton
116	**Shaw & Copestake** Earthenwares **(listed in 1960s, 1970s, 1980s tables)**	Following voluntary liquidation the pottery was run by workers trading as Longton ceramics from 1982 – 1984 and was subsequently acquired by United Co-op Society in 1984	Acquired by Longton ceramics 1982	Est.1901 – 1982	No	Longton
117	**Shelley Potteries Ltd** China **(see S. E. Pearson and Royal Doulton)** **(listed in 1960s table)**	Allied English Potteries later acquired by Royal Doulton	Acquired by Allied English Potteries (S. E. Pearson) in 1966	Est. 1925 - 1966	No	Longton
	Shore & Coggins	Allied English Potteries later acquired by Royal Doulton	Acquired by Allied English Potteries in 1966	Est. 1911 - 1966	No	Longton

118	China **(see S. E. Pearson and Royal Doulton)** **(listed in 1960s table)**					
119	**Shorter & Son Ltd** **(see Midwinter and J & G meakin)** **(listed in 1960s table)**	Midwinter acquired J & G Meakin in 1968 Meakin was acquired by Wedgwood in 1970	Acquired by Midwinter in 1964	Est. 1905 - 1964	No	Stoke
120	**Simpsons (Potters) Ltd** Earthenwares **(listed in 1960s, 1970s tables)**		Acquired by Wood & Sons 1976	Est. 1944 – 1976	No	Cobridge
121	**Staffordshire China Ltd** **(listed in 2000s table)**	Staffordshire China Ltd. acquired Brian Wood ceramics 2003 Company re-opened 2006? But no longer manufacture ceramics themselves. May be some link to Berkshire China. May have had less than 10 employees but no details found.	Voluntary Liquidation 2005	Est. 2000 - 2005	No	Fenton
122	**Staffordshire Heritage** **(not listed as not strictly tableware or ornamentalware)**	Normacot Road (on the end of the Hudson & Middleton factory)		Est.? - present	Yes but not included as producing ceramic light fittings for retailers	
123	**Staffordshire Potteries Ltd** Earthenwares **(see Keele Street Pottery and Staffordshire Tableware)** **(listed in 1960s, 1970s, 1980s tables)**	Previously Keele Street Pottery Group. Name changed to Staffordshire Potteries Ltd in 1950. Acquired by Coloroll in 1986. Management buyout of Coloroll in 1990 renamed Staffordshire Tableware	Acquired by Coloroll Group 1986	Est. 1950 - 1986	No	Longton
124	**Staffordshire Tableware Ltd** Earthenwares **(see Keele Street Pottery, Staffordshire Potteries Ltd., and Coloroll)** **(listed in 1990s table)**	Originally called Keele Street Pottery Group. Name changed to Staffordshire Potteries Ltd in 1950. Acquired by Coloroll in 1986. Management buyout of Coloroll in 1990 renamed Staffordshire Tableware	Closed down	Est. 1990 – 2000	No	Longton
	Staffordshire Tea Set Co. Ltd	Part of Biltons?	Closed down	Est. 1926 – c1965?	No	Tunstall

125	Earthenwares **(listed in 1960s table)**					
126	**Steelite International P.L.C.** **(includes Royal Crown Derby since 2012)** **(listed in 1980s, 1990s, 2000s, 2010s, 2016 tables)**	Previously Dunn Bennett who were acquired by Royal Doulton in 1968 and disposed of In 1983 D. E. D. Johnson acquired Royal Doulton Hotelware and Steelite International was formed ST6 3RB. 01782 821000		Est. 1983 - present	Yes	Burslem
127	**Studio Hinks** **(listed in 2000s, 2010s tables)**	Spin-off from Royal Stratford 16 employees	Closed down	Est. 2005 - 2011		Longton
128	**Studio Szeiler Ltd** Earthenwares **(listed in 1960s, 1970s, 1980s tables)**	May be less than 10 employees – no details found.	Closed down	Est. 1951 – 1986	No	Hanley then Burslem
129	**R. Sudlow & Sons Ltd.** Earthenwares **(listed in 1960s table)**	May be less than 10 employees – no details found.	Closed down	Est. 1886 - 1965	No	Burslem
130	**Summerbank Pottery Ltd** Earthenwares **(listed in 1960s, 1970s, 1980s, 1990s, 2000s tables)**	New owners in 1970?	Closed down (see DueDil)	Est. 1952 – 2001?	No	Tunstall
131	**John Tams & Son Ltd** **(see Tams Group Ltd)** Earthenwares **(listed in 1960s, 1970s, 1980s, 1990s, tables)**	Acquired A T Finney (Duchess China) in 1989 and Royal Grafton in 1992	Ownership and Name changed.	Est. 1875 - 2000	No	Longton
132	**Tams Group Ltd** **(see John Tams & Son)** Earthenwares **(see Duchess China)** **(listed in 2000s table)**	Formerly John Tams & Son Ltd Management buy-in in 2000 formed Tams Group and Taylor-Tunnicliffe also acquired Duchess China business from John Tams in 2000. In 2006 the group went into receivership and the Crown Works finally closed, ending over 160years of ceramic manufacturing on the site.	Closed down	Est. 2000 - 2006	No	Longton

133	**Taylor & Kent Ltd** Porcelains **(see Crownford and Elizabethan)** **(listed in 1960s, 1970s, 1980s tables then under Crownford)**	Possibly renamed Elizabethan Bone China in 19??	Merged with Rosina China in 1989 and renamed Crownford China	Est. 1867 - 1989	No	Longton
134	**Taylor, Tunnicliffe & Co. Ltd** Industrial Ceramics & Earthenwares & China **(Listed in 1960s, 1970s, 1980s tables then under Crownford for 1990s. See also Duchess China)**	Acquired former A. T. Finney and Sons Ltd from John Tams in 2000 and renamed it Duchess China	Name changed to Crownford in 1989	Est. 1866 - 1989	Yes	Hanley
X	**The Big Tomato** **Too small to include in this survey**	See: http://www.bigtomatocompany.com/about.php. [Accessed 20 July 2017]		Est. 2003 - present	Yes but not included. Too small	
135	**Thorley China Ltd** China **(listed in 1960s, 1970s tables)**		Closed down	Est. 1940 – 1971	No	Longton
136	**Viking Pottery Co.** China & Earthenwares **(listed in 1960s tables)**		Closed down	Est. 1936 – 1964	No	Cobridge
137	**Wade Ceramics Ltd** **(inc. George Wade & Son Ltd. And Wade, Heath & Co. Ltd)** Earthenwares **(listed in 1960s, 1970s, 1980s, 1990s, 2000s, 2010s, 2016 tables)**	Established 1810. Wade Group renamed Wade ceramics 1989 Acquired by Beauford Group in 1989. Management buyout 1999. Called Wade Allied Holdings. Moved to new factory in 2009 ST1 5GR.		Est. 1810 - present	Yes	Etruria
138	**Washington Pottery Ltd** Earthenwares **(see English Ironstone Tableware)** **(listed in 1960s tables)**	Subsequently English Ironstone Tableware	Name changed	Est. 1946 – 1973	No	Shelton

139	**J. H. Weatherby & Sons Ltd** Earthenwares **(listed in 1960s, 1970s, 1980s, 1990s and 2000s tables)**		Closed down	Est. 1891 – 2000	No	Tunstall then Hanley
X	**Wedgwood & Co. Ltd** Earthenwares **(listed under Enoch Wedgwood & Co. Ltd)**	1965 Renamed Enoch Wedgwood (Tunstall) Ltd	Name changed	Est. 1860 - 1965	No	Tunstall
140	**Enoch Wedgwood (Tunstall) Ltd** Earthenwares **(see Wedgwood & Co. Ltd and Wedgwood Group)** **(listed in 1960s, 1970s, 1980s tables)**	Formerly Wedgwood & Co. Ltd	Acquired by Wedgwood Group in late 1980	Est. 1965 - 1980	No	Tunstall
141	**Wedgwood Group (Josiah Wedgwood & Sons Ltd)** Jaspers, porcelains, parian, etc. **(listed in 1960s, 1970s, 1980s, 1990s, 2000s, 2010s, 2016 tables)**	Acquired by Waterford Glass in the 1980s Acquired Royal Doulton in 2005 Went into administration 2009. Bought by KPC Private Equity 2009 and named WWRD Holdings. Bought in 2015 by FISKARs Group **Ceramics/glass firms in the Wedgwood Group** **(1974):** Josiah Wedgwood & Sons Ltd. Royal Tuscan *Coalport* *Susie Cooper* *Johnson Bros.* *William Adams* *J & G Meakin* *Midwinter* *Mason's Ironstone China* *Crown Staffordshire China* **(2005):** *Waterford Crystal* *Rosenthall* *Royal Doulton*		Est. 1759 - present	Yes	Etruria then Barlaston

142	**Weetman Figures** China and Earthenware **(listed in 1960s tables)**	No further information available so assume closed down in 1960s	Closed down	Est. 1952 – 19??	No	Tunstall
143	**Thomas C. Wild & Sons Ltd** China **(listed in 1960s table)**	Renamed Royal Albert in 1961	Acquired by S. E. Pearson & Son 1964 then Royal Doulton in 1972	Est. 1894 - 1964	No	Longton
144	**Arthur J. Wilkinson Ltd** Earthenwares (**listed in 1960s table then under Midwinter/ Meakin. See also Wedgwood)**	Renamed W. R. Midwinter after acquisition J & G Meakin acquired Midwinter in 1968. Both companies acquired by Wedgwood in 1970	Acquired by W. R. Midwinter in 1964	Est. 1885 - 1964	No	Burslem
145	**Arthur Wood & Son (Longport) Ltd** Earthenwares **(listed in 1960s, 1970s, 1980s tables)**	See Price & Kensington and Raywear	Acquired by Price and Kensington 1989	Est. 1928 - 1989	No	Longport
146	**Brian WoodCeramics** Earthenwares **(see Staffordshire China Ltd)** **(listed in 1990s, 2000s tables)**	Deborah Wood was a founding partner of Brian Wood Ceramics	Acquired by Staffordshire China Ltd 2003	Est. 1997 - 2003	No	Longton
X	**Deborah Wood Ceramics** Earthenwares Too small to include in this survey.	Formed after closure of Staffordshire China Ltd where Deborah Wood worked (see also Brian Wood ceramics) Deborah Wood retired to look after her young family.	Closed down	Est. 2005 - ?	No	Burslem
X	**Tony Wood** Too small to include in this survey.	Studio potter Assume less than 10 employees – no details found	Too small	Est. 1980 - 1991	No	Various
147	**Wood & Sons Ltd** Earthenwares, Ironstones, etc. **(listed in 1960s, 1970s, 1980s, 1990s, 2000s tables)**	Links to Ellgreave Pottery and Susie Cooper Pottery Co. Ltd	Closed down	Est. 1865 – 2005	No	Burslem

Appendix 4a: Additional Sources Used to Construct Longitudinal Study of SOT Development 1960-2016

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Appendix 5a

UK Ceramics Tableware/Giftware Manufacturers SOT: Firms Existing 1960 - 1969

	Name	date	Status in 2016
1	**William Adams & Sons Ltd**	Est. 1769 – 1966	Acquired
2	**Allied English Potteries (Lawley Group until 1964)**	Est. 1964 – 1972	Acquired
3	**Charles Amison & Co. Ltd**	Est. 1889 – 1962	Closed down
4	**Aristocrat Florals & Fancies (assume closed down by 1960)**	Est. 1958 – 19??	Assume closed down
5	**Artone Pottery**	Est. 1946 – 1993	Closed down
6	**Astbury Fine Bone China of Staffordshire Ltd**	Est. 19?? – 1995	Closed down
7	**Avon Art Pottery Ltd**	Est. 19?? - 1968	Closed down
8	**H. Aynsley & Co. Ltd**	Est. 1873 – c1970	Closed down
9	**Aynsley China Ltd**	Est.1864 – 1971	Closed down
10	**Baifield Productions**	Est. 1964 – c1969	Closed down
11	**P. E. Bairstow & Co**	Est. 1954 – 2013	Closed down
12	**Barratts of Staffordshire Ltd**	Est. 1943 – 1992	Merged
13	**John Beswick Ltd**	Est. 1936 – 1969	Acquired
14	**Biltons Ltd**	Est. 1912 – 1986	Acquired *
15	**Blakeney Pottery Ltd**	Est. 1968 – 2012	Closed down
16	**Blue John Pottery**	Est. 1886 – 1989	Closed down
17	**E. Brain & Co. Ltd**	Est. 1903 – 1967	Acquired
18	**Sampson Bridgwood & Son Ltd**	Est. 1805 – 1964	Acquired
19	**British Anchor Pottery**	Est. 1884 – c1970	Closed down
20	**James Broadhurst & Sons Ltd**	Est. 1862 – 1984	Acquired
21	**Burgess & Leigh Ltd**	Est. 1867 – 1999	Acquired
22	**Cara China Co**	Est. 1945 – c2015	Closed down
23	**Carlton Ware Ltd**	Est. 1958 – 1967	Acquired
24	**Chapmans Longton Ltd**	Est. 1916 – 1966	Acquired
25	**Cloughs Royal Art Pottery**	Est. 1961 – 1985	Acquired
26	**Susie Cooper China Ltd**	Est. 1950 – 1966	Acquired
27	**Co-operative Society (Windsor Pottery; Crown Clarence)**	Est. 1911 – 1989	Acquired
28	**W. T. Copeland & Sons**	Est. 1932 – 1970	Merged
29	**Cotton**	Est. 1880 – 1981	Closed down
30	**Crown Staffordshire China Co. Ltd**	Est. 1948 – 1964	Acquired
31	**Denton China (Longton) Ltd.**	Est. 1945 – 1968	Acquired
32	**Doulton (Royal) & Co. Ltd**	Est. 1862 – 2004	Acquired
33	**Dudson Bros Ltd**	Est. 1898 – present	Still operating
34	**Dunn, Bennett & Co. Ltd**	Est. c1878 – 1968	Acquired
35	**Elektra Porcelain Co. Ltd**	Est. 1924 – 1969	Closed down
36	**Elizabethan Bone China**	Est. 1875 – 1989	Acquired
37	**Empire Porcelain Co. Ltd**	Est. 1896 – 1967	Closed down
38	**Empress Pottery**	Est. 19?? – c1969	Closed down
39	**Fielding & Co. Ltd**.	Est. 1879 – 1982	Closed down
40	**A. T. Finney & Sons Ltd**	Est. 1947 – 1989	Acquired
41	**Five Towns China Co. Ltd (assume closed down in 1960s)**	Est. 1957 – 19??	Assume closed down
42	**Ford & Sons (Crownford) Ltd**	Est. 1938-1965	Closed down
43	**J Fryer & Son Ltd.**	Est. 1945 – 1998	Acquired
44	**Furnivals Ltd**	Est. 1890 – 1967	Acquired
45	**Gladstone China (Longton) Ltd**	Est. 1939 – 1970	Closed down
46	**Grenville Pottery Ltd**	Est. 1946 – c1964	Closed down

47	**W H Grindley & Co. Ltd.**	Est. 1880 – 1960 And 1988 – 1991	Acquired*
48	**Hammersley & Co. Ltd**	Est. 1887 – 1966	Acquired
49	**Howard Pottery Co. Ltd**	Est. 1925 – c1974	Acquired
50	**Hudson & Middleton Ltd**	Est. 1941 – present	Still operating
51	**Johnson Bros. (Hanley) Ltd**	Est. 1883 – 1968	Acquired
52	**A B Jones & Sons Ltd**	Est. 1900 – 1992	Acquired
53	**James Kent Ltd**	Est. 1897 – 1989	Acquired
54	**William Kent (Porcelains) Ltd**	Est. 1894 – 1962	Industrial ceramics
55	**Kirkhams Ltd**	Est. 1946 – 1961	Acquired
56	**Lancaster & Sandland Ltd.**	Est. 1944 – 1968	Closed down
57	**Lingard Webster & Co. Ltd**	Est. 1900 – c1972	Closed down
58	**Longton New Art Pottery Co. Ltd**	Est. 1932 – c1960s	Closed down
59	**John Maddock & Sons Ltd**	Est. 1855 – c1987	Closed down
60	**Masons Ironstone China**	Est. 1968 – 1973	Acquired
61	**Alfred Meakin Ltd**	Est. 1875 – 1976	Acquired
62	**J & G Meakin Ltd**	Est. 1851 – 1970	Acquired
63	**Melba-Wain Ltd**	Est. 1946 – c2000	Assume closed down
64	**W R Midwinter Ltd**	Est. 1910 – 1968	Acquired
65	**G E Milner (assume closed down in 1960s)**	Est. 1957 – 19??	Acquired
66	**Minton & Co**	Est. 1793 – 1968	Acquired
67	**W Moorcroft PLC**	Est. 1913 – present	Still operating
68	**Moorland Pottery**	Est. 1960 – present	Still operating
69	**Myott-Meakin Ltd**	Est. 1898 – 1991	Acquired
70	**Nanrich Pottery (assume present in 1960)**	Est. 19?? – 1991	Acquired
71	**New Chelsea China Co. Ltd**	Est. 1912 – 1961	Acquired
72	**Newport Pottery Co. Ltd**	Est. 1920 – 1964	Acquired
73	**Paragon China Co. Ltd**	Est. 1920 – 1960	Acquired
74	**Portmeirion Potteries Ltd**	Est. 1961 – present	Still operating
75	**R. H. & S. L. Plant Ltd**	Est. 1898 – 1966	Acquired
76	**Price & Kensington Potteries Ltd**	Est. 1962 – 2009	Acquired
77	**Regency China Ltd**	Est. 1953 – 2007	Closed down
78	**A. G. Richardson & Co. Ltd**	Est. 1915 – 1974	Acquired
79	**Rosina China**	Est. 1941 – 1989	Merged
80	**Roslyn China**	Est. 1946 – 1963	Merged
81	**Royal Stafford China**	Est. 1845 – present	Still operating
82	**James Sadler & Sons Ltd**	Est. 1899 – 2000	Acquired
83	**Salisbury China Co. Ltd**	Est. 1954 – 1970	Closed down
84	**Shaw & Copestake**	Est. 1901 – 1982	Closed down
85	**Shelley Potteries Ltd**	Est. 1925 – 1966	Acquired
86	**Shore & Coggins**	Est. 1911 – 1966	Acquired
87	**Shorter & Son Ltd**	Est. 1905 – 1964	Acquired
88	**Staffordshire Potteries Ltd**	Est. 1950 – 1986	Closed down
89	**Staffordshire Tea Set Co. Ltd**	Est. 1926 – c1965?	Closed down
90	**Studio Szeiler Ltd**	Est. 1951 – 1986	Closed down
91	**R. Sudlow & Sons Ltd.**	Est. 1886 – 1965	Closed down
92	**Summerbank Pottery Ltd**	Est. 1952 – 2001	Closed down
93	**John Tams & Son Ltd**	Est. 1875 – 2006	Closed down
94	**Taylor & Kent Ltd**	Est. 1867 – 1989	Acquired
95	**Taylor, Tunnicliffe & Co Ltd**	Est. 1866 – 1989	Acquired
96	**Thorley China Ltd**	Est. 1940 – 1971	Closed down

97	**Viking Pottery Co.**	Est. 1936 – 1964	Closed down
98	**Wade Ceramics Ltd**	Est. 1922 – present	Still operating
99	**Washington Pottery Ltd**	Est. 1946 – 1973	Closed down
100	**J. H. Weatherby & Sons Ltd**	Est. 1891 – 2000	Closed down
101	**Enoch Wedgwood & Co Ltd**	Est. 1860 – 1980	Acquired
102	**Wedgwood Group**	Est. 1759 – present	Still operating
103	**Weetman Figures**	Est. 1952 – c1960s	Assume closed down
104	**Thomas C. Wild & Sons Ltd**	Est. 1894 – 1964	Acquired
105	**Arthur J. Wilkinson Ltd**	Est. 1885 – 1964	Acquired
106	**Arthur Wood & Son (Longport) Ltd**	Est. 1928 – 1989	Acquired
107	**Wood & Sons Ltd**	Est. 1865 – 2005	Closed down

Appendix 5b

UK Ceramics Tableware/Giftware Manufacturers SOT: Firms Existing 1970 - 1979

	Name	Date	Status in 2016
1	**Allied English Potteries (Lawley Group until 1964)**	Est. 1964 – 1972	Acquired
2	**Artone Pottery**	Est. 1946 – 1993	Closed down
3	**Ashley Ceramics Ltd**	Est. 1975 – 2007	Closed down
4	**Astbury Fine Bone China of Staffordshire Ltd**	Est. 19?? – 1995	Closed down
5	**H. Aynsley & Co. Ltd**	Est. 1873 – c1970	Closed down
6	**Aynsley China Ltd**	Est. 1864 – 1971	Acquired
7	**P. E. Bairstow & Co**	Est. 1954 – 2013	Closed down
8	**Barratts of Staffordshire Ltd**	Est. 1943 – 1992	Merged
9	**Berkshire China Co Ltd**	Est. c1970 – 2007	Closed down
10	**Biltons Ltd**	Est. 1912 – 1986	Acquired *
11	**Blakeney Pottery Ltd**	Est. 1968 – 2012	Closed down
12	**Blue John Pottery**	Est. 1886 – 1989	Closed down
13	**British Anchor Pottery**	Est. 1884 – c1970	Closed down
14	**James Broadhurst & Sons Ltd**	Est. 1862 – 1984	Acquired
15	**Broadhurst Bros.**	Est. 1977 – 2007	Closed down
16	**Burgess & Leigh Ltd**	Est. 1867 – 1999	Acquired
17	**Cara China Co**	Est. 1945 – c2015	Closed down
18	**Caverswall China**	Est. 1973 – present	Still operating
19	**Cloughs Royal Art Pottery**	Est. 1961 – 1985	Acquired
20	**Co-operative Society (Windsor Pottery; Crown Clarence)**	Est. 1911 – 1989	Acquired
21	**W. T. Copeland & Sons**	Est. 1932 – 1970	Merged
22	**Elijah Cotton**	Est. 1880 – 1981	Closed down
23	**Doulton (Royal) & Co. Ltd**	Est. 1862 – 2004	Acquired
24	**Dudson Bros Ltd**	Est. 1898 – present	Still operating
25	**Elizabethan Bone China**	Est. 1875 – 1989	Acquired
26	**English Ironstone Pottery (formerly Washington Pottery)**	Est. 1973 – 1994	Closed down
27	**Fielding & Co. Ltd**.	Est. 1879 – 1982	Closed down
28	**A. T. Finney & Sons Ltd**	Est. 1947 – 1989	Acquired
29	**J Fryer & Son Ltd.**	Est. 1945 – 1998	Acquired
30	**Gladstone China (Longton) Ltd**	Est. 1939 – 1970	Closed down
31	**W H Grindley & Co. Ltd.**	Est. 1880 – 1960 And 1988 – 1991	Acquired*
32	**Howard Pottery Co. Ltd**	Est. 1925 – c1974	Acquired
33	**Hudson & Middleton Ltd**	Est. 1941 – present	Still operating
34	**A B Jones & Sons Ltd**	Est. 1900 – 1992	Acquired
35	**James Kent Ltd**	Est. 1897 – 1989	Acquired
36	**Roy Kirkham & Co Ltd**	Est. 1970 – present	Still operating
37	**Lingard Webster & Co. Ltd**	Est. 1900 – c1972	Closed down
38	**John Maddock & Sons Ltd**	Est. 1855 – c1987	Closed down
39	**Masons Ironstone China**	Est. 1968 – 1973	Acquired
40	**Alfred Meakin Ltd**	Est. 1875 – 1976	Acquired
41	**J & G Meakin Ltd**	Est. 1851 – 1970	Acquired
42	**Melba-Wain Ltd**	Est. 1946 – c2000	Assume closed down
43	**W Moorcroft PLC**	Est. 1913 – present	Still operating
44	**Moorland Pottery**	Est. 1960 – present	Still operating
45	**Myott-Meakin Ltd**	Est. 1898 – 1991	Acquired

46	**Nanrich Pottery (assume present in 1960)**	Est. 19?? – 1991	Acquired
47	**Portmeirion Potteries Ltd**	Est. 1961 – present	Still operating
48	**Price & Kensington Potteries Ltd**	Est. 1962 – 2009	Acquired
49	**Regency China Ltd**	Est. 1953 – 2007	Closed down
50	**A. G. Richardson & Co. Ltd**	Est. 1915 – 1974	Acquired
51	**Rosina China**	Est. 1941 – 1989	Merged
52	**Royal Stafford China**	Est. 1845 – present	Still operating
53	**Royal Stratford**	Est. 1976 – 2005	Closed down
54	**James Sadler & Sons Ltd**	Est. 1899 – 2000	Acquired
55	**Salisbury China Co. Ltd**	Est. 1954 – 1970	Closed down
56	**Shaw & Copestake**	Est. 1901 – 1982	Closed down
57	**Staffordshire Potteries Ltd**	Est. 1950 – 1986	Closed down
58	**Studio Szeiler Ltd**	Est. 1951 – 1986	Closed down
59	**Summerbank Pottery Ltd**	Est. 1952 – 2001	Closed down
60	**John Tams & Son Ltd**	Est. 1875 – 2006	Closed down
61	**Taylor & Kent Ltd**	Est. 1867 – 1989	Acquired
62	**Taylor, Tunnicliffe & Co Ltd**	Est. 1866 – 1989	Acquired
63	**Thorley China Ltd**	Est. 1940 – 1971	Closed down
64	**Wade Ceramics Ltd**	Est. 1922 – present	Still operating
65	**Washington Pottery Ltd**	Est. 1946 – 1973	Closed down
66	**J. H. Weatherby & Sons Ltd**	Est. 1891 – 2000	Closed down
67	**Enoch Wedgwood & Co Ltd**	Est. 1860 – 1980	Acquired
68	**Wedgwood Group**	Est. 1759 – present	Still operating
69	**Arthur Wood & Son (Longport) Ltd**	Est. 1928 – 1989	Acquired
70	**Wood & Sons Ltd**	Est. 1865 – 2005	Closed down

Appendix 5c

UK Ceramics Tableware/Giftware Manufacturers SOT: Firms Existing 1980 - 1989

	Name	Date	Status in 2016
1	**Amber China Ltd**	Est. 1983 – 2005	Closed down
2	**Artone Pottery**	Est. 1946 – 1993	Closed down
3	**Ashley Ceramics Ltd**	Est. 1975 – 2007	Closed down
4	**Astbury Fine Bone China of Staffordshire Ltd**	Est. 19?? – 1995	Closed down
5	**P. E. Bairstow & Co**	Est. 1954 – 2013	Closed down
6	**Barratts of Staffordshire Ltd**	Est. 1943 – 1992	Merged
7	**Berkshire China Co Ltd**	Est. c1970 – 2007	Closed down
8	**Biltons Ltd**	Est. 1912 – 1986	Acquired *
9	**Birchcroft Fine Bone China Co Ltd**	Est. 1980 – c2015	Closed down
10	**Blakeney Pottery Ltd**	Est. 1968 – 2012	Closed down
11	**Blue John Pottery**	Est. 1886 – 1989	Closed down
12	**Emma Bridgewater**	Est. 1984 – present	Still operating
13	**James Broadhurst & Sons Ltd (afterwards Churchill China)**	Est. 1862 – 1984	Acquired
14	**Broadhurst Bros.**	Est. 1977 – 2007	Closed down
15	**Burgess & Leigh Ltd**	Est. 1867 – 1999	Acquired
16	**Cara China Co**	Est. 1945 – c2015	Closed down
17	**Caverswall China**	Est. 1973 – present	Still operating
18	**Cloughs Royal Art Pottery**	Est. 1961 – 1985	Acquired
19	**Co-operative Society (Windsor Pottery; Crown Clarence)**	Est. 1911 – 1989	Acquired
20	**Elijah Cotton**	Est. 1880 – 1981	Closed down
21	**Crown Trent China Ltd**	Est. 1980 – c2015	Closed down
22	**Peggy Davies Ceramics**	Est. 1981 – c2015	Acquired
23	**Doulton (Royal) & Co. Ltd**	Est. 1862 – 2004	Acquired
24	**Dudson Bros Ltd**	Est. 1898 – present	Still operating
25	**Dunoon Ceramics**	Est. 1980 – present	Still operating
26	**Elizabethan Bone China (See Crownford after 1990)**	Est. 1875 – 1989	Acquired
27	**English Ironstone Pottery (formerly Washington Pottery)**	Est. 1973 – 1994	Closed down
28	**Fielding & Co. Ltd**.	Est. 1879 – 1982	Closed down
29	**A. T. Finney & Sons Ltd**	Est. 1947 – 1989	Acquired
30	**J Fryer & Son Ltd.**	Est. 1945 – 1998	Acquired
31	**W H Grindley & Co. Ltd.**	Est. 1880 – 1960 And 1988 – 1991	Acquired*
32	**Holland Studio Craft**	Est. 1986 – 1996	Acquired
33	**Hudson & Middleton Ltd**	Est. 1941 – present	Still operating
34	**A B Jones & Sons Ltd**	Est. 1900 – 1992	Acquired
35	**James Kent Ltd**	Est. 1897 – 1989	Acquired
36	**Roy Kirkham & Co Ltd**	Est. 1970 – present	Still operating
37	**Little Acorns Pottery**	Est. 1980 – 2009	Closed down
38	**John Maddock & Sons Ltd**	Est. 1855 – c1987	Closed down
39	**Melba-Wain Ltd**	Est. 1946 – c2000	Assume closed down
40	**W Moorcroft PLC**	Est. 1913 – present	Still operating
41	**Moorland Pottery**	Est. 1960 – present	Still operating
42	**Myott-Meakin Ltd**	Est. 1898 – 1991	Acquired
43	**Nanrich Pottery (assume present in 1960)**	Est. 19?? – 1991	Acquired
44	**Portmeirion Potteries Ltd**	Est. 1961 – present	Still operating
45	**Price & Kensington Potteries Ltd**	Est. 1962 – 2009	Acquired

46	**Regency China Ltd**	Est. 1953 – 2007	Closed down
47	**Rosina China**	Est. 1941 – 1989	Merged
48	**Royal Stafford China**	Est. 1845 – present	Still operating
49	**Royal Stratford**	Est. 1976 – 2005	Closed down
50	**James Sadler & Sons Ltd**	Est. 1899 – 2000	Acquired
51	**Shaw & Copestake**	Est. 1901 – 1982	Closed down
52	**Staffordshire Potteries Ltd**	Est. 1950 – 1986	Closed down
53	**Steelite International**	Est. 1983 – present	Still operating
54	**Studio Szeiler Ltd**	Est. 1951 – 1986	Closed down
55	**Summerbank Pottery Ltd**	Est. 1952 – 2001	Closed down
56	**John Tams & Son Ltd**	Est. 1875 – 2006	Closed down
57	**Taylor & Kent Ltd**	Est. 1867 – 1989	Acquired
58	**Taylor, Tunnicliffe & Co Ltd**	Est. 1866 – 1989	Acquired
59	**Wade Ceramics Ltd**	Est. 1922 – present	Still operating
60	**J. H. Weatherby & Sons Ltd**	Est. 1891 – 2000	Closed down
61	**Enoch Wedgwood & Co Ltd**	Est. 1860 – 1980	Acquired
62	**Wedgwood Group**	Est. 1759 – present	Still operating
63	**Arthur Wood & Son (Longport) Ltd**	Est. 1928 – 1989	Acquired
64	**Wood & Sons Ltd**	Est. 1865 – 2005	Closed down

Appendix 5d

UK Ceramics Tableware/Giftware Manufacturers SOT: Firms Existing 1990 - 1999

	Name	Date	Status in 2016
1	**Amber China Ltd**	Est. 1983 – 2005	Closed down
2	**Artone Pottery**	Est. 1946 – 1993	Closed down
3	**Ashley Ceramics Ltd**	Est. 1975 – 2007	Closed down
4	**Astbury Fine Bone China of Staffordshire Ltd**	Est. 19?? – 1995	Closed down
5	**Lorna Bailey Artware**	Est. 1995 – 1998	Closed down
6	**P. E. Bairstow & Co**	Est. 1954 – 2013	Closed down
7	**Barratts of Staffordshire Ltd**	Est. 1943 – 1992	Merged
8	**Berkshire China Co Ltd**	Est. c1970 – 2007	Closed down
9	**Birchcroft Fine Bone China Co Ltd**	Est. 1980 – c2015	Closed down
10	**Blakeney Pottery Ltd**	Est. 1968 – 2012	Closed down
11	**Emma Bridgewater**	Est. 1984 – present	Still operating
12	**Broadhurst Bros.**	Est. 1977 – 2007	Closed down
13	**Burgess & Leigh Ltd**	Est. 1867 – 1999	Acquired
14	**Cameleon China Ltd**	Est. 1998 – 2004	Closed down
15	**Cara China Co**	Est. 1945 – c2015	Closed down
16	**Caverswall China**	Est. 1973 – present	Still operating
17	**Churchill China PLC (formerly listed as James Broadhurst)**	Est c1990 – present	Still operating
18	**Collectible World Studios**	Est. 1993 – 2008	Closed down
19	**Crownford China**	Est. 1990 – 1994	Acquired
20	**Crown Trent China Ltd**	Est. 1980 – c2015	Closed down
21	**Peggy Davies Ceramics**	Est. 1981 - present	Still operating
22	**Doulton (Royal) & Co. Ltd**	Est. 1862 – 2004	Acquired
23	**Dudson Bros Ltd**	Est. 1898 – present	Still operating
24	**Dunoon Ceramics**	Est. 1980 – present	Still operating
25	**English Ironstone Pottery (formerly Washington Pottery)**	Est. 1973 – 1994	Closed down
26	**J Fryer & Son Ltd.**	Est. 1945 – 1998	Acquired
27	**W H Grindley & Co. Ltd.**	Est. 1880 – 1960 And 1988 – 1991	Acquired*
28	**Holland Studio Craft**	Est. 1986 – 1996	Acquired
29	**Hudson & Middleton Ltd**	Est. 1941 – present	Still operating
30	**A B Jones & Sons Ltd**	Est. 1900 – 1992	Acquired
31	**Roy Kirkham & Co Ltd**	Est. 1970 – present	Still operating
32	**Little Acorns Pottery**	Est. 1980 – 2009	Closed down
33	**Melba-Wain Ltd**	Est. 1946 – c2000	Assume closed down
34	**W Moorcroft PLC**	Est. 1913 – present	Still operating
35	**Moorland Pottery**	Est. 1960 – present	Still operating
36	**Myott-Meakin Ltd**	Est. 1898 – 1991	Acquired
37	**Nanrich Pottery (assume present in 1960)**	Est. 19?? – 1991	Acquired
38	**Portmeirion Potteries Ltd**	Est. 1961 – present	Still operating
39	**Price & Kensington Potteries Ltd**	Est. 1962 – 2009	Acquired
40	**Ravensdale Pottery Ltd**	Est. 1999 – 2006	Closed down
41	**Regency China Ltd**	Est. 1953 – 2007	Closed down
42	**Royal Stafford China**	Est. 1845 – present	Still operating
43	**Royal Stratford**	Est. 1976 – 2005	Closed down
44	**James Sadler & Sons Ltd**	Est. 1899 – 2000	Acquired
45	**Steelite International**	Est. 1983 – present	Still operating

46	**Summerbank Pottery Ltd**	Est. 1952 – 2001	Closed down
47	**John Tams & Son Ltd**	Est. 1875 – 2006	Closed down
48	**Wade Ceramics Ltd**	Est. 1922 – present	Still operating
49	**J. H. Weatherby & Sons Ltd**	Est. 1891 – 2000	Closed down
50	**Wedgwood Group**	Est. 1759 – present	Still operating
51	**Brian Wood Ceramics**	Est. 1997 – 2003	Acquired
52	**Wood & Sons Ltd**	Est. 1865 – 2005	Closed down

Appendix 5e

UK Ceramics Tableware/Giftware Manufacturers SOT: Firms Existing in 2000 - 2009

	Name	Date	Status in 2016
1	**Amber China Ltd**	Est. 1983 – 2005	Closed down
2	**Ashley Ceramics Ltd**	Est. 1975 – 2007	Closed down
3	**H. Aynsley & Co Ltd (re-entered in 2002)**	Est. 2002 – 2013	Closed down
4	**P. E. Bairstow & Co**	Est. 1954 – 2013	Closed down
5	**Belvedere China**	Est. 2002 – 2007	Closed down
6	**Berkshire China Co Ltd**	Est. c1970 – 2007	Closed down
7	**Birchcroft Fine Bone China Co Ltd**	Est. 1980 – c2015	Closed down
8	**Blakeney Pottery Ltd**	Est. 1968 – 2012	Closed down
9	**Emma Bridgewater**	Est. 1984 – present	Still operating
10	**Broadhurst Bros.**	Est. 1977 – 2007	Closed down
11	**Cameleon China Ltd**	Est. 1998 – 2004	Closed down
12	**Cara China Co**	Est. 1945 – c2015	Closed down
13	**Caverswall China**	Est. 1973 – present	Still operating
14	**Churchill China PLC (formerly listed as James Broadhurst)**	Est c1990 – present	Still operating
15	**Collectible World Studios**	Est. 1993 – 2008	Closed down
16	**Crown Trent China Ltd**	Est. 1980 – c2015	Closed down
17	**Peggy Davies Ceramics**	Est. 1981 – c2015	Closed down
18	**Denby Pottery Company (Acquired Burleigh)**	Est. 2009 – present	Still operating
19	**Doulton (Royal) & Co. Ltd**	Est. 1862 – 2004	Acquired
20	**Duchess China (See Crownford and Taylor Tunnicliffe)**	Est. 2000 – present	Still operating
21	**Dudson Bros Ltd**	Est. 1898 – present	Still operating
22	**Dunoon Ceramics**	Est. 1980 – present	Still operating
23	**Hudson & Middleton Ltd**	Est. 1941 – present	Still operating
24	**Roy Kirkham & Co Ltd**	Est. 1970 – present	Still operating
25	**Little Acorns Pottery**	Est. 1980 – 2009	Closed down
26	**Melba-Wain Ltd**	Est. 1946 – c2000	Assume closed down
27	**W Moorcroft PLC**	Est. 1913 – present	Still operating
28	**Moorland Pottery**	Est. 1960 – present	Still operating
29	**Portmeirion Potteries Ltd**	Est. 1961 – present	Still operating
30	**Price & Kensington Potteries Ltd**	Est. 1962 – 2009	Acquired
31	**Pyramid Pottery Co Ltd**	Est. 2005 – 2009	Closed down
32	**Ravensdale Pottery Ltd**	Est. c1999 – 2006	Closed down
33	**Regency China Ltd**	Est. 1953 – 2007	Closed down
34	**Royal Stafford Tableware**	Est. 1845 – present	Still operating
35	**Royal Stratford**	Est. 1976 – 2005	Closed down
36	**James Sadler & Sons Ltd**	Est. 1899 – 2000	Acquired
37	**Staffordshire China Ltd**	Est. 2000 – 2005	Closed down
38	**Steelite International**	Est. 1983 – present	Still operating
39	**Studio Hinks**	Est. 2005 – 2011	Closed down
40	**Summerbank Pottery Ltd**	Est. 1952 – 2001	Closed down
41	**John Tams & Son Ltd (Tams group Ltd from 2000)**	Est. 1875 – 2006	Closed down
42	**Wade Ceramics Ltd**	Est. 1922 – present	Still operating
43	**J. H. Weatherby & Sons Ltd**	Est. 1891 – 2000	Closed down
44	**Wedgwood Group**	Est. 1759 – present	Still operating
45	**Brian Wood Ceramics**	Est. 1997 – 2003	Acquired
46	**Wood & Sons Ltd**	Est. 1865 – 2005	Closed down

Appendix 5f

UK Ceramics Tableware/Giftware Manufacturers SOT: Firms Existing 2010 - 2016

	Name	Date	Status in 2016
1	**H. Aynsley & Co Ltd (re-entered in 2002)**	Est. 2002 – 2013	Closed down
2	**P. E. Bairstow & Co**	Est. 1954 – 2013	Closed down
3	**Birchcroft Fine Bone China Co Ltd**	Est. 1980 – c2015	Closed down
4	**Blakeney Pottery Ltd**	Est. 1968 – 2012	Closed down
5	**Emma Bridgewater**	Est. 1984 – present	Still operating
6	**Cara China Co**	Est. 1945 – c2015	Closed down
7	**Caverswall China**	Est. 1973 – present	Still operating
8	**Churchill China PLC (formerly listed as James Broadhurst)***	Est 1985 – present	Still operating
9	**Crown Trent China Ltd**	Est. 1980 – c2011	Closed down
10	**Peggy Davies Ceramics (still operating? but less than 10 staff)**	Est. 1981 – present	Not included as too small
11	**Denby Pottery Company (Acquired Burleigh)**	Est. 2009 – present	Still operating
12	**Duchess China (See Crownford and Taylor Tunnicliffe)**	Est. 2000 – present	Still operating
13	**Dudson Bros Ltd**	Est. 1898 – present	Still operating
14	**Dunoon Ceramics**	Est. 1980 – present	Still operating
15	**Hudson & Middleton Ltd**	Est. 1941 – present	Still operating
16	**Roy Kirkham & Co Ltd**	Est. 1970 – present	Still operating
17	**W Moorcroft PLC**	Est. 1913 – present	Still operating
18	**Moorland Pottery**	Est. 1960 – present	Still operating
19	**Portmeirion Potteries Ltd**	Est. 1961 – present	Still operating
20	**Royal Stafford Tableware (formerly Royal Stafford China until 1992)**	Est. 1845 – present	Still operating
21	**Steelite International**	Est. 1983 – present	Still operating
22	**Studio Hinks**	Est. 2005 – 2011	Closed down
23	**Wade Ceramics Ltd**	Est. 1922 – present	Still operating
24	**Wedgwood Group**	Est. 1759 – present	Still operating

Appendix 5g

UK Ceramics Tableware/Giftware Manufacturers SOT: Firms Existing in 2016

	Name	Date	Status in 2016
1	**Emma Bridgewater**	Est. 1984 – present	Still operating
2	**Caverswall China**	Est. 1973 – present	Still operating
3	**Churchill China PLC (formerly listed as James Broadhurst)***	Est 1985 – present	Still operating
4	**Denby Pottery Company (Acquired Burleigh)**	Est. 2009 – present	Still operating
5	**Duchess China (See Crownford and Taylor Tunnicliffe)**	Est. 2000 – present	Still operating
6	**Dudson Bros Ltd**	Est. 1898 – present	Still operating
7	**Dunoon Ceramics**	Est. 1980 – present	Still operating
8	**Hudson & Middleton Ltd (NEWS: Closed down June 2017)**	Est. 1941 – present	Closed June 2017
9	**Roy Kirkham & Co Ltd**	Est. 1970 – present	Still operating
10	**W Moorcroft PLC**	Est. 1913 – present	Still operating
11	**Moorland Pottery (less than 10 employees)**	Est. 1960 – present	Still operating but not included. Too small
12	**Portmeirion Potteries Ltd**	Est. 1961 – present	Still operating
13	**Royal Stafford Tableware**	Est. 1845 – present	Still operating
14	**Steelite International**	Est. 1983 – present	Still operating
15	**Wade Ceramics Ltd**	Est. 1922 – present	Still operating
16	**Wedgwood Group**	Est. 1759 – present	Still operating

Appendix 6

SOT Ceramics Tableware & Giftware Manufacturers: New Entrants 1960-2016

6 a) SOT Ceramics Tableware/Giftware Manufacturers: New Entrants 1960-1969

	Name	date	Status in 2016
1	**Allied English Potteries (Lawley Group until 1964)**	Est. 1964 – 1972	Acquired
2	**Baifield Productions (assume closed down c1969)**	Est.1964 – 1969?	Assume closed down
3	**Blakeney Pottery Ltd (re-opened by Meakin 1999)**	Est. 1968 – 1999 Then 1999 – 2012	Closed down
4	**Clough's Royal Art Pottery**	Est. 1961 – 1985	Acquired
5	**Mason's Ironstone China**	Est. 1968 – 1973	Acquired
6	**Moorland Pottery**	Est. 1960 – present	Still operating
7	**Portmeirion Potteries Ltd**	Est. 1961 – present	Still operating
8	**Price and Kensington Potteries Ltd**	Est. 1962 – 2006	Acquired

6 b) SOT Ceramics Tableware/Giftware Manufacturers: New Entrants 1970-1979

	Name	date	Status in 2016
1	**Ashley Ceramics Ltd**	Est. 1975 – 2007	Closed down
2	**Berkshire China Co Ltd**	Est. c1970 – 2007	Closed down
3	**Broadhurst Bros. (Argyle China Co.)**	Est. c1977? – 2007	Closed down
4	**Caverswall China**	Est. 1973 – present	Still operating
5	**English Ironstone Pottery (formerly Washington Pottery)**	Est. 1973 – 1994	Closed down
6	**Roy Kirkham & Co. Ltd**	Est. 1970 – present	Still operating
7	**Royal Stratford**	Est. 1976 – 2005	Closed down

6 c) SOT Ceramics Tableware/Giftware Manufacturers: New Entrants 1980-1989

	Name	date	Status in 2016
1	**Amber China Ltd**	Est. 1983 – 2005	Closed down
2	**Birchcroft Fine Bone China Co. Ltd**	Est. 1980 – c2015	Closed down
3	**Emma Bridgewater (Bridgwater Pottery Ltd)**	Est. 1984 – present	Still operating
4	**Crown Trent**	Est. 1980 – 2009	Import & decorate since 2009
5	**Peggy Davies Ceramics Ltd**	Est. 1981 – present	Still operating
6	**Dunoon Ceramics Ltd**	Est. 1980 – present	Still operating
7	**Holland Studio Craft Ltd**	Est. 1986 – 1996	Acquired
8	**Little Acorns Pottery (assume Est. 1980)**	Est. c1980 – 2009	Closed down
9	**Steelite International P.L.C.**	Est. 1983 – present	Still operating

6 d) SOT Ceramics Tableware/Giftware Manufacturers: New Entrants 1990-1999

	Name	date	Status in 2016
1	**Lorna Bailey Artware**	Est. 1995 – 1998	Closed down
2	**Cameleon China Ltd**	Est. 1998 – 2000	Closed down
3	**Churchill China PLC (formerly listed as Broadhurst Bros)**	Est 1985 – present	Still operating
4	**Collectible World Studios**	Est.1993 – 2008	Production shifted o/seas
5	**Crownford China**	Est. 1990 – 1994	Acquired
6	**Ravensdale Pottery Ltd**	Est. 1999 – 2006	Closed down
7	**Brian Wood Ceramics**	Est. 1997 – 2003	Acquired

6 e) SOT Ceramics Tableware/Giftware Manufacturers: New Entrants 2000-2009

	Name	date	Status in 2016
1	**H Aynsley & Co. Ltd (present also 1973 – 1961)**	Est. 2002 – 2013	Closed down
2	**Belvedere China**	Est. 2000 – 2007	Closed down
3	**Denby Pottery Company (Acquired Burleigh)**	Est. 2009 – present	Still operating
4	**Duchess China**	Est. 1947 – present	Still operating
5	**Pyramid Pottery Co. Ltd**	Est. 2005 – 2009	Closed down
6	**Staffordshire China Ltd**	Est. 2000 – 2005	Closed down
7	**Studio Hinks**	Est. 2005 – 2011	Closed down

Appendix 7

UK Ceramics Manufacturing Industry SOT: Origin of New Entrants 1960-2016

	Old name	Additional details	New Entrant Origin
1	**Allied English Potteries (1964-1972)**	Formerly existed as Lawley Group under S E Pearson & Son	Name change
2	**Amber China (1983-2005)**	Phoenix Works	Not known
3	**Ashley Ceramics Ltd (1975-2007)**		Not known
4	**Aynsley (H) & Co. Ltd (2002-2013)**	Also known between 1876 and 1961	New entrant
5	**Baifield Productions (1964-69)**	Set up by S. Fielding & Co. Ltd who were operating from 1879 - 1982	Spin-off
6	**Belvedere (2000-2007)**		Not known
7	**Berkshire China Co Ltd (1970-2007)**		Not known
8	**Birchcroft Fine Bone China Co. Ltd (1980-c2015)**	See internet sales site	Not known
9	**Blakeney Pottery Ltd (1968-2012)**	Site Closed in 1999 but reopened in 2000 by Bernard Meakin	Not known
10	**Bridgewater Pottery Ltd Emma Bridgewater 1984-present)**		New entrant
11	**Broadhurst Bros. (1977-2007)**	Known as Argyle China Co.	Not known
12	**CameleonChina Ltd (1998-2004)**		Not Known
13	**Caverswall China (1973-present)**	Thomas Goode Co. Ltd. Caverswall China (Brand Name)	Not known
14	**Churchill China PLC (1985-present)**	Formerly Sampson Bridgwood and then part of J A S Broadhurst	Spin-off
15	**Clough's Royal Art Pottery (1961-1985)** **(see Federated Potteries)**	Formerly Alfred Clough Est.1913 – 1961 Part of Federated Potteries with W. H. Grindley	Name change
16	15**Collectible World Studios (1993-2008)**	Formerly Lilliput Lane	Name change
17	**Crownford China (1989-1994)** **(See Taylor & Kent and Elizabethan)**	A merger between Taylor & Kent Ltd and Rosina China resulted in a new company name - Crownford China	Name change after merger
18	**Crown Trent China (1980-2010)**		Not Known
19	**Peggy Davies Ceramics (1981-present)**	Liverpool Road Pottery	New entrant
20	**Denby Pottery Group (in SOT 2009-present)**	Acquired Burgess and Leigh (Burleigh) in 2009	Name change after acquisition
21	**Duchess China (1947-present)** **(see John Tams and Taylor Tunnicliffe)**	Formerly A. T. Finney & Sons Ltd. Who were acquired by John Tams in 1989 then by Taylor Tunnicliff in 2000 and renamed Duchess China	Name change after acquisition
22	**Dunoon Ceramics Ltd (1980-present)**	Were based in Scotland. Moved into SOT in 1980. Later closed Scottish operations.	New entrant
23	**English Ironstone Pottery (1973-1994)**	Formerly Washington Pottery	Name change

24	**Holland Studio Craft (1986-1996)**		Not known
25	**Kirkham (Roy) (1970-present)**		Not known
26	**Little Acorns Pottery (1980-2009)**	Assume present in 1970	New entrant
27	**Lorna Bailey Artware (1995-1998)**	LJB Ceramics –renamed Lorna Bailey Artware in Feb 2003	Spin-off
28	**Mason's Ironstone China (1968-1973)** **(see Wedgwood)**	Formerly G. L. Ashworth & Bros Acquired by Wedgwood	Name changed
29	**Moorland Pottery (1960-present)**	Site was formerly Studio Szeiler Ltd	New entrant
30	**Portmeirion Potteries Ltd (1961-present)**	Susan Williams-Ellis (a designer) bought A E Gray & Co. Ltd in 1960 and Kirkhams Ltd in 1961 and merged to form Portmeirion	New entrant
31	**Price and Kensington Potteries Ltd (1962-2006)**	Price Brothers from 1896 Price Bros. (Burslem) Ltd. From 1903 – 1961 Amalgamation of Price Bros. and Kensington Pottery in 1962 In 1989 Price & Kensington bought Arthur Wood out	Name changed after merger
32	**Pyramid Pottery (2005-2009)**		Not known
33	**Ravensdale Pottery Ltd (1999-2006)**		New entrant
34	**Royal Stratford (1976-2005)**		Not known
35	**Staffordshire China Ltd. (2000-2005)**		Not known
36	**Steelite International PLC (1983-present)**	Previously Dunn Bennett who were acquired by Royal Doulton in 1968 and disposed of. In 1983 D. E. D. Johnson acquired Royal Doulton Hotelware and Steelite International was formed	Spin-off
37	**Studio Hinks (2005-2011)**	Spin-off from Royal Stratford	Spin-off
38	**Brian WoodCeramics (1997-2003)** **(see Staffordshire China Ltd)**	Deborah Wood was a founding partner of Brian Wood Ceramics	Spin-off

Appendix 8

SOT Ceramics Tableware & Giftware Manufacturers: New Entrants Narrow Definition 1960-2016

SOT Ceramics Tableware/Giftware Manufacturers: New Entrants 1960 – 1969

	Name	date	Status in 2016
1	**Baifield Productions**	Est. 1964 – c1969	Closed down
2	**Moorland Pottery**	Est. 1960 – present	Still operating
3	**Portmeirion Potteries Ltd**	Est. 1961 - present	Still operating

SOT Ceramics Tableware/Giftware Manufacturers: New Entrants 1970 – 1979

	Name	date	Status in 2016
1	**Dunoon Ceramics Ltd**	Est. 1980 - present	Still operating
2	**Peggy Davies Ceramics Ltd**	Est. 1980 – c2015	Still operating

SOT Ceramics Tableware/Giftware Manufacturers: New Entrants 1980 – 1989

	Name	date	Status in 2016
1	**Emma Bridgewater**	Est. 1984 – present	Still operating
2	**Little Acorns Pottery**	Est. 1980 – 2009	Closed down
3	**Steelite International P.L.C.**	Est. 1983 - present	Still operating

SOT Ceramics Tableware/Giftware Manufacturers: New Entrants 1990 - 1999

	Name	date	Status in 2016
1	**Lorna Bailey Artware**	Est. c1998 - present	Still operating
2	**Churchill China Ltd**	Est. 1990 - present	Still operating
3	**Ravensdale Pottery Ltd**	Est. 1999 – 2006	Closed down
4	**Brian Wood Ceramics**	Est. 1997 - 2003	Acquired

SOT Ceramics Tableware/Giftware Manufacturers: New Entrants 2000 - 2010

	Name	date	Status in 2016
1	**H Aynsley & Co Ltd**	Est. 2002 – 2013	Closed down
2	**Studio Hinks**	Est. 2005 - 2011	Closed down

Appendix 9: Innovation & Co-operation Questionnaire 2016

North Staffordshire Ceramics (Tableware & Giftware Sector) Innovation Survey 2016

This Innovation survey will be completed in a face-to-face interview with the researcher:
Lorraine Limbrick
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Stoke-on-Trent
Staffordshire
ST4 2DF

Innovation Survey 2016 **(Version 2: November 2016)**

This survey collects information about product and process innovation as well as organisational and marketing innovation during the five-year period 2010 to 2015 inclusive. Most questions cover new or significantly improved goods or the implementation of new or significantly improved processes, logistics or distribution methods. Organisational and marketing innovations are covered in section 4. In order to be able to compare enterprises with and without innovation activities, we request all enterprises to respond to **all** questions, unless otherwise instructed. If you don't know the answer to a question or think one is not relevant, just leave that particular question unanswered.

Person we should contact if there are any queries regarding the form:

Name: _____
Job title: _____
Organisation: _____
Phone: _____
E-mail: _____

1. General information about your enterprise

Name of enterprise _____
Name of Owner _____
Address _____
Postal code _____ **Main activity** _____

1.1 Is your enterprise part of an enterprise group? (A group consists of two or more legally defined enterprises under common ownership. Each enterprise in the group may serve different markets, as with national or regional subsidiaries, or serve different product markets. The head office is also part of an enterprise group.)

Yes ☐ In which country is the head office of your group located? _____

No ☐

If your enterprise is part of an enterprise group, please answer all further questions only for your enterprise in [your country]. Do not include results for subsidiaries or parent enterprises outside of [your country]

1.2 What was your enterprise's total turnover for 2010 and 2015?[141] Turnover is defined as the market sales of goods and services (Include all taxes except VAT[142]).

	2010	2015
Less than £500,000	☐	☐
Between £500,000 - £1,000,000	☐	☐
Between £1,000,000 and £2,000,000	☐	☐
Between £2,000,000 and £5,000,000	☐	☐
Between £5,000,000 and £10,000,000	☐	☐
Between £10,000,000 and £20,000,000	☐	☐
More than £20,000,000	☐	☐

1.3 What was your enterprise's total number of employees in 2010 and 2015?[143]

	2010	2015
Less than 10	☐	☐
Between 10 and 49	☐	☐
Between 50 and 249	☐	☐
More than 249	☐	☐

[141] Give turnover in '000 of national currency units to nine digits.

[142] For Credit institutions: Interests receivable and similar income; for Insurance services: Gross premiums written

[143] Annual average. If not available, give the number of employees at the end of each year. Give figures to six digits.

1.4 Does your enterprise undertake all phases of the production process?

	Yes	No
Manufacture blanks only	☐	☐
Manufacture and decorate/glaze	☐	☐
Decorate/glaze only	☐	☐
Packaging of manufactured products	☐	☐
Other not listed here*	☐	☐
All of the above	☐	☐

*** Please explain**_____

1.5 In which geographic markets did your enterprise sell goods or services during the five years 2010 to 2015?

	Yes	No
Local / regional within [your country]	☐	☐
National	☐	☐
Other European Union (EU) countries, EFTA, or EU candidate countries*	☐	☐
Other countries	☐	☐

*: Include the following countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Italy, Ireland, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovenia, Slovakia, Switzerland, Turkey, Spain, Sweden and the United Kingdom.

1.6 Were any of these markets new to your enterprise during the five years 2010 to 2015?

	Yes	No	Year
Local / regional within [your country]	☐	☐	.....
National	☐	☐	.....
Other European Union (EU) countries, EFTA, or EU candidate countries*	☐	☐	.....
All other countries	☐	☐	.....

1.7 In which one of the following sectors is your main activity?

Domesticwares only	☐
Hotelwares only	☐
Both domesticwares and hotelwares	☐

1.8 Which segments of the market are your products positioned in? (relative to competitors). Tick all boxes that apply.

	Hotelwares	Domesticwares
Low price range	☐	☐
Medium price range	☐	☐
Premium price range	☐	☐

1.9 Has your market positioning within segments changed over the five years 2010 to 2015?

Yes ☐

No ☐

If no, go to question 2.0, otherwise:

1.10 Please indicate how your positioning has changed.

From Low price range – Medium price range	☐
From Low price range – Premium price range	☐
From Medium price range – Low price range	☐
From Medium price range – Premium price range	☐
From Premium price range – Low price range	☐
From Premium price range – Medium price range	☐

2. Product innovation

A product innovation is the market introduction of a **new** good or a **significantly** improved good with respect to its capabilities, such as improved benefits, user friendliness, components or sub-systems. The innovation (new or improved) must be new to your enterprise, but it does not need to be new to your sector or market. It does not matter if the innovation was originally developed by your enterprise or by other enterprises.

2.1 During the five years 2010 to 2015, did your enterprise introduce:

	Yes	No
New or significantly improved goods. (Exclude the simple resale of new goods purchased from other enterprises and changes of a solely aesthetic nature.)	☐	☐

If no go to question 3.1, otherwise:

2.2 Who developed these product innovations?

Select the most appropriate option only

Mainly your enterprise or enterprise group	☐
Your enterprise together with other enterprises or institutions	☐
Mainly other enterprises or institutions	☐

2.3 Were any of your product innovations during the five years 2010 to 2015?

		Yes	No
New to your market?	Your enterprise introduced a new or significantly improved product onto your market before your competitors (it may have already been available in other markets)	☐	☐
Only new to your firm?	Your enterprise introduced a new or significantly improved product that was already available from your competitors in your market	☐	☐

2.4 Using the definitions above, please give the percentage of your total turnover in 2015 from:

Product innovations introduced during 2010 to 2015 that were **new to your market**	☐☐☐ %
Product innovations introduced during 2010 to 2015 that were **only new to your firm**	☐☐☐ %
Products that were **unchanged or only marginally modified** during 2010 to 2015 (include the resale of new products purchased from other enterprises)	☐☐☐ %
Total turnover in 2015	**1 0 0** %

3. Process innovation

A process innovation is the implementation of a **new** or **significantly** improved production process, distribution method, or support activity for your goods or services. The innovation (new or improved) must be new to your enterprise, but it does not need to be new to your sector or market. It does not matter if the innovation was originally developed by your enterprise or by other enterprises. Exclude purely organisational innovations.

3.1 During the five years 2010 to 2015, did your enterprise introduce:

	Yes	No
New or significantly improved processes for manufacturing your goods	☐	☐
New or significantly improved logistics, delivery or distribution processes	☐	☐
New or significantly improved supporting activities for your processes, such as maintenance systems or operations for purchasing, accounting, computing and marketing planning	☐	☐

If no to all options, go to section 4, otherwise:

3.2 Who developed these process innovations?

Select the most appropriate option only

Mainly your enterprise or enterprise group	☐
Your enterprise together with other enterprises or institutions	☐
Mainly other enterprises or institutions	☐

If your enterprise had no product or process innovations or innovation activity during 2010 to 2015 (no to all options in questions 2.1 and 3.1), go to section 8.

Otherwise, go to section 4.

4. Other Innovation activities and expenditures

Innovation activities include the acquisition of machinery, equipment, software, and licenses; engineering and development work, training, marketing and R&D[144] when they are *specifically* undertaken to develop and/or implement a product or process innovation.

4.1 During the Five years 2010 to 2015, did your enterprise engage in the following ORGANISATIONAL innovation activities?

	Yes	No
New business practices for organising procedures (e.g. supply chain management, business re-engineering, knowledge management, lean production, quality management, etc.)	☐	☐
New methods of organising work responsibilities and decision making (e.g. first use of a new system of employee responsibilities, team work, decentralisation, integration or de-integration of departments, education/training systems, etc.)	☐	☐
New methods of organising external relations with other firms or public institutions (e.g. first use of alliances, partnerships, outsourcing or sub-contracting, etc.)	☐	☐

Other, please specify:

4.2 During the Five years 2010 to 2015, did your enterprise engage in the following MARKETING innovation activities?

	Yes	No
Significant changes to the aesthetic design or packaging of a good or service	☐	☐
New media or techniques for product promotion (e.g. first use of a new advertising medium, introduction of loyalty cards, etc.)	☐	☐
New methods of pricing goods or services (i.e. first time use of variable pricing by demand, discount systems, etc.)	☐	☐
New methods for sales channels (i.e. first time use of franchising or distribution licenses, direct selling, exclusive retailing, new concepts for product presentation, e-commerce facilities, etc.)	☐	☐

Other, please specify:

4.3 Please estimate (approximately) the total amount of expenditure on all of your innovation activities as a share of turnover in 2015.

0%	1-5%	6-10%	11-15%	16-25%	26-50%	>50%
☐	☐	☐	☐	☐	☐	☐

4.4 Five years ago did you devote....?

Fewer resources to innovation	About the same resources to innovation	More resources to innovation
☐	☐	☐

[144] Include basic R&D as an innovation activity even if not specifically related to a product and/or process innovation

5. Importance of innovation

5.1 How important were each of the following effects of your product, process, organisational and marketing innovations introduced during the five years 2010 to 2015?

		Degree of importance of effect			
		Essential	**Highly important**	**Slightly important**	**Not important**
Product oriented effects	Increased range of products	☐	☐	☐	☐
	Entered new markets or increased market share	☐	☐	☐	☐
	Improved quality of products	☐	☐	☐	☐
Process oriented effects	Improved flexibility of production	☐	☐	☐	☐
	Increased capacity of production	☐	☐	☐	☐
	Reduced labour costs per unit output	☐	☐	☐	☐
	Reduced materials and energy per unit output	☐	☐	☐	☐
Other effects	Reduced environmental impacts or improved health and safety	☐	☐	☐	☐
	Met regulatory requirements	☐	☐	☐	☐
	Speeded up decision making	☐	☐	☐	☐
	Developed knowledge sharing capabilities (inside and outside your enterprise)	☐	☐	☐	☐

5.2 How many job positions have been created, sustained or lost in your company as the result of introducing new or substantially improved products or processes since 2010?

	0	1-5	6-10	11-20	21-30	31-40	41-50	>50
Jobs created	☐	☐	☐	☐	☐	☐	☐	☐
Jobs sustained	☐	☐	☐	☐	☐	☐	☐	☐
Jobs lost	☐	☐	☐	☐	☐	☐	☐	☐

5.3 How important are the following innovation capabilities for your firm's survival and performance?

	Of no importance	Slightly important	Important	Highly important	Essential
Product innovation	☐	☐	☐	☐	☐
Process innovation	☐	☐	☐	☐	☐
Marketing innovation	☐	☐	☐	☐	☐
Organisational innovation	☐	☐	☐	☐	☐
Other, please specify	.....	.....	.....	.....	.....

5.4 How would you judge your firm's innovation capabilities within your industry in the past and now, regarding?

In the past (2010)	Lagging	Average	Above average	Leading
Product innovation	☐	☐	☐	☐
Process innovation	☐	☐	☐	☐
Marketing innovation	☐	☐	☐	☐
Organisational innovation	☐	☐	☐	☐
Other, please specify	.....	.....	.....	.....

Now (2015)	Lagging	Average	Above average	Leading
Product innovation	☐	☐	☐	☐
Process innovation	☐	☐	☐	☐
Marketing innovation	☐	☐	☐	☐
Organisational innovation	☐	☐	☐	☐
Other, please specify	.....	.....	.....	.....

5.5 What proportion of your current sales by value comes from new or substantially improved products or processes introduced since 2010?

0%	1-5%	6-10%	11-15%	16-25%	26-50%	>50%
☐	☐	☐	☐	☐	☐	☐

5.6 During the five years 2010 to 2015, did your enterprise receive any public financial support for innovation activities from the following levels of government? Include financial support via tax credits or deductions, grants, subsidised loans, and loan guarantees. Exclude research and other innovation activities conducted entirely for the public sector under contract.

	Yes	**No**
Local or regional authorities	☐	☐
Central government (including central government agencies or ministries)	☐	☐
The European Union (EU)	☐	☐

Other (please state)……

6. Sources of information and co-operation for innovation activities

6.1 From 2010 to 2015 did your enterprise co-operate on any of your innovation activities with other enterprises or institutions?

Yes	No
☐	☐

If no please go to section 7, otherwise:

6.2 Please indicate the types of innovation co-operation partner (s) with whom you have collaborated IN YOUR REGION (i.e. the Stoke-on-Trent Industry cluster).

		Degree of co-operation			
	Information source	**High**	**Medium**	**Low**	**Not used**
Internal	Within your enterprise or enterprise group	☐	☐	☐	☐
Market sources	Suppliers of equipment, materials, components, or software	☐	☐	☐	☐
	Clients or customers	☐	☐	☐	☐
	Competitors or other enterprises in your sector	☐	☐	☐	☐
	Consultants, commercial labs, or private R&D institutes	☐	☐	☐	☐
Institutional sources	Universities or other higher education institutions	☐	☐	☐	☐
	Government or public research institutes	☐	☐	☐	☐
Other sources	Conferences, trade fairs, exhibitions	☐	☐	☐	☐
	Scientific journals and trade/technical publications	☐	☐	☐	☐
	Professional and industry associations	☐	☐	☐	☐

6.3 Please indicate the types of innovation co-operation partner (s) with whom you have collaborated IN OTHER UK LOCATIONS.

		Degree of co-operation			
	Information source	**High**	**Medium**	**Low**	**Not used**
Market sources	Suppliers of equipment, materials, components, or software	☐	☐	☐	☐
	Clients or customers	☐	☐	☐	☐
	Competitors or other enterprises in your sector	☐	☐	☐	☐
	Consultants, commercial labs, or private R&D institutes	☐	☐	☐	☐
Institutional sources	Universities or other higher education institutions	☐	☐	☐	☐
	Government or public research institutes	☐	☐	☐	☐
Other sources	Conferences, trade fairs, exhibitions	☐	☐	☐	☐
	Scientific journals and trade/technical publications	☐	☐	☐	☐
	Professional and industry associations	☐	☐	☐	☐

6.4 Please indicate the types of innovation co-operation partner (s) with whom you have collaborated OVERSEAS (i.e. not in the UK).

		Degree of co-operation			
		Tick 'not used' if no co-operation was obtained from a source.			
	Information source	**High**	**Medium**	**Low**	**Not used**
Internal	Within your enterprise or enterprise group	☐	☐	☐	☐
Market sources	Suppliers of equipment, materials, components, or software	☐	☐	☐	☐
	Clients or customers	☐	☐	☐	☐
	Competitors or other enterprises in your sector	☐	☐	☐	☐
	Consultants, commercial labs, or private R&D institutes	☐	☐	☐	☐
Institutional sources	Universities or other higher education institutions	☐	☐	☐	☐
	Government or public research institutes	☐	☐	☐	☐
Other sources	Conferences, trade fairs, exhibitions	☐	☐	☐	☐
	Scientific journals and trade/technical publications	☐	☐	☐	☐
	Professional and industry associations	☐	☐	☐	☐

6.5 Please indicate the areas where you have collaborated.

		Type of co-operation		
	Information source	**Information only**	**Product design and materials**	**Process developments**
Internal	Within your enterprise or enterprise group	☐	☐	☐
Market sources	Suppliers of equipment, materials, components, or software	☐	☐	☐
	Clients or customers	☐	☐	☐
	Competitors or other enterprises in your sector	☐	☐	☐
	Consultants, commercial labs, or private R&D institutes	☐	☐	☐
Institutional sources	Universities or other higher education institutions	☐	☐	☐
	Government or public research institutes	☐	☐	☐
Other sources	Conferences, trade fairs, exhibitions	☐	☐	☐
	Scientific journals and trade/technical publications	☐	☐	☐
	Professional and industry associations	☐	☐	☐

6.6 Please indicate the nature of the collaborative relationship (i.e. formal or informal; short-term or long-term).

		Type of relationship			
	Information source	**Formal contractual relationship**	**Informal relationship**	**Long-term relationship (more than 1 year)**	**Short-term relationship (less than 1 year)**
Internal	Within your enterprise or enterprise group	☐	☐	☐	☐
Market sources	Suppliers of equipment, materials, components, or software	☐	☐	☐	☐
	Clients or customers	☐	☐	☐	☐
	Competitors or other enterprises in your sector	☐	☐	☐	☐
	Consultants, commercial labs, or private R&D institutes	☐	☐	☐	☐
Institutional sources	Universities or other higher education institutions	☐	☐	☐	☐
	Government or public research institutes	☐	☐	☐	☐
Other sources	Conferences, trade fairs, exhibitions	☐	☐	☐	☐
	Scientific journals and trade/technical publications	☐	☐	☐	☐
	Professional and industry associations	☐	☐	☐	☐

6.7 Are there any other types of collaborations not listed above that you have taken part in?

No	**Yes**
☐	☐

If yes, please list in order of importance

_____

6.8 Five years ago, did your enterprise engage in …….?

Fewer collaborative Projects	**About the same Projects**	**More collaborative Projects**
☐	☐	☐

6.9 Which type of co-operation partner did you find the most valuable for your enterprise's innovation activities?

Please state:_____

6.10 Did your enterprise during the five years 2010 to 2015 receive any public support for your innovation activities?

Yes	No
☐	☐

If no go to section 7, otherwise:

6.11 If yes, and if you know, please tick the source(s) of this funding?

	Yes	No
Local or regional authorities	☐	☐
Central government (including central government agencies or ministries)	☐	☐
The European Union (EU)	☐	☐

Other? Please state_____

7. Factors hampering innovation activities

7.1 During the five years 2010 to 2015 were any of your innovation activities or projects?

	Yes	No
Abandoned in the concept stage	☐	☐
Abandoned after the activity or project was begun	☐	☐
Seriously delayed	☐	☐

7.2 During the five years 2010 to 2015, how important were the following factors for hampering your innovation activities or projects or influencing a decision not to innovate? TO BE ANSWERED BY ALL.

		Degree of importance			
		High	Medium	Low	Factor not experienced
Cost factors	Lack of funds within your enterprise or group	☐	☐	☐	☐
	Lack of finance from sources outside your enterprise	☐	☐	☐	☐
	Innovation costs too high	☐	☐	☐	☐
Knowledge factors	Lack of qualified personnel	☐	☐	☐	☐
	Lack of information on technology	☐	☐	☐	☐
	Lack of information on markets	☐	☐	☐	☐
	Difficulty in finding cooperation partners for innovation	☐	☐	☐	☐
Market factors	Market dominated by established enterprises	☐	☐	☐	☐
	Uncertain demand for innovative goods or services	☐	☐	☐	☐
Reasons not to innovate	No need due to prior innovations	☐	☐	☐	☐
	No need because of no demand for innovations	☐	☐	☐	☐

END OF QUESTIONS

Thank you for completing this questionnaire. If required, would you agree to a longer (approximately 45mins-1hour) interview?

Yes ☐ **No** ☐

Appendix 10: Questionnaire Sections Mapped to the Research Objectives

Questionnaire section 1 – General Information

In this section general information about the company will be gathered. For example, information that will help to determine firm ownership and size in terms of the number of employees, it will also identify firm turnover. This approach, along with other data gathered from the questionnaire, will assist in determining the sample for stage 4 of the research (objectives 9 and 10 - semi-structured interviews). Section 1 is also aimed at gathering information about markets, segments and positioning within segments, *e.g.* whether firms operate in domestic and/or international markets and, whether firms operate in low price or premium price segments. This information will be mapped back to objective 2, to reinforce or refute earlier findings on competitive activity. A final aim of section 1 is to determine the degree of vertical integration apparent within cluster firms, *e.g.* whether firms carry out all phases of the production process or if there is evidence of specialisation. This information will achieve objective 6 and, will contribute to the findings on the identification of the 'need for co-operation'.

Questionnaire section 2 – Product Innovation

In this section information about innovative activity relating to new or significantly improved products will be gathered. For example, questions are aimed at identifying new to market products as well as new to firm products. Furthermore, this section also aims at identifying whether such innovations were developed internally or externally, it also aims to identify the success of such innovations in terms of their contribution to turnover. This section will partially achieve objective 7 (determining the output of innovative activity).

Questionnaire section 3 – Process Innovation

In this section information about the implementation of significantly improved production processes, distribution methods and support activities for the firm's products will be gathered. For example, questions are aimed at identifying whether innovations were made in improved product manufacturing processes, and/or in logistics and distribution processes. It also aims at identifying whether such innovations were developed internally or externally. This section will partially achieve objective 7 (determining the output of innovative activity).

Questionnaire section 4 – Other Innovation Activities and Expenditures

This section seeks to gather information about activities that *support* the development and implementation of product and process innovations. The questions cover the following; organisational innovation activities, such as new business practices, work organisation and methods of organising external relations; and, marketing innovation activities, such as new methods for promoting products, pricing products and selling products. This section also seeks information about total expenditure on all innovation activities as a percentage of firm turnover (in 2015), as well as information about whether that expenditure has increased/decreased over the period in question. This section will partially achieve objective 7 (determining the output of innovative activity).

Questionnaire section 5 – The Importance of Innovation

This section is aimed at gathering information about the effects of innovation and their importance to the firm. The questions categorise a number of possible effects. For example, increased range of products, entry into new markets, greater flexibility, and reduced labour costs. Firms are asked to rate the effects in terms of their importance. This section also seeks to discover the effects of innovations on: turnover, by identifying the percentage of turnover attributable to new innovations; and employment, by identifying the number of jobs created, sustained or lost as a result of introducing new innovations. The questions in this section are mostly aimed at partially achieving objective 7 (identifying innovative activity and determining the success of innovative activity). However, questions in this section are also aimed at identifying whether the firm's innovation capabilities (absorptive capacity) have increased/decreased over time. This information is linked to objective 8 and will contribute to the analysis of the cluster's knowledge creation capabilities.

Questionnaire section 6 – Sources of Information and Co-operation for Innovation Activities

This section is aimed at gathering information about the extent, types and depth of knowledge exchange relationships taking place within and outside the SOT cluster. The questions are divided into three main categories: 1) relationships with entities existing within the SOT cluster; 2) with other entities based in the UK; and, 3) with entities from outside the UK. The same questions will be asked for each of the three categories, *e.g.* whether relationships are with other ceramics manufacturers, with suppliers, with R&D institutions or with Trade Associations. Another set of questions in this section is aimed at discovering whether the identified relationships are formal (contractual) or informal and, whether they were short-term (less than 1year) or long term (more

than 1 year). A further set of questions is aimed at determining the types of innovation that firms have collaborated on, *e.g.* product, process, *etc.* The final set of questions in this section is aimed at determining what firms consider to be the most valuable of the identified relationships and, whether the number of collaborative relationships increased or decreased over the period 2010 – 2015. The questions in this section are aimed at partially achieving objective 8. However, in order to fully understand the nature and depth of relationships, *i.e.* whether relationships can be identified as 'strong ties' or 'weak ties' (see proposition 1), some of the findings from this section of the questionnaire will need to be explored in much more depth in stage 4 of the research (qualitative research stage).

Questionnaire section 7 – Factors Hampering Innovation Activities

This final section of the questionnaire is aimed at identifying some of the main reasons why firms in the SOT cluster may decide not to innovate. Questions are categorised into different sets of factors, *e.g.* cost factors, knowledge factors, market factors. Data on the importance of specific factors on decisions not to innovate will be collected by using a Likert scale of degrees of importance. The questions in this section are aimed at partially achieving objective 8. However, as with section 6, in order to clarify and to fully understand the reasons why firms decide whether to innovate or not, some of the findings from this section of the questionnaire will be explored in much more depth in stage 4 of the research (qualitative research stage).

Appendix 11: Example of Questionnaire and Interview Survey Covering Letter

Staffordshire University Business School

Room B362

Brindley Building

Leek Road

Stoke-on-Trent

Staffordshire

ST4 2DF

08/10/2016

Dear Sir/Madam,

My name is Lorraine Limbrick and I'm a senior Researcher at Staffordshire University's Business School. I'm currently carrying out research into the North Staffordshire ceramics cluster, focussing specifically on the industry's core manufacturers.

It is my intention to survey all of the current core ceramics manufacturing firms in the North Staffs area. To do this I have formulated a questionnaire and I'm currently in the process of contacting relevant firms to see if they will take part in the survey. The survey is aimed at identifying innovation and collaboration initiatives within the industry over the period 2010-2015.

As some of the questions in the questionnaire may require further explanation or clarification, I would like to be present when the questionnaire is being completed. This is so that I can guide the respondent through the questions. Ideally, the questionnaire should be completed by a senior manager, or owner, in the company. So far, five leading Stoke-on-Trent ceramics companies have agreed to take part in the survey.

If you agree to take part then I would like to assure you that the results of the survey will remain anonymous, i.e. no firms will be named in the findings from the questionnaire survey. Firms will be allocated a letter, e.g. ‘A’, ‘B’, ‘C’, etc. and will only be discussed in categories, e.g. small firms, medium sized firms or large firms. It is also my intention to make the results of the survey available to ceramics firms and other interested parties, such as the BCC and local government. I would be very happy to personally email/post the findings of the survey to all firms taking part before the results are formally published.

I would like to ask if your firm would take part in the survey? If you would like to take part, can we please arrange an appointment to complete the questionnaire? I estimate that the questionnaire should take about half-an-hour to complete. My contact details are:

Mobile: [anonymised]

Email: l.limbrick@staffs.ac.uk

Yours sincerely,

Lorraine Limbrick

(Senior Lecturer in Strategy, Enterprise and International Business)

The Business School

Staffordshire University

Appendix 12: Interview Schedule

Q1. Do SOT ceramics manufacturers co-operate with each other on product innovations?
Q2. Do SOT ceramics manufacturers co-operate with other firms on process innovations?
Q3. Do SOT ceramics manufacturers co-operate with other non-ceramic firms and institutions?
Q 4. Do SOT ceramics manufacturers co-operate more or less now than 10 years ago?
Q5. Do SOT ceramics manufacturers see themselves as part of one whole industry cluster?
Q6. What effect did the SOT cluster's past dominant firms, e.g. Wedgwood and Royal Doulton, have on the rest of the SOT cluster?
Q7. Why do you think that Wedgwood and Royal Doulton acquired so many other pottery companies between 1960 and 1990?
Q8. Overall, do you think Wedgwood and Royal Doulton were good for the SOT ceramics cluster?
Q9. What do you think the role of the SOT cluster's NEW dominant firms, e.g. Steelite, Portmeirion, etc., is/should be?

Appendix 13: Questionnaire & Interview Company Profiles (Q1 – Q1.9 plus Q2.1, Q3.1 & Q4.1)

		Company 'A'	Company 'B'	Company 'C'	Company 'D'	Company 'E'	Company 'F'
Q	**Company ownership**	Private	Publicly quoted	Private	Private	Private	Private
1	**Part of a group**	YES	YES	NO	NO	YES	NO
1.1	**Head office location**	UK (Stoke)	UK (Stoke)	UK (Stoke)	UK (Stoke)	UK	UK (Stoke)
1.2	**Turnover 2010**	£20,000,000 +	£20,000,000 +	£10,000,000 - £20,000,000	£20,000,000 +	£500,000 - £1,000,000	Less than £500,000
1.2	**Turnover 2015**	£20,000,000 +	£20,000,000 +	£10,000,000 - £20,000,000	£20,000,000 +	£500,000 - £1,000,000	£500,000 - £1,000,000
1.3	**Employees 2010**	249 +	249 +	Between 50 - 249	Between 50 - 249	Between 10 - 49	Between 1 - 9
1.3	**Employees 2015**	249 +	249 +	249 +	Between 50 - 249	Between 10 - 49	Between 1 - 9
1.4	**Does your firm undertake all phases of production?**	YES	YES	YES – except slips	YES – except slips & glazes	YES	YES
1.5	**Which geographic markets do you operate in?**	ALL - Regional/national/Europe and other	ALL - Regional/national/Europe and other	ALL - Regional/national/Europe and other	ALL - Regional/national/Europe and other	ALL - Regional/national/Europe and other	National
1.6	**Where any of these new markets between 2010-2015?**	NO	NO	NO	YES – Germany, France, Australia, Japan	YES – EU and other countries	NO
1.7	**Your main activity?**	Hotelwares	Domesticwares	Domesticwares	Domesticwares & commercial	Domesticwares & hotelwares	Domesticwares
1.8	**Your market positioning?**	ALL – low/medium/premium	Medium	Premium	ALL – low/medium/premium	Premium	Premium
1.9	**Change in market positioning 2010-2015**	NO	NO	NO	NO	NO	NO
2.1	**Product innovations 2010-2015?**	YES - various	YES - various	YES - various	YES - various	YES - various	YES - various
3.1	**Process innovations 2010-2015?**	YES – robotic pressure casting; ERP system	YES – not stated	YES – now making own moulds; new shapes	YES – pressure casting; super-heated steam drying	NO	YES – developing clay technology/firing
4.1	**Other organisational innovations 2010-2015?**	YES – ERP; website development	YES – not stated	YES – website development; Social media; investment in skills; boxing & packaging	YES – lean production 6 sigma; social media	YES – supply chain system; work organisation; marketing; design & packaging; social media; sales channels	NO – apart from social media

Appendix 14: Ethical considerations in this research study

1	**Research participants should not be subjected to harm in any ways whatsoever.** The use of offensive, discriminatory and other unacceptable language was avoided in the formulation of the covering letter, questionnaire and interview questions (see 3.7.15, 3.7.19 and copies of documents in appendices ?, ? and ?)
2	**Respect for the dignity of research participants should be prioritised.** Voluntary participation of respondents in the research was important. During the questionnaire and interview process, all respondents were treated with courtesy and professionalism by the researcher. Respondents were also informed that they could abandon the research and withdraw responses at any point.
3	**Full consent should be obtained from the participants prior to the study.** The concept of 'informed consent' was applied to the research through explaining to senior managers the aims and objectives of the research, the duration of the research, the purpose and possible consequences of the research and the dissemination strategy (see 3.7.15 and 3.7.19 and covering letter, appendix ?).
4	**The protection of the privacy of research participants has to be ensured.** All participants were ensured anonymity. Senior managers were verbally notified at the beginning of the questionnaires and interviews that their company would be identified as either 'A', 'B', 'C', etc. Respondents were also informed that they could abandon the research and withdraw responses at any point.
5	**Adequate level of confidentiality of the research data should be ensured.** It was explained to the participants that the research findings would be published. and permission was sought to proceed with the questionnaire and interviews in light of this.
6	**Anonymity of individuals and organisations participating in the research has to be ensured.** All participants were ensured anonymity. Senior managers were notified at the beginning of the questionnaires and interviews that their company would be identified as either 'A', 'B', 'C', etc.
7	**Any deception or exaggeration about the aims and objectives of the research must be avoided.** The aims and objectives were carefully constructed from the theoretical framework, which was based on an extensive review of the academic literature.
8	**Affiliations in any forms, sources of funding, as well as any possible conflicts of interests have to be declared.** There were no sources of funding or conflicts of interests in this research study.
9	**Any type of communication in relation to the research should be done with honesty and transparency**. All communications by email and/or post are available for inspection. (see covering letter in appendix ?)
10	**Any type of misleading information, as well as representation of primary data findings in a biased way must be avoided.** Findings were carefully mapped to the theoretical framework and thus discussed and evaluated in light of theory, thus reducing the potential for bias as much as possible.
11	**Reciprocity – the idea that the research should be of some mutual benefit to researcher and participant.** All participants were informed that the research findings would be made available to them (see covering letter, appendix?)

Appendix 15: Chapter 5 Findings Summarised

Antecedents of Knowledge Creation	Life-cycle Stage (√ = some evidence X = no evidence)	Discussion	Opportunities for Knowledge Creation
Breadth of Knowledge (5.2) **Circa 1700s-1960** • Highly skilled workers • Skills take many years to learn • Wide range of product skills • Task specific • Tacit knowledge • Knowledge often unique to the firm – concentrated within a single pottery • Wide product range per manufacturer • Complexity of knowledge is high	**Rapid Growth** According to theory, Focus should be on product innovation. There's some evidence of this happening. √ According to theory horizontal inter-firm linkages should be strong at this stage**.** There's no evidence of this happening. **X**	Highly systemic architectural knowledge and unique to the firm. Thus, little need for inter-firm cooperation. Knowledge was also difficult to transfer inside the firm due to the task specific nature of knowledge. Firms may also have wanted to keep knowledge private for competitive reasons.	**Low number of opportunities** Architectural knowledge = Few opportunities for knowledge exchange outside the firm (external). Few opportunities for knowledge exchange inside the firm (internal) due to task specificity and protection of knowledge by worker families. Lack of mobility reduces opportunities for external knowledge exchange
Circa 1960s-2008 • Some attempts to simplify tasks • Some automated processes introduced • Multiple skilling of employees • Fewer employees needed • Two main skills groups emerge – Higher Order and Lower Order • New skills developed and aimed at increasing flexibility and responsiveness • Many mergers and acquisitions take place • Many factories are closed and unemployment is high Note: Only some technological processes were automated at this stage (*i.e.* become component knowledge). Many processes remained extremely difficult to automate.	**Slowing growth and then mature phase** According to theory, focus should be on process innovations**.** There's some evidence of this happening but mostly in larger firms. √ **1979-2008 decline phase** According to theory, focus should be on product innovations**.** There's no strong evidence of this happening at this stage. **X** According to theory horizontal inter-firm linkages should be strong at this stage**.** There's no evidence of this happening. **X**	Knowledge becomes less complex. Some knowledge becomes more technical (mechanised) and tangible (through routines and instructions).	**Increased number of opportunities for internal knowledge exchange (limited)** Opportunities for knowledge exchange increase marginally as only some processes are automated. **Fewer opportunities for external knowledge exchange between firms** Consolidation effects reduce opportunities for external knowledge exchange as there are fewer firms overall. Some opportunities though through increased worker mobility.
Circa 2008 – present • Many highly specialist skills lost within firms through streamlining and automation • Many highly specialised skills lost in the SOT ceramics cluster as a whole through consolidation and job losses • Evidence indicates a focus on product innovation • Worker mobility within the cluster increases due to high unemployment.	**2008-present, re-generation phase** According to theory, Focus should be on product innovation. There's evidence of this happening. √	Knowledge becomes less complex. Some knowledge becomes more technical (mechanised) and tangible (through routines and instructions). According to theory, horizontal inter-firm linkages should be strong at this stage**.**	**Increased opportunities for internal knowledge exchange (limited)** Increased firm size (groups of firms) increases internal knowledge exchange opportunities but mostly for the largest firms.

Degree of Modularity (5.3) **Circa 1700s-1960** • Evidence indicates that most manufacturers carry out all/most phases of production • Production processes, although highly complex and distinct, were inseparable • The production sequence was composed of many interdependent phases • The level of mechanisation was low • Attempts to codify the diversity of activities failed	**Rapid Growth** According to theory, Focus should be on product innovation. √	Tasks and processes are distinct and appear to be modular, but processes are complex, highly interdependent and often firm specific. Opportunities for internal knowledge exchange are greatly reduced due to the unique and peculiar way work was organised, *i.e.* although interdependent, knowledge was specific to individuals.	**Low number of opportunities** Modularity should lead to increased opportunities for knowledge exchange. However, highly interdependent processes reduce opportunities for external knowledge exchange. **Increased opportunities for internal knowledge exchange (limited)** Increasing (limited) opportunities for internal knowledge exchange, but limited externally due to inseparability.
Circa 1960s-2008 • Attempts to simplify processes • Some of the largest firms adopt Fordist methods for some processes, *e.g.* introduced automatic and semi-automatic machines for some processes (low level standardisation) • Reduction in model ranges (rationalisation) • Some vertical disintegration takes place in the early production processes, *e.g.* some outsourcing to specialist firms (*e.g.* clay, print, colour, glaze) **2008-present** • Continued investment in automation of some processes • Introduction of flexible specialisation methods • Process remains highly integrated	**Slowing growth and then mature phase** According to theory, focus should be on process innovations. √ **1979-2008 decline phase** According to theory, focus should be on product innovations. √ **2008-present, re-generation phase** According to theory, Focus should be on product innovation. horizontal inter-firm linkages should be strong at this stage. √	The breakdown of some task divisions aids the flexible use of labour although the majority of processes remain interdependent and highly inseparable. Outsourcing of some processes increases knowledge exchange opportunities.	**Fewer opportunities for external knowledge exchange between firms** Increasing opportunities for external knowledge exchange with suppliers. **Increased opportunities for internal knowledge exchange (limited)** As some task divisions are broken down.
Technological Dynamism (5.4) **Circa 1700s-1890** • Small and incremental advances during this period • Firms operate in separate market niches • Domestic competition is indirect	**Rapid Growth** According to theory, Focus should be on product innovation. √	Low technological dynamism and little need for cooperation.	**Low number of opportunities** for knowledge exchange.
Circa 1890-1960 • The Clean Air Act (1956) and the introduction of natural gas in 1960 changed firing technology • Significant changes in pressing and firing technology introduced (mostly by large firms) • No evidence of radical product innovations taking place during this period.	**slowing growth and then mature phase** According to theory, focus should be on process innovations. √	**The First Technological Revolution:** increasing technological dynamism, but mostly within the largest firms.	**Increasing number of opportunities for external knowledge exchange between firms (limited)** With suppliers, but limited to the largest firms.

Circa 1960-1978 • Some adoption of Fordism principles (some standardisation) • Job de-skilling • Simplification of some processes • Mergers and acquisitions are frequent • Firms focus more on process innovations	**slowing growth and then mature phase** According to theory, focus should be on process innovations. √	Some knowledge becomes codified and capable of being transferred across geographic space. Mergers and acquisitions increase opportunities for internal (within the group) knowledge transfer but reduce external knowledge transfer opportunities because there are far fewer firms (consolidation effects).	**Increasing number of opportunities** Increases internal opportunities for knowledge transfer but mostly for the largest firms. **Fewer opportunities for external knowledge transfer between firms.** Fewer firms = fewer external opportunities. **Increased opportunities for internal knowledge exchange** Mostly within the larger firms.
Circa 1979-2008 • External environment becomes more unstable due to globalisation and recession effects • Changes in consumer spending and demand • UK ceramics sales peak in 1978 then decline rapidly over the next few years • Continued investment in automation of some processes • Introduction of flexible specialisation methods • Switch in focus to fast response to rapidly changing fashions • More product innovations aimed at serving market niches • Mergers and acquisitions continue • Some of the largest firms locate production overseas	**1979-2008 decline phase** According to theory, focus should be on product innovations. √ There is also evidence at this stage of increasing process innovation. √	<u>The Second Technological Revolution:</u> evidence of increased investment in automation but mostly by the largest firms. Evidence indicated little large-scale investment by SMEs. Mergers and acquisitions continue. The switch to high quality, low volume production is mainly carried out by SMEs but they tended to be owned by large groups or were subcontractors of large firms.	**Fewer opportunities for external knowledge transfer between firms** Consolidation effects reduce opportunities for external knowledge exchange as there are fewer firms overall. Although, there are some external knowledge exchange opportunities with subcontractors. **Increased opportunities for internal knowledge exchange** Increased firm size (groups of firms) increases internal knowledge exchange opportunities.
Circa 2008-date • Evidence indicates increasing investment in technology, factories and marketing (to be explored further in stage 3 of the research) • A few new start-up firms have entered the industry (not clear how many or how big) • Evidence of a strong revival in tableware and giftware – exports have been rising (see chapter 4. to be explored further in stage 3 of the research) • Some evidence of product innovations (to be explored further in stage 3 of the research)	**2008-present, re-generation phase** According to theory, focus should be on product innovations. √	Some new start-up firms have entered the industry. Some evidence of growth in inter-firm co-operative activity (see 5.5).	**Increased opportunities for internal knowledge exchange** New firms in the industry provide some opportunities for knowledge exchange.

Other Influences on Knowledge Exchange (5.5 & Table 5.1) **Circa 1700s - 1960** • Worker families. Several generations in one firm. • Little worker movement between firms or between pottery towns (*e.g.* Burslem, Longton, Fenton, *etc.*). • Workgroups were mostly self-governing units with little supervision. Power and knowledge kept within workgroups. • Some manufacturers offered incentives to tie workers to the firm. • Workers often knew more than management. • Management begin to reform shop floor processes. • Worker opposition to changes. • Relationships between hierarchically ordered workgroups are competitive and often deeply antagonistic. • Family structure of pottery firm ownership minimises the loss of recipes and technical knowledge. • Some evidence of inter-firm co-operation by owners and managers through membership of The Potteries Club. • There are many supporting institutions during this phase (see table 5.1) but it's not clear how many firms use their services.	**Rapid Growth** According to theory, Focus should be on product innovation. √	Knowledge is unique to the firm. Knowledge is protected within firms and within groups, e.g. owner families and worker families. Low mobility of workers is not good for knowledge exchange. There is evidence of worker opposition to changes.	**Fewer opportunities for external knowledge transfer between firms and also within firms.** Knowledge is protected.
Circa 1960-2008 • Worker family units begin to break up in the late 1970s. • Family ownership begins to break down from the late 1970s onwards. • Some firms transfer ownership to multi-product corporations from outside the region. • Very few new supporting institutions at this stage (see table 5.1) **Circa 2008-present** • Shift in management recruitment from inside the cluster/industry to outside, drawing from across manufacturing and other sectors. • Evidence indicates that cluster firms are making greater efforts to encourage networking and collaboration (to be explored further in stage 3 of the research). • Some of the new 'lead' firms have been advising and supporting others (to be explored further in stage 3 of the research). • Some new supporting institutions during this phase (see table 5.1).	**Slowing growth and then mature phase** According to theory, focus should be on process innovations. √ **1978-2008 decline phase** According to theory, focus should be on product innovations. √ **2008-present, re-generation phase** According to theory, Focus should be on product innovation. √	Relationships are based on dominance and independence. Consolidation and job losses in the industry increase worker mobility. There is some evidence of increasing co-operation through initiative such as the Ceramics Biennial and the Ceramic Skills Academy	**Fewer opportunities for external knowledge transfer between SOT cluster firms (owners)** Due to general mistrust between firms. **Increased opportunities for knowledge transfer between firms (workers)** Workers move between firms. **Increased opportunities for external knowledge exchanges (between SOT firms and overseas firms)** Due to transference of ownership and outsourcing of production. **Increased opportunities for external knowledge exchange** Due to management recruitment from outside of the SOT cluster. **Increased opportunities for external and internal knowledge exchange** Due to greater efforts to co-operate with other firms (mostly suppliers) and supporting institutions.

Appendix 16: Notes to Accompany Table 5.1

Staffordshire University was established in 1901 as a centre to support the ceramics industry. After several stages of expansion and development it became North Staffordshire Technical College in 1924. In 1992 it became Staffordshire University. (Source: https://en.wikipedia.org/wiki/Staffordshire_University, Accessed: 30/06/16)

The Ceramic and Allied Trades Union (CATU) can trace its origin from the formation of the National Amalgamated Society of Male and Female Pottery Workers (NASMFPW) in 1906. The name was changed to the National Society of Pottery Workers (NSPW) in 1917. The National Society of Pottery Workers became 'CATU' in 1970, in 2006 the name was changed to UNITY. (Source: http://archiveshub.ac.uk/data/gb1008-tu/ceramic, Accessed: 30/06/16)

CERAM - In April 1948 the British Ceramic Research Association was created by the fusion of the British Refractories Research Association, which had been in existence since 1920 and the British Pottery Research Association, which was founded in 1937. In February 2014 Ceram, M+P Labs and CICS joined together under the name Lucideon. (Source: www.thepotteries.org, Accessed: 29/06/16)

Keele University is a public research university located about 3 miles (4.8 km) from Newcastle-under-Lyme, Staffordshire, England. Keele was granted university status by Royal Charter in 1962 and was originally founded in 1949 as the University College of North Staffordshire. (Source: https://en.wikipedia.org/wiki/Keele_University, Accessed: 30/06/16)

The Institute of Clay Technology (ICT) was formed in 1927 as the National Association of Clayworks Managers, originally with a particular emphasis on management and production matters. Over the years the Institute adapted to changes in the industry, growing to embrace all clay industry related disciplines, from materials extraction, through production, marketing, finance, administration, management and strategy. The ICT merged with IOM3 in 2006. (Source: http://www.iom3.org/history-institute, Accessed: 27/07/16)

The Hothouse Design Centre was established as part of the Stoke-on-Trent Urban Pilot Project which was a regeneration initiative based on the concepts of design and heritage. It aimed to rejuvenate a run-down industrial area in the south of the city by creating a new, vibrant and historically valuable quarter specialised in the ceramics industry. At the same time, measures were taken to conserve the area's industrial heritage. Work to implement the project began in January 1992 and finished in June 1995. (Source:

http://www.stoke.gov.uk/ccm/content/business/general/business-centres/st-james-house-.en, Accessed: 27/07/16)

The Sutherland Institute was built in 1897. It is a Grade II-listed building which was once a technical college, intended to promote and support the industries of its day: coal, steel and ceramics. (Source: http://www.stoke.gov.uk/ccm/content/business/general/business-centres/sutherland-institute.en, Accessed: 27/07/16)

Ceramic Skills Academy – an information hub and educational and training resource for those working in and aspiring to work within the ceramic industry. Owned and led by leading ceramics businesses, the programme has been part-funded by the UK Commission for Employment and Skills through the Growth and Innovation Fund. CSA mission is to ensure that those skills that set UK ceramics apart from the rest of the world do not become lost. Specialist knowledge and resources are maintained and passed to future generations. (Source: http://www.ceramicskillsacademy.co.uk/, Accessed 27/07/16)

Appendix 17: Drivers of Demand for China & Earthenware in the UK Market

Positive drivers

- Overall UK demand for china and earthenware is predicted to increase. (MINTEL 2008, 2010; KEYNOTE, 2011, see also section 4.4 of this thesis).
- Considerations of style and fashion are playing a larger part in the market, demanding more of producers in design terms and opening up new opportunities to provide a wider range of pieces, a faster purchasing cycle and promoting overall volume growth (MINTEL 2008, 2010, 2014; FWC, 2008; CBI 2010, 2014[145]).
- Designer names and celebrity endorsements are being used to develop and promote brand extensions (MINTEL, 2008, 2014).
- The UK population was 61.2 million in 2008 (MINTEL 2008). In 2016 it was estimated at 65.4 million (http://www.tradingeconomics.com/united-kingdom/population accessed 16/05/17).
- The total number of households in the UK is increasing. In 2003 there were 25.24m households, in 2008 there were 26.54m (MINTEL, 2008). The number of households is expected to grow by 30% between 2006 and 2031, with the majority of them being one-person households (CBI, 2011).
- The number of consumers within the important age brackets of 45-65+ is increasing. In 2003 there were 21.8m, in 2008 there were 22.9m (MINTEL, 2008), in 2015 there were 28.2m. (https://www.statista.com/statistics/281174/uk-population-by-age/ accessed 16/05/17)
- Despite the ongoing (2008-date) economic crisis the UK remained one of the most vibrant and promising markets for ceramic tableware and kitchenware, especially in the mid-upper and premium segments (CBI, 2010). The EU has a competitive advantage in producing high quality value-added ceramics, which is a product of specialised SMEs pursuing differentiated production and marketing strategies (FWC, 2008).
- There has been a big increase in the number of people eating out and this is set to continue (http://www.bighospitality.co.uk/Trends-Reports/UK-diners-to-spend-54.7bn-on-eating-out-by-2017).

Negative drivers (with some positives)

- There has been a rapid increase in imports of comparable low-cost tableware from non-EU emerging economies (FWC, 2008), *e.g.* UK imports of china and earthenwares rose by 38% between 1999 and 2003 and by 25.8% between 2003 and 2007 (MINTEL 2004, 2008). UK imports from developing countries rose from 59.5% in 2005 to 68.3% in 2009.
- UK exports of china and earthenwares fell by 10% between 1999 and 2003 and by 27% between 2003 and 2008 (MINTEL 2004, 2008). However, UK exports rose between 2007 (£162.1m) and 2016 (£198.2m) by 22%.
- In 2003 the balance of trade for ceramic imports/exports was positive, albeit declining, at +£67 million, by 2008 it was negative at -£35m (MINTEL 2004, 2008). In 2016 it was still negative at -£80.1m (HMRC Trade Statistics, accessed 18/05/17. See Fig. 4.19)
- UK demand for UK Manufacturers' products declined from £567 million in 1998 to £416million in 2002 (MINTEL, 2004). UK demand for UK Manufacturers' products was £170.0m in 2008 but this figure had risen to £218.9 by 2015 (See Fig. 4.20).
- A large part of ceramics production is derived from the construction/housing sectors and the economic downturn has badly affected these sectors (FWC, 2008; CBI, 2010).
- Lifestyle changes have meant that today's (younger) households are far less willing to spend money on expensive high-quality tableware (FWC, 2008; MINTEL 2014). At the lower end of the market the life-cycle of products is much shorter (12-18months), this gives an opportunity to low-cost/price producers from developing economies, *e.g.* China (CBI, 2011: MINTEL 2014).

(Source: Author, collated from various sources as referenced)

[145] CBI, 2014, *CBI Product Factsheet: Ceramic dinnerware in Europe,* [ONLINE]. Available at: https://www.cbi.eu/sites/default/files/market_information/researches/product-factsheet-dinnerware-europe-home-decoration-textiles-2. [Accessed 10 July 2017]

Appendix 18: SWOT analysis for the SOT Cluster in 2016

Strengths	Weaknesses
• The SOT cluster has a very long history and good reputation (Global and domestic) (see 6.6.1-6.6.3) • The SOT cluster is currently in a rejuvenation phase of the industry life-cycle (see 5.6.3) • The SOT cluster benefitted for a long time by having large successful firms in the cluster who were responsible for many of the industry's technological advances and technical standards, thus giving the cluster a strong technological base. However, the cluster's past dominant firms also had a negative effect on the cluster in terms of power and control (Is also a weakness due to the effects this had on trust between firms) (see 6.6.1-6.6.3 and 4.5.2) • Despite a decline in the number of suppliers, the supply base in SOT is still strong and ceramics firms can take advantage of fast and early access to supplier inputs and technologies (cluster/agglomeration benefits) (see 6.6.1) • The majority of the SOT cluster's largest firms are performing well and have increased revenue, profits and employees over the last seven years. The success of the cluster's largest firms attracts buyers and suppliers and thus other cluster firms benefit (see Table 4.2 and 6.6.4) • The majority of the SOT cluster's ceramics manufacturers follow niche strategies and operate in the mid-upper and premium segments. Cluster firms have a competitive advantage in producing high quality value-added products which is evidence of differentiation (see Appendix 17 and 6.5) • The SOT cluster has increased both domestic sales and exports over recent years. Despite declining sales in traditional export markets, sales to new markets are growing significantly (see Figures 4.20-4.21 and Table 4.6) • The SOT cluster's new dominant firms are seen as a strength of the cluster as the industry is now less hierarchical and power and control are more evenly balanced. The new dominant firms appear to be more cluster focused than the past dominant firms (see 6.6.4 and 4.4.3, 4.5.2) • The cluster still has a strong supplier base in SOT although this has diminished (see weaknesses) (see 6.6.1-6.6.3) • SOT cluster firms are 'excellent' at product innovation, evidenced by strong innovative output for all SOT survey firms (see 6.3.1) • SOT cluster firms are 'strong' in process innovations. However, mostly by the cluster's largest firms. Firms do co-operate with suppliers on process innovations and thus knowledge may diffuse throughout the cluster over time (see 6.3.2) • SOT cluster firms carry out high levels of innovation in marketing, especially in packaging design, new media and promotions (See 6.3.3) • SOT cluster firms are devoting more resources to innovation now (2015) than they did in the past (2010) (see 6.3.4) • SOT cluster firms appear to be receiving a high return on their new innovation investments (16-50% of sales by value for SOT survey firms) (see 6.3.4) • SOT cluster firms have significantly improved on all of their innovation capabilities since 2010 (product, process, marketing and organisational). The two largest firms in the cluster are industry leaders in product innovations (see 6.3.4) • SOT cluster firms have a strong sense of identity and independence and this is reflected in strong brands (see 6.4.2) • SOT cluster firms regularly manufacture ceramics products for each other and this can result in knowledge exchanges between cluster firms (see 6.4.2) • There are many supporting institutions in the SOT cluster (cluster/agglomeration benefits). The biggest SOT cluster firms are members of the BCC and other trade/professional associations. This is evidence of some co-operation and opportunities for knowledge exchange (This is also an opportunity) (see 6.4.4) • SOT cluster firms perceive each other as competitors even though they operate in separate market niches. This is a stimulus for product innovation (is a threat too) (see 6.5.1) • SOT cluster firms see developing knowledge sharing capabilities outside their organisation as 'essential' or 'highly important', however, they do not appear to co-operate much with external firms and organisations. This is a strength and a weakness (see 6.3.4)	• Consolidation in the industry led to the demise of many well-known pottery brands. This led to a significant reduction in knowledge creating opportunities (see 6.6.1-6.6.3 and 4.3) • Due to the shrinkage in the SOT cluster and the demise of the two largest firms (W&D), many supply firms have left the cluster. This reduces cluster benefits and reduces knowledge creating opportunities (see 6.6.1-6.6.3 and 4.5.1) • Consolidation in the cluster, coupled with some large firms shifting production overseas, resulted in the loss of many jobs in the cluster and thus the loss of tacit knowledge, *i.e.* specialised employee knowledge left the cluster (see 6.6.1-6.6.3 and) • Consolidation in the cluster has led to a reduction in local competitive rivalry, simply because there are fewer firms to compete (see chapter 4.5.1) • Since 1960, there have been very few new entrants of any size into the SOT cluster. This is a weakness of the cluster and also a threat to the long-term survival of the cluster(see 4.5.3) • The cluster's past dominant firms (W&D) may be responsible for the hierarchical mode of governance that existed in the cluster up to 2008 and this may have contributed to the general mistrust that cluster firms have for each other (This is also a threat) (see 6.4.4 and 4.2.4, 4.5.2) • Cluster firms see developing knowledge sharing capabilities outside their organisation as 'essential' or 'highly important', however, they do not appear to co-operate that much with external firms and organisations (see 6.3.4) • Cluster firms do not co-operate on their product innovations (some co-operation with suppliers and customers only) (see 6.3.1) • Smaller cluster firms do not appear to carry out as much process innovation as larger firms in the cluster. It could be that they do not have a requirement for process innovations though due to their size and the nature of their technologies (This is also an opportunity) (see 6.3.2 and 5.4.2) • Cluster firms tend to be weakest at introducing new methods for organising external relations, *i.e.* co-operation (This is also an opportunity) (see 6.3.3) • The smallest firms in the cluster experience the most factors hampering their innovations, *e.g.* lack of qualified personnel, lack of information on technologies and financing/cost issues (This is also an opportunity) (see 6.3.4) • Many cluster firms appear not to take advantage of government support that may be available to them (This is also an opportunity) (see 6.3.4) • Cluster firms tend not to co-operate much with consultants, private and public research and development institutes (This is also an opportunity) (see 6.4.1)

• The SOT cluster's largest firms tend to co-operate more with suppliers and customers. These relationships are classed as 'weak' ties and are considered beneficial to innovation (see 6.4.1) • SOT cluster firms are very protective about their intellectual property and ideas and they don't share these with other cluster firms. This is good for product innovation (see 6.4.2)	
Opportunities	**Threats**
• Knowledge creating opportunities (co-operations) have historically been low in the SOT cluster, although they have increased a little since 2005 and there is an opportunity for cluster firms to take advantage of those opportunities and to develop further opportunities (see 5.6.3 and 6.7.2) • Some SOT cluster firms (largest) co-operate to a degree with suppliers. The opportunity is for smaller firms to co-operate more with suppliers on their process innovations (see 6.3.2) • SOT cluster firms have an opportunity to investigate new methods for organising external relations, *i.e.* co-operation (see 6.3.3) • The smallest firms in the SOT cluster experience the most factors hampering their innovations, *e.g.* lack of qualified personnel, lack of information on technologies and financing/cost issues. There is an opportunity to co-operate with supporting institutions to investigate ways of overcoming these problems (see 6.3.4) • There are opportunities for SOT cluster firms to co-operate on finding ways of promoting 'made in Stoke-on-Trent' (see 6.7.2) • There is an opportunity for SOT cluster firms to co-operate with policy makers and supporting institutions to take advantage of any government financial support that may be available to them (see 6.3.4) • There is an opportunity for smaller SOT cluster firms to become more involved with the BCC and other supporting institutions over a range of industry related issues (see 6.4.4) • There is an opportunity for SOT cluster firms and educational/training institutions to act collectively (co-operate) to provide the number of employees required to run industry training courses (see 6.4.4) • There is an opportunity for cluster firms to co-operate on ways to purchase inputs together and also to possibly backward integrate elements of the supply chain (see 6.4.6) • There is an opportunity for policy makers and other interested parties to investigate ways of stimulating new firm entry into the SOT cluster (see 6.5.1)	• Global competition - there has been a rapid increase of imports of comparable low-cost tableware from EU and non-EU economies in recent years. SOT cluster firms also face stiff competition in overseas markets (see Figure 4.19, 6.5.1 and appendix 17) • Cluster firms perceive each other as competitors even though they operate in separate market niches. This is a stimulus for product innovation. However, intense competition may lead to negative, price based forms of competition (see 6.5.1) • Since 1960, there have been very few new entrants of any size into the SOT cluster. This is seen as a threat to the long-term survival of the cluster(see 4.5.3) • Cluster firms do not trust each other and this is not good for co-operation and knowledge creating opportunities. This is a weakness and a threat (see 6.4.4)

Appendix 19: Interview Responses Mapped to Themes on Co-operation and Dominant Firm Effects

SECTION ONE - CO-OPERATION	
Q1. Do SOT ceramics manufacturers co-operate with each other on product innovations?	
YES B – yes, in some ways, but it's not formal. D – Yes, we do co-operate. We do work together, not as well as we could. F – Yes, I think people do cooperate.	**NO** A - I don't think they cooperate at all. C – I don't think we co-operate. E - My experience is no -- very, very limited. F - I don't know if that's just the nature how the industry's always been, but I don't think there was a lot of collaboration or cooperation.
Ways that firms co-operate: B – We've all been around each other's factories. I've been around every pottery in Stoke except (anonymous company). So there is co-operation there, or at least it's not hidden. B – We all see each other's stands when we go to the NEC or when we go to Ambiente – the big trade fairs. I would say though that some firms look a bit too closely because some of their patterns look quite similar to ours. B – Some of our ceramic products are made by other manufacturers here in Stoke. C - We do co-operate with (anonymous company), now I think about it. So, we make some of our pottery at (anonymous company). I think there is a little bit of co-operation there because they make for us, and I think we have had some decorations as well. D - I do. I do cooperate – you know, we have done – we've manufactured products in the past for other – sort manufacturers, such as Portmeirion and people like that. D - We've also bought from suppliers (other ceramics mfs.) where we have not been able to produce it because we've been under pressure from ??. It's been something that our customer wanted. D - That which they (ceramics mfs.) don't make themselves I know, it's made elsewhere in Stoke-on-Trent and I know that other people do the same thing. D - Well, you know, this is confidential, I know (ceramics mf. company kept anonymous) buy product from (ceramics mf. company kept anonymous). D – With other ceramic manufacturers we don't have any secrets. We say come and see. Come and have a look. We don't care. Most of the guys who we've done it with, reciprocated with visits. So the technical teams and the production teams have been around the other factories. F - We have done some cooperation but it's tended to be with all the other manufacturers and it hasn't always been that successful because, say we wanted a	**Reasons why firms do not co-operate:** A - I think that's actually healthy not to [co-operate] because ways that companies actually maintain their own sense of identity purposes is to keep everything kind of very tight and secret. A – For some, innovation comes about by stealing little bits off all the people. That leads to a market place that's just full of many derivatives of the same products and we have seen that happen to us. A - We will innovate something new and it becomes massively successful and everybody obviously wants a piece of that success and they just do very poor knock-offs of the same thing. A - it's sad really because it means the individual factories that are involved in that, lose something of their own identity in the mad scramble to have a successful product that was originally initiated by somebody else. B – Because potters have been stealing off each other for 250 years. C - I think the nature of being an entrepreneur and setting up a business is probably you're quite independent. C - And I just said I don't think we do cooperate, we don't un- cooperate but we were not in deadly competition with Wade's or with Portmeirion or anyone. We're friendly with them but we wouldn't ring up and say, "Oh, we don't know what to do about this customer or that one." D – Do people share product ideas? No, and I wouldn't expect that to happen because that's you know – that's it like intellectual property and stuff. They're very protective of their own designs and their own innovations, I understand that. E - My experience is no, very, very limited. They always talk. They kind of talk but then I've never seen it in my 32 years I've been in the ceramic industry. No, I've never seen it.

component part of something making a certain way, a particular part and we will do the rest of it. We'd find that the quality wasn't good enough. So what you tend to do is you find problems. You end up buying you then glaze it. You then glaze it and we find out that most often the quality is poor.	E - That culture is there, that by sharing, you almost say well, I don't want them to have my ideas because my ideas made me survive, I don't want to pass them on or show people. E - They [Mfs.] would arrange for instance, factory tours so you would have gone and visited (anonymous company and anonymous company).You wouldn't show anybody around the factory now from within the industry. Simply due to what you think is competition. F - We try to collaborate with various people because of our production capacity problem, because it was only small and we've approached bigger people but the problem with that is that because they are going to make a margin which is fine, the product then becomes too expensive. So we couldn't do that. So as a consequence, we have to source overseas to get as good a price we could. F - I think most companies are very, very protective about their IP, about the product development. And they don't want to share that.
Q2. Do SOT ceramics manufacturers co-operate with other firms on process innovations?	
YES D – Yes, we all do. F – yes we do with suppliers, e.g. on ceramic bodies. B – Sometimes, but it's not formal.	**NO** A – I don't think they co-operate at all. I think what they do is they go to the same suppliers for the same kind of end results. C – We are more inclined to do things by ourselves.
Ways that firms co-operate: B – Because we are a cluster, most of the pieces of machinery are from local firms, e.g. kilns. For example, last year we put in a new kiln, the new technology put into that will get transmitted elsewhere, and you know it will. F - This company I'm working with now on producing this new body. It's a stronger body so the benefit for this guy working with me is that as a small company, I might not going to be buying big volumes of it, but if that system works, he's then got a fantastic opportunity to market that to loads of people. So, the benefits are there, it's a win-win for both of us, that's why it works.	**Reasons why firms do not co-operate:** A - There's a mad scramble at the moment for entry into digital direct printing. I was at Ambiente in February and we [ceramics mfs.] were all on the same stand looking at the same kind of products. But, we are not talking to anybody, you know, any of our competitors about it, we are doing our own thing with it and suspect that they do the same thing as well. C - We are more inclined to do our thing ourselves. It's not through a kind of isolationist approach, it's just because what we do is so different from what everybody else does.
Q3. Do SOT ceramics manufacturers co-operate with other non-ceramic firms and institutions?	
YES A - It seems to go through phases. B – Yes, with BCMF and suppliers. C – Yes but limited. D – Yes. F – Yeah, I would say so.	**NO** E – No, I don't think so.
Ways that firms co-operate: A - You know, I've been here for 20 something years and when the market changes you might need some input in that area, you go and seek it out and those	**Ways/ Reasons why firms do not co-operate:** D - I'm frustrated at it, as a matter of fact, that the industry won't get together for more training. Because we've all got similar issues……..we've all got our own

relationships are formed and I think that's happened fairly recent with digital printing. You know, because it's a new exciting innovative area. So, we've kind of engaged with universities that are actually doing research projects in that area, just so we understand what's going on. B – Well, we're all part of the BCMF (BCC) which is a good talking shop and where it benefits us we will co-operate. B – We do co-operate a lot with customers, e.g. on market specific product development. B – We get our clay here from Stoke, We get our glaze from here in Stoke. Increasingly we're getting our lithographs locally, whereas we used to get most of them in Germany. And largely, most of our equipment comes from Stoke. C – I know people who buy together. There are some people [ceramics mfs.] who own one of the clay companies together. We are neither of those… but there are, I know, people doing both of those things. D - Well, again I don't know what other people said, but by default, we all do because we all deal with most of the big (inaudible)… and Americans --- and we sit here on the BCMF committee and so they do things that are – if they think that something is innovative for the industry, then we all take part of that invention so it isn't that there's no cooperation. It might not be, you know Steelite and Dudson talking to Wade, but by default those people are involved in that committee ….but whatever comes after that, it's beneficial. We all share it. D - Yes, at the confederation BCMF (BCC). This again, you know, these people who sit on the board at BCMF, I'm not one of them but they are from different companies….there was a meeting last Friday…..and (anonymous company and anonymous company) also had people walk in for the actual meeting, so they're all there together in a common room, talking about common interests. They [ceramics mfs.] all sit on various committees, I just think they have never really understood what they're doing is co-operating. The same goes for Lucideon, which used to be called Ceram, and Ceram was basically kept going by the industry. We paid the membership fee, you got 70 days of their time and ideas, that were shared, and so I just think the industry is always as they used to be. I myself used to be a director at ACTD [Association for Ceramic Training Development] as it was called, the ceramic training center. D - They (ceramics mfs.) all sit on various committees, I just think they have never really understood what they're doing is co-operating. And the same goes for Lucideon, which used to be called Ceram and Ceram was basically kept going by the industry. We paid the membership fee and you got 70 days of their time and	personal recipes, we're all using slightly different bodies and different mixtures and different whatevers, but the bottom line is, clay is clay. The techniques are almost exactly the same. There's nobody big enough in the city, I believe, that could put 15 people on a course like that. So we should co-operate. D – The problem is, most of the industry won't buy into that (co-operation on training). They pay lip service to it too and they say all the right things and then when it comes to making a decision or trying to sort out you put your hand in your pockets, they all run away. It's like – well that isn't exactly what we want, you know? Well that isn't exactly what we want. We want some of this and that and this and that. E - I think back in the day, when the ceramic industry was big, we had the British Pottery Managers Association, and that would have been everybody from all the factories who would have been talking. F - The thing about us as a small company is that we do everything in-house we've got to. Anything within the industry we can do. We can monoblock case design so we could originate. We do a lot of hard work or processing or building, what we don't do is printing. We also make moulds outside. That is the only thing we don't do so we traditionally have not done that. F - You know, we've not used outside resources because when I have used it in the past, I found that the actual technology and processes didn't work for us. At one time I used Ceram, good people, you know, the expert of ceramic industry, we used them to develop an angle and it was useless. Yes, it didn't work, they didn't do the job. They never came back and never followed it through. For them, they'd be getting paid so much for doing it. They do the job, thanks very much. We'd rather do it ourselves with the suppliers we've got. The glaze suppliers too do it all the time, the clay suppliers. I think it's a bit too academic, yeah.

ideas were shared and so I just think the industry is always as they used to be. I used to be a director at ACTD as it was called, the ceramic training center. D – We put on a University course. We had 11 people on that course, which was unbelievable. It was very specific and it wasn't really a ceramics course, it was a leadership course. But we did it because we thought it was worthwhile, but it's very rare you could do that. F I think, you know, in the last 20 years, there has been enormous co-operation with overseas manufacturers. Because people like Doulton, and Wedgwood in particular, who were seen as the kind of policy, you know. So they co-operated with lots of manufacturers and basically exported that expertise and where has it got them.	

Q 4. Do SOT ceramics manufacturers co-operate more or less now than 10 years ago?	
YES B – Probably more.	**NO** A - I think they probably co-operate less. D – Probably co-operate less. E - No. I think it got worse. F - I'd say less.
Reasons why firms co-operate MORE now than 10 years ago: B – Wedgwood have been gone in that time and I don't think they co-operated much. The BCF now pulls us together more tightly now and therefore that helps co-operation, so probably more.	**Reasons why firms co-operate LESS now than 10 years ago:** A - I think because competitions increased and people are just being very protective about what they do and they just don't want to give anything away at all competitively to anybody else. A - Less local competitors but you know on the global stage, there's many more people entered the industry. You know, from lots of different countries that weren't even on the radar before. You know, these countries are making quality products. So I think competition's actually increased and I think that's forced people into being much more protective about letting their competitors see what their activities are and what their… A - I think nobody trusts anybody basically. I think there's just been a long history of, you know, general mistrust of anybody else's activity and you know a rise to kind of steal. A - There's just a great opportunity to come up with a key kind of product that will kind of wow the whole industry but you're the first to market with and I think that drives a protective kind of standpoint with practically everything that pottery manufactures do.

	D - No. I would say it's always been as it is and if anything it's probably worse now than it was. I think in the old days when the companies were bigger, there was more competition, and there was probably more co-operation. E - I think back in the day, when the ceramic industry was big, we had the British Pottery Managers Association, and that would have been everybody from all the factories who would have been talking. You would have known people from those factories as well and they would arrange for instance, factory tours so you would have gone and visited Wedgwood and Churchill. You wouldn't show anybody around the factory now from within the industry. Simply due to what you think is competition. E - I think it was as if the shrinking of the industry almost made you just kind of close your ranks in effect because, you know, it was just your business that wanted to survive and it was very much - if we are surviving, it's only about surviving. E - It's always described as a peculiar industry and I don't know whether it might be the fact as well, that it was very much owned by families. So, you know, it was the Dudson's, the Ropers at Churchill…and it was almost like, you know, it's the case of 'I know I'm better than you'….and, you know, they were almost like kids at times. Because I've seen that personally, you know. F - I think there's less companies that's why. Yeah, that's why. And you know, companies are all still going belly up, still gone through a really bad 25 years, you know.
Q5. Do SOT ceramics manufacturers see themselves as part of one whole industry cluster?	
YES A - I think they see themselves as that but I don't actually think they have a voice which is built. D - When it suits them (e.g. collective bargaining with trade unions in the past).	**NO** E - I wouldn't say that. No, definitely. Definitely not, no.
Ways that firms act as one cluster:	**Reasons why firms may not act as one cluster:** A - It's like there's not enough companies to achieve critical mass….I think companies tend to work much more in isolation now than they have in the past. D - But you see, I think, I do believe that the industry would be stronger if we all got together and did a big thing about making in Stoke-on-Trent. But you know, that's – there's got to be strength in made in Stoke-on-Trent. Stoke-on-Trent likes to sell itself as a city as the world capital of ceramics. If that's the situation shouldn't we all be singing from the rooftops that we're in Stoke-on-Trent?

	E - You see, they see themselves certainly as individuals and 'we are going to do better than (anonymous company)' or 'better than (anonymous company)' or 'better than (anonymous company)', they definitely see themselves as that.
SECTION TWO – DOMINANT FIRMS	
Q6. What effect did the SOT cluster's past dominant firms, e.g. Wedgwood and Royal Doulton, have on the rest of the SOT cluster?	
Advantages to the cluster: A - Having companies like that in the locale mean that everybody kind of benefits because it's good for the service industries, the service sales factories, you know. The clay suppliers, the glaze suppliers, the colour suppliers, the machinery people. A – It's good for the workforce as well. A - Also for tourism, you know, people come and they want to visit Wedgwood. B – Well, I suppose a heavy ballast to the cluster makes it a cluster because of the gravitational pull. It's like, I'm here, I'm big, I'm important, I can employ these people, come in and set up then. You can steal employees off that, or maybe processes or ideas, or the same supply chain. So, it's important to have the heavyweight ones in the middle. They bring that benefit, they bring the reputational benefit, but really, they bring the supply chain and the skill base benefit more than anything. C - They used to do a lot of training in the old days, we used to get everyone really trained by them. Because they had huge training budgets…..you know, Nile Street had 3,000 people working there. Well, at least they trained brilliant craftsmen. So, yes, they were very, very useful. D - Wedgwood and Doulton would also be the ones leading the discussions with the unions on who what pay rises and what levels would agree. D - They drove growth and pottery was probably at its absolute peak in those years, in those mid 70's years. The ceramics industry probably employed more people than it had ever done. Even though technology had progressed from back in the early 19th and 20th centuries when it first kicked off and I think probably it was at its most successful overall as an industry. So if you look back at the turnover, and what was being manufactured in the city, the number of people employed and therefore the prosperity brought to the local community, not just the people employed in the ceramics companies but in all the suppliers and support industries around. But also, at the same time, it did put the smaller firms under pressure. D - The bigger companies would obviously help the suppliers to develop new techniques and technologies and so I'm sure there was a lot of cross-fertilization in	**Disadvantages to the cluster:** A - Wedgwood and Doulton between them were buying so much raw materials, they can obviously get it at much cheaper price than you know a 10-person operation could. A - And then you know, taking the manufacturing heart out of the UK and putting it somewhere else. People buy the history and the romance around the product rather than the product itself, and if you have not got that anymore, you haven't really got a product and I think that was something that got lost in that era. B – Wedgwood swallowed up 54 brand names. So that was a disadvantage. C - We know that both did huge damage to the industry. Wedgwood and Doulton got rid of all of the major competitors and did massive damage of shutting down companies like Mason's or like that. So I think, you know, very bad. C - Outsourcing manufactures in Indonesia and Malaysia, all those places that basically completely trashed the jobs here. C - And Doulton, you know, what they did -- they were very big and then they were very inflexible so they didn't spot the changes in habits and taste because they were too big to notice. So, I think again, that's bad and a bit of anti-innovation. D – After acquisition they sold land, then liquidised assets and they moved the production to Wedgwood or to overseas or to whatever they did and, but that's inevitable, the industry contracted. Had the industry still been as buoyant as it was in the 70's, I mean back in the 70's with Wedgwood you're talking about £100 million or some £120 million turnover. Doulton, I think did the same thing one year with £249 million turnover. I mean they were big, big companies. D - I don't think there were any benefits for the people (ceramic firms) who weren't in the group, really. D - As the industry started to struggle, this is where they weren't good for the industry. They were too long waking up to the fact that the industry had changed and you know. The management became lethargic and comfortable and cocky and arrogant and made a lot of wrong decisions and it ended up costing the industry a lot of jobs. Because they were in this mindset that what we've always been, the big boy you know. Wedgwood didn't believe that anybody could make a product better than they did.

few of the guys who make the prints, or who supply the clay, or who supplies – you know, glazes, etcetera. E - They were good trainers of people so they were seen as the Rolls Royce of the industry and they trained a lot of people and we have all benefited. They probably kept the college courses going because they were probably setting on 20 or 30 people a year and then the likes of Steelite or Churchill at that time might only have one or two, so if they (Wedgwood and Doulton) hadn't been there, the college courses wouldn't have run in the first place, so I think, that would have been a benefit. E - And at that time, they set levels of efficiencies, they set levels of productivity, they set levels of quality and that is very good that the rest of the industry have something to aspire to. E - They were always looking at innovations, so from machinery point of view, so they would've gone to Ceram research, etcetera. They would have backed the project. They would've done the research with Ceram. They would've gone to the manufacturer of machinery and then the machinery would've been available to everybody. So, that would've been why the printing processes evolved with printing machinery, why pressure casting evolved, why roller making evolved from A-rolls or B-rolls or C-rolls. I think without the bigger firms and having that investment into research to say yes, this is the way for all with that, a lot of the techniques wouldn't have advanced as fast as they did. It's certainly moved it (the industry) forward a little bit. E - They are a brand. If somebody says Royal Doulton, or Wedgwood, people know that straight away don't they. Whether people would know straight away they're from Stoke-on-Trent, I don't know. If it was in the internet, if you put Wedgwood in Google say, it would say Stoke-on-Trent wouldn't it.	E - I suppose they set benchmarks in terms of pricing and wages, and so you would have to follow that and maybe a smaller business wouldn't have been able to compete with that. So maybe the pool of labour, we wouldn't have been able to pay the wages that Wedgwood would've paid, so you wouldn't get those people in and maybe we wouldn't have attracted the best pool of talent. So, the pool of talent will be all going to Wedgwood and Doulton maybe, and we wouldn't have seen that. F - There were no advantages, they had a negative effect. Because what you got is two big players, and they were both vying with each other for dominance. What they did was, any small independent company that came up for sale or they wanted to buy, they would buy them. As a consequence, the whole of Stoke-on-Trent was either owned by Doulton or Wedgwood. All these great little companies became part of the overall Wedgwood brand, or the overall Doulton brand. Often they just destroyed them really and of course, you know, they [acquired firms] were not independent anymore. They were not making their own decisions so, as a consequence, you get a pretty bland environment, and non-competitive, and it just wasn't healthy for Stoke. Not innovative enough you know, because often those factories had their very own fashion as well.
Q7. Why do you think that Wedgwood and Royal Doulton acquired so many other pottery companies between 1960 and 1990?	
Reasons for acquisitions: A – I really can't speculate on that. B – Because they could. I think it was driven by cost efficiency, which is to feed the big factory. Also, taking the brand names, because they didn't want other people to do it and because they wanted to put the volume production through. Nowadays the same reasons would apply but I think the profit motive would be stronger. D - You know, Wedgwood was big and strong and a lot of the smaller potbanks were struggling a little bit. It was all consolidation and bringing them together. I	**Effects on acquired firms:** A - My experience of that whole thing was all I saw was a kind of dilution of the businesses that they acquired and you know, all those great names when they became part of a corporate entity, they kind of loss their own identity and became weaker for it. A - Some of these bigger companies just became so focused on profitability and driving down the cost to the detriment of the product that they actually forgot what their customer was actually buying.

suppose it was companies who want to take over what they see as competitors or minions or different ways of extending their range or whatever. So I think Doulton and Wedgwood both went through that phase. C - It was a campaign to get rid of competition and simultaneously they then put in the hands of too few players some decision making, like outsourcing manufacturing to Indonesia and Malaysia, all those places that basically completely trashed the jobs here. C - They didn't just get rid of business it's like, you know, Wedgwood just bought to shut down. That was the strategy. I don't have any doubt about it. I don't think there's any question of it. In my mind, I've always known that was absolutely it. E - I'm guessing. I mean, because I have been around -- I was in the industry from '85, but I would've imagined that it's – most of it profit led, surely because, you know, if you're making money, you've got money around, what am I going to do with that money? Well, I'll buy another pottery firm. So, rather than to go and buy a different businesses, it is the business I know and if we can acquire another pottery manufacturer and actually pick on certainties so we can make savings, hopefully then we can be more profitable. Top sales line goes up without us having to invest in a lot of sales. You can invest in your own products and sales routine or you can buy one that is already there. The turn-over is guaranteed and if you put the two businesses together and make savings. F - They (Wedgwood & Doulton) were both vying with each other for dominance. So what they did, any small independent company that came up for sale, they wanted to buy, they would buy them, so as a consequence, eventually, the whole of Stoke-on-Trent was either owned by Doulton or Wedgwood. F - Because they were competing against each other. They were trying to get more market share. It is about snapping up another company, you know. I mean, Wedgwood bought Enoch Wedgewood, which was spelled with an E, so Wedgwood bought that to shut it down because they didn't like another Wedgwood on the market.	C - We know that both did huge damage to the industry. Wedgwood and Doulton got rid of all of the major competitors and did massive damage of shutting down companies like Mason's or like that. So I think, you know, very bad. D - If you (an acquired firm) had a bad year, you'd be part of the group, and if the group had a good year, you know, you could survive that bad year and go back. But they were able to survive that because of the Wedgwood brand, if you like, supported that – you know, the fact that it didn't – it's a year when perhaps it didn't make a profit, it would've required to stay in existence under its own steam. D - Wedgwood did invest a lot of money into the factories that probably wouldn't have happened without them. You know, new technology back then, I mean, it wasn't a very technological industry back then and it still isn't now, really. But where there were opportunities, Wedgwood invested in all the factories, not just in Barlaston. E - There's less competition. Competition can be a good thing and a bad thing, can't it? It would've been less competition but certainly they should've taken advantage of that being a big manufacturer. They should've been able to really drive efficiency. So, the lack of competition would've made it more difficult and so everybody who was buying just would've gone to Doulton and Wedgwood first because they were seen as the ones always kind of making a monopoly and everybody else is just the little fish in the big sea I suppose. F - So all these great little companies (acquisitions) became part of the overall Wedgwood brand or the overall Doulton brand, and often, they just destroyed them really and of course, you know, they (acquired firms) are not independent anymore. They're not making their own decisions. So as a consequence, you get a pretty bland environment, and non-competitive and it just wasn't healthy for Stoke. Not innovative enough you know, as often these factories had their very own fashion as well. F - I will say no, they didn't share knowledge. They were incredibly protective, you know. It was like a closed shop really. I mean when they went bump, and all companies were shut down and they made these people redundant, I think probably most of them didn't get back into the industry because that was getting smaller anyway so they'd go into other industries and get out of it, you know.
Q8. Overall, do you think Wedgwood and Royal Doulton were good for the SOT ceramics cluster?	
YES B – At times in their lives, yes, e.g. industry reputation and the supply chain, but in later years they were bad, they were very badly run in the end.	**NO** A - I don't think they were.

D - In some ways, yes. In some ways, no. E - Yeah, yeah, definitely.	C - I would say that in terms of the industry, of the city, I don't think they have been particularly useful to it. But brilliant for skills. D - In some ways, yes. In some ways, no. F - No, had a negative effect.

Q9. What do you think the role of the SOT cluster's NEW dominant firms, e.g. Steelite, Portmeirion, etc., is/should be?

A – We've tried to be good neighbours.

A – Our former CEO was always very, very positive about the industry in general and he saw himself really as kind of like -- you know, if he could make things better somehow, he would go out of his way to try to find a way to do that. If the industry in general is strong, everybody benefits. You know, because it removes all the uncertainly of certain suppliers going out of business or certain key elements of the industry not being available anymore which is no good to anybody.

A - The biggest thing we can bring to the industry is again stability. You know, the more successful we are the more successful everybody around us will be which just brings more confidence and stability and if everybody kind of grows along with us, that brings other people into the periphery as well.

B – I think we're a good employer. I don't want to use the word 'paternal' but it's the word that comes out, and that's an important role. We have an ambassadorial role as well – we're publicly quoted so we spend a great deal of time talking to the City and pushing the right levers. There's a brand protection role too for the Potteries. I kind of think we are more of a lighthouse and a gatekeeper, but that doesn't mean keeping others out. We (current large ceramics firms) have less control over the industry than the biggest firms in the past, we're not the same at all.

C - They make good sound jobs. They've stocked the manufacturing in Britain, they've behaved in a principle way and employed well.

D - We don't compete as such. But we talk. You know, we just – I think it benefits a bit for the industry. And if the industry's strong, then we're all strong, if we do something, and If we're really good at what we do, we're all stronger together.

E - Of course, if they've kept the industry going in Stoke-on-Trent they've done something right, and they're hopefully now becoming more profitable. If then they can invest their profits into the business and, whether that be training, marketing their businesses, marketing the made in Stoke-on-Trent ceramic brands, that's going to be good, isn't it? It's going to be good.

SECTION THREE – VIEWS ON INNOVATION, SUCCESS FACTORS AND COMPETITION

Views on opportunities for innovation:

A - The great thing about ceramics is just how much you can push the material. You know, it's a fantastic medium for constant innovations, there are always new ways of doing things, different combinations of things that can come together. There's always a chance you'll steal a march on your competitors by coming up with some magic formula, not just in terms of chemistry but in terms of you know, shape and design innovation.

A - I think that the pottery industry is a very strange industry in that -- traditionally, it was always run by people who understood pots. You know, they knew how to make a pot, they knew what was involved in the craft of pottery because pottery isn't engineering. You know, there's almost like a dark art to it that isn't written.

Views on success factors for firms:

A - I think that is indicative of the people that survived because they found a niche. They stuck to it and they fine-tuned it, they've honed it and they've innovated within that niche. They've got a strong identity and it's the thing that people buy into. I think the companies that survive are the ones that have had a very strong sense of self and purpose and that's something, people don't buy pots, they buy a dream or they buy, you know, the romance of the product, they buy the sizzle not the sausage.

F – We're still here today, particularly in niche companies like the table work, the hotel work, companies who still choose particular countries that really have a huge market to go at. It is a growing market, you know. They get fantastic margin off the product. They are not dealing directly with retail because that's hard, you've got to

make sure that retail has a good margin. So, that is the difference between their business and ours and that's why they have enormous success, when that's finally done really well, you know.

Views on competitors and competition:

A - I think because competitions increased and people are just being very protective about what they do and they just don't want to give anything away at all competitively to anybody else.

A - Less local competitors but you know on the global stage, there's many more people entered the industry. You know, from lots of different countries that weren't even on the radar before. You know, these countries are making quality products, so I think competition has actually increased, and I think that has forced people into being much more protective about letting their competitors see what their activities are. A lot of pottery manufacturers are actually competing with holiday companies or electronics companies, their biggest competitor problem is Apple or Samsung. You know, that is the reality of it

A – Competition in the hospitality area, I think it's incredibly strong. Our key competitors are local. And you know, there's also competition coming in from abroad via our own distributors as well.

B – Our competitors include people (overseas) who produce for the likes of John Lewis or House of Fraser or Debenhams, It'll include Marks and Spencer and at the lower end products sold in Sainsbury's and Tesco. It would also include in the UK Bridgewater and Wedgwood (you're never quite sure whether they're competitors or not or where they are in life). And Churchill increasingly within consumerware, given that what we make is consumerware rather than hotelware. There are dozens of overseas competitors – worldwide.

C - No, we don't really compete with any them (other SOT ceramics firms) much. They're bigger and more mechanised than us. So, we're both kind of non-competitive or committed that easily to each other.

D - I think in the old days when the companies were bigger, there was more competition (local).

D – We don't have any competitors in the UK, we've got one in Germany, one in France. You know, we don't really compete with anybody in Stoke.

D - You know, we don't really compete with anybody in Stoke. Moorland's a little company, but they have a really unique offer. So it's not, yeah, okay. You can sell mugs. Dunoon, they sell mugs. Emma's sort of design led and I suppose if anyone competes with them it's Portmeirion. It's perhaps Emma but really she doesn't offer the full range that they offer. So perhaps there isn't as much direct competition as there used to be. Yeah, and therefore it was perhaps a bit tougher in the past and perhaps really, the industry is a little bit more I mean, Portmeirion and Spode don't really compete head to head with Steelite and Dudson.

E - We haven't got a lot of competition because we are kind of in a niche with our supply really, but we've got (anonymous company) which I think is another small business. They import product from China and they decorate in the UK.

F - So all these great little companies (acquisitions) became part of the overall Wedgwood brand or the overall Doulton brand, and often, they just destroyed them really and of course, you know, they (acquired firms) are not independent anymore. They're not making their own decisions. So as a consequence, you get a pretty bland environment, and non-competitive and it just wasn't healthy for Stoke. Not innovative enough you know, as often these factories had their very own fashion as well.

Views on trust:

A - I think nobody trusts anybody basically. I think there's just been a long history of, you know, general mistrust of anybody else's activity and you know a rise to kind of steal.

B – Would you say that ceramics firms don't trust each other then? Yes, it will be that in part.

E - That culture is there, that by sharing, you almost say well, I don't want them to have my ideas because my ideas made me survived, I don't want to pass them on or show people.

F - But, I think my experience from working for myself for 30 years is that, you know, they're not be trusted to be honest. The other manufacturers? Yeah, say we went to a firm with a really good idea, it really sells well, would you like to license it? I tried things out like in the past but you end up not getting paid. You know, so it is not professional enough.

Views on other cluster benefits and opportunities for co-operation:

C - You make instate because you want to have people working for you who already worked in the industry or his grandmother or his father or his mother used skills as a traditional in the areas. You don't have to start anybody from scratch. You want to be near the places that make the kilns – that made the glaze, that made the molds, that fix the machines, that deliver pottery, that know how to make packaging for pottery. You need to be in an area where there is a structure in place to service that industry. So, it's very much easier to do that. You want to be able to recruit when people leave. You want to get new people to come in quickly again.

D - People would sort of change jobs and move from Doulton to Wedgwood to Dudson – you know, and so there's always this sort of – you know, there was like a pool of personnel and people rotated. I mean, lots of industries are sort of incestuous but the ceramics industries is incestuous, you get the same guy popping up in four different brands, own by four different of companies. Doing the same job. And so we know what ? have done in the past and what ? were doing and, you know, what ? have done whatever it is.

E - Do you think there are any areas where the manufacturers should've worked more closely together? Yeah, definitely, it's the supply chain, so that's the glaze manufacturers, refractory manufacturing, colour supply, colour technology, because all of that supply chain's just disappeared. Things like ceramic and kiln furniture, what used to be five or six manufacturers in Stoke-on-Trent, there are none now, it's all imported by one firm. I'm sure there's an opportunity, if we did get together, to set up manufacturing in Stoke-on-Trent of ceramic and kiln furniture, by all of us putting some money in. We could see benefits from that ship by being in control over what they sell rather than the third party being in control only to put their margin on.

E – But you see, I think, I do believe that the industry would be stronger if we all got together and did a big thing about making in Stoke-on-Trent. But, you know, there's got to be strength in made in Stoke-on-Trent. Stoke-on-Trent likes to sell itself as a city as the world capital of ceramics. If that's the situation shouldn't we all be singing from the rooftops that we're in Stoke-on-Trent? We could all grow 10%. Fabulous, If we would all grow 20%.

E - I know they're starting to look at it now but education and training is another one where cooperation definitely needs to be done because, you know, colleges and the universities run courses. They've got to make money. They've got to have a number of people. So, you can't just run a course for Churchill, because there might only be three people, you can't just run a course for Steelite with another three, but by putting the threes together, you end up with 12 or 20 people.

Appendix: 20

SOT: Firms Existing in 2016. Contact efforts made.

	Name	date	Status
~~1~~	**Birchcroft Fine Bone China Co. Ltd**	Est. 1980 – present	No longer in business.
2	**Emma Bridgewater (Bridgewater Pottery Ltd)**	Est. 1984 – present	**Questionnaire and Interview completed**
	Cara China Co	Est. 1945 – present	Not found
3	**Caverswall China**	Est. 1973 – present	**Questionnaire completed** Email sent regarding interview – 21/2/17 **Interview arranged with Paul Smith – 1st March 2017 3pm - completed**
4	**Churchill China PLC (formerly James Broadhurst & Sons)**	Est. 1862 – present	Letter and Email sent to David O'Connor CEO 21/2/17– no reply Email reply – request rejected 21/2/17
~~5~~	**Peggy Davies Ceramics Ltd**	Est. 1981 – present	Letter sent in December – no reply Visit to factory February – no reply Letter through door February – no reply
6	**Denby Pottery (present in SOT after 2009 as BURLEIGH)** **Denby owned by HILCO who also own Poole Pottery (now made in SOT) and Royal Stafford**	Est. 1809 – present	Letter sent in December – no reply (Steven Moore) Emailed general request via website (Burleigh) – 21/2/17 Try Norman Tempest MD of Poole and Royal Stafford – no response
7	**Duchess China (see Crownford/Taylor-Tunnicliffe)**	Est. 1947 – present	Email sent 7/2/17 – general enquiry on website (Chris Carnell, General Manager) Request rejected 10/2/17 Further request emailed – 21/2/17 No reply
8	**Dudson Bros Ltd**	Est. 1898 – present	Letter and email sent to Danny Goodall 2/2/17 – no reply
9	**Dunoon Ceramics Ltd (part of SOT cluster since 1980)**	Est. 1980 – present	Email sent with questionnaire to Peter Smith MD 7/2/17 No reply
10	**Hudson & Middleton Ltd** (Just been acquired by Times Square, Mark Chilton MD (since going into liquidation))	Est. 1941 – present	Emailed general request via website 7/2/17 – no response Letter through door – 9/2/17 – no response Emailed general request via website 21/2/17 – No reply Factory closed down June 2017
11	**Roy Kirkham & Co. Ltd**	Est. 1970 – present	Emailed general request via website 21/2/17 Letter posted to Ian Kirkham (MD) – 21/2/17 No reply
12	**W Moorcroft PLC**	Est. 1913 – present	Visit to factory October 2016 – no response Letter sent to Hugh Edward 21/2/17 – no reply
13	**Moorland Pottery**	Est. 1960 – present	**Questionnaire & Interview completed**
14	**Portmeirion Potteries Ltd**	Est. 1961 – present	**Interview arranged with Dick Steele 7/4/17 - completed**
	Raywear Group (acquired price Kensington 2009)	Est. 2009 – present	Still operating but not included as manufacture overseas
15	**Steelite International PLC**	Est. 1983 – present	**Interview arranged with Andrew Klimecki 23/2/17 – completed**
16	**Wade Ceramics Ltd**	Est. 1810 – present	**Questionnaire & Interview completed**
17	**Wedgwood Group**	Est. 1759 – present	Email sent and response 4/2/17 Awaiting further reply Email sent – 21/2/17 (Dik Delaney Design Director) No response
18	**Walpole Fine Bone China (Pollyanna)**	Est?	Contacted several times by email but no response. Too small?
19	**Staffordshire Heritage**		Visited factory and left questionnaire – 9/2/17 Email sent – 21/2/17 No reply. Not included as they make ceramic light fittings for trade.