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Strategic Management Accounting practices in medium sized UK construction companies: A mixed-methods approach

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Copyright Statement

Abstract

This study examines the extent to which strategic management accounting (SMA) is used by medium sized UK construction companies, explains the rational for this and explores the contingent factors which affect its use in the construction sector. To the best of the Researcher's knowledge the study is the first to investigate the use of SMA in this context.

The use of SMA is considered as an aspect of the reality gap, the difference between management accounting theory and management accounting practice. Contingency theory is applied to examine the organisational contexts in which SMA techniques are deployed.

Using the Researcher's own definition of SMA he identified a definitive list of twenty-five SMA techniques which satisfy this definition. The use of these SMA techniques is empirically tested using a mixed methods research design. An explanatory sequence design is used. The researcher started with a first phase in which quantitative data was collected and analysed. This was followed up with a second, qualitative phase, the results of which were used to explain the findings of the first phase.

The study identifies a low level of use of the twenty-five SMA techniques, supporting the idea that a significant reality gap exists in relation to SMA theory and its use in practice. This reality gap is explained in terms of the non-relevance of many of the SMA techniques to senior executives in the participating businesses. It is also identified that quantity surveyors were often involved in SMA practices to the exclusion of their accounting colleagues, this is discussed as another aspect of the reality gap.

The study identifies the 'strategic customer' to add to the list of contingent variables which affect the use of SMA. Specifically, the use of lifecycle costing and value chain analysis are highly relevant to the construction sector but will not be effective if the existing commercial practices of the sector remain. A case-study demonstrating where these techniques are productively used by a number of different businesses is presented which concludes that having a 'strategic customer' is one context in which these techniques are successfully deployed.

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List of Abbreviations

ABB Activity Based Budgeting

ABC Activity Based Costing

ABCM Activity Based Cost Management

AMT Advanced Manufacturing Technology

ANT Actor-Network Theory

ASP Accounting for Strategic Positioning

BSC Balanced Scorecard

CA Customer Accounting

CBMA Contingency-based Management Accounting

CE Customer Equity

CEO Chief Executive Officer

CEMARS Certified Emissions Measurement and Reduction Scheme

CFA Competitor Focused Accounting

CFO Chief Financial Officer

CFMAC Cashflow Minus Amortised Capital

CIMA Chartered Institute of Management Accounting

CLV Customer Lifetime Value

COQ Cost of Quality

CPA Customer Profitability Analysis

CPF Contract Profitability Forecast

CSF Critical Success Factors

CVR Cost Value Reconciliation

DCF Discounted Cashflow

EC European Commission

EMA Environmental Management Accounting

EVA Economic Value Added

FD Financial Director

G&A General and Administrative

H&S Health and Safety

IC Intellectual Capital

ICA Intellectual Capital Accounting

ICAEW Institute of Chartered Accountants in England and Wales

ICM Intellectual Capital Management

IRR Internal Rate of Return

JPA Job Profitability Analysis

KC Kaizen Costing

KPI Key Performance Indicator

LCC Lifecycle Costing

MA Management Accounting

MAI Management Accounting Information

MAP Management Accounting Practice

MAS Management Accounting Systems

MAT Management Accounting Technique

MBA Master of Business Administration

MCS Management Control Systems

MD Managing Director

NED Non-Executive Director

NIS New Institutional Sociology

NPV Net Present Value

ODI Outcome Delivery Initiative

OECD Organisation for Economic Co-operation and Development

OIE Old Institutional Economics

OPP Obligatory Passage Point

PAF Prevention-Appraisal-Failure

PP Payback Period

PPA Product Profitability Analysis

PQQ Pre-qualification Questionnaire

QLF Quality Loss Function

QS Quantity Surveyor

RI Residual Income

RICS Royal Institute of Chartered Surveyors

SBU Strategic Business Unit

SCM Strategic Cost Management

SHEQ Safety, Health, Environment and Quality

SIC Standard Industry Classification

SID Strategic Investment Decision

SMA Strategic Management Accounting

SME Small or Medium sized Enterprise

SMP Strategic Management Process

SMT Senior Management Team

TC Target Costing

TDABC Time Driven Activity Based Costing

TCM Total Cost Management

TMA Traditional Management Accounting

TQM Total Quality Management

VCA Value Chain Analysis

1 Introduction

Johnson and Kaplan (1987) challenged the status quo of management accounting practice (MAP) by saying that it no longer provided information which was relevant for decision making and control purposes, because its development had failed to keep up with a rapidly changing business environment. The response to this by the Chartered Institute of Management Accountants (CIMA), the body responsible for representing the management accounting (MA) profession in the UK, was that evolution, not revolution was required (Bromwich and Bhimani, 1989). It did result in a revision of the CIMA professional exam syllabus with the incorporation of case-study based exams to assess student's capability to think strategically and apply accounting techniques to support that thinking (Allott, Weymoth and Claret, 2000).

Businesses were facing increasing competition driven in part by globalisation. At the same time new technologies were driving a change in manufacturing processes. These new technologies included both the use of advanced manufacturing equipment but also a change in how shopfloors were managed (Prowle and Lucas, 2016), for example the use of just in time manufacturing or total quality management (TQM) (Bromwich and Bhimani, 1994). This in turn generated increased volumes of data and the requirement for more and different information to enable managers to make decisions and maintain control in an era of devolved authority within organisations (Bhimani, 2006). New technologies were not restricted to the shopfloor. Improved and cheaper data storage and processing systems facilitated the analysis of data and the provision of information for decision making and control purposes and enabled new management accounting techniques (MATs) to become established (Christiansen and Mouritsen, 1995). In turn the role of management accountants changed from bean-counters to business analysts, supporting their colleagues to make business decisions (Scapens, 2006).

According to Otley (2008), Johnson and Kaplan's intervention was a turning point resulting in "more management accounting innovation over the past two decades than in the previous fifty years" (Otley, 2008, p.230). One such innovation, more a collection of innovations, was strategic management accounting (SMA), a term first coined by

Simmonds (1981). As discussed later in this thesis no agreed definition of the term has found favour (Prowle and Lucas, 2016), but for the purposes of this thesis the following definition was used (see section 2.1.1 below for a full discussion of this).

The provision and analysis of future orientated financial and non-financial information on the organisations business environment, products and internal processes, as well as both its current and potential competitors' products, cost structures and strategic intentions and the costs of its value chain as necessary to plan, implement and monitor its own business strategy.

This allows a distinction to be made between traditional management accounting (TMA) techniques and SMA techniques (see Table 3 and Table 4 below). TMA such as standard product costing, budgeting and variance analysis (McLellan, 2014) take a short-term and internal view of an organisation, whereas SMA takes a longer-term and more outward looking perspective.

1.1 Research Objectives and Questions

The study was conducted in medium sized businesses in the East Midlands of the UK who are engaged in construction activities. This was a sector in which the Researcher had previously worked and, as demonstrated later in this thesis, is a sector in which limited MA research had previously been conducted. The study had the following objectives:

- to investigate the extent of the usage of SMA,
- to understand the rationality for this,
- to identify new contingent factors which affect the use of SMA in the construction sector and
- to empirically test if there is a correlation between organisational performance and the use of SMA.

These research objectives, the gap in the literature (see 1.3.1 below) and the Researcher's professional experience (see 1.3.4 below) gave rise to the following research question:

How can the reality gap and contingency theory be applied to assist in understanding the rationale of the use of SMA and its contribution to improved performance in medium sized construction companies based in the East Midlands of the UK?

This main question was broken down into several complementary sub-questions as follows:

To what extent are SMA techniques used by medium sized construction companies?

Who is responsible for using these techniques?

Which contingent variables help to explain the use of SMA in medium sized construction companies?

Does the use of SMA contribute to an improvement in the performance of medium sized construction companies?

The answers to these questions presented below address a gap in the current literature; namely the lack of empirical knowledge of the usage of SMA techniques in medium sized companies in general and more specifically the construction industry. In answering these questions, the contribution to knowledge made by this study is to extend our knowledge of contingency theory to identify contextual factors which explain the use of SMA in medium sized construction companies. The following section discusses the theories applied in this study to achieve the research objectives and answer the research questions stated above.

1.2 Theoretical underpinning

This section discusses and justifies the use of the reality gap and contingency theory to achieve the objectives of this study.

1.2.1 The reality gap in management accounting

The reality gap in management accounting, as identified by Scapens (1984), is the gap that exists between management accounting theory and the practice of management accountants. He identified a clear gap between materials in textbooks, which he classified as theory founded on neoclassical economics theory of the firm and the actual practice of management accountants. He dismissed this gap as being a result of the time lag between the development of theory and practice or as a result of practitioners failing to recognise so called best practice. He identified

> "that the simple, rule-of-thumb methods frequently observed in practice could represent optimal reactions to information costs and benefits in an uncertain world" (Scapens, 1984, p.75).

Lucas and Rafferty (2008) defined the reality gap as

> "the alleged gap between the conventional wisdom of the management accounting textbooks, academic/professional journals and management accounting practice" (Lucas and Rafferty, 2008, p.148).

They considered the reality gap in relation to cost analysis for pricing, but rather than use information economics, the cost/benefit analysis of using different costing techniques, they used old institutional economics (OIE) to explain the gap. The reality gap is discussed further in section 2.6.1 below

The first two research objectives referred to above can be considered as features of this reality gap. Firstly, to what extent is theory, that is, the SMA techniques described in chapter 3 below, being practised by management accountants within medium sized construction companies? This is discussed in chapters 6 and 7 below. Secondly, when these techniques are being used, who is using them? Is it management accounting practitioners, or is it others who are responsible for their application? This is discussed in chapter 8 below.

1.2.2 The use of contingency theory

The third and fourth research objectives are to investigate if there are circumstances, perhaps unique to medium sized construction companies, which cause them to use SMA techniques to any greater or lesser extent than other businesses and to identify if there is a correlation between organisational performance and the use of SMA. Contingency theory was considered to be an appropriate theory to use to achieve these objectives as it is deployed to study the effect of the design of management control systems (MCS) on organisational performance, in this case the use of SMA within the system of management control. Contingency theory has a "long tradition in the study of management control systems" (Chenhall, 2006, p.163). Chenhall also states that a

> "conventional, functionalist contingency-based approach to research assumes that MCS are adopted to assist managers achieve some desired organizational outcomes or organizational goals" (Chenhall, 2006, p.164).

As this study aims to examine the effect of SMA on business performance then this provides further justification for the use of contingency theory in this study. Furthermore, in relation to the use of contingency theory in MAR

> "it seeks to discover when specific techniques might be most appropriate for particular organisations in their specific circumstances" (Otley, 2016, p.47).

This relates directly to the third research objective in so far as specific SMA techniques are appropriate to medium sized construction companies.

In MA research, contingency theory is concerned with studying the influence of independent variables such as the business environment, technology, organisational structure, business size, business strategy and culture on the design of MCS. Its central proposition is that organisational performance depends on the fit between organisational context and structure (Cadez and Guilding, 2008; Abdel Al and McLellan, 2013) and that there is no one universal design to achieve an optimal organisation performance (Otley, 2016). SMA supports an organisation's strategic management process (SMP) as described in section 2.1.3 below. As the SMP is an integral part of an organisations MCS, utilising contingency theory was considered to be the most

appropriate theory to achieve these objectives in this study. The use of contingency theory in SMA research is discussed in greater detail in section 2.5 below.

The use of alternative theoretical approaches in MAR, such as institutional isomorphism (DiMaggio and Powell, 1983), old institutional economics (OIE) (Scapens, 1994) or managerial discourse (Seal, 2010) which adopt an interpretive view of the world, is discussed in detail in section 2.6 below. Their use in studying SMA has been limited. Contrary to this, contingency based management accounting (CBMA) research does not consider such an interpretivist view of the world (Chenhall, 2006). However, these theories were not considered appropriate for achieving the objectives of this study or answering the research questions presented above. Firstly, these alternative theories adopt an interpretivist approach to MAR, as discussed in section 5.2 below. However, as this study adopts a positivist paradigm (also see section 5.2 below), the use of contingency theory, which takes a traditional mainstream economic approach adopting a positivist paradigm to MAR (Scapens, 2006), is consistent with this research philosophy. Furthermore, these alternative theoretical approaches are used to explain change, or resistance to change, in MAPs using in-depth longitudinal case-studies (Scapens, 2006), whereas this cross-sectional study was aimed at identifying, and understanding, the use of SMA techniques in a number of organisations at a point in time, rather than explaining the process of change associated with the implementation of the techniques. The remainder of this chapter provides a number of justifications for the research and defines the context of the study.

1.3 Justification of the Research Topic

Justification for this research project comes from four differing perspectives; a gap in the current literature; the economic significance of the research population; the distinctiveness of the construction sector; and the Researcher's professional experience gained over the thirty years since he qualified as an accountant, of which sixteen were spent in the sector.

1.3.1 Gap in Current Literature

Construction activities are more fully defined in section 1.4.1 below. This study is primarily concerned with those organisations involved directly in construction activities such as principle contractors, civil engineers, and other specialist sub-contractors. Section 2.3 of the literature review below demonstrates that there have been no studies conducted into the use of SMA techniques in this sector. There have been generic studies which have looked at multiple sectors including construction (McLellan, 2014; Mohamed and Jones, 2014; Chenhall and Langfield-Smith, 1998b), however none of these have looked at this sector in any detail. According to Messner "studies that explicitly discuss industry contexts are exceptions rather than the rule" (Messner, 2016, p.104), especially in the for profit sector. He suggests that opportunities exist to study how individual industry contexts shape the design of MAPs, especially in those industries with distinctive practices. The Researcher regards the construction sector as having distinctive practices which justify a detailed empirical study adopting an idiosyncratic logic (Messner, 2016).

There has been research conducted into the application of specific SMA techniques in the construction sector such as lifecycle costing (LCC), for example Gluch and Baumann (2004) (see section 3.1.5 below) and target costing (TC), for example Nicolini et al. (2000) (see section 3.1.6 below). However, no research has been conducted on how a range of SMA techniques has been used to support the SMP within the construction sector.

Other industries in which SMA research has been previously conducted range from the hotel sector (Turner et al., 2017; Pavlatos, 2015; Collier and Gregory, 1995) to hospitals (Lachmann, Knauer and Trapp, 2013; Rahman et al., 2012); from West End musicals (Lapsley and Rekers, 2017) to the education sector (von Alberti-Alhtaybat, Al-Htaybat and Hutaibat, 2012; Bjørnenak, 2000); from the pharmaceutical sector (Ratnatunga and Alam, 2011) to robotics (Carlsson-Wall, Kraus and Lind, 2015) as well as research based in the general service and manufacturing industries (Auzair et al., 2013; Al-Mawali, Zainuddin and Ali, 2012; Cadez and Guilding, 2012; Nilsson and Rapp, 1999).

This research therefore addresses a gap in the current literature relating to the usage of SMA techniques in the construction sector and makes a contribution to knowledge by

offering empirical evidence to support a contingency model of the use of SMA in medium sized UK construction companies.

1.3.2 The economic significance of medium sized enterprises engaged in construction activities in the East Midlands

The Department for Business, Energy & Industrial Strategy's statistical release (Barton, 2019) uses a definition of headcount to determine the size of organisations, with small enterprises employing less than 50, medium-sized enterprises employing between 50 and 249 and large enterprises employing more than 250 employees. This is also the definition used in this thesis for classifying the size of organisations as discussed in more detail in section 1.4.2 below. It also uses the same definition of construction used in this thesis; this is discussed in more detail in section 1.4.1 below.

This research focuses on medium sized organisations as there has been limited SMA research conducted into organisations of this size (see section 2.4 below). Small sized organisations have been excluded as it has been shown that they do not have access to the resources to deploy the SMA techniques that will be the subject of this study (Armitage, Webb and Glynn, 2016).

An analysis of the statistical release data (Barton, 2019) shows that whilst medium sized enterprises only accounted for 0.6 percent of all private sector enterprises in the UK (35,585 enterprises), they accounted for 12.6 percent of private sector employment (3,473,000 employees) and 15.4 percent of private sector turnover (£639 billion). This demonstrates the importance of medium sized enterprises to the UK economy in terms of employment and revenue generation if not in terms of numbers of enterprises. Furthermore, the importance of the construction sector to the UK economy can also be identified in the same report. At the start of 2019 the sector had the largest number of private sector enterprises in the UK at 17.7 percent (1,037,280 enterprises). It employed 8.1 percent of the private sector workforce (2,217,000 employees) and accounted for 8.6 percent of private sector turnover (£357 billion).

Considering this on a regional basis, a similar analysis shows that, at the start of 2019, the East Midlands had 6.1 percent of all UK private sector enterprises (356,430

enterprises), was responsible for 7.5 percent of all UK private sector employment (2,053,000 employees) and accounted for 5.9 percent of all UK private sector turnover (£243 billion).

This justifies the focus of this thesis both in terms of the significance of the construction sector to the UK economy and the importance of the East Midlands as an economic region of the UK.

The report shows that the East Midlands region had 67,745 private sector enterprises engaged in construction activities (19.0 percent of all private sector enterprises in the region), these enterprises employed 145,000 employees (7.1 percent of the total private sector employment in the region) and had a total turnover of £23.7 billion (9.7 percent of the total private sector turnover in the region). Regarding medium sized enterprises the survey shows that in the East Midlands there were 135 enterprises engaged in construction activities, employing 12,000 people and generating £2.3 billion of annual turnover (Barton, 2019). In terms of the number of enterprises this total represented 6.6 percent of the medium sized enterprises engaged in construction activities in the UK.

Medium sized construction-based enterprises in the East Midlands are clearly economically significant. This, together with strategic planning literature which usually predicts that the use of a strategic planning process positively affects profitability (Pearce II, Freeman and Robinson Jr. 1987 cited in Frezatti et al., 2011), means this study should be of particular interest to entrepreneurs, proprietors and managers of medium sized enterprises, educators and policy makers. The application of contingency theory to investigate this contributes to academic knowledge in a sector underrepresented in MA research.

1.3.3 Industry context

The aim of this section is to provide some industry context for the study. It uses the comments of the interview participants to describe the nature of the industry as making a bespoke product and therefore being different to a manufacturing environment, where many of the SMA techniques discussed later might be more at home. It is highly

competitive and cyclical; has demanding clients who want a quality product/service whilst at the same time seeking the cheapest tender price; is risky; is inefficient; is easy to lose money in but where cashflow is seen as more important than profit; is working class, male dominated and is very traditional. It also demonstrates that the industry cannot be viewed homogenously, for example, some participants view their sector as being innovative whilst others take an opposite view. Below are some quotes which demonstrate this characterisation of the industry.

> "Every contract is different, that's part of the appeal. In construction you are building a bespoke product" Company L, Commercial Director.
>
> "Construction always has been, I think still is, a very inefficient industry. I know we don't work in a factory and we don't come in one end and go out the other end, but we could still adopt a lot of the stuff that does work in that sort of environment" Company A, Operations Director.
>
> "it is a risky business and it's very competitive as well" Company A, Managing Director.
>
> "[The level of competition is] fierce" Company F, Financial Director.
>
> "[The level of competition] it's ferocious" Company G, Managing Director.
>
> "There is a lot of competitors in the construction industry" Company K, Financial Controller.
>
> "The UK construction market is a cyclical market. When it's good it's good when its bad it's horrible" Company C, Managing Director.
>
> "I think people are quite cost conscious in the industry" Company A, Operations Director.
>
> "It's very easy to lose money in this industry. It's very easy to lose control" Company I, Managing Director.
>
> "Cashflow is king in any construction company" Company B, Operations Director.
>
> "It's a very working-class industry" Company B, Managing Director.
>
> "It is a very male dominated environment" Company E, Managing Director.
>
> "It's a bit of a man's [world]… they don't have that soft approach to running the business" Company K Financial Controller.
>
> "We are defiantly old school. The whole industry is" Company J, Financial Director.
>
> "Innovation is constant in our industry" Company K, Commercial Director.
>
> "We are luddites in construction, we really are" Company L, Commercial Director.

> "The Romans built the roads 2,000 years ago the same way we do now, we just use better materials and bigger machines, less labour; they had a lot more cheap labour back then. The principles of what we do haven't changed" Company A, Operations Manager.

These comments support the Researcher's view that this is an industry which, with its distinctive characteristics, is worthy of an in-depth study of its SMA practices.

1.3.4 Personal Justification

As already stated, the focus of this study is medium sized enterprises engaged in the construction industry that are based in the East Midlands of England. Not only is this a sector with which the Researcher is very familiar, but, as demonstrated above, it is also significant from an economic perspective as well as having distinctive characteristics.

Between 1999 and 2016 the Researcher was employed as Group Financial Director (FD) by two medium sized companies, both based in the East Midlands and both engaged in the construction industry (See Appendix 11 for more detail). As part of this role the Researcher played a key role in the SMP of both organisations. It was between these two sets of employment that the Researcher completed a master's in business administration (MBA) at Nottingham Trent University which included an optional module called Strategic Management Accounting. The following quote is from the MBA documentation produced at the time (Nottingham Business School, 2012)

> "This module aims to provide participants with the ability to understand the application of strategic management accounting tools and techniques in supporting the assessment and improvement in business performance with references to strategic decision making"

The module introduced many accounting techniques which were, at that time alien to the Researcher but, from an academic perspective, were viewed as being invaluable in supporting the strategic decision-making process. This was a view which, at the time, did not reconcile with the Researcher's personal experience of twenty-five years as a qualified chartered accountant and certainly not in the strategic decision-making FD role. The Researcher therefore decided to investigate this further within an MBA dissertation (Taylor, 2012). Due to the limited timescales allowed for that study only a limited amount of primary research could be conducted. Five interviews were

conducted with management accountants in small or medium sized enterprises (SMEs) in a variety of industrial sectors, one of which was from the construction sector. This study compliments this earlier piece of work allowing a greater depth of research focused on medium sized businesses within the construction industry.

1.4 Definitions

So far, the context of this study has been referred to several times without defining precisely what that means. This section provides the definition of construction activities and what measure is used to determine the population of businesses studied.

1.4.1 Definition of Construction Activities

The activities involved in any construction project are varied and encompass a range of tasks which take place during the life of a construction project. The relative importance of each of these tasks depends on the nature and scale of each unique project. These activities are generally linear in nature starting with the planning stage which involves the client who has commissioned the project, designers, structural engineers and architects. The on-site stage involves all manner of activities including civil engineering, builders, specialist sub-contractor trades, project managers, quantity surveyors (QSs), building inspectors, health and safety (H&S) officers, plant hire specialists and material suppliers. Once the project is handed over to the client it will need to be maintained sometimes by specialist organisations. Eventually the asset will no longer be used and will be demolished and possibly replaced by a new project on the same site (Wübbenhorst, 1986).

This study focused on the SMA practices of organisations involved in the physical construction activities in the on-site stage of the process described above. Namely, civil engineers, builders and specialist sub-contractors. It will also include developers of building projects for later resale as well as organisations engaged in maintaining properties on behalf of the property owners. The suppliers of materials or hire equipment, temporary labour agencies, and professional firms providing support services such as project management, quantity surveying, H&S services or building inspection did not form part of the research population. It should be noted that some of

these specialist functions are not exclusively sourced from external organisations and these specialists can also be employed directly by construction companies. Any organisation that employs these professionals directly was not be excluded from the research.

This definition of construction activities is consistent with Section F of the Office for National Statistics publication (2007). This means that standard industry classifications (SIC) could be used for identifying the research population. Section F specifically excludes the professional services referred to above as these are contained with section M (Group 71.1 Architectural and engineering activities and related technical consultancy). Section F does allow for the repair and maintenance, refurbishment of, and additions to existing buildings but not organisations engaged in facilities management which are included in section N (Group 81.10 Combined facilities support activities). It does however include the supply of operated plant and equipment (as opposed to the hire only of plant and equipment such as excavators, rollers, trucks and hand tools) and therefore organisations specialising in this activity were also be included in the research population.

1.4.2 Definition of SMEs

Having defined the type of construction activities undertaken by the organisations researched in this study, it remains to define the size of those organisations which weree selected. Using size to classify different organisations is common, the usual classification being into small, medium and large. With small and medium sized organisations often combined in a classification called SMEs. Government policy and legislation often treat SMEs differently as they recognise that they need additional support, of all kinds, to aid their development and growth. They are viewed as being key to the growth of the UK economy (Lucas, Prowle and Lowth, 2013). In order for this support to be targeted consistently and transparently, definitions of size are necessary.

In the UK one such definition is provided by the Companies Act 2006. For a company to be classified as small it must satisfy at least two of the following conditions:

- turnover of less than £10.2 million,

- balance sheet total assets of less than £5.1 million,
- less than 50 employees (Companies Act 2006 s382).

Similarly, a company will be classified as medium if it satisfies two or more of the following conditions:

- turnover of less than £36 million,
- balance sheet total assets of less than £18 million,
- not more than 250 employees (Companies Act 2006 s465).

The favourable provisions within the Companies Act in relation to SMEs relate to financial reporting, for example, exemption from audit for small companies and exemptions for filing full statutory accounts for both small and medium sized companies.

The European Commission (EC) also has a definition of company size (see Table 1 below). These provisions were introduced to determine those organisations who could apply for EC support programmes.

Company category	**Staff headcount**	**Turnover**	or	**Balance sheet total**
Medium-sized	< 250	≤ € 50 m		≤ € 43 m
Small	< 50	≤ € 10 m		≤ € 10 m
Micro	< 10	≤ € 2 m		≤ € 2 m

Table 1: EC definition of SMEs

(What is an SME? - European Commission, 2017)

These provisions are the same as the Companies Act 2006 in respect of the number of employees but (after adjusting for exchange rates) are different in respect of turnover levels and balance sheet asset totals. Furthermore, the provisions are applied differently with the Companies Act requiring that two out of three conditions must be met to comply, whereas the EC provisions stipulate that employee numbers and either one of the turnover or balance sheet asset conditions must be met.

In the construction industry, turnover values can give a misleading impression of the size of an organisation. Organisations who sub-contract a large proportion of their activities will have fewer employees than organisations who perform those activities themselves. Organisations utilising these two distinct business models would have the same level of business turnover. However, the former preferring a project management business model, would have much simpler internal business processes and therefore require less MA input to help to monitor and control those business processes. As discussed in section 2.5 below the use of MATs and SMA techniques is influenced by the size of an organisation. Therefore, whilst the UK government and the EC use the definitions discussed above to measure the size of organisations, this thesis used employee numbers as the measure for organisation size. Hence a small company has 49 or less employees, a medium sized company has between 50 and 249 employees and a large company has 250 or more employees. This is the same approach as adopted by the government statistical release referred to in section 1.3.2 above.

1.5 Structure of the remainder of the thesis

The remainder of this thesis is structured as follows:

Chapters 2 and 3 review the current literature associated with the topics included in the research questions and identifies the gap in the current literature which the study addresses. In chapter 4 a conceptual framework of SMA usage in the construction sector is proposed which was then used as the basis to undertake the field work. Chapter 5 presents and justifies the research methods and methodologies used in answering the research questions. It considers the selection of participants for the field-based research, summarises the levels of participation achieved and details the ethical considerations involved in this research.

Chapters 6 to 10 present the findings and analysis of the study. Chapter 6 presents a revised conceptual framework which was used in the data analysis and chapters 7 to 10 discuss the four themes which were identified during the data analysis; the SMA techniques used, who is responsible for using them, the contingent factors affecting their use and the impact on business performance of using these techniques. Chapter

11 summarises the conclusions presented in chapters 7 to 10 and discusses the theoretical and practical contributions made by the study. It concludes with a discussion of the limitations of the research conducted and offers recommendations for future work in this area.

2 Literature Review

The literature map presented in Figure 1 below was created in order to identify relevant areas of literature to review. The research question was deconstructed into six main areas; CBMA research, the reality gap, other theories used to study MA, SMA, medium sized enterprises and the construction industry. The literature review identified a gap in the SMA literature in relation to medium sized enterprises or the construction industry as identified in Figure 1 below. This resulted in the review of these areas being broadened to a consideration of MA in general. Literature on both the use of contingency theory in MA and SMA research was much more abundant. The SMA literature was categorised into a number of different themes. Firstly the historical development of the concept; definition of the term and associated techniques; how SMA forms a part of the overall system of management control, specifically in the SMP; the alignment of SMA with the strategy of the business including the effect of this alignment on performance and the role played by management accountants, and others, in the use of SMA techniques.

A review of individual SMA techniques is the subject of chapter 3, but before that this chapter considers the following themes. Firstly, it presents the definition of SMA used in this study, identifies the SMA techniques which subscribe to that definition and explores how it supports the SMP. An overview of the academic evolution of the concept is presented. Then the literature in relation to the use of SMA in the construction industry and in SMEs is reviewed. Next the application of contingency theory to MA research and more specifically SMA is explored. Other theories used to study MA are then discussed before the chapter concludes with a review of the role played by accountants, and others, in the use SMA.

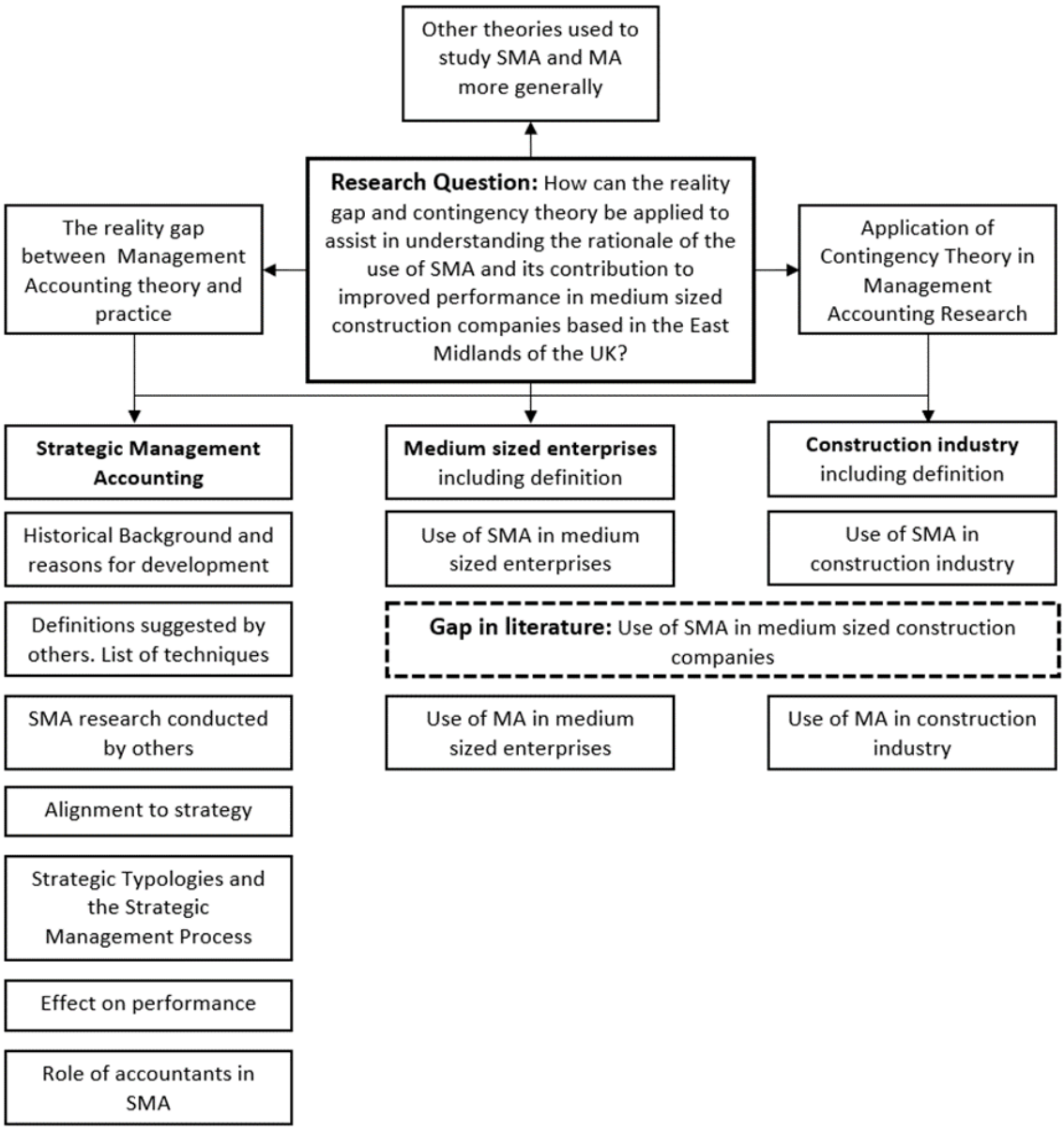

Figure 1: Literature map

2.1 Definitions

This section provides a definition of SMA and explores how it supports the SMP within organisations.

2.1.1 Strategic Management Accounting

According to Prowle and Lucas (2016) there is no agreed definition of SMA a term which was first introduced into the literature in 1981 by Simmonds, who defined it to mean:

> "the provision and analysis of management accounting data about a business and its competitors for use in developing and monitoring the business strategy" (Simmonds, 1981, p.26).

He introduced the idea that management accounting information (MAI) should have an external focus (on competitors) as well as the traditional internal focus but did not include an emphasis on forming a longer-term view as later suggested by Bromwich (1990). Nor did it include information on other external parties in the firms' value chain such as customers or suppliers. However, what Simmonds was saying was that traditional measures of profit do not adequately represent the changes in a firm's competitive advantage over a period of time. In fact, decreases in profit as a result of costs incurred in gaining on competitors (such as research and development costs) may well have improved that firms competitive advantage.

Bromwich's (1990) definition:

> "the provision and analysis of financial information on the firm's product markets and competitors' costs and cost structures and the monitoring of the enterprise's strategies and those of its competitors in these markets over a number of periods" (Bromwich, 1990, p.28).

emphasised the longer-term nature of the MAI required as well as adding customers (markets) to the external analysis, but still did not go as far as including suppliers as adopted in the value chain approach taken by Govindarajan and Shank (1993). Bromwich also suggested that the monitoring of competitors be extended to consider potential competitors. A clear overlap with Simmonds (1981) was the focus on competitor cost analysis.

In 1996 Tomkins and Carr said that whilst there is a clear external focus to SMA there is more to it and

> "a comprehensive approach to SMA would also involve new forms of internal analysis and accounting process/roles that will help management devise better strategies" (Tomkins and Carr, 1996a, p.165).

This approach would allow concepts such as Strategic Cost Analysis (Shank and Govindarajan, 1989) to be considered as SMA. In 2000 Guilding, Cravens and Tayles studied the usage of twelve SMA techniques which were determined using the following criteria

> "The management accounting practices examined in this study exhibit one or more of the following characteristics: environmental or marketing orientation; focus on competitors; and long-term, forward-looking orientation" (Guilding, Cravens and Tayles, 2000, p.117).

Whilst not a definition as such these criteria explicitly include the forward-looking perspective missing in the earlier definitions considered above, but once again does not include suppliers in the external view. It therefore excludes Porter's (1985) concept of value chain analysis (VCA).

None of these definitions has specifically considered the provision of non-financial information which one would expect to see in a contemporary performance management system such as one based on the balanced scorecard (BSC) (Kaplan and Norton, 1992, 1996). Taking this into account, the comments of Tomkins and Carr (1996a) and combining elements of the definitions considered above the following is the working definition of SMA which was used in this study:

The provision and analysis of future orientated financial and non-financial information on the organisations business environment, products and internal processes, as well as both its current and potential competitors' products, cost structures and strategic intentions and the costs of its value chain as necessary to plan, implement and monitor its own business strategy.

This definition captures both the provision of financial and non-financial information focusing on external factors (business environment, existing and potential competitors,

customers and suppliers) as well as internal factors (products, employees, manufacturing technologies and processes, quality systems, research and development, marketing, performance management, investment appraisal and costing). It also emphasises a future bias on the provision of information which links to the concluding part of the definition, in that the priority must be to support management in the execution of its business strategy. Using this definition of SMA it is now possible to review the literature to identify MATs which can be classified as SMA techniques.

2.1.2 SMA techniques

This section considers the literature to identify those MATs which, according to the above definition, can be classified as SMA techniques. It starts with a review of previous surveys which have been conducted into the use of both TMA and SMA before identifying other techniques not previously included in such surveys.

As can be seen in Table 2 and Table 4 below surveys to determine the extent of the use of SMA and TMA are common. The SMA techniques identified have been classified into five categories as used by Cadez and Guilding (2008). Those techniques not previously included by Cadez and Guilding have been categorised by the Researcher. Table 2 below is prepared firstly by category, with those categories demonstrating an internal focus (costing; planning, control and performance management; strategic decision making) shown first and those categories demonstrating an external focus (competition monitoring; customer accounting) shown second. Within each category each technique is listed alphabetically, the table therefore implies no priority in respect of the order in which the techniques are listed.

		SMA specific surveys							General Management Accounting surveys					
SMA Categories	SMA Techniques	Guilding, Cravens and Tayles (2000)	Cravens and Guilding (2001)	Cinquini and Tenucci (2007)	Cadez and Guilding (2008)	Shah, Malik and Malik (2011)	Fowzia (2011)	Hatif AlMaryani and Sadik (2012)	Petera and Šoljaková (2020)	Drury, Braund, Osbourne and Tayles (1993)	Chenhall and Langfield-Smith (1998)	Waweru, Hoque and Uliana (2003)	Abdel and McLellan (2013)	Ahmad (2014)	McLellan (2014)
Costing	Activity Based Costing / Cost Management		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Costing	Attribute Costing	✓	✓	✓	✓	✓	✓								
Costing	Cost of Quality	✓	✓	✓	✓		✓		✓	✓					✓
Costing	Kaizen Costing							✓							
Costing	Life Cycle Costing	✓	✓	✓	✓		✓		✓				✓	✓	✓
Costing	Target Costing	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓	✓
Costing	Value Chain Costing/ Value Chain Analysis	✓	✓	✓	✓	✓	✓	✓				✓	✓	✓	
Planning, control & performance measurement	Activity Based Budgeting								✓			✓	✓		✓
Planning, control & performance measurement	Balanced Scorecard/other multi-dimensional performance measurement		✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		✓
Planning, control & performance measurement	Benchmarking		✓	✓	✓		✓		✓				✓		✓
Planning, control & performance measurement	Economic Value Added											✓			
Planning, control & performance measurement	Product Profitability analysis									✓		✓	✓	✓	✓
Strategic decision making	Brand valuation (budgeting and monitoring)	✓	✓		✓	✓									
Strategic decision making	Strategic Costing / Strategic Cost Management	✓	✓	✓	✓	✓	✓		✓					✓	
Competiton monitoring	Competitor accounting (as a holistic concept)								✓						
Competiton monitoring	Competitive position monitoring	✓	✓	✓	✓		✓			✓		✓		✓	✓
Competiton monitoring	Competitor cost analysis	✓	✓	✓	✓	✓	✓								
Competiton monitoring	Competitor performance appraisal based on published financial statements	✓	✓	✓	✓	✓	✓								
Customer accounting	Customer accounting (as a holistic concept)			✓			✓		✓						
Customer accounting	Customer profitability analysis				✓					✓		✓		✓	✓
Customer accounting	Lifetime customer profitability analysis				✓										
Customer accounting	Valuation of customers as assets				✓	✓									

Table 2: SMA techniques included in previous relevant surveys

As can be seen there is no commonly agreed list of SMA techniques, as Cadez and Guilding state

> "This problem is bound to persist, as even for conventional management accounting, which has a much longer history than SMA, there is no single definitive listing of techniques" (Cadez and Guilding, 2007, p.141).

They go on to say

> "A closely related problem stems from the incompleteness that can be expected to be endemic to any generated listing of SMA techniques. SMA continues to be in a state of fairly rapid evolution" (Cadez and Guilding, 2007, p.141).

This is evident as three additional techniques, which have not been the subject of earlier general surveys on the use of SMA or TMA, were identified from the wider SMA literature. These are; environmental management accounting (EMA) (Savage and Jasch, 2004); intellectual capital accounting (ICA) (Guthrie, Ricceri and Dumay, 2012) and strategic investment appraisal (Northcott and Alkaraan, 2007). Adding these three techniques results in the definitive list of SMA techniques adopted for this study presented in Table 3 below and discussed individually, in greater detail, in chapter 3 and Appendix 1 below.

In contrast Table 4 below, compiled from recent surveys and a relevant textbook, shows those MATs which do not satisfy the definition of SMA presented in section 2.1.1 above. Typically, these TMA techniques take a short-term, backward and inward-looking perspective of an organisation. Investment appraisal techniques feature on both lists, the difference is the nature of the decision they are supporting. Within SMA these techniques are used to support strategic investment decisions (see section 3.3.5 below) as opposed to operational investment decisions which are concerned with sustaining continuing activities, and can be evaluated using routine investment appraisal techniques (Northcott and Alkaraan, 2007).

SMA Categories	SMA Techniques	Section	Appendix
Costing	Activity Based Costing / Cost Management	3.1.1	1.1.1
Costing	Attribute Costing	3.1.2	1.1.2
Costing	Cost of Quality	3.1.3	1.1.3
Costing	Kaizen Costing	3.1.4	1.1.4
Costing	Life Cycle Costing	3.1.5	1.1.5
Costing	Target Costing	3.1.6	1.1.6
Costing	Value Chain Costing/ Value Chain Analysis	3.1.7	1.1.7
Planning, control & performance measurement	Activity Based Budgeting	3.2.1	1.2.1
Planning, control & performance measurement	Balanced Scorecard/other multi-dimensional performance measurement	3.2.2	1.2.2
Planning, control & performance measurement	Benchmarking	3.2.3	1.2.3
Planning, control & performance measurement	Economic Value Added	3.2.4	1.2.4
Planning, control & performance measurement	Product Profitability analysis	3.2.5	1.2.5
Strategic decision making	Brand valuation (budgeting and monitoring)	3.3.1	1.3.1
Strategic decision making	Environmental management accounting	3.3.2	1.3.2
Strategic decision making	Intellectual capital accounting	3.3.3	1.3.3
Strategic decision making	Strategic Costing / Strategic Cost Management	3.3.4	1.3.4
Strategic decision making	Strategic investment appraisal	3.3.5	1.3.5
Competiton monitoring	Competitor accounting (as a holistic concept)	3.4	1.4
Competiton monitoring	Competitive position monitoring	3.4.1	N/A
Competiton monitoring	Competitor cost analysis	3.4.2	N/A
Competiton monitoring	Competitor performance appraisal based on published financial statements	3.4.3	N/A
Customer accounting	Customer accounting (as a holistic concept)	3.5	N/A
Customer accounting	Customer profitability analysis	3.5.1	1.5.1
Customer accounting	Customer segment profitability analysis	3.5.2	N/A
Customer accounting	Lifetime customer profitability analysis	3.5.3	1.5.2
Customer accounting	Valuation of customers as assets	3.5.4	N/A

Table 3: Final list of SMA techniques

		General Management Accounting surveys						
TMA Categories	TMA Techniques	Drury, Braund, Osbourne and Tayles (1993)	Chenhall and Langfield-Smith (1998)	Waweru, Hoque and Uliana (2003)	Abdel and McLellan (2013)	Ahmad (2014)	McLellan (2014)	Drury (2015)
Costing	Absorption costing and overhead rate calculations	✓	✓	✓	✓	✓	✓	✓
Costing	Marginal/variable costing	✓	✓		✓	✓	✓	✓
Costing	Process costing					✓	✓	✓
Costing	Job Costing					✓	✓	✓
Costing	Joint and by-product costing					✓		✓
Planning, control & performance measurement	Budgeting and budgetary control	✓	✓	✓	✓	✓	✓	✓
Planning, control & performance measurement	Zero based budgeting			✓		✓		✓
Planning, control & performance measurement	Standard costing and variance analysis	✓	✓	✓		✓	✓	✓
Planning, control & performance measurement	Divisional financial performance measures: Return on investment	✓	✓	✓	✓	✓	✓	✓
Planning, control & performance measurement	Divisional financial performance measures: Residual Income	✓	✓		✓	✓	✓	✓
Planning, control & performance measurement	Transfer pricing	✓		✓				✓
Decision making	Cost -volume-profit analysis inc. breakeven analysis		✓		✓	✓	✓	✓
Decision making	Investment appraisal methods; PP, ARR, NPV, IRR	✓	✓	✓	✓	✓	✓	✓
Decision making	Relevant costing							✓

Table 4: List of TMA techniques

Nixon and Burns (2012) associated the difficulty in defining SMA, discussed in section 2.1.1 above, to the difficulty in identifying the SMP which takes place in a business environment that is constantly evolving and is increasingly turbulent. Therefore, to better understand what SMA is and to properly answer the research questions posed above requires an understanding of what is meant by strategy and the SMP, neither of which have commonly accepted definitions. This is discussed in the next section.

2.1.3 Strategy, Strategic typologies and the Strategic Management Process

This section defines what is meant by strategy, discusses different typologies used to characterise business strategy and outlines the SMP within a business. Strategy has been described by many authors in many ways, for example Porter says:

> "competitive strategy is about being different. It means deliberately choosing a different set of activities to deliver a unique mix of value" and "choosing to perform activities differently or to perform different activities than rivals" (Porter, 1996, p.64).

This is in keeping with his earlier work on competitive strategy in which he introduced the idea of generic strategies; cost leadership and differentiation. He said that organisations need to choose one specific strategy to avoid being "stuck in the middle" (Porter, 1985, p.16) and therefore failing to deliver an effective competitive strategy.

Mintzberg on the other hand said that there can be no one definition of strategy:

> "The field of strategic management cannot rely on a single definition of strategy." (Mintzberg, 1987, p.11).

He offered five different definitions of strategy; strategy as a plan, as a ploy, as a pattern, as position and as perspective. This allows for the idea that strategies can be, at one extreme, deliberate, made in advance of action being taken and therefore created consciously and purposefully. Or, at the other extreme, unplanned and only identified retrospectively after a pattern emerges, this pattern of consistent behaviour that develops is then identified as the organisation's strategy.

For the purposes of this thesis the following simple definition of strategy will suffice.

"the long-term direction of an organisation" (Johnson et al., 2011, p.4).

This definition allows for strategies to be both deliberate and emergent whilst also encompassing the competitive (business) strategies as identified by Porter (1985), as well as corporate strategies which are concerned with issues such as the extent of diversification of business activities between products and markets and how parent companies add value to these individual businesses (Johnson et al., 2011).

In addition to Porter's generic strategies two other strategic typologies are regularly used in SMA research. These are strategic patterns (Miles et al., 1978) and strategic missions (Gupta and Govindarajan, 1984). Miles et al. (1978) proposed a theoretical framework of how organisations define their strategies and construct mechanisms to pursue these strategies. Their strategic typology identifies four types of organisation; Defenders, Prospectors, Analysers and Reactors. Each type of organisation has its own characteristics and its own unique strategy for competing in its chosen market. A Defender targets only a narrow domain of their potential market, offering a limited product range in a highly cost-efficient manner and achieves this using strict controls. A Prospector is capable of exploiting new market opportunities, they are seen as innovators and creators of change in their industry, controls are needed to facilitate flexibility and innovation. An Analyser operates between these two extremes and seeks new opportunities, but only after they have been proven to be successful, whilst maintaining a firm base of existing products and customers. This duality forces a hybrid set of controls. Finally, a Reactor exhibits an inconsistent and unstable reaction to changes in its competitive environment, generally because its competitive strategy is unclear. It is a strategic failure with its organisation structure and processes not aligned to its strategy. On the other hand Gupta and Govindarajan (1984; 1985) use strategic mission as their characterisation of business strategy. They categorise business strategy on a continuum from build through maintain to harvest. A build strategy is focused on growing market share often resulting in reduced or negative short-term cash flow and low short-term profitability. A harvest strategy is focused on maximising short-term profitability and cash flow often resulting in a reduced market share. In between, businesses following a maintain mission are seeking to both maintain market share and obtain a reasonable level of profitability.

These strategic orientations are managed through the SMP and it is important to understand how this operates as SMA potentially plays a significant role in supporting the process. In the context of a deliberate strategy, the SMP is the mechanism by which an organisation develops, plans, implements, monitors and reviews its strategy. MAI will be required to support each stage of this process. In the context of emergent strategies then the SMP is managing the strategy which evolves from a series of unrelated decisions rather than from the formal planning of strategy. Once again MAI is required to support strategic decision-making, monitor and review these unrelated decisions that evolve into the pattern of strategy that emerges (Ward, 1992b).

The size of an organisation has an influence on the design of the SMP. In smaller or family led organisations it is not unusual for the process to be led by one individual in which case the process may be less formal than in a larger organisation which might have a highly systemised process where it would be beyond the scope of a single individual to be responsible for the development of strategy (Johnson et al., 2011). It should also be noted that these processes are not mutually exclusive as organisations can have a mix of both intended and emergent strategy development with intended strategies not always being realised (Johnson et al., 2011).

Nixon and Burns (2012) note that:

> "There are many definitions of the strategic management process but there is a broad consensus that key activities are (1) development of a grand strategy, purpose or sense of direction, (2) formulation of strategic goals and plans to achieve them, (3) implementation of plans, and (4) monitoring, evaluation and corrective action" (Nixon and Burns, 2012, p.229).

Using this definition of the SMP it is possible to conceptualise how SMA inputs into each of these activities with the result being the organisations strategy. This can be seen in Figure 2 below.

Figure 2: SMA input into the strategic management process

2.2 Evolution of SMA

As mentioned in section 2.1.1 above Simmonds (1981) first introduced the concept of SMA into the literature, identifying it as a field developing in practice but as yet unrecognised in the literature. He argued that management accountants had been spending a "significant proportion of their time" (Simmonds, 1981, p.26) producing information used in the formation of business strategy. It was only later in that decade that other articles and books by different authors started to appear using the same term (Bromwich, 1990; Ward, 1992b; Drury et al., 1993). During the same time period Johnson and Kaplan (1987) published their seminal critique of MA practices in the US called 'Relevance Lost: The rise and fall of management accounting'. In their introduction they say:

> "Today's management accounting information, driven by the procedures and cycle of the organization's financial reporting system, is too late, too

> aggregated, and too distorted to be relevant for managers planning and control decisions" (Johnson and Kaplan, 1991, p.1).

In reaction to this, and following the work of Porter (1985), strategic cost analysis (Shank and Govindarajan, 1988, 1989) was developed which then evolved into strategic cost management (SCM) (Shank, 1989; Shank and Govindarajan, 1992a, 1993). SCM focused on the need for MA to support the SMP and to be more forward-looking, blending together the themes of VCA, strategic position analysis and cost driver analysis. Shank (1989) argued that SCM was a paradigm shift in MA much as Simmonds was calling for in the UK earlier in the decade. Activity based costing (ABC) (Cooper and Kaplan, 1988) and the BSC (Kaplan and Norton, 1992), both of which generated subsequent literature of their own (see section 3.1.1 and section 3.2.2 below), were also responses to the critique of MA in Relevance Lost.

In the UK the professional accounting bodies were also becoming interested in SMA, although it was not until 2000 that CIMA changed their exam syllabus to include SMA in the final stage case-study examination (Allott, Weymoth and Claret, 2000). The Institute of Chartered Accountants in England and Wales (ICAEW) organised a training course 'Strategic Management Accounting – Gaining the Competitive Edge' (Whats on, 1990) and CIMA published Management accounting: Pathways to Progress (Bromwich and Bhimani, 1994) which was an update on an earlier publication (Bromwich and Bhimani, 1989). The later book included a new chapter explaining "the relative new ideas of strategic management accounting" (Bromwich and Bhimani, 1994, p.ix) indicating that, more than 10 years after the introduction of the term, SMA was still considered to be in the early stages of its development. The authors continue to say that

> "Western management accounting practice still focuses almost exclusively on costing and helping to control activities within the enterprise by concentrating on the understanding of internal costs" (Bromwich and Bhimani, 1994, p.125).

Their view was that the attention given to SMA in the academic literature to this point still had not had an impact on the professional practice of accountants, this seems strange given that Simmonds originally identified it as existing in practice but not in the literature. This view was echoed by Lord who wrote

> "perhaps the widely touted 'strategic management accounting' is but a figment of academic imagination" (Lord, 1996, p.364).

This was the conclusion to a study which was critical of the concept of SMA claiming that many of the SMA techniques were identified in the case-study organisation and, rather than being a new concept, they were already in existence being "the natural outcomes of effective management processes" (Lord, 1996, p.364).

In 1995 Roslender (1995) included SMA as one of three generic approaches to what he called accounting for strategic positioning (ASP), the other two approaches being activity accounting and accounting for advanced manufacturing technology (AMT). The categorisation of these three generic approaches seems unnecessary and using the definition within this study, all three would be classified as SMA. Perhaps for this reason the term ASP never gained any traction within the literature.

In the special issue of Management Accounting Research on SMA (Tomkins and Carr, 1996a) the editors justified a focus (four out of five papers) on empirical rather than conceptual research

> "The result is a journal issue which is quite slim, but that reflects the current state of the art where research based on empirical analysis is still quite limited. Perhaps this issue can help to stimulate more empirical analysis in this field" (Tomkins and Carr, 1996a, p.166).

In their reflections they presented a strategic investment framework suggesting that this should be developed into a full SMA conceptual framework. They suggested that the reason that an agreed framework does not already exist "is probably due to the lack of an agreed conceptualisation of corporate strategy itself" (Tomkins and Carr, 1996b, p.280). No one took up this challenge, instead researchers have chosen to present lists of SMA techniques selected following a discussion of their own definition of SMA, and empirically tested the use and sometimes the perceived value of the use of SMA techniques, using survey techniques (Guilding, Cravens and Tayles, 2000; Cravens and Guilding, 2001; Cinquini and Tenucci, 2007; Cadez and Guilding, 2008; Shah, Malik and Malik, 2011; Fowzia, 2011; Petera and Šoljaková, 2020). The techniques surveyed, when listed, are presented in Table 2 above. Many of these survey-based studies used contingency theory (see section 2.5.2 below) as the theoretical basis for their analysis.

Langfield-Smith (2008) in her influential review paper (Juras, 2014) called for an end to surveys of SMA techniques asking for more work on the manner in which these techniques are used in practice and how the change process of their introduction occurs. This did not stop survey research taking place and neither did it result in a significant increase in the number of qualitative research studies being published. Langfield-Smith (2008) concluded that twenty-five years after its introduction to the literature, SMA had failed to live up to its promise with a lack of evidence of widespread adoption and a lack of recognition of the term itself. She did concede however, that certain techniques associated with SMA such as ABC and BSC had become part of managerial discourse.

Sixteen years after the first special issue on SMA in Management Accounting Research a second special issue was published. This contained an article by Nixon and Burns (2012) which contrasted the rapid evolution of the strategic management literature in parallel with strategic management practice with SMA which has

> "remained a collection of academic texts and has had a negligible impact on managerial discourse and practice" (Seal, 2010, p.95).

Nixon and Burns (2012) called this the SMA paradox where the academic literature and practice seem to be out of step, clearly contradicting Langfield-Smith's (2008) conclusion in relation to the BSC and ABC. They were also critical of the conclusions drawn from survey results. They cautioned on the interpretation of survey results which conclude that SMA techniques have not been widely adopted saying that these results might be misleading because of the lack of identity with the SMA brand name rather than the lack of use of SMA techniques in practice. They said that there is evidence from the small number of case-studies conducted which demonstrated the use of MATs supporting the SMP. They did not quote these case-studies, so it is not clear if these were conducted after Langfield- Smith's 2008 paper and therefore she may not have had access to the results when she concluded that there was not a widespread adoption of SMA techniques in practice. It seems that in order to get a proper understanding of the use of SMA it would be necessary to conduct case-study investigations rather than relying solely on surveys.

In subsequent case-study based research, different theoretical approaches were adopted (although contingency theory still dominates) with the overarching aim to assess how SMA is perceived and used in practice. Tillman and Goddard (2008) were critical of earlier SMA research which adopted a normative , survey based or contingency theory based approach, in that it threw

> "little light on how SMA practices are implemented and used in practice and provide no theoretical explanation of such practices" (Tillmann and Goddard, 2008, p.81).

They asserted that prior case-study research was descriptive rather than providing any theoretical insight. Whilst their research adopted a grounded theory approach, they identified during their work that sense making theory could be applied to explain their findings. They also concluded that even amongst actors in the same company there is confusion about the definition of strategy and therefore it is not surprising that there is confusion about what SMA is.

Ma and Tayles (2009) adopted neo-institution theory to interpret the results of their longitudinal single company case-study to examine how SMA practices have evolved during a period of MA change. They concluded that only those SMA practices which showed a high relevance with the company strategy were adopted and rejected Lord's view that SMA is a figment of academic imagination.

In 2012 Cadez and Guilding (2012) used a configurational analysis approach to SMA research. Their findings rejected, what at the time was already a significant body of work, using a contingency theory approach (see section 2.5 below) and concluded that similar levels of financial performance can be achieved by employing different configurations of strategy and MA control systems.

Nearly forty years after Simmonds introduced the term, academic opinion seems to be divided over the practice of SMA by management accountants. Different methods have been adopted to research its use employing varying theoretical approaches. It may well be that, until an agreed definition is reached, and research takes place using this definition, these different research findings will continue to be produced. Alternatively, it is possible that these differences will continue to exist as organisations, and the MAI

they use to support their strategies, continue to evolve in an increasingly globally competitive environment.

2.3 Strategic Management Accounting in construction companies

Given the economic significance of the construction sector to the UK economy there is a surprising dearth of literature on the use of SMA in construction companies. In fact, there is very little written about accounting in general in the sector.

One exception is by Halpin and Senior (2009) which covered financial management, financial reporting and MA in the sector. In respect to MA it covered project-level cost control, forecasting cash requirements at project and then at company level, break-even analysis and evaluating investments but nothing in relation to the other SMA techniques identified in section 2.1.2 above. The chapter (Halpin and Senior, 2009) on project-level cost control highlighted the unique aspects of construction cost control. With the revenue from any project being fixed at the time a bid is accepted, project management becomes primarily focused on cost control as the only significant way to effect final project profitability.

> "Because 'cost of work' is the variable in this equation, [profit = fixed bid price less actual cost of work] management is heavily involved in data collection, reporting, and analysis with the objective of controlling and reducing (where possible) the project cost." (Halpin and Senior, 2009, p.99).

They listed the following issues which they said are critical in making any individual project profitable:

- Tracking costs to date is one of the primary jobs of a successful project manager.
- On more sophisticated projects, finding the earned value to date is essential to avoiding cost overruns.
- Projection of profit to date, based on revenues and costs to date allows the project manager to assess the profitability of the project.
- Actual costs must be compared to budgeted costs in order to determine whether the project is on the cost profile originally predicted.
- A viable cost control system must be developed to ensure the early detection and assessment of financial problems on the project.
- An effective cost control system must be able to detect and reflect both profitable and negative cost trends.

- A good cost control system can be the basis for accurate calculation of unit costs, which can be used for pricing future work.

Whilst they made it explicit that cost control is a very important for the construction sector their aim was to provide guidance from an operational perspective rather than consider the strategic implications of a cost control system.

There is no literature in relation to the generalised use of SMA in construction companies. Several of the general surveys conducted into the use of SMA techniques reported in section 2.1.2 above provided details of the breakdown of responses by industrial sector, these are shown in Table 5 below.

Author(s)	**Responses from construction sector (of total)**	**Country research conducted in**	**Findings refer to construction sector**
SMA based surveys			
Chenhall and Langfield-Smith (1998a)	3/78	Australia	No mention
Cadez and Guilding (2008)	9/193	Slovenia	No mention
Cinquini and Tenucci (2007, 2010)	2/93	Italy	No mention
General management accounting practices surveys			
Waweru, Hoque and Uliana (2005)	2/52	South Africa	No mention
McLellan (2014)	10% (of 264)	United States of America	No mention
Other surveys			
Aver and Cadez (2009)	9/193	Slovenia	Yes
Bedford, Malmi and Sandelin (2016)	26/400	Australia	No mention

Table 5: Analysis of surveys mentioning construction sector

As can be seen none of the surveys conducted into the use of SMA techniques or MAPs in general, that provide an analysis of respondents by sector, go into any detail about differences in findings between the construction sector and other industrial sectors. Two other surveys reported information about the industry sector of respondents. Bedford, Malmi and Sandelin (2016) examined the effectiveness of different configurations of MCS but did not report any differences between sectors in their findings. However, Aver and Cadez (2009) reported that whilst accountants in large Slovenian companies were relatively strongly involved in the SMP within their organisations, the level of involvement varied intensively across industries. They found that participation is relatively high in contemporary manufacturing industries, the trade sector, and tourism and hospitality services, whereas it was relatively low in public services and utilities, construction, and logistics sectors. A summary of their findings is presented in Table 6 below.

SMP Activity	**Construction (n=9)**	**Mean of all respondents (n=193)**
Identifying problems and proposing objectives	4.33 (6th out of 8)	4.78
Generating options	4.11 (6th out of 8)	4.55
Evaluating options	4.56 (7th out of 8)	5.12
Developing details about options	4.44 (7th out of 8)	5.13
Taking the necessary actions to put strategic change into place	3.11 (8th out of 8)	4.38

Table 6: Management accountants' participation in strategic management processes within industry sectors (rankings across industry sectors in parentheses)

(Aver and Cadez, 2009, p.316 and 318).

As can be clearly seen accountants within the construction sector in Slovenia, compared with their peers in other sectors did not get actively involved in the SMP of their companies and, in particular, were not involved in delivering strategic change.

When it comes to research on individual SMA techniques and their use in the construction sector more literature is available, however there is still not a significant amount. In relation to TC and whole life costing Nicolini et al. (2000) had two criticisms of the industry stating:

> "[adoption] requires a set of competencies, skills and attitudes that much of the industry is simply lacking at the moment" and that "probably the main barrier to the adoption of a fully-fledged version of target costing in construction derives from the extant commercial practices in the UK construction industry" (Nicolini et al., 2000, p.321).

Wübbenhorst (1986) described the lifecycle of a construction project as follows:

1. initiation;
2. planning, i.e. conception, design and construction;
3. realisation, i.e. manufacture/installation and test/introduction;
4. operation, i.e. use and maintenance and
5. disposal/salvage.

He said that LCC is best applied when there are high initial and downstream costs and when service lives are long. Even then there are reasons that the approach gets rejected, such as:

1. An increase in initial costs in an environment of short-term focus;
2. Procurement and maintenance undertaken by different departments within the organisation using the asset;
3. Inaccuracy of forecasts;
4. Contractors not wanting to take the risk of being accountable for long-term costs over which they have no control.

ABC was examined by Kim et al. (2011) whose case-study highlighted the benefits of allocating overhead to reinforced steel bar costs using ABC techniques compared to using a single overhead cost pool method. As well as improved cost allocation leading to better pricing decisions, they found that the ABC process highlighted process improvement opportunities and was used to justify investments to implement these improvements. They suggested their model could be easily customised for use in construction suppliers of different sizes and making different products. Kim (2017)

provided guidance on how to implement an ABC system within construction companies, however she was keen to point out that

> "you cannot achieve success simply by copying the procedures described in this book. One essential piece of wisdom in relation to applying ABC to any organisation is that there is no cookbook" (Kim, 2017, p.134).

In her final chapter she listed the benefits available to construction companies who implement ABC as follows:

1. Making people across departments cost-conscious and accountable for their processes;
2. Transparency of cost allocation;
3. Flexible costing system;
4. Bidding with reliable cost data;
5. Evaluation of subcontractors, using a management burden ratio;
6. Develop a marketing strategy, based on accurate customer profitability analysis;
7. Identifying major activities;
8. Identifying the critical activities that need to be improved; and
9. Setting up a cost target for major processes.

Given the comments earlier in this section regarding the importance of cost control once a tender has been accepted it is not surprising that the industry specific SMA literature identified above relates to costs and costing.

The lack of industry specific MA based research is not unique to this sector as reflected by Messner (2016) who summarises

> "Interestingly, one type of empirical context that has received comparatively little attention is that of the industry (or sector) to which an organization belongs. While studies would routinely mention the industries which the organizations under study are operating in, they would usually engage in little explicit discussion of whether and how industry affiliation matters for management accounting practice. Even though all of the above outlined theoretical approaches [contingency theory, practice theories and actor-network theory] allow for consideration of industry context, the majority of studies does not seem to regard industry as a particularly relevant type of context and hence does not elaborate on how industry specifics shape management accounting practice" (Messner, 2016, p.105).

He expected organisational practices to be influenced by industry specific legislation, by consultants or software firms offering solutions for particular industries, by industry conferences or by industry bodies and trade associations. This does not mean that MA would be practiced homogeneously, variation may occur due to different strategies being adopted, different business models, different leadership styles or other contextual factors. This study addresses the concerns of Messner by focusing on the construction industry and sought to identify whether there are any factors unique to the sector that affect the implementation of SMA and what contextual factors might lead to differences in SMA usage between construction companies. One such contextual factor is firm size as discussed in the next section.

2.4 Strategic Management Accounting in medium sized companies

The size of an organisation is one of the contextual factors which has been studied by contingency theorists (see section 2.5 below) with findings indicating that the design of MCS become more sophisticated as the size of the firm increases (Libby and Waterhouse, 1996). Chenhall and Langfield-Smith (1998a) found that large firms were relatively high adopters of recently developed MAPs due to their greater access to resources which enabled them to experiment with administrative innovations. Similarly Adbel-Kader and Luther (2008) concluded that moving from naïve to more sophisticated MAPs requires resources and specialists only available to larger firms. Furthermore, Cadez and Guilding (2008) found that SMA usage was greater in larger companies. One reason given for this was that the cost per unit of providing data fell as firm size increased; another was that as firms grow so does their complexity which therefore required more detailed MAI.

Given these findings there is a surprising “paucity of research into the use of MAPs among SMEs” (Ahmad, 2014, p.237). Armitage, Webb and Glyn (2016) decried a general lack of research on the use of MATs in SMEs, whilst López and Hiebl (2015) described research on the subject as fragmented. A corollary to this is that there is a minimal amount of work looking at the use of SMA techniques in SMEs. Only two examples were found.

Firstly, Santini (2013) proposed a contingency model of TMA and SMA in SMEs. His study of forty Italian SMEs found that firm size and empowerment of employees were the most significant variables in determining the use of MA, but that owner/manager qualifications and ownership pressure (the degree of shareholder interference with business management not involving professional or non-family personnel) did not. Firm complexity was found to be a factor in determining the use of SMA but not TMA, with firm complexity being positively associated with the use of SMA. He also found that, contrary to expectations derived from his literature review, the use of SMA was greater than expected. His study used a survey followed by telephone interviews with respondents, this revealed an even greater use of SMA than the survey indicated, caused by respondents not fully identifying their practice with the SMA terminology presented within the survey. Finally, he found that complex organisations show a positive correlation between financial performance and SMA usage, that is, organisations operating in high-complexity environments used SMA more extensively to achieve higher performance.

Secondly, Kalkhouran et al. (2015) combined the use of upper echelons theory and contingency theory to theorise that the characteristics of the chief executive officer (CEO) act as a contingent variable in the use of SMA in SMEs.

> "The central premise of upper echelons theory is that executives' experiences, values, and personalities greatly influence their interpretations of the situations they face and, in turn, affect their choices." (Hambrick, 2007, p.334).

Their conceptual framework proposed that more highly educated CEOs would be more open to change and therefore more open to a greater use of innovative MAPs. This openness and the key management role they play in SMEs would, they propose, result in a greater use of SMA. They later went on to examine their theory in an empirical study (Kalkhouran, Nedaei and Rasid, 2017) the results of which are discussed in section 2.5.2 below.

Given the lack of research into the use of SMA in SMEs the remainder of this section will focus on MA research conducted in SMEs. Mitchell and Reid (2000) promoted the need for more research on MA in SMEs and suggested that it "can be studied with greater

ease and clarity than is often possible in larger, more complex organisations" (Mitchell and Reid, 2000, p.387). López and Hiebl's (2015) review of the literature on MA in SMEs found that "usage of management accounting is not only lower but also different in SMEs compared to larger entities" (López and Hiebl, 2015, p.81). These differences resulted in comments such as "a small business is not a little big business" (Welsh and White, 1981 in López and Hiebl, 2015, p.82) implying that MATs used in larger organisations cannot be simply copied and pasted into smaller organisations, a sentiment echoed by Kober, Subraamanniam and Watson (2012).

Armitage, Webb and Glyn (2016) noted some of the differences between larger companies and SMEs. They were more complex; operated in a larger geographical area; were more decentralised; had more diverse product lines; were more divisionalised and used mass production techniques. Of the nineteen MATs they studied, only five are included in the list of SMA techniques presented in section 2.1.2 above. They found that 72% of respondents made no or low use of TC; 73% for cost of quality (COQ); 95% for ABC; 91% for capital spending analysis and 63% for the BSC. When asked about their future plans respondents said they would adopt techniques that they believed would help them better manage performance. This perceived usefulness was one of three main factors they identified which affect the adoption and use of MATs in SMEs along with the complexity of the operating environment and the age of the organisation.

The idea of complexity is similar to the 'tipping point' identified by Lucas, Prowle and Lowth (2013). In their investigation into the use of MAPs in UK SMEs, which included the use of SMA, they found SMA was not used by SMEs. The reason they concluded:

> "seemed partly explicable by the fact that there was very little evidence of strategy–the emphasis being very much on tactical and operational management. Such strategy as there was tended to be, of necessity, 'emergent' rather than 'planned', making SMA tools less applicable. Also, for smaller enterprises, there is the additional problem that the information gathering required for SMA may well be prohibitively costly in terms of accounting resource." (Lucas, Prowle and Lowth, 2013, p.7).

The ‘tipping point’ is

> “a point where some of the techniques currently not used, will become relevant” which “will vary from enterprise to enterprise, but will be determined by the emergence of decentralised decision-making and increased scope in product range.” (Lucas, Prowle and Lowth, 2013, p.11).

Ahmad (2014) looked at the usage of forty-five MAPs amongst them an undisclosed set of SMA. Contrary to Lucas, Prowle and Lowth (2013) he reported distinct findings between small and medium sized companies in their usage of SMA. Small firms were found to have a usage level of 35%, whereas for medium sized firms it increased to 58%. This, they concluded, indicated that the increased complexity of medium sized firms, with greater access to resources and a greater risk aversion requires a more analytical approach to decision making and development of business strategy necessitating a greater use of SMA.

Rather than using size as a determining factor for SMA usage Ward (1992b) identified the varying strategic information needs of organisations at four different lifecycle stages as shown in Figure 3 below. He identified the critical success factors (CSF) pertinent to each lifecycle stage and continued by recommending the financial control measures appropriate for each stage in the lifecycle.

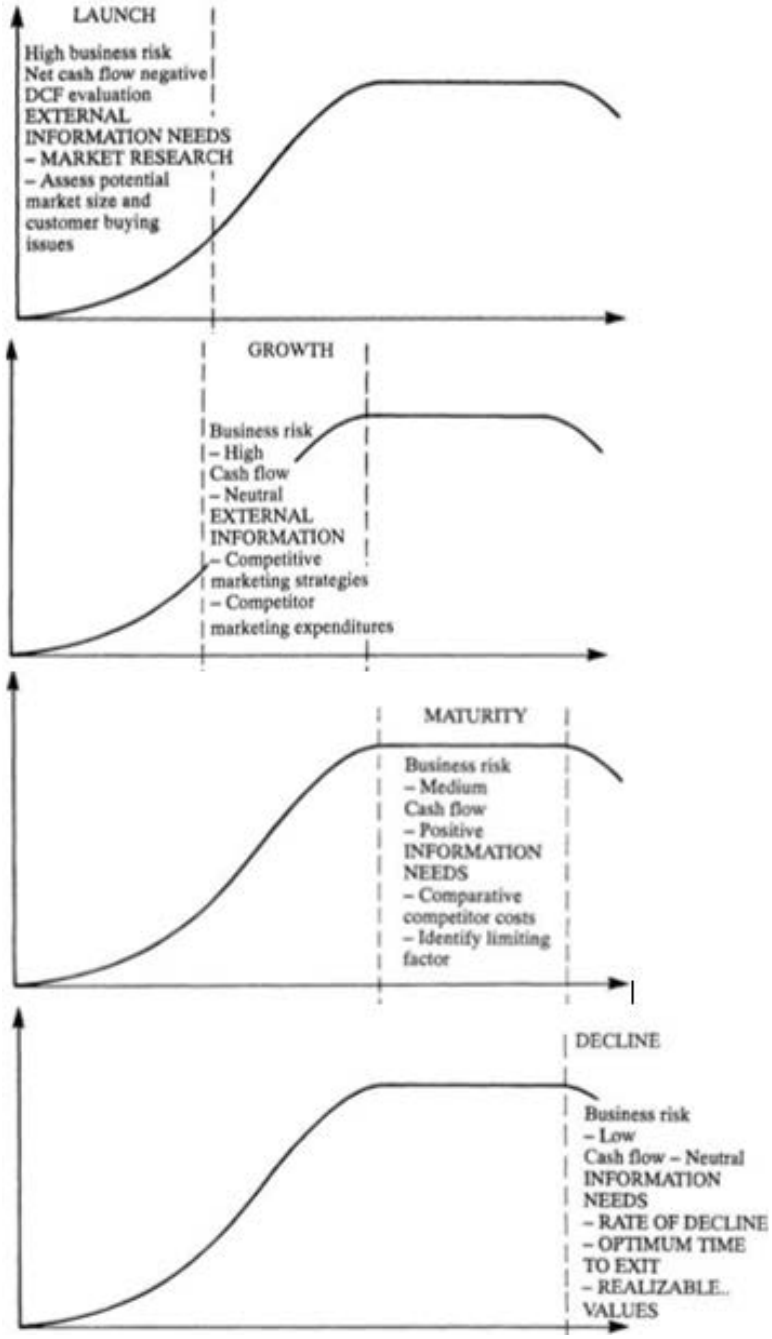

Figure 3: Information needs of a business at each stage of its lifecycle.
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(Ward, 1992b, pp.242, 253, 270, 279).

In a similar vein Pasch (2019) studied the relationship between organisational lifecycle and the adoption of SMA, concluding that usages rates increased from birth through growth to maturity but reduced in the decline stage. They also found that firms that deviate from the optimal SMA profile had a lower performance than those that do not, but that underuse (under-fit) had a much bigger impact than overuse (over-fit).

It is clear that there is little available research into SMA in SMEs. From what does exist it can be concluded that the use of SMA changes as organisations increase in size, or complexity, or move through their lifecycle. The definition of medium sized used for this thesis, as discussed in section 1.4.2 above is based on employee numbers of between 50 and 249. Given the discussion above it is expected that medium sized firms will exhibit an increased use of SMA as employee numbers increase.

2.4.1 Use of specific SMA techniques in SMEs

The above section considered the available literature on the general use of SMA in SMEs. This section reviews the literature on the use of individual SMA techniques (as presented in section 2.1.2 above) in SMEs.

Of all the different SMA techniques the use of ABC by SMEs seems to have the greatest amount of attention in the literature. This is perhaps not surprising given the large amounts of resources required to implement ABC as identified in the literature (see section 3.1.1 below). Elhamma (2012) concluded that large firms have an interest in adopting ABC whereas SMEs were indifferent to it. However, Hughes' (2005) textile industry based case-study

> "showed that there are opportunities to improve the profitability of SMEs if the findings were transposed to other similar businesses willing to invest the time and effort into setting up an ABC/ABM system" (Hughes, 2005, p.8).

Another case-study compares ABC to traditional costing methods in a small company and concluded that it is clear that ABC provides more accurate cost information but without providing the evidence to support this claim (Gunasekaran and Singh, 1999). Gunasekaran, Marri and Grieve (1999) presented a framework for the implementation of ABC in SMEs which discussed the issues of implementation but surprisingly failed to consider the lack of resources as an issue. Stout and Propri (2011) suggested time driven activity based costing (TDABC) (see section 3.1.1 below) as a solution for medium sized companies:

> "With the support of an effective ERP system, a medium-sized company can successfully implement and use a TDABC system for allocating support costs to products and customers. Although the potential value of a TDABC system

in a large, multinational company goes without saying, even a small company can benefit" (Stout and Propri, 2011, p.10).

Cassell, Nadin and Older Grey (2001) considered benchmarking in SMEs and concluded that "where benchmarking information was used, it was seen to be effective" (Cassell, Nadin and Older Gray, 2001, p.219). However, they also found that despite its overwhelming perceived benefits, the third of the sample that were not using it showed no interest in it. They suggested that because the literature often identifies best practice as emanating from larger companies, managers in SMEs might not be convinced of its appropriateness for their own circumstances. Singh, Garg and Deshmukh (2008) claimed that, to facilitate continuous improvement and change, SMEs needed to benchmark themselves with the best in their industry but considered it to be a difficult task due to lack of resources and limited knowledge of benchmarking methodologies.

The use of the BSC in an e-commerce SME was the subject of Rickards' (2007) study. Involvement of top managers in the day to day activities of SMEs, whilst offering flexibility did not compensate for lack of strategic controlling. Rickards (2007) saw that this could be potentially compensated by introducing the BSC. However, he saw several limitations to this being a success in an SME environment:

- The BSC assumes that well informed strategies are in place, strategy development must therefore precede any BSC implementation,
- Top management must have a culture of devolving decision making, and
- BSC requires well developed processes of control, although the BSC implementation will identify any areas of weakness in other controls.

He concluded "the BSC would seem to be a valuable management instrument for SMEs" (Rickards, 2007, p.247). Hoque and James (2000), on the other hand, found larger firms are more likely to use BSC. Therefore, it might be expected that, despite its value, the use of the BSC in medium sized companies would be limited.

Other examples of research into SMEs and specific SMA techniques are as follows; EMA (Christ and Burritt, 2013; Muhammad Jamil et al., 2015); COQ (Bangert, 2012); economic value added (EVA) (Bouwens and Spekle, 2007) and TQM (Kober, Subraamanniam and Watson, 2012). The last study found no evidence that use of TQM improved the financial performance of SMEs and concluded that "management accounting practices

developed for larger companies may not necessarily be transposable to SMEs" (Kober, Subraamanniam and Watson, 2012, p.421). This seemed to be a common theme amongst the literature. The next section considers the use of contingency theory which seems to be the most frequently used theoretical base for studying the use of SMA.

2.5 Contingency Theory

> "Contingency-based research has a long tradition in the study of management control systems" (Chenhall, 2006, p.163).

It is concerned with studying the influence of independent variables such as the business environment, technology, organisational structure, business size, business strategy and culture on the design of MCS. Its central proposition is that organisational performance depends on the fit between organisational context and structure (Cadez and Guilding, 2008; Abdel Al and McLellan, 2013). According to Otley (2016) it has been

> "recognised that universal solutions to problems in organisational control generally do not exist" (Otley, 2016, p.45).

That is, there is no one universal design for an MCS to achieve an optimal organisational performance, the best MCS design for any organisation will depend on the conditions experienced by that organisation. As the term contingency means that something is true only in specific circumstances:

> "there is no 'contingency theory', rather a variety of theories may be used to explain and predict the conditions under which particular MCS will be found or whether they will be associated with enhanced performance" (Chenhall, 2006, p.191).

In Otley's (2016) review of contingency theory and management accounting and control he concludes that this approach is still in its early stages and has, so far, been limited. He claimed this is due to most research adopting a survey-based approach with little use of combining them with interpretive methods. This study aimed to address this concern. He summarised the independent contingent variables examined in literature to date, categorising them as follows:

- **External variables:** technology, market competition or hostility, environmental uncertainty and national culture;

- **Internal variables:** organisational size, structure, strategy, compensation systems, information systems, psychological variables, employees' participation in the control systems, market position, product lifecycle stage and systems change.

He also listed the dependant variables considered to date as, performance, performance measures, budgeting behaviour, MCS design, and its use, effectiveness, job satisfaction, change in practices and product innovation, of which financial performance is the most used outcome variable.

He concluded that

> "The work conducted under the banner of contingency theory has been one of the success stories of research in management accounting and control over the past forty years… However, it has also been tantalisingly inconclusive and has produced little cumulative knowledge" (Otley, 2016, p.55).

It is perhaps not surprising that strategy seems to be one of the most investigated contingent variables studied in SMA research. The next section considers strategy as a contingent variable in more detail.

2.5.1 Strategy as a contingent variable

Chenhall and Langfield-Smith (1998b) examined the relationship between strategic priorities, management techniques, MA and performance. They operationalised strategy using Porters (1985) generic classifications of cost leadership or differentiation. They proposed two hypotheses for combinations of management techniques and MA in high performing firm's following each strategic option and tested these using a survey of seventy-eight of Australia's largest companies. The research method employed demonstrated the potential to include a variety of variables within a contingency analysis. They concluded that high performing firms following a cost leadership strategy used a combination of TMA and ABC techniques, whereas those following a differentiation strategy used more advanced MAPs such as balanced performance measures; employee-based measures; benchmarking and strategic planning techniques.

Abdel Al and McLellan (2013) examined the relationship between the overall strategy of a firm, the use of forty-two MAPs and the result of that relationship on organisational

performance. They found support for contingency theory's central proposition referred to above.

> " If an organization has a good alignment between management accounting practices and strategy employed, this fit has both a positive and significant affect on operational performance" (Abdel Al and McLellan, 2013, p.1).

They classified MAPs as conventional or advanced and concluded that companies that use only conventional MAPs tend to follow a low-cost strategy whereas those that also use advanced MAPs tend to follow a differentiation strategy, thereby confirming the findings of Chenhall and Langfield-Smith (1998b).

Other authors reported ambiguous findings of the effect of strategy on MAPs (Kald, Nilsson and Rapp, 2000), according to Langfield Smith (1997), who reached a similar conclusion, this was because of the different ways in which strategy, MCS and performance had been operationalised. As a result Kald, Nilsson and Rapp (2000) proposed that:

> "future studies based on contingency theory should examine business units in regard to a number of strategic variables" (Kald, Nilsson and Rapp, 2000, p.209).

As a result they proposed the hypothetical relationships as shown in Figure 4 below

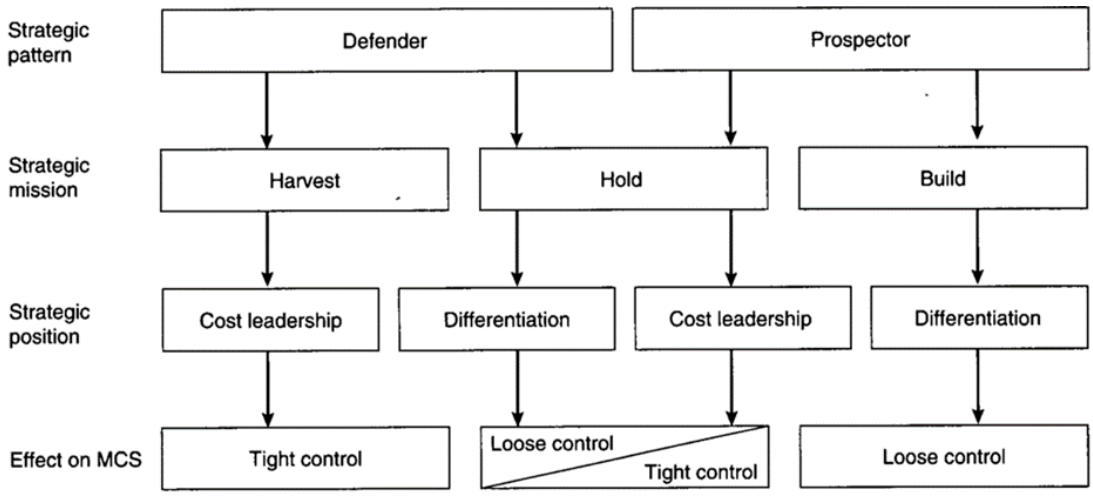

Figure 4: Hypothetical relationships between strategic pattern, strategic mission strategic position and the design of MCS
Permission to reproduce Figure 4 has been granted by the publisher.

(Kald, Nilsson and Rapp, 2000, p.207).

This approach to operationalising strategy using three different typologies was used in the survey instrument used in this study (see chapter 5 below). The next section considers the influence of strategy and other contingent variables on the use of SMA.

2.5.2 SMA research using contingency theory

A number of studies, for example (Cinquini and Tenucci, 2007; Cadez and Guilding, 2008; Santini, 2013; Kalkhouran, Nedaei and Rasid, 2017; Petera and Šoljaková, 2020) have used contingency theory to study the effect of a number of contingent factors on the use of SMA. Cinquini and Tenucci (2007) used a survey of Italian firms to test fourteen SMA techniques and five contingent variables (strategic pattern, strategic mission, strategic positioning, company size and industry). They found that although SMA techniques were extensively used, their adoption was only weakly associated with strategic positioning and not associated with any of the other four variables, including size. They therefore concluded that SMA adoption is not strategy driven. Other than that, their study has a limited contribution to the development of contingency theory as it did not study the effect of SMA use on business performance. According to Cadez and Guilding (2008) this would be better described as an application of a congruent proposition as opposed to a contingent proposition (Drazin and Van de Ven, 1985).

Cadez and Guilding (2008) used a survey of Slovenian companies to test sixteen SMA techniques and four contingent factors (business strategy, the degree to which business strategy is deliberately formulated, market orientation and size). They found that the participation of accountants in strategic decision making, formulating a deliberate strategy, adopting a prospector strategy and company size were all positively associated with the use of SMA. Given these findings they reached a different conclusion to Cinquini and Tenucci (2007) stating that their analysis supports

> "contingency theory's tenet of no universally appropriate SMA system, with factors such as company size and strategy having a significant bearing on the successful application of SMA" (Cadez and Guilding, 2008, p.836).

In follow-up interviews they found support for the conclusions drawn from the survey data and almost unanimous support for the idea that strategy was the most important factor affecting SMA usage. Furthermore, they uncovered another potential contingent

variable not looked at in the survey, intensity of competition, which interviewees felt had a positive association with the use of SMA. Unlike Cinquini and Tenucci (2007) they did investigate the effect of SMA on performance concluding that:

> "the application of SMA systems are not necessarily related to superior performance, but that superior performance is a product of an appropriate match between contingent factors and SMA application." (Cadez and Guilding, 2008, p.855).

And therefore, argued that:

> "the findings provide support for contingency theory's central proposition that organizational performance depends on the fit between organizational context and structure." (Cadez and Guilding, 2008, p.854).

Lachmann, Knauer and Trapp (2013), who studied the impact of four contingent factors (size, ownership structure, legal form and affiliation with a group of hospitals), on the use of twenty SMA techniques in German hospitals, found that SMA techniques were not in widespread use. They found that size (as measured by the number of hospital beds) and legal form were not associated with SMA usage but that ownership structure and affiliation with a group of hospitals was. This led them to the conclusion:

> "Our findings indicate that an appropriate match of organizational characteristics and a particular configuration of SMA techniques constitutes a prerequisite for increased performance" (Lachmann, Knauer and Trapp, 2013, p.358).

Thereby supporting the findings of Cadez and Guilding (2008).

Kalkhouran, Nedaei and Rasid (2017) used their framework, as discussed in section 2.4 above, to investigate the impact of networking and the characteristics of the firms CEO on the usage of eighteen unspecified SMA techniques and the subsequent impact of this on business performance in Malaysian SMEs. CEO characteristics were measured using their educational background and years of experience, involvement in networking was measured by the number of contacts with relevant parties and the participation of the CEO and other directors. They found that the educational background of the CEO and involvement in networking activities were positively related to the use of SMA techniques, but that CEO experience did not have a significant impact on SMA usage.

They concluded that the use of SMA had a significant indirect effect in the relationship between CEO education and involvement in networks and business performance.

Pavlatos and Kostakis (2018) extended this beyond the CEO and consider the effects of the characteristics of the senior management team (SMT), that is the CEO, the chief financial officer (CFO) and the chief marketing officer on the use of SMA in Greek manufacturing companies. They found that executives whose educational background was business orientated tended to use SMA tools more often and that marketing managers could make effective use of SMA tools. They called for greater communication between marketing and accounting managers in order to improve business performance. They also found that organisational tenure had a negative effect on SMA usage, concluding that

> "It is highly probable that top-level managers who have long tenure in those positions believe that they already have the experience in formulating and implementing a business strategy and that new tools will not help them exercise management and control" (Pavlatos and Kostakis, 2018, p.468).

They also identified that creativity amongst the SMT influenced the use of SMA with those managers who considered themselves to be creative, wanted to investigate new and innovative accounting techniques to aid their decision making.

Other authors have considered contingency theory in relation to the use of individual SMA techniques. In relation to EMA Christ and Burritt (2013) found that current and future EMA activities were associated with environmental strategy, organisational size and with environmentally-sensitive industries. Guilding (1999) investigated the impact of four contingent factors (size, industry, strategic mission and competitive strategy) on the use of competitor focused accounting (CFA) by which he meant the following five SMA techniques:

- Competitor cost assessment;
- Competitive position monitoring;
- Competitor appraisal based on published financial statements;
- Strategic costing and
- Strategic pricing.

He found that the use of CFA was higher than expected but that there appeared to be potential for it to be used more. He found strong support that firm size was positively associated with greater use of CFA supporting the conclusion of others in this respect (see section 2.4 above). Unlike the findings of Christ and Burritt (2013) in respect of EMA, little evidence was found of a systematic relationship between CFA and industry sector. In relation to strategy Guilding (1999) found that companies following a prospector strategic pattern made a greater use of CFA than others and that businesses following a build strategic mission had a greater propensity to use strategic pricing and strategic costing.

A number of studies have used contingency theory to study the use of customer accounting (CA). Guilding and McManus (2002) used a survey of Australian companies to investigate the relationship between two contingent factors (intensity of competition and market orientation) and the use of CA as a holistic notion and four specific techniques; customer profitability analysis (CPA), customer segment profitability analysis, lifetime customer profitability analysis and valuation of customers or customer groups as assets. They found that the usage of CA was greater than expected and that the perceived benefit of each technique was significantly higher than its actual usage. They found a positive association between a market orientation and three of the five CA concepts; CA as a holistic notion, lifetime customer profitability analysis and valuation of customers or customer groups as assets. However, they found no support for their hypothesis that CA usage rates are higher in companies experiencing medium levels of competition intensity. They therefore concluded that:

> "it appears that CA is another accounting technique where the long-standing criticism of accounting's short-termist tendency is again in evidence" (Guilding and McManus, 2002, p.56).

Later Lord, Shanahan and Nolan (2007) replicated this survey, but in New Zealand, and reached different conclusions, they surmised that this was as a result of the smaller size of the companies surveyed. As a result of these contradictory findings Tanima and Bates (2015) replicated and extended the New Zealand survey by increasing the number of contingent factors to six (competitive strategy, market orientation, environmental uncertainty, costing methodology, company size and industrial sector). Their findings

supported the usage and perceived usefulness of CA techniques found by Guilding and McManus (2002) and concluded that

> "There is strong evidence for a positive contingent relationship between the marketing concept of marketing management and both the use and perceived merit of historical CA measures. Also found is a significant positive relationship between the customer concept of marketing management and the use and perceived merit of customer profitability analysis at the individual customer level" (Tanima and Bates, 2015, p.466).

They found some CA techniques to be associated with the use of ABC but not all, which was a surprising result given that the adoption of CA is often cited as a reason for adopting ABC techniques (Tanima and Bates, 2015). They also found some support for a relationship between industry sector and CA usage, which was particularly evident in organisations involved in financial services. This finding is in contrast to Cinquini and Tenucci (2007) who found no relationship between industrial sectors and the SMA techniques (including CA) which they tested.

Carr, Kolehmainen and Mitchell (2010) proposed a theoretical framework for strategic investment decision (SID) making practices which they also suggested could be used in future research to help explain differences in the use of other SMA techniques. They used two contingent factors (market orientation and a firm's performance in relation to shareholder expectations) to categorise firms' as either market creators, value creators, refocusers and restructurers as shown in Figure 5 below.

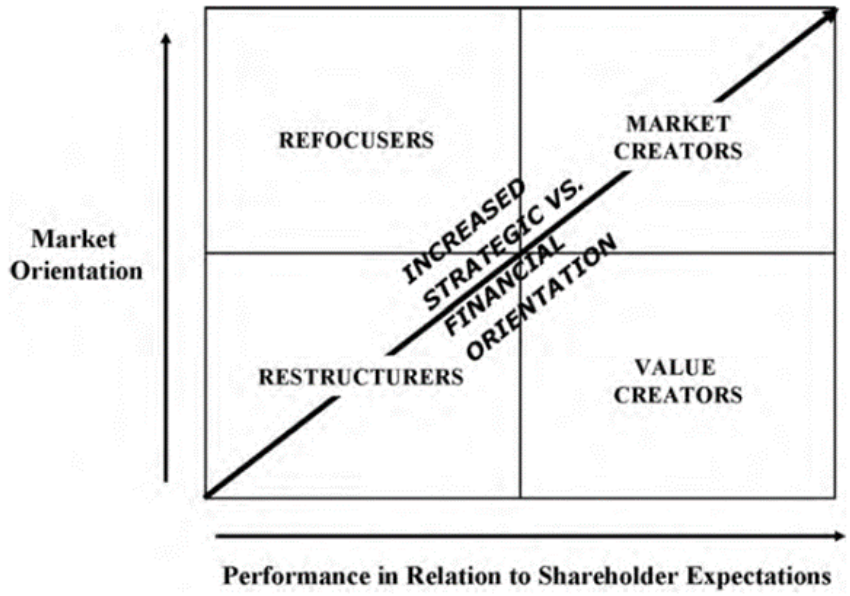

Figure 5: Contextual framework for strategic investment decision making practices

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(Carr, Kolehmainen and Mitchell, 2010, p.171).

In testing their framework with fourteen case-studies they found that:

- Market creators tend to put strong emphasis on strategic considerations when making decisions on strategic investments,
- Value creators and refocusers tend to take a more balanced approach to SID making by paying attention to both strategic and financial analysis,
- Restructurers exhibit a very strong financial emphasis with strategic considerations given very little attention.

Further results of this study are discussed in section 3.3.5 below.

2.5.3 The impact of SMA on performance

Contingency theory's central proposition is that organisational performance depends on the fit between organisational context and structure (Cadez and Guilding, 2008; Abdel Al and McLellan, 2013) and that there is no one universal design to achieve an optimal organisation performance (Otley, 2016). Financial performance is the most commonly used measure of organisation performance in CBMA research. (Otley, 2016).

A number of studies have found a positive relationship between the use of SMA and performance. Cadez and Guilding (2008) found that SMA had a mediating effect on

performance, where performance was measured by respondents own views on business performance compared to their competitors across seven dimensions. Santini (2013) found that SMEs in highly complex industries used SMA more extensively to improve financial performance, in this case financial performance was measured by ROI and an assessment by management. Lachmann, Knauer and Trapp (2013) concluded that the application of SMA alone did not necessarily lead to improved performance but that

> "an appropriate match of organizational characteristics and a particular configuration of SMA techniques constitutes a prerequisite for increased performance" (Lachmann, Knauer and Trapp, 2013, p.358).

Likewise Kalkhouran, Nedaei and Rasid (2017) concluded that SMA had a significant indirect effect in the relationship between education and involvement in networks and company performance where company performance was measured on twelve financial and non-financial indicators. It would appear that SMA based contingency theory has taken a broader view on performance than suggested by Otley (2016) and this might be why the impact of SMA on performance seems to be more conclusive and unequivocal in its findings than studies which consider the impact of MA on performance, many of which have been inconclusive and equivocal (Cadez and Guilding, 2008).

Other studies have focused on the relationship between individual SMA techniques and performance. Pizzini (2006) found that more sophisticated costing systems offering better cost detail resulted in better financial performance. This was contrary to the findings of Cravens and Guilding (2001) who concluded that SMA costing techniques were associated with costing effectiveness rather than having a strategic orientation. Elhamma's (2012) study focused on the use of ABC and found better performance in large firms which adopted it, whereas the same effect was not noticed in those SMEs which had adopted it. This was in contrast to Ittner, Lanen and Larker (2002) who found that, although the use of ABC had a positive impact on operational efficiencies, it had no significant effect on return on assets.

The results of the studies of individual techniques are less conclusive compared to the results of studies incorporating a number of SMA techniques. It would seem that using multiple SMA techniques is a better way to obtain performance improvements compared to using just one technique in isolation.

2.5.4 Criticisms of contingency theory-based research

A number of researchers have been critical of the use of contingency theory in MA research. Langfield-Smith (1997) criticised how MCS have been operationalised, how effectiveness of those systems has been measured and how strategy has been operationalised in contingency based research into MCS, all of which leads to fragmented and often conflicting research evidence. She called for consistent classifications of controls, of contingent variables and the use of established classifications of strategy. A call which seems to have gone unanswered as, according to Tillman and Goddard (2008),

> "this research has contributed to our understanding of SMA but does suffer from the usual drawbacks of contingency theory in that variable selection and specification have been eclectic, sample selection not always comprehensive and some conflicting results have been produced" (Tillmann and Goddard, 2008, p.81).

Contrary to Langfield-Smith (1997), Granlund and Lukka (2017) were critical of the

> "overly mechanistic employment of established research practices in CBMA research" (Granlund and Lukka, 2017, p.64).

They cited the contingent variable of uncertainty as an example of a

> "potentially questionable, if not even misleading, belief that we can capture the complexities that occur in the everyday life of an organisation by using the pre-defined constructs and ready-made measurement instruments of established CBMA practices" (Granlund and Lukka, 2017, p.65).

They made it clear that they were not arguing for case-study based research in favour of surveys, nor being critical of the contingency approach to MA research but the way

> "it seems that the CBMA research practice tends to assume that there is one correct instrument for each variable, whereas there are grounds to argue that a truly contextual approach would suggest that the question of reliable and valid measures is always, in principle, an open one" (Granlund and Lukka, 2017, p.65).

Cadez and Guilding (2012) challenged contingency theory, which assumes unifinality in the design of systems, in favour of the equifinality proposition that different strategic and structural alternatives are associated with similar performance levels. They

supported the view that internally consistent configurations are associated with higher performance and that multiple designs of strategy and SMA may be equally effective. This stance does not actually reject the contingency model but takes a systems approach to fit in contingency theory as described by Drazin and Van de Ven (1985).

> "The systems approach maintains that two basic choices confront the organizational designer: (1) to select the organizational pattern of structure and process that matches the set of contingencies facing the firm, and (2) to develop structures and processes that are internally consistent" (Drazin and Van de Ven, 1985, p.521).

What Cadez and Guilding (2012) were actually rejecting was the reductionist approach to contingency theory which says we can examine one management control in isolation and that management controls can be decomposed into individual practices (Grabner and Moers, 2013). Cadez and Guilding's (2012) findings were similar to those of Gong and Ferreira (2014) who found that:

> "high performing firms display MCS design choices that are theoretically consistent and that low performing firms exhibit MCS design choices that are theoretically inconsistent" (Gong and Ferreira, 2014, p.498).

In conclusion, whilst contingency theory-based research is commonplace in MA it is not without its problems or critics. The next section considers other theories which have been used to study MA and SMA more specifically.

2.6 Alternative theories applied in management accounting research

The appropriateness of contingency theory to study SMA, as demonstrated above is not in doubt and

> "it remains an important and central field of inquiry in management accounting research" (Hall, 2016, p.63).

Contingency theory based MAR follows a traditional mainstream economic approach adopting a positivist paradigm to MAR (Scapens, 2006). This portrays MA as a set of techniques which faithfully represent economic reality which thereby enables it to support the rational decision making of management as underpinned by neoclassical economics theory of the firm (Scapens, 1994). However, alternative approaches, which do not necessarily characterise management accounting as a quest for efficiency and

effectiveness, have also been taken to MAR (Baxter and Chua, 2006). Instead, they draw on theories from the wider social sciences to

> "construct, narrate and critique the practice of management accounting" (Baxter and Chua, 2006, p.43).

These approaches can be characterised as exploring MA as organisational, social and political phenomena (Englund and Gerdin, 2014) and understanding MA as a practice. They adopt an interpretivist paradigm in MAR. Whilst these alternative approaches have not been widely adopted in SMA research they are worthy of discussion as alternative approaches to MAR more generally.

Amongst these alternative approaches, institutional theories have become a popular choice to study management accounting change. These institutional theories, new institutional sociology (NIS) and old institutional economics (OIE) are concerned with how institutions shape the actions of individuals and how new rules and institutions emerge . (Alsharari, Dixon and Youssef, 2015). According to Scapens

> "understanding of accounting practices as institutionalised routines is likely to be a more fruitful starting point for MAR than the view that accounting practices do or should represent optimally rational procedures for the maximisation of, say, owner's wealth" (Scapens, 1994, p.306).

Scapens' (1994) framework proposed utilising an OIE perspective to study MAP from an institutional perspective rather than focusing on the reality gap per se (see section 2.6.1 below). In this context an institution is defined by Scapens as

> "a way of thought or action of some prevalence and permanence, which is embedded in the habits of a group or the customs of a people" (Scapens, 1994, p.306).

He later applied this framework to explain the continued use of traditional costing practices which have been criticised by economists and academic accountants as failing to provide MAI suitable for decision making purposes (Ahmed and Scapens, 2000). It was claimed that a new institutional economics approach failed to recognise the impact of broader economic, political and social institutions on the development of MAPs as demonstrated through an historical review of cost allocation practices in Britain during the twentieth century. Institutions therefore not only prevent some sorts of actions and

behaviours but also make others possible. In this way institutions both enable and constrain the actions of economic agents, in particular they help to explain changing management accounting practice and practices.

Like Ahmed and Scapens (2000) before them Lucas and Rafferty (2008) utilised OIE to explain the reality gap in relation to cost accounting concluding that

> "much observed management accounting practice is difficult to reconcile with ex ante constrained optimisation, but is explicable in terms of conditioning by various institutions" (Lucas and Rafferty, 2008, p.148).

They argued that the reality gap is better explained by considering the environment within which management accounting is practised rather than assuming rationality amongst practitioners in adopting textbook theories based on neoclassical economics (Lucas and Rafferty, 2008). In their first case-study industrywide kudos associated with sales or market share growth was identified as an institution impeding the use of ABC to improve customer profitability analysis. Similarly, an incorrect belief amongst the founders of the business that sales growth would automatically lead to increased profitability was an impediment to the introduction of ABC, as was the group decision making which contributed to a lack of focus on ABC as a basis to improve knowledge of customer profitability. In their second case-study these institutions were the accepted norm of right and proper costing practice within the industry, based on maintaining an orderly and stable market (Lucas and Rafferty, 2008).

One criticism with adopting an OIE approach to MAR is that, by considering accounting practise at an intra-organisational level, it does not place enough emphasis on environmental pressures (Wanderley et al., 2011). Another institutional theory approach, NIS which focuses on external institutions to explain why homogeneity is present amongst organisations, a process called isomorphism (DiMaggio and Powell, 1983), addresses this concern but as a result leaves intra-organisational behaviours largely unexplored (Wanderley et al., 2011). To overcome these criticisms Wanderley et al. (2011) proposed a framework to study management accounting change incorporating NIS, OIE and the dialectical perspective. Similarly, Alsharari, Dixon and Youssef (2015) also proposed a new conceptual framework to overcome these criticisms

which, instead of using the dialectical perspective considered the use of a power and politics dimension in management accounting change. Neither of these new frameworks, nor the ones they were based upon, appear in any empirical studies in the SMA literature.

These two new frameworks rely on the same two existing frameworks by Burns and Scapens (2000) and Dillard, Rigsby and Goodman (2004) which draw on structuration theory assumptions which include the domination (power) dimension as one of its key assumptions (Alsharari, Dixon and Youssef, 2015). Structuration theory has been used to study both sources of accounting continuity; why certain accounting practices continue and sources of accounting change; why new practices are introduced. It introduced the concept of duality thereby dissolving the separation of agency and structure which had dominated alternative approaches to MAR at the time (Englund, Gerdin and Burns, 2011). Whilst structuration theory has become one of the dominant alternative approaches to exploring MAP its application to SMA is limited. Elmassri, Harris and Carter (2016) used structuration theory to examine how local managers responded to the impact of emergent structures in post-revolutionary Egypt in relation to their strategic investment decision (SID) making. They argued that whilst SIDs may involve technical elements it is necessary to study accounting decision making holistically. They found that

> "organisational decision-makers were impacted by the uncertainty of external (political, social and economic) structures in making SIDs. This did not result in agents' inability to act, as might have been expected, but in their shift of focus from previous accounting routines to more socially sensitive considerations" (Elmassri, Harris and Carter, 2016, p.165).

They supported the idea of the structure-agent dualism identified by structuration theory and concluded that even in extremely uncertain contexts capital investment can be justified even when NPV maybe unreliable or even broken as a decision-making rule.

Another popular alternative theory deployed to study management accounting change is Actor-Network Theory (ANT) and, in particular, is one which has also been applied to study SMA. According to Ahrens and Chapman

> "ANT has made an important contribution to the theorising of practice in management accounting. It has shown the significance of actors, action, and inscriptions in the fabrication of social order" (Ahrens and Chapman, 2006, p.104).

ANT can be summarised as the study of how actor-networks create and sustain knowledge. In ANT accounting systems are built as networks which bind together humans (actors) and non-humans (actants) as seamless webs. System building requires the enrolling and controlling of allies in the spread of ideas. These allies might be human (colleagues or users) or non-human (artifacts, theories and concepts, instruments or software). When system-builders are successful in constructing extensive networks of alliances between human actors and non-human actants, then ideas become facts, taking on certainty and solidity and they become black boxes and become taken for granted (Jones and Dugdale, 2002). ANT has been used in MAR to answer two questions. Firstly, what are the roles played by accounting innovations once they have reached the status of 'black boxes'? and secondly, how are management accounting innovations produced, modified and accepted? (Alcouffe, Berland and Levant, 2008).

Using ANT, the aim is to show how accounting practices and technologies partake in a construction process which is temporary and fragile. As such it challenges the positivist and functionalist accounting research paradigm utilised for this thesis, in favour of studying accounting "as a social and organisational phenomenon" (Burchell et al., 1980, p.22). This approach

> "differs significantly from contingency theory because accounting practices are not seen as passively adapting to environmental demands. Rather accounting as a technology acts and is acted upon by the contexts in which it is intertwined" (Justesen and Mouritsen, 2011, p.170).

It therefore challenges the concept that that innovations are accepted rationally because they accurately represent reality and are technically more efficient and considers the powers struggles, often ignored in positivist research in management accounting, that exist in management accounting change (Alcouffe, Berland and Levant, 2008).

As stated above ANT has been deployed to study the change process involved in implementing SMA, specifically ABC and the BSC. Briers and Chua (2001) studied the

implementation of ABC "by a heterogeneous actor-network of local and global actors and actants" (Briers and Chua, 2001, p.237). They found that accounting change was "anti-heroic" being the result of engaging the efforts of the many rather than a powerful few. The case illustrated that accounting change was the outcome of many interconnections between local and cosmopolitan networks of actors and actants. In this case Chau seemed to accept the role played by non-human actors which she had earlier dismissed (Chua, 1995). Briers and Chau's (2001) research cast doubt on studies which emphasise the need for senior management support in order for the introduction of new accounting initiatives to be successful. It is claimed that whilst this support is necessary it is not sufficient for change to occur, with the need for other actors, lower down in the organisation, to be part of the actor-network. They also found that accounting change was cyclical with new accounting technologies being adopted on faith, forced to work on a temporary basis before being abandoned, even though it had earlier been deemed to be a success, in favour of another accounting innovation. This stresses the temporary and fragile nature of management accounting systems (MAS). Their study was motivated by a desire to understand why accounting innovations have been unevenly adopted, particularly ABC which has strong support from some influential academics. It was concluded that ABC was adopted, not because of its utility or because it was a good strategic fit, or because it was known for certain that it would deliver the MAI they needed, it was adopted because the local actor-network had faith in the ABC model presented by cosmopolitan experts.

Busco and Quattrone (2015) followed the lead of Chua (1995) by utilising ANT to emphasise the role of rhetoric and visual inscriptions in the spread of the BSC with a single organisation. They found that the power of specific visual diagrams (visual inscriptions) associated with the BSC generated

> "organising work, and causes the BSC to carry out multiple functions within the organisation" (Busco and Quattrone, 2015, p.1237).

This allowed them to explain how the BSC plays multiple roles when observed in practice without having to rely on human agency or external and contingent factors to explain this mulitple functionality. The BSC is a means that creates knowledge not by providing answers to its users (be it in the form of numerical performance measures or stable

logical relationships), but rather by making users ask questions that continuously open possibilities for new knowledge to be constructed, making the BSC a platform for mediation between various users at different levels. Not everyone starts off with the same understanding but the BSC aids discussion and therefore mediation.

Likewise Cooper, Ezzamel and Qu (2017) applied ANT to study BSC but stressed how human-actors can also shape the way ideas develop from local practice and become global management practice. They investigated

> "how an accounting idea (the BSC), that can be casually dismissed as unworthy of careful examination, becomes accepted and even a taken-for-granted component of 'good management'" (Cooper, Ezzamel and Qu, 2017, p.992).

They identified how Kaplan and Norton, the instigators and promoters of the BSC (see section 3.2.2 below) kept control of the innovation and became obligatory passage points (OPPs) (Latour, 1987), though which new practices or information must pass, by linking the BSC to their own names. This conceptualisation of human-actors as OPPs was a development of ANT at that point in time.

The alternative theoretical approaches discussed above challenge the traditional mainstream economic positivist approach to MAR adopted by contingency theory (Scapens, 2006). Instead they are based on theories born in the wider social sciences to view and understand accounting as an organisational and social phenomenon (Englund, Gerdin and Burns, 2011). However, whilst this approach has increased in popularity since structuration theory paved the way for this alternative direction for MAR in the 1980s (Englund, Gerdin and Burns, 2011), its application to study SMA has been limited.

The use of these alternative theories to study the use of SMA would not have contributed to answering this studies research question which was to understand the context in which the use of SMA contributes to improved performance in medium sized construction companies. The use of ANT could have helped to understand how the power relationships between accountants and the other members of the SMT influence the use of SMA whereas institutional isomorphism could have been used to explain the similarities and differences in SMA usage between different organisations. Both are

worthwhile objectives but nevertheless different to the objectives of this particular study. The Researcher therefore choose to use a contingency approach for this study incorporating a qualitative element to explain the quantitative survey results (see section 5.3 below) as suggested by Otley (2016) whilst at the same time recognising some of the issues raised by Langfield-Smith (1997), Tillman and Goddard (2008) and Granlund and Lukka (2017).

In addition to utilising contingency theory to study the contexts in which SMA techniques are used, aspects of the reality gap in relation to the usage of SMA techniques and who applies those techniques were also explored. This was enabled by comparing SMA theory, as expressed by textbooks and academic and practitioner journals, with the evidence of SMA practice in medium sized businesses in the construction sector as presented in chapters 7 and 8 below. The following section reviews the literature in relation to the reality gap.

2.6.1 The reality gap in management accounting

In addition to the behavioural studies already mentioned above a number of other studies exist which explore the reality gap in management accounting.

Trahan and Gitman (1995) investigated what they referred to as the theory-practice gap in relation to corporate finance. They found that respondents (chief financial officers (CFOs)) reading tended to be focused on popular business periodicals rather than academic journals and that whilst respondents felt there was a need to better explain and develop useful applications of the existing academic research they were neutral to the idea of applying more sophisticated techniques even if they were better explained and easier to apply. Trahan and Gitman conclude that this

> "reflect[s] their relatively low assessment of the role and importance of academic research and sophisticated decision techniques" (Trahan and Gitman, 1995, p.77).

In relation to the barriers to adopting more sophisticated techniques they concluded that sophisticated financial decision-making techniques are not practical; had unrealistic assumptions; could not be explained to top management and were difficult to apply.

Arnold and Hatzopoulos (2000) also investigated the theory-practice gap but in relation to capital budgeting. They found that the theory-practice gap had been narrowed but that practitioners, whilst adopting more theoretically sound techniques continued to use "simpler rule of thumb techniques" (Arnold and Hatzopoulos, 2000, p.622) resulting in a wider range of appraisal techniques being used, with older approaches having "numerous endearing qualities which modern techniques seem unable to provide" (Arnold and Hatzopoulos, 2000, p.622).

Tucker's work (Tucker and Parker, 2014; Tucker and Lowe, 2014; Tucker and Schaltegger, 2016) focused on the other side of the same coin in that it considered the gap from an academic perspective (the research-practice gap) and focused on what academics could do to narrow the gap. Tucker and Lowe (2014) found that the perception of the research-practice gap was real and significant and that practitioners could benefit from an awareness of academic research. Interestingly they also found that practitioners did not perceive this as problematic, being too busy with day to day activities to be concerned about the issue.

The communication of academic research presents a barrier preventing a more effective engagement of academic research with practice (Tucker and Lowe, 2014; Tucker and Schaltegger, 2016) . They identified a belief that academic research is presented in such a manner that is largely incomprehensible by most practitioners. They also identified that practitioner access to academic research was problematic, a similar finding to Trahan and Gitman (1995). Surprisingly, and perhaps contrary to the reality gap discussed above, the propensity of academic research to the adopted and implemented in practice did not emerge as a major contribution to the research-practice gap, however this was qualified by the statement that practitioners must be presented by research findings which are convincing and illustrate a practical application (Tucker and Lowe, 2014).

The differences between the prescriptive management accounting literature and the academic management accounting literature is an important explanation of the gap between theory and practice (Jansen, 2018). Jansen (2018) suggested that a systematic literature review combining both of these literatures could be used to provide an

overview of existing knowledge about how specific practical management accounting problems could be solved. This would, it is claimed, bridge the gap between theory and practice by providing practitioners with a reliable basis for their actions. Jansen (2018) recommended that this process should be undertaken by a panel comprising academics and practitioners who have experience in dealing with the selected problem.

2.7 The role of the accountant in SMA

This section considers the role played by accountants, and others, in the use of SMA. It also looks at the skills required by accountants for the successful implementation of SMA.

The ability of the management accountant to take part in SMA has been discussed since the concept was first introduced:

> "the collection and analysis of the appropriate strategic data are either carried through by someone with highly developed skills in management accounting or are done poorly" (Simmonds, 1981, p.26).

However, Lord (1996) took an opposing view:

> "the Cyclemakers case shows that Simmonds assertion is not true—the firm has successfully collected and used competitor information without any input from the management accountant" (Lord, 1996, p.364).

Others have joined in the argument. Some taking a negative perspective, for example:

> "Accountants may have difficulty in learning to accommodate a lack of precision [in VCA]; strategists and marketeers will not" (Partridge and Perren, 1994, p.24).
>
> "UK accountants are presently wholly ill-suited to such exercises [SMA] as a consequence of their experience of an essentially quantitative, number-crunching approach to accounting education and training" (Roslender, 1995, p.52).
>
> "I cannot see what comparative advantage the management accountant has in making such judgments over, for example, a marketing expert. Thus, much of SMA falls outside the actual expertise of management accountants" (Otley, 2008, p.233).

Cooper (1996c) envisaged that management accountants might lose their jobs if they failed to adapt to the new environment.

Others take a more positive viewpoint, for example:

> "The management accountants have demonstrated their success in blending into the new decision-making and commercial support role" (Ma and Tayles, 2009, p.484).
>
> "The research also highlights the importance [to SMA] of the management accountants' extensive professional skills" (Tillmann and Goddard, 2008, p.97).
>
> "Strategic management accountants are no longer seen as just information providers, they are seen more as active players in the strategic management process" (Cadez and Guilding, 2008, p.840).

These positive views are perhaps a sign that the roles and skills of management accountants are evolving, supported through the exam syllabuses of their professional bodies, that they are being released from the factory floor as demanded by Bromwich (1990) and are becoming "strategic accountants" (Cadez and Guilding, 2008, p.839).

Management accountants also appear to be working in a more collaborative way as urged by Bromwich and Bhimani (1994). Roslender and Hart (2006), in their analysis of brand management accounting, claimed that, this exemplar of SMA, demonstrates "high levels of interfunctional cooperation between management accountants and marketing management practitioners" (Roslender and Hart, 2006, p.229). Other examples exist:

> "The success of ABC implementations requires the creation of multifunctional teams in which accountants have to work with operation and marketing people" (Gosselin, 2006, p.665).
>
> "Strategic pricing is the coordination of interrelated marketing, competitive, and financial decisions to set prices profitably" (Nagle and Holden see Smith, 2015, p.104).
>
> "The use of multiple individuals [in gathering competitor information] may enhance the quality of the analysis and may create buy-in for subsequent strategy formulation and implementation" (Jaworski, Macinnis and Kohli, 2002, p.301).

However, not all researchers share these positive views with regards to cooperation between functions involved in SMA, with Lefley (1996) referring to conflict between accountants and engineers as a cause of issues in investment appraisal of AMTs. Whilst Williams, van der Wiele and Dale (2000) described accountants taking an adversarial position with quality managers in relation to quality costing.

Whilst there are calls for management accountants to adopt a more business partnering role Lambert and Sponem (2012) claimed that there is little empirical evidence to test if this is the case. Using case-study research methods they concluded that:

> "the myth of the management accountant business partner – close to and heeded by operational managers – is not as commonplace as is widely believed" (Lambert and Sponem, 2012, p.587).

According to Aver and Cadez (2009) there was also little empirical evidence on the role played by management accountants in the SMP. Two earlier studies in the United States and United Kingdom revealed that management accountants were relatively strongly involved in the SMP. Their study (a survey of accountants in Slovenian companies) supported the earlier findings that management accountants are more involved in evaluating strategic options and developing details about those options rather than taking the necessary actions to put strategic change into place. That is, they are involved in the planning but not the implementation of strategy. As discussed in section 2.3 above it also revealed relatively low involvement by management accountants in construction companies (see Table 6 on page 36 above).

Coad (1996) considered the skills and aptitudes required to undertake a SMA project. His case-study provided evidence that a learning orientation, which motivates both smart and hard working, is required. Individuals with a learning orientation tend to respond to challenges in a positive and creative manner. Smart working was defined as

> "the manifestation of a tendency to select clever and ingenious approaches to deal with a given task, and to modify those approaches, intelligently and resourcefully" (Coad, 1996, p.387).

He concluded that:

> "It seems likely that management accountants who are heavily involved in strategy-making processes should ideally favour a learning orientation. Furthermore, because of the necessity to liaise effectively across functional boundaries and with different levels of management, the strategic management accountant will require good communication skills and an ability to empathise with others both within and outside the organization" (Coad, 1996, p.404).

Furthermore, Cooper (1996a) suggested that management accountants who wish to become effective members of a management team need to spend less time on financial accounting, auditing and tax issues and more time learning about products, processes, marketing, operations, systems, strategy and behavioural and organisational issues relating to the implementation of new systems and processes. He could quite easily have been describing the syllabus of a current-day MBA program. Naranjo-Gil, Maas and Hartman (2009) supported this view of the characteristics of accountants when they concluded that younger, less tenured and more business orientated CFOs were more likely to adopt innovative MAS.

It seems that whilst the role of management accountants has evolved in recent years there is further progress to be made. The ability to work co-operatively and build trust with other functions, to be creative and innovative, to understand how businesses operate, to communicate effectively, to embrace new information technologies as well as their technical knowledge continues to "offer [management accountants] some advantages over potential professional competition" (Burns and Baldvinsdottir, 2007, p.130).

In the construction sector one such profession capable of competing with the management accountant in providing information pertinent to SMA is the chartered quantity surveyor. According to the Royal Institute of Chartered Surveyors (RICS)

> "Chartered quantity surveyors are highly trained professionals offering expert advice on construction costs. They are essential for lifecycle costing, cost planning, procurement and tendering, contract administration and commercial management" (RICS, 2018).

Management Accountants working in the sector need to be conscious of this potential competition and embrace the challenges of SMA if they are not to be marginalised in the SMP. These two professions can work together with mutual respect such as in the way clinical professionals and cost accountants do in the health care setting described by Cooper (1996b). This, however, means that accountants need to adopt a partnership as opposed to a leadership role, what Cooper (1996b) referred to as a "marriage."

Working closely with other functions can, however, cause a dilemma with regards to independence. Lambert and Sponem (2012) found evidence that the ability of business-orientated management accountants to criticise managerial plans and operations remains limited. This requires that management accountants must also have the ability to make decisions and judgements in an ethical manner (Burns and Baldvinsdottir, 2007).

The next chapter considers the literature in relation to the individual SMA techniques identified in section 2.1.2 above.

3 Review of individual SMA techniques

This chapter examines the literature in relation to accounting techniques which have been identified as SMA according to the definition adopted for this thesis (see section 2.1.1 above) and presented in Table 3 on page 24 above. Given the number of techniques to review each section is quite brief but additional literature is also presented in Appendix 1 if further detail is required. The chapter is structured by the categories identified by Cadez and Guilding (2008) as follows: costing; planning, control and performance measurement; strategic decision making; competition monitoring; and customer accounting.

3.1 Costing

This section reviews the literature on costing in the context of SMA. Starting with ABC it moves on to discuss attribute costing, COQ, kaizen costing (KC), LCC, TC and value chain costing. Whilst these are reviewed in separate sections it should be noted that there is a great deal of overlap between the concepts being discussed. For example, ABC techniques have been used to determine the costs used in COQ, KC, LCC and TC all of which should be regarded as management processes rather than new costing systems per se.

3.1.1 Activity Based Costing (ABC)/Activity Based Cost Management (ABCM)

The literature on the use of ABC in the construction industry was reviewed in section 2.3 above, this section looks at ABC more generally. ABC was a response by Cooper and Kaplan (1988) to the criticisms made by Johnson and Kaplan (1987) regarding the ability of MAS to provide accurate products costs due to costs being allocated to products using "simplistic and arbitrary measures" (Johnson and Kaplan, 1987, p.2) . For some, ABC is not considered a SMA technique as it is just a more accurate way of allocating overheads to product costs (Shank, 1989). However "activity-based costing is as much a tool of corporate strategy as it is a formal accounting system" (Cooper and Kaplan, 1988, p.40). A claim they made on the basis that decisions made by managers about pricing, marketing, product mix and design, all of which require accurate cost information, are some of the most important decisions managers are required to make.

ABCM (Cooper and Kaplan, 1991), developed ABC from a product costing technique into a management information system. It is a process of identifying activities within support functions and determining the cost of those activities to provide information which can be used to make the type of strategic decisions described by Cooper et al. (1992).

Major described ABC as

> "a method that assigns cost activities to cost objects such as products, services and customers, based on two main stages. The first stage pools costs to activities according to each activity's consumption of resources. The second stage assigns costs to cost objects based on their use of activities" (Major, 2007, p.160).

This also alludes to the strategic nature of the technique with customers treated as cost objects allowing CPA to be undertaken (see section 3.5 below). It is not clear in this definition that the cost of activities such as selling and general administration should be included, this is different to traditional absorption costing where they are treated as period costs (Cooper and Kaplan, 1988). The emphasis on using the data provided by ABC techniques for decision making purposes is nicely summarised in the following quote

> "No organisation ever made money merely because it had a more accurate understanding of its economics. Only when understanding is translated into action is the potential for profit improvement unleashed" (Cooper et al., 1992, p.57).

TDABC was developed by Kaplan and Anderson (2004) to address some of the implementation issues associated with ABC as discussed in Appendix 1.1.1. In TDABC managers estimate the resource demands imposed by each transaction, product or customer. They need estimates of only two parameters; cost per time unit of the supplying resource capacity and the unit time of consumption of the resource capacity by products, services or customers (Kaplan and Anderson, 2004). TDABC simplifies the cost allocation process and in turn leads to a much more accurate cost model than by using traditional ABC. Furthermore, it allows spare resources to be identified unlike traditional ABC. (Kaplan and Anderson, 2004). Santana and Afonso (2014) confirmed the claims of Kaplan and Anderson that using TDABC is easier and faster to develop an accurate cost model than traditional ABC, although they found that there were

difficulties in estimating spare resources when there are irregular working hours i.e. an unstable environment exists.

The application of TDABC has been studied in many sectors including education (Sorros, Karagiorgos and Mpelesis, 2017), academic libraries (Siguenza-Guzman et al., 2016), fabrication of building materials (Kim et al., 2016), logistics (Afonso and Santana, 2016) and healthcare (Keel et al., 2017). Healthcare seems to be a sector which has implemented TDABC the most, possibly due to the work by Kaplan and Porter (2011) who proposed this as a solution to high healthcare costs in the US. TDABC seems to address many of the resource issues relating to ABC whilst at the same time offering more accurate product costs than traditional costing systems.

3.1.2 Attribute Costing

Attribute costing (Bromwich, 1990) was an early example of a technique included within SMA which was justified from a purely theoretical perspective unlike earlier works which had "tended to rely on its common sense appeal" (Bromwich, 1990, p.28). It advanced the ideas of ABC discussed above but rather than allocate costs to activities it seeks to identify the cost of providing the perceived benefits that products provide to customers (product attributes). To do this requires an external focus, in that, organisations must identify the attributes of their products that customers value as well as identifying the attributes provided by competing products in the firms' markets. This is quite different from the internal focus of ABC, although both seek to identify and reduce non valued-adding costs.

3.1.3 Cost of Quality (COQ)

> "Quality provides a different perspective and the potential to put an organisation on a higher competitive plane than its competitors." (Belohlav, 1993, p.67).

From the above quotation it can been seen why the COQ has been included in many surveys of SMA techniques. Views on the scale of the COQ vary amongst authors but as Sower, Quarles and Broussard (2007) stated:

> "That the most conservative of these estimates might exceed a company's net profit highlights the potential importance of COQ" (Sower, Quarles and Broussard, 2007, p.122).

Taken from an extensive literature review Porter and Rayner (1992) quoted a figure of eighteen percent of turnover as the median COQ. Furthermore, they claimed that superior quality can, on average, result in a five percent price premium.

COQ is a financial measure of quality and it has been defined as:

> "the cost of not performing an operation or making a product 'right the first time'. That is, the COQ measures the cost of defects or any variation from the quality standard which is measured by conformance to requirements" (Merino, 1990, p.13).

Given the extent of conceptual and empirical evidence supporting benefits to be gained from the introduction of quality programmes and reporting of the COQ it is surprising that its use is not widespread. Sower, Quarles and Broussard (2007) found that only thirty-four percent of respondents were systematically tracking their COQ. This low rate of adoption was consistent with other surveys they had reviewed. In 2012 Sower was reported as saying that he had no evidence that this percentage had increased since then (Bangert, 2012). Reasons given for this low level of adoption are as follows:

- lack of management support including management philosophy and company culture,
- lack of knowledge on how to track quality costs,
- lack of accounting or IT systems to provide the necessary information, and
- the organisation did not see the benefit in calculating COQ or felt they need to focus on other areas perceived to be of more benefit.

Of these the lack of management support was found to be the most common and the conclusion was that before trying to implement COQ businesses would need the support of their senior management who should be prepared for a short-term increase in COQ (Sower, Quarles and Broussard, 2007).

One solution to the difficulties in performing the COQ calculation was suggested by Albright and Roth (1992). They proposed the use of the Taguchi quality loss function (QLF) with the following benefits:

- to provide an estimate of the hidden costs of quality. It not only calculates the cost of failure but also the cost associated with process variation,
- to provide information for appraising process improvement projects,
- to measure the actual performance of process improvement projects, and
- to evaluate progress towards quality goals.

Whilst a fictitious example calculation of the QLF was demonstrated, no empirical evidence was provided to support their claims. There is no subsequent literature relating to the use of the QLF in calculating the COQ.

Appendix 1.1.3 discusses different quality philosophies but whatever the approach adopted, implementing a quality initiative and monitoring COQ is conceptually of potential strategic benefit to organisations, whilst in practice they are either not widely implemented or fail to deliver their potential benefits (Sower, Quarles and Broussard, 2007).

3.1.4 Kaizen Costing (KC)

Continuous Improvement was included in one of the surveys discussed in section 2.1.2 above (Hatif AlMaryani and Sadik, 2012). However, unlike other SMA surveys (Guilding, Cravens and Tayles, 2000; Cravens and Guilding, 2001; Cadez and Guilding, 2007, 2008; Cinquini and Tenucci, 2010) which included definitions of the techniques, no definition is provided for what is meant by continuous improvement and so it was interpreted by the Researcher as KC. It is a technique closely associated with continuous improvement (Cheser, 1994) and it can be considered a SMA technique due to the way it seeks cost reduction based on the targets established in the SMP (Kaur and Kaur, 2013). KC is often associated with Target Costing (TC) as part of a larger cost reduction initiative, for example, total cost management (TCM) at Toyota referred to in section 3.1.6 below, but it is also considered in the literature in its own right (Kaur and Kaur, 2013).

Monden and Hamada (1991) identified that, like TC, KC is not a costing system but an approach to cost reduction. Unlike TC it is focused on the production stage of an existing products lifecycle rather than through cost reduction identified before production commences. Monden and Hamada (1991) described the process as operating outside of the standard costing function but using previous periods actual costs as the basis for

targeting cost reductions calculated to achieve the profit targets established during the strategic planning process. However, they need to be established fairly and in consultation between managers and employees, as employees need to be motivated to achieve the targets set.

Like TC, cooperation between departments is essential if the targets set in KC are to be achieved. Furthermore, if KC is to be successful, the shopfloor must be held accountable for achieving the cost reduction targets, but only in costs they can control. In this respect additional information is required to enable areas for improvement to be identified and the financial impact of those improvements to be monitored (Modarress, Ansari and Lockwood, 2005). In this study the authors reported that

> "[traditional costing] systems are insufficient in supporting lean manufacturing objectives and are often in conflict with strategic goals of the firm" (Modarress, Ansari and Lockwood, 2005, p.1758).

3.1.5 Lifecycle Costing (LCC)

LCC provides the opportunity to take a long-term view of the cost of a product or service (Cadez and Guilding, 2007). It has been defined as:

> "the sum of all funds expended in the support of an item from its conception and fabrication through its operation to the end of its useful life" (White and Ostwald (1976) in Woodward, 1997, p.366).

It was introduced in the 1960's by the United States Department of Defence for procurement purposes (Shields and Young, 1991). Woodward (1997) reported little evidence of its use except in the military and construction projects. Similarly a CIMA survey in 2009 reported that only fourteen percent of businesses surveyed, reported using the technique (Atrill and McLaney, 2015). The concept has evolved in recent years as their impact on the environment has become an increasing factor for organisations who want to remain competitive (Asiedu and Gu, 1998).

The literature discusses the concept from two perspectives; firstly, from the perspective of the producer (Czyzewski and Hull, 1991; Shields and Young, 1991; Asiedu and Gu, 1998; Dunk, 2004; Kambanou and Lindahl, 2016) and secondly from the perspective of the purchaser/owner, often in consideration of investment decisions (Wübbenhorst,

1986; Woodward, 1997; Addis, 2001; Goh and Sun, 2016; British Standards Institute, 2017). In both perspectives, costs are included at all stages of a products lifecycle (growth, maturity and decline (Levitt, 1965)). LCC comprise of the costs to the manufacturer, the user and society (Asiedu and Gu, 1998) and can be analysed as shown in Figure 6 below. Issues associated with the practical application of LCC including calculating costs to include are discussed in more detail in Appendix 1.1.5.

	Company Cost	Users Cost	Society Cost
Design	Market Recognition Development		
Production	Materials Energy Facilities Wages, Salaries Etc.		Waste Pollution Health Damages
Usage	Transportation Storage Waste Breakage Warranty Service	Transportation Storage Energy Materials Maintenance	Packaging Waste Pollution Health Damages
Disposal/ Recycling		Disposal/ Recycling Dues	Waste Disposal Pollution Health Damages

Figure 6: Lifecycle stages and costs at each stage
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(Asiedu and Gu, 1998).

LCC has been adopted for a variety of uses in a variety of industries. It is used to help producers to monitor the requirements of their customers, and in doing so, design products with the distribution of costs over the products lifetime consistent with the needs of their customers (Dunk, 2004). As stated by Shank and Govindarajan (1992b) designing products to reduce post acquisition costs of consumers will give competitive

advantage. It has also been used to inform investment decisions, particularly in new buildings, so much so that it has been incorporated into a British Standard (British Standards Institute, 2017). Both of these points demonstrate why LCC should be considered a SMA technique, one which seems particularly relevant to this study.

3.1.6 Target Costing (TC)

TC is not a costing system, nor a simple cost reduction method "it is part of a comprehensive strategic profit management system" (Kato, 1993, p.36). It encourages innovation which is seen as essential to creating a competitive advantage (Hiromoto, 1991). There is no agreement of its exact definition, nor when it is best used (Shank and Fisher, 1999). Kato's definition seems to cover all the pertinent points

> "Target costing is an activity which is aimed at reducing the lifecycle costs of new products whilst ensuring quality, reliability and other customer requirements, by examining all possible ideas for cost reduction at the product planning, research and development, and the prototyping phases of production." (Kato, 1993, p.36).

It is not to be confused with KC (see section 3.1.4 above) which is a costing process aimed at reducing the cost of existing products during the manufacturing process. Although discussed separately here, Monden and Hamada (1991) considered the two to be inseparably related in what they called TCM covering all phases of a products lifecycle.

Monden and Hamada (1991) noted that TC comprises two distinct phases, firstly calculating the TC. In planning a specific product which meets customer needs an expected selling price can be established, deducting the targeted profit from this leaves the target cost i.e. the maximum cost allowed to make the product to achieve the desired profit margin. Secondly, the process of achieving the target cost through value engineering and other activities and comparing target cost with the achievable cost. According to Kato (1993) eighty percent of a products costs are fixed once a specification has been agreed therefore, only looking for cost reductions during the production process (kaizen costing) limits the scope for cost reduction. "Upstream of production is a treasure island of cost reduction opportunities" (Kato, 1993, p.35). The first phase ties into an organisations overall business strategy by calculating the target profit for each new product. This is identified from the profit targets established within the business

strategy. This is considered a critical activity (Kato, 1993). However, the price consumers are prepared to pay for a new product can be difficult to calculate. Many Japanese companies use “pricing by function” (Kato, 1993, p.38) in which the product selling price can be broken down into elements, each of which reflects the price customers are prepared to pay for that element, this appears to be similar, in principle, to attribute costing discussed in section 3.1.2 above.

Much of the TC literature has a manufacturing bias (Kato, 1993; Mia and Clarke, 1999; Filomena, Neto and Duffey, 2009; Woods, Taylor and Cheng Ge Fang, 2012). However, Yazdifar and Askarany (2012) included service organisations in their sample concluding that there is no significant difference in adoption rates between manufacturing and service organisations. Overall, they found a rate of adoption of only eighteen percent in the UK, concluding this was low, especially when compared to the results of a survey of the Japanese assembly industry which reported an eighty percent adoption rate. They suggested cultural differences as a possible explanation for the difference. Yazdifar and Askarany (2012) however, found that manufacturing companies had progressed their implementations to more advanced levels than the service organisations surveyed.

One study has been undertaken into the use of TC in the construction sector. It concludes that

> “The industry is lacking both the rigorous cost management practices and market orientation which are pre-requisites to the adoption of target costing as developed in the commodity manufacturing industry.” (Nicolini et al., 2000, p.319).

The action research-based case-study also attempted to introduce post construction maintenance costs into the TC calculations. This added another level of complexity into the decision-making process requiring skills, which the researchers concluded, were missing from the industry at the moment. Overall, the research was highly critical of the industry being capable of adopting TC unless it changed its adversarial and non-transparent commercial practices.

3.1.7 Value Chain Costing/Value Chain Analysis (VCA)

The concept of the value chain was introduced into the strategy literature in Porter's seminal text (1985). In order to support the achievement of his generic strategies (see section 2.1.3 above) Porter proposed using the firm's value chain to examine all the activities a firm performs and how they interact. This would identify opportunities to reduce cost, by eliminating non-value adding activities or increase sources of differentiation. The generic value chain is presented in Figure 7 below.

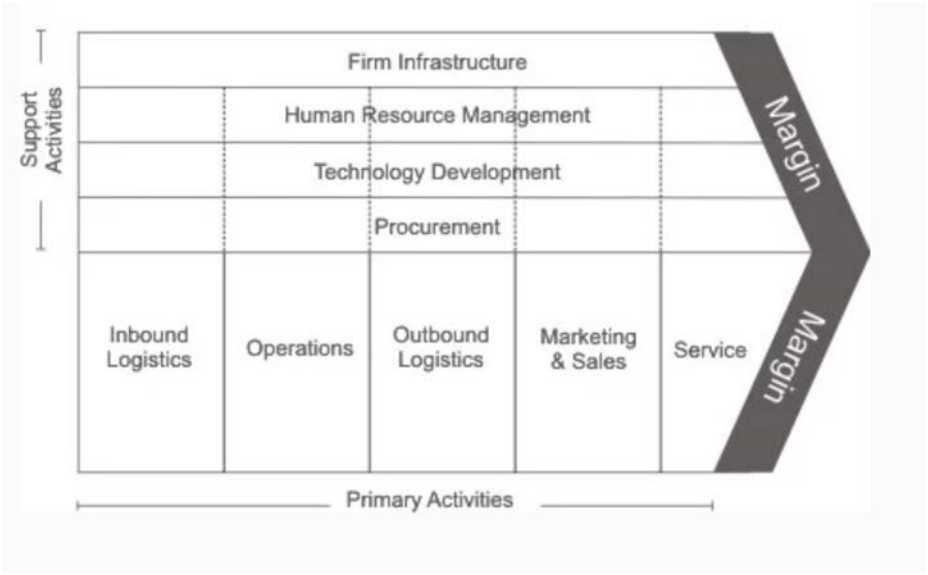

Figure 7: Porter's generic value chain
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(Porter, 1985, p.37)

Porter went on to describe how to use the value chain to support each of the generic strategies. In considering the cost leadership strategy, costs and assets for each value activity are analysed. Cost behaviours in each activity are determined by cost drivers of which Porter identified ten (Porter, 1985). In discussing this Porter criticised traditional accounting systems "While accounting systems do contain useful data for cost analysis, they often get in the way of strategic cost analysis" (Porter, 1985, p.63). This view is also supported by Hergert and Morris (1989) as discussed in more detail in Appendix 1.1.7. This might mean VCA is little used in practice and hence why, according to Wingren (2005), there appears to be a lack of empirical studies in this area.

The value chain concept was developed further by Shank and Govindarajan (1989, 1992b; a) as part of their SCM framework (Shank, 1989; Shank and Govindarajan, 1993; Shank, 2006). For a fuller discussion on SCM see section 3.3.4 below. They defined the value chain for a firm as:

> "the linked set of value creating activities- from basic raw materials sources to the ultimate product or service that is delivered to customers" (Shank and Govindarajan, 1992b, p.5).

They contrasted VCA with value added, which has an internal focus of maximising the difference between purchases and sales. Being critical of value added from a strategic analysis viewpoint as "it starts too late and stops too soon" (Shank and Govindarajan, 1992b, p.8) they claimed that:

> "the strategic insights yielded by VCA differ significantly from, and are superior to, those suggested by valued added" (Shank and Govindarajan, 1992b, p.5).

They therefore extended Porter's value chain concept to consider the whole industry. With customers ultimately paying for all the margins within the supply chain, they claimed that understanding the margin in each activity within the value chain enables cost reduction or value enhancement by exploiting supplier and customer linkages (Shank and Govindarajan, 1992b). This is the key idea behind LCC discussed in section 3.1.5 above. In the same year Shank and Govindarajan (1992a) published the first empirical study of a full VCA.

Dekker (2003) considered the importance of strong relationships between organisations when undertaking an interfirm VCA, whilst at the same time suggesting that there was little evidence of either intra or inter firm VCA as envisaged by Shank and Govindarajan (1992b). Despite this he argued that Lord's (1996) conclusion that, firms focusing on satisfying customers and developing relationships with suppliers will gain the advantages of exploiting linkages without undertaking a formal VCA, was wrong. In relation to his case-study he concluded that:

> "VCA added to an understanding of supply chain performance and of the cost consequences of changes in supply chain operations. This understanding was the basis for specific actions to exploit the linkages in the supply chain" (Dekker, 2003, p.18).

The different conclusions reached by these authors may have been due to the size and nature of the organisations in their specific studies. Lord (1996) examined a small firm with a single product but Dekker (2003) studied a much larger firm selling thousands of product lines. Dekker also refuted the earlier work of Hergert and Morris (1989) by demonstrating that accounting information was available to perform a VCA, although in the intervening fifteen years it is possible that there had been significant developments in the availability of accounting data.

The above discussion demonstrates why VCA should be considered a key concept in SMA as it provides MAI to support the achievement of a sustainable competitive advantage. As Dekker states

> "the exploitation of linkages with suppliers and buyers, by performing VCA, is thus explicitly positioned as an important constituent of SMA" (Dekker, 2003, p.6).

However, as discussed in relation to TC, the adversarial and non-transparent commercial practices in the sector (Nicolini et al., 2000) are a potential barrier to its application by construction companies.

3.2 Planning, Control and Performance Measurement

This section looks at the SMA techniques associated with business planning, control and performance measurement systems, techniques which complement TMA techniques such as budgeting and standard costing (McLellan, 2014).

3.2.1 Activity Based Budgeting (ABB)

Budgeting is the process whereby the plans developed as part of the SMP are implemented in the year ahead. The preliminary targets and objectives required by an organisation to achieve its strategic plans are operationalised through the budgeting process. In addition to preparing the plan for the next twelve months, budgeting acts as a control process by looking backwards in comparing actual against planned outcomes

and taking the necessary action to correct any deviations from the budget, or by amending the plan if it is no longer thought to be achievable (Drury, 2015).

ABB has been adopted by those organisations using ABC to overcome the problems associated with the incremental budgeting of indirect and support costs associated with conventional budgeting. Its aim is to identify the cost of resources required to perform the activities required to meet the budgeted production and sales volumes. These costs are then compared to current costs and action taken so they are aligned (Drury, 2015).

Hansen, Otley and Van der Stede (2003) reviewed the long standing criticisms of conventional budgeting referring to the twelve most cited weaknesses of the budget process as reported by Neely, Bourne and Adams (2003). Their review compared the views of two competing camps; either improve budgeting systems (using a closed loop ABB system) or abandon it (the beyond budgeting perspective). Although they went on to conclude that these are not solutions to the same problem. ABB does not address issues of performance management whereas the beyond budgeting approach seeks to resolve the issues of using budgets as the basis of performance management systems.

The closed loop ABB system proposed by the Consortium for Advanced Manufacturing-International (Sandison, Hansen and Torok, 2003; Stevens, 2004) is illustrated in Figure 8 below

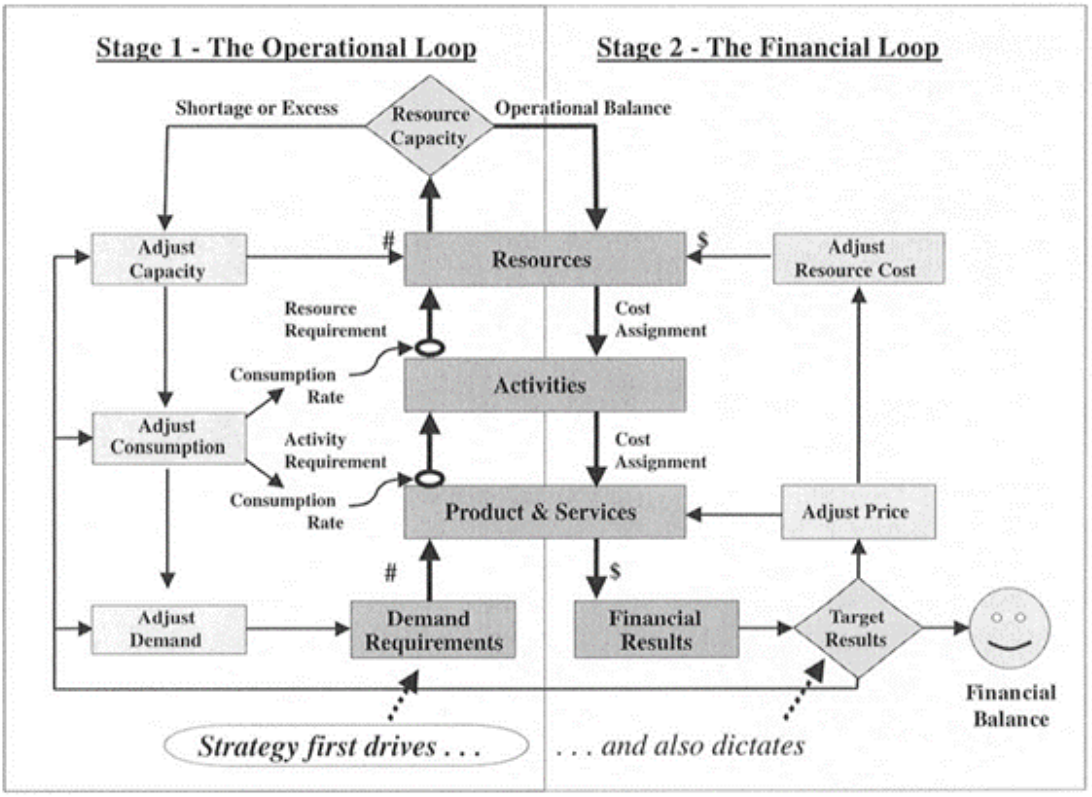

Figure 8: Overview of the ABB approach
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(Hansen, Otley and Van der Stede, 2003, p.100)

It requires a feasible operational plan to be established i.e. a balance of resources available and resources required before a financial model is developed and balanced. If the financial loop is not balanced, then the ABB approach provides more levers to pull, compared to conventional budgeting, to achieve the desired financial projections (Hansen, Otley and Van der Stede, 2003). Further benefits of adopting an ABB approach are considered in more detail in Appendix 1.2.1 below.

Empirical evidence of the use of ABB appears to be limited. Buys and Green (2007) concluded that "while ABB remains unchartered ground for many organisations it is clear that, as the business environment evolves, so must the budgeting process" (Buys and Green, 2007, p.39). Similarly McLellan (2014) found that, whilst planning and budgeting tools were highly adopted by business, with the seven highest ranking processes all including the word budgeting in their description, ABB was ranked only 37th out of 40 practices. The results demonstrated that:

> "practitioners may believe that ABB could improve performance but in their ranking of that tool they could be suggesting, that in their opinion there, are many other MA tools more important and probably more easily operationally do-able" (McLellan, 2014, p.60).

Despite an apparent lack of enthusiasm amongst practitioners for ABB it seems that the beyond budgeting approach is also not in favour. Libby and Lindsay (2010) found that of seventy-nine percent of respondents, who used budgets for control purposes, a massive ninety-four percent planned to continue using them, with the majority of respondents managing to find ways to get value out of the process. However, forty-six percent of those who planned to continue using them had plans to adapt or change their budgeting systems. Three such ways were to use rolling forecasts, to align them better with their strategic planning or to produce less detailed budgets initially whilst at the same time updating them regularly by using ongoing forecasts.

3.2.2 The Balanced Scorecard (BSC)

This section focuses on one specific performance management framework, the BSC which Hoque called a "seminal concept" (Hoque, 2014, p.50). First introduced in 1992, it remains a popular management tool, appearing at number 14 in Bain and Company's management tools survey (Rigby and Bilodeau, 2017) (see Appendix 2).

BSC was introduced by Kaplan and Norton (1992) following their observations of organisations which were using a mix of financial and non-financial measures to assess their performance. It was offered as a solution to criticisms of the over reliance on short-term financial measures to assess performance, as these measures did not capture customer quality or product/service innovation and resulted in dysfunctional managerial behaviours (Fitzgerald, 2007). It was quickly modified by the same authors from a measurement system, to a performance management system to a strategic management system (Cooper, Ezzamel and Qu, 2017). However, it maintained the underlying concept of identifying measures in four key perspectives as shown in Figure 9 below, even though this approach has been criticised for missing the supplier and public authorities perspectives (Nørreklit, 2000) .

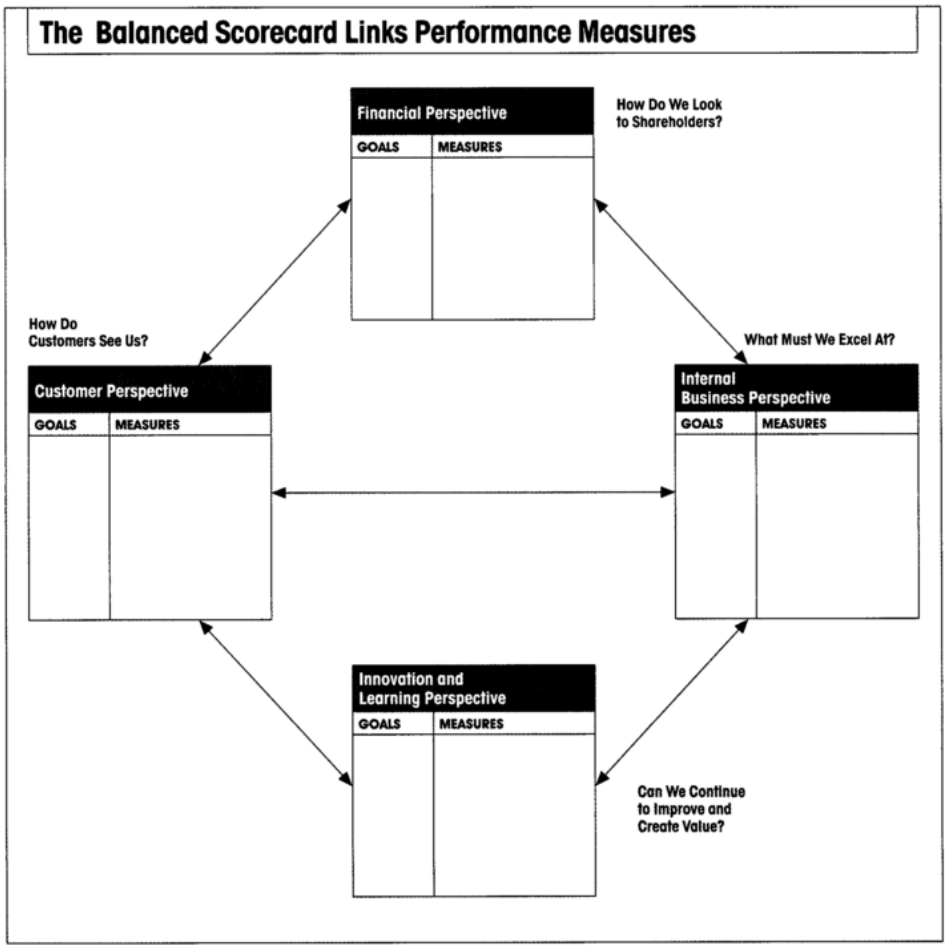

Figure 9: The Balanced Scorecard

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(Kaplan and Norton, 1992, p.72).

In 1993 Kaplan and Norton said "the BSC is not just a measurement system it is a management system to motivate breakthrough competitive performance" (Kaplan and Norton, 1993, p.142) adding that it "is most successful when it is used to drive the process of change". The use of the BSC as a strategic management system was described by Kaplan and Norton (1996) as the cornerstone of a system linking short-term actions to long-term strategy involving a four step process as depicted in Figure 10 below:

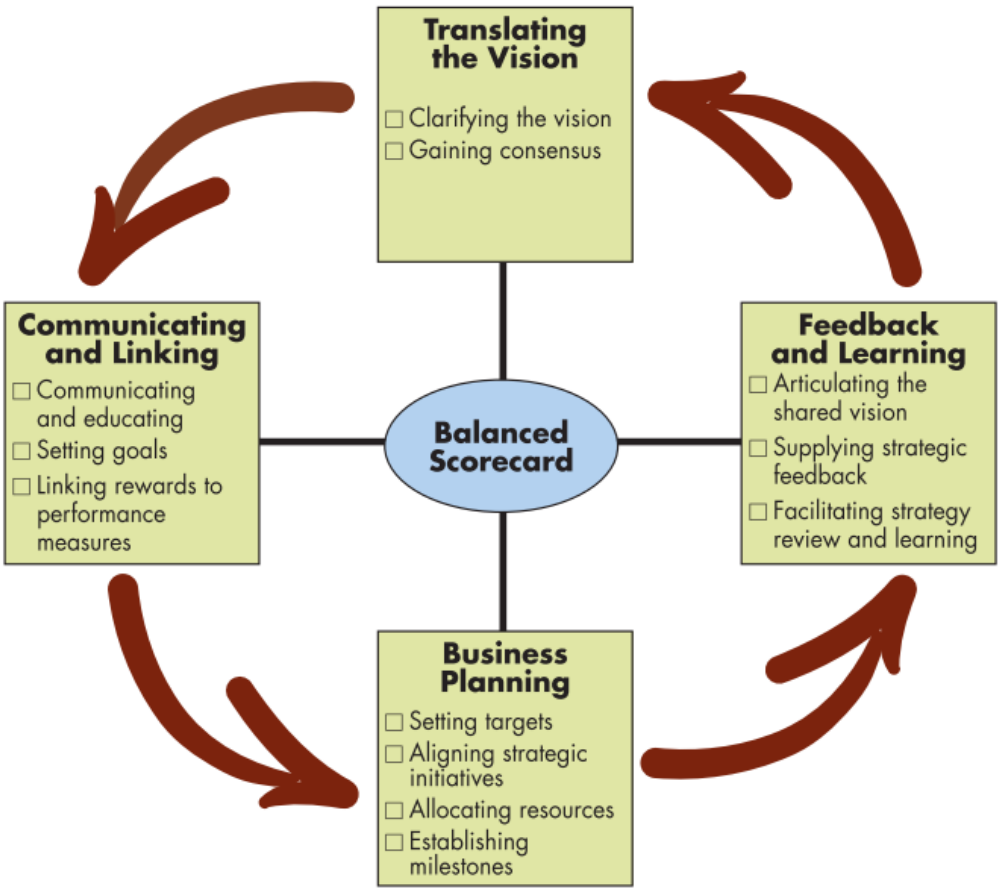

Figure 10: Managing Strategy: Four Processes
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(Kaplan and Norton, 1996, p.77)

Under the communication and linking process they considered the linking of rewards to the performance measures, which despite being "attractive and powerful" does carry risks. To combat this, they listed a series of questions to be asked by management before proceeding along these lines, including consideration of whether unintended consequences could arise from the way the targets are achieved. In the business planning process, setting targets could use the benchmarking process discussed in section 3.2.3 below. As part of the feedback and learning process the BSC is said to create strategic learning, a form of double-loop learning, whereby feedback is gathered, the hypotheses on which the strategy was based are tested and the strategy is amended if necessary.

Strategy maps were introduced by Kaplan and Norton in 2000. They

> "embed the different items on an organization's balanced scorecard into a cause-and-effect chain, connecting desired out-comes with the drivers of those results" (Kaplan and Norton, 2000, p.170).

They involve a top-down approach starting with the mission statement, setting the strategic goals for the organisation and demonstrating the routes to get there. Communication was a key theme

> "perhaps the greatest benefit of strategy maps is their ability to communicate strategy to an entire organisation" (Kaplan and Norton, 2000, p.176).

Kaplan and Norton (2000) also claimed that strategy maps help identify when BSCs are not truly strategic i.e. they can help show how a strategy is to be achieved. Furthermore, they claimed that they can help identify gaps in strategy and help to fill those gaps. Despite all these claims Hoque (2014) found little research attention on strategy maps in the literature. Criticisms of the BSC are considered in Appendix 1.2.2 below.

In considering the impact of the use of non-financial measures on performance, Ittner and Larcker (2003) found a negative association between BSC adoption and return on assets. However, when they looked closer, those organisations (only 29% of respondents) who had identified measures with a cause and effect relationship to profit or cashflow "produced significantly higher returns on assets and returns on equity over a five-year period than those that did not" (Ittner and Larcker, 2003, p.90).

Fitzgerald (2007) identified three generations of BSC users. The first generation used it as a measurement system; second generation users identified cause and effect relationships; whilst third generation users incorporated it into an incentive system. Ittner and Larcker's work (2003) may demonstrate that only second and third generation users gain a performance benefit from its use (Fitzgerald, 2007). In other words, the BSC needs to be used as a performance management system, rather than to just measure performance, if it is to lead to an improvement in performance. In 2008 Neely also concluded that the performance impact of the BSC has to be questioned (2008). This was based on comparing the results of two divisions of the same company, one of which implemented a BSC and another which did not. Over a three-year period, the study found no significant impact on divisional performance measured by sales or gross profit,

however as the BSC was only in operation for the second of the three years investigated, even the author admitted this was possibly too short a period of time for the BSC to have had an impact.

The above discussion has centred on why organisations use the BSC. Wiersma (2009) considered how and why managers use it. She identified three complimentary purposes for which managers use the BSC; for decision-making; co-ordination; and for self-monitoring. She also found that even when its usage is mandated by their firm, individual managers usage may vary considerably. The extent of usage, whilst influenced by the firm, was also driven by; the managers style of evaluating sub-ordinates; whether alternative controls are also used in the managers organisational unit and the receptiveness of managers to new types of information.

In conclusion, BSC is a popular, if not theoretically strong (Busco and Quattrone, 2015), SMA technique and

> "until another improved innovation tool appears, the balanced scorecard will continue to provide organisations with a valuable option as a strategy map, an enabler of policy implementation, and an organisational control and accountability tool" (Hoque, 2014, p.50).

3.2.3 Benchmarking

Hoque (2006c) suggested that competitive advantage cannot be achieved or maintained by setting goals based on past or present achievements and that these goals need to be established by reference to best practice, wherever this occurs. Benchmarking, according to Bain & Company's management tools survey (Rigby and Bilodeau, 2017) (see Appendix 2), was the third most widely used management tool. It was one of only four tools to have appeared in each survey since it was first published in 1993. However, with a satisfaction rating below average, the authors suggested that this will need to improve for benchmarking to maintain its high position in the ratings.

There is no universally accepted definition of benchmarking, Bain and Company's described it as follows:

> "Benchmarking improves performance by identifying and applying best demonstrated practices to operations and sales. Managers compare the performance of their products or processes externally with those of competitors and best-in-class companies, and internally with other operations that perform similar activities in their own firms." (Rigby, 2017, p.18).

Shetty (1993) and Hoque (2006c) both suggested the following benchmarking implementation process:

1. Planning; identify functional areas to be benchmarked and determine data collection method,
2. Identify benchmark partners who exhibit superior performance,
3. Data analysis and identification of performance gap,
4. Establish performance goals, create an action plan to achieve performance goals, communicate and implement,
5. Monitor targets pro-actively. Revise action plan if not working and reset performance goals as existing targets are achieved.

Shetty (1993) suggested three types of benchmarking exist; strategic, where comparison of different business strategies takes place to identify the key elements of a successful strategy; operational, which focuses on relative cost positions or ways to increase differentiation and managerial, which involves reviewing processes within the support functions. Whereas Hoque (2006c) analysed benchmarking into three types; internal, looking at performance in other parts of the same business; external, comparison with 'lookalike' businesses and best practice, looking outside of your industry to identify benchmarking partners who exhibit superior performance in the functional area of concern.

The framework presented by Elnathan, Lin and Young (1996) is valuable as it lists antecedents for a successful benchmarking implementation which organisations should consider before benchmarking occurs. These antecedents can be summarised in three areas as follows:

- Results of a preliminary competitive analysis; which can give the impetus for benchmarking to occur,
- Degree of organisational commitment; including senior management support, and

- Prior benchmarking experience.

In conclusion “benchmarking… is an essential responsibility of the strategic planning process” (Watson, 1993, p.13). It can play a key role as part of an organisation’s performance management system in setting objective performance standards for key parts of the business (Hoque, 2006c). However, even though it is a popular management tool it does have some issues (see Appendix 1.2.3) which must be addressed for it to be implemented successfully.

3.2.4 Economic Value Added (EVA)

EVA is a single measure of financial performance developed and promoted by the Stern Stewart consultancy (Stern, Stewart III and Chew Jnr, 1995). Against a background of increasing divisionalisation and delegation of decision-making authority to divisional managers, their claim was that earnings per share was no longer an appropriate measure of managerial performance in creating wealth for business owners. EVA was not new but derived from the residual income (RI) measure. Wallace (1997) described RI as earnings before interest less a cost of capital charge based on the capital employed by a business/division. RI therefore represents the value left over after shareholders and other providers of capital have been adequately rewarded and therefore measures the creation of shareholder value.

However, as RI is based on earnings it is distorted by the way accountants are required to report certain transactions. In calculating EVA Stern Stewart (1995) suggested one hundred and twenty possible adjustments to earnings and capital employed to adjust for the accounting distortions associated with RI as a measure of economic performance. Although they said that typically they identified between fifteen and twenty in any one organisation, and between only five and ten adjustments are required in practice. They also proposed an EVA based bonus scheme to encourage managers to behave as owners of the business with the introduction of a bonus bank to resolve the issue of short-term manipulation of profits. However, Hogan and Lewis (2000) found no evidence that an EVA based bonus scheme did a better job at improving goal alignment than traditional incentive plans and concluded that:

> "the recent popularity of products like Stern Stewart's EVA simply reflects impressive marketing, rather than a new and different way to motivate managers' (Hogan and Lewis, 2000, p.3).

Bouwens and Spekle's (2007) literature review showed that there was little diffusion of its use in practice and therefore they claimed that "its potential benefits cannot be enjoyed universally, and that EVA is only appropriate in specific conditions" (Bouwens and Spekle, 2007, p.262). They reported that manufacturing firms were more likely to use it due to the capital-intensive nature of their business and that strategy influences its use, with defender firms being more likely to use it. They also found that ownership is also a factor in the use of EVA with owner managed businesses less likely to adopt it as they do not need sophisticated measures to access performance.

EVA is theoretically a proxy measurement for the creation of long-term shareholder value (see Appendix 1.2.4) and therefore a suitable measure in assessing the success of an organisation's strategic objectives. It can therefore be included as a SMA technique. However its practical use seems to create issues (see Appendix 1.2.4) resulting in its eventual abandonment (McLaren, Appleyard and Mitchell, 2016). It's value to the population of this study seems to be limited.

3.2.5 Product Profitability Analysis (PPA) and Job Costing

PPA shows the revenues, costs and profits for each product produced and sold by an organisation (Brierley, 2016). Laing (1994) described PPA as a change in traditional accounting methods to provide assistance to look at the business strategically. It provides a tool for managers to identify profitable products and their characteristics, and to then attempt to incorporate these characteristics into unprofitable products. It also aids strategic management decision making such as outsourcing and product discontinuation (Brierley, 2016).

Drury and Tayles (2006) found that profitability analysis plays a key role in price taking firms and is mainly used for attention directing, signalling the need for further detailed studies to be instigated. These special studies are undertaken to address specific issues/decisions that managers require more accurate and detailed information on. As a signalling tool PPA therefore does not need perfectly accurate product cost

information undermining Kaplan and Cooper's (1998) claim that one of the major benefits of ABC systems relates to the improved quality of profitability analysis. This might explain Drury and Tayles findings that:

> "the adoption of ABC and more complex costing systems does not seem to have permeated much to data included in routine profitability analysis" (Drury and Tayles, 2006, p.413).

They found that there was a 50/50 split between profitability analyses compiled using contribution (sales revenue less direct costs) and a profitability measure incorporating overhead allocations. Only six percent assigned indirect costs based on a cause and effect allocation (ABC) with forty-one percent relying on arbitrary allocations. Drury and Tayles (2006) also reported that companies consider profitability analysis to be one of the most important MAPs, reporting that ninety-one percent of respondents used PPA. This supports Chenhall and Langfield-Smith's (1998a) earlier findings where eighty-nine percent of respondents were using it. Brierley (2016) found that 86.5 percent used profitability analysis of which 71.2 percent used PPA. He also found that it was sometimes used in conjunction with CPA (see section 3.5.1 below) to identify the products contributing to unprofitable customers. However, where a company produces bespoke products and sells one product to each customer, as in the construction industry, then PPA and CPA are the same (Brierley, 2016). Furthermore, when the accuracy of PPA was not in doubt he found that PPA was used for decision making purposes, otherwise further special studies were required for the purpose of decision making, supporting the findings of Drury and Tayles (2006).

To support PPA, job costing is required in organisations where each output of a product or service is unique (Drury, 2015). Job costing is known as contract costing when it is applied to large cost units which take a significant amount of time to complete, such as a construction project. The importance of contract costing systems and their critical role in cost control in the construction sector was discussed in section 2.3 above. Halpin and Senior (2009) identified three different types of construction cost; direct costs, such as labour and materials; production support costs, such as QSs; and general and administrative (G&A) costs, such as accounts office staff. They referred to non-direct costs as overhead which are typically less than five percent of a total project cost,

comparing this to other industries where the percentages tend to be much higher. They therefore suggested that the contract costing systems must focus on managing direct costs. One possible consequence of such a low level of overhead in the sector is that the benefits of ABC are not as high as other industries with higher overheads.

Clearly PPA is a commonly used MAP which, whilst having operational utility, also has a major role to play in supporting the strategic decision making of price taking organisations. Within the construction sector this role is supported by contract costing systems.

3.3 Strategic Decision Making

This section considers five SMA techniques categorised as strategic decision-making; brand valuation; environmental management accounting; intellectual capital accounting; strategic cost management and strategic investment appraisal.

3.3.1 Brand Valuation

Brand valuation rose to prominence in the accounting literature in the late 1980s when public companies started to include internally generated brands or 'home grown' brands as intangible assets on their balance sheets. This was contrary to UK standard accounting practice at the time (Roslender and Hart, 2006). The early discussions were from a financial accounting perspective, where objective valuation based on historical cost is the predominate paradigm. MA does not suffer from these restrictions and soon MA literature entered and started to lead the debate. As noted by Guilding and Pike (1994a) current brand valuation activity seems to be driven more by management information needs, than by a desire to capitalise brands in published accounts. The literature has two main focuses; methods of valuation, and the managerial benefits of reporting brand value information. A third focus, its role in encouraging management accountants and marketing managers to work more closely together, is discussed in Appendix 1.3.1.

Cravens and Guilding (1999) provided an excellent summary of the methods of brand valuation broken down into four categories; cost based approaches; market based approaches; income based approaches and formulary based approaches. They recommended using a formulary approach, such as the Interbrand approach initially

developed for external reporting. They claimed that this approach is much more robust as it takes a comprehensive account of factors likely to affect the ability of the brand to create value for its owner. Aaker's Brand Equity Ten Method is another formulary approach (Cravens and Guilding, 2000).

Several managerial benefits have been identified in the literature. It is a powerful counter to short-termism; it can help in allocating marketing budgets between brands; it results in increased expenditure on marketing in order to maintain the now recognised asset; it plays an important role in strategic decision making, such as brand portfolio management; it has the potential to lessen the rift between accounting and marketing functions; it can improve communication and coordination; it can help improve forecasting and planning and it can improve performance evaluation (Guilding, 1992; Guilding and Pike, 1994a; Egan and Guilding, 1994). Although, as Guilding and Pike (1994a) observed, despite these benefits, a cost benefit analysis should be undertaken before incurring the high cost of a brand valuation exercise. Guilding and Pike also noted that the

> "perceived organisational and behavioural benefits arising from brand valuations tend to be somewhat more strongly associated with long-term, strategic management issues rather than short-term operational issues" (Guilding and Pike, 1994b, p.251).

They also noted that marketing directors perceive greater benefits, from undertaking a brand valuation exercise, than FDs did. Cravens and Guilding (2000) also found that organisations with strong brands, which were pursuing a market oriented strategy, were more likely to use brand valuation and were found to return greater levels of organisational performance.

Recently the discussion of brand accounting as a standalone topic seems to have disappeared from the literature, perhaps because it was subsumed into the IC literature (see section 3.3.3 below).

3.3.2 Environmental Management Accounting (EMA)

The United Nations define EMA as:

> "physical procedures for material and energy consumption, flows and final disposal, and monetarized procedures for costs, savings and revenues related to activities with a potential environmental impact" (UNDSD, 2001, p.1).

Accordingly a framework of EMA has been developed which separated it into two dimensions; monetary environment management accounting (MEMA) and physical environment management accounting (PEMA) as shown in Figure 11 below.

		Environmental Management Accounting (EMA)			
		Monetary Environmental Management Accounting (MEMA)		Physical Environmental Management Accounting (PEMA)	
		Short Term Focus	Long Term Focus	Short Term Focus	Long Term Focus
Past Oriented	Routinely generated information	1. Environmental cost accounting (eg. variable costing, absorption costing, and activity based costing)	2. Environmentally induced capital expenditure and revenues	9. Material and energy flow accounting (short term impacts on the environment – product, site, division and company levels)	10. Environmental (or natural) capital impact accounting
	Ad hoc information	3. Ex post assessment of relevant environmental costing decisions	4. Environmental life cycle (and target) costing Post investment assessment of individual projects	11. Ex post assessment of short term environmental impacts (eg. of a site product)	12. Life cycle inventories Post investment assessment of physical environmental investment appraisal
Future Oriented	Routinely generated information	5. Monetary environmental operational budgeting (flows) Monetary environmental capital budgeting (stocks)	6. Environmental long term financial planning	13. Physical environmental budgeting (flows and stocks) (eg. material and energy flow activity based budgeting)	14. Long term physical environmental planning
	Ad hoc information	7. Relevant environmental costing (eg. special orders, product mix with capacity contraint)	8. Monetary environmental project investment appraisal Environmental life cycle budgeting and target pricing	15. Relevant environmental impacts (eg given short run constraints on activities)	16. Physical environmental investment appraisal Life cycle analysis of specific project

Figure 11: Framework of environmental management accounting
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(Burritt, Hahn and Schaltegger, 2002, p.43)

From this framework it can be seen that MEMA comprises of a number of tactical and strategic tools and techniques. Materials flow cost accounting (MFCA), which relies on the information in box 9, has been described as the most basic of EMA tools (Christ and Burritt, 2015) the data from which can be used in other EMA activities such as investment appraisal, environmental impact analysis and long term environmental budgeting. This is important information as prior research has demonstrated that costs associated with wasted materials can amount to between forty and seventy percent of the total environmental expenses of an organisation. MFCA has more recently been used in supply chain management (Christ and Burritt, 2015) which therefore links it with VCA (see 3.1.6 above) however, there is little empirical evidence of its use outside of manufacturing industry.

According to Jasch (2006) EMA does not typically calculate external environmental costs, which Greene (1998) identified as "the costs of impacts, emissions, pollution, rubbish, waste, heat, accidents or scrap for which the firm is not legally responsible" (Greene, 1998, p.373). He argued that these 'beyond compliance' costs should be considered in decision making as they may, as a result of increased regulation, become internal costs of the future. For the moment, only internal costs seem to be recognised within the EMA literature.

Despite the strategic benefits of EMA identified in the normative literature (see Appendix 1.3.2), empirical surveys have demonstrated a low level of EMA adoption in practice. Ferreira, Moulang and Hendro (2010) concluded that this was perhaps because EMA processes were still in a state of evolution. They also found that its use was greater in industries deemed to have "a greater and direct impact" on the environment. However, unlike Christ and Burritt (2013) they found its use was not contingent on the size of the firm. Phan, Baird and Su (2017) found a moderate use of PEMA and low use of MEMA but did confirm the earlier finding of Ferreira, Moulang and Hendro (2010) that no significant relationship between firm size and EMA usage existed. This led them to conclude that the benefits of EMA could be harnessed by firms of all sizes.

Empirical evidence of the impact on financial performance of EMA is mainly restricted to case-study observations (Christ and Burritt, 2013, 2015). However in their survey of

manufacturing companies Henri, Boiral and Roy (2014b) found that the tracking of environmental costs has an indirect influence on economic performance through improved environmental performance.

Järvenpää and Länsiluoto (2016) considered EMA from an institutional logic perspective. Their study demonstrated that the design and implementation of new EMA performance measures was shaped by the dominant profit oriented institutional logic, with environmental targets tightly connected with cost savings and profitability improvements. Institutional logic forced these measures to remain non-strategic and sit outside of bonus scheme calculations. This case was from the food industry where margins are very tight (Järvenpää and Länsiluoto, 2016). Therefore, as profit margins in the construction industry are also low (Akintoye and Skitmore, 1991), it might be expected that if EMA has been adopted in the sector it may not be being used in a strategic manner due to the profit orientation of firms in the industry. Furthermore, following the findings of Ferreira, Moulang and Hendro (2010), as the construction industry has a low environmental impact it would be expected that EMA usage would be minimal.

3.3.3 Intellectual Capital Accounting (ICA)

ICA was defined by Guthrie, Ricceri and Dumay (2012) as a

> "management, accounting and reporting technology towards understanding, measuring and reporting knowledge resources such as employee competencies, customer relationships, brands, financial relationships and information and communication technologies" (Guthrie, Ricceri and Dumay, 2012, p.70).

The accounting literature looks at IC from a financial accounting and disclosure perspective as well as a MA perspective; this section will focus on the latter.

It is generally agreed that the three components of IC are human capital, relational capital and structural capital (Roslender and Fincham, 2004; Marr, 2008; Pires and Alves, 2009; Guthrie, Ricceri and Dumay, 2012). Human capital includes the knowledge, professional skill, experience and the creativity of employees. Relational capital captures the knowledge of market channels, customer and supplier relationships, and

governmental or industry networks, whilst structural capital consists of innovation capital (intellectual assets such as patents) and process capital (organisational procedures and processes) (Tayles, Pike and Sofian, 2007). Pires and Alves (2009) considered IC to be more than the sum of these three components, it is also how these resources are used together to create value, what Edvinsson (1997) in his "seminal paper" (Roslender and Fincham, 2004, p.179), referred to as intellectual capital management (ICM). ICM converts IC into intellectual assets which when commercialised, creates shareholder value (Tayles, Pike and Sofian, 2007). In 2008 Marr produced a very practical guide to managing IC. He said that IC, along with physical and financial capital, is one of the three vital resources of organisations (Marr, 2008). He listed the principle sub-components of each of the three components of IC and produced a "five step ICM model" (Marr, 2008, p.7) of which step 3 was "measuring intellectual capital".

Edvinsson (1997) considered that relational and structural capital grows from human capital and that it is a key role of leadership to make this happen. He described how Skandia (a Scandinavian service company) introduced an IC function:

> "to grow and develop intellectual capital as a visible, lasting value, complementary to the traditional balance sheet" (Edvinsson, 1997, p.368).

This 'hidden value' is recognised by stock markets by the way that market capitalisations exceed book values. To facilitate the ICM process new measurement tools and ratios were developed including the 'Skandia Navigator', these were not to value IC but to monitor its growth over time, many of these measures were non-financial and narrative. Edvinsson (1997) likened this to a BSC approach.

That IC has not been included in any of the surveys conducted in relation to the use of SMA techniques appears to be an oversight. As Tayles et al. stated

> "The failure of accountants to adopt a strategic management accounting approach and focus on the evaluation, appraisal and measurement of it [IC] will also result in the neglect of what may prove to be an organisation's most valuable resource" (Tayles et al., 2002, p.257).

Furthermore, Roslender (1997) had earlier considered the human capital element of IC in relation to accounting for strategic positioning, considering how employees are another factor in creating a competitive advantage. He reviewed the work of Hermanson and Flamholtz with regards to human capital valuation but concluded that neither of these ideas developed any traction within the accounting community.

Guthrie, Ricceri and Dumay (2012) considered that ICA research has matured into a third stage; critically examining ICA in practice. The first two stages were establishing and developing ICA as a field and then legitimising it as an area of multi-disciplinary research. They found that the development of new frameworks was decreasing with existing frameworks being used to frame research and that narrative articles were being replaced with empirical studies. Some of these empirical studies have proven the theoretical link between IC and firm performance. Tayles, Pike and Sofian (2007) found that managers perceived that a high level of IC is associated with higher levels of business performance whilst Novas, Alves and Sousa (2017) found that "structural capital is the major idiosyncratic resource that affects performance and growth of firms" (Novas, Alves and Sousa, 2017, p.303).

Construction companies often have very few tangible non-current assets but instead generate their profits through the collaboration of different management skills, directing physical and human resources to successfully complete projects. As such understanding the use of ICA, particularly in relation to human capital, in the sector would seem to be valuable objective of this study.

3.3.4 Strategic Costing/Strategic Cost Management (SCM)

SCM has been defined as

> "deliberate decision making aimed at aligning the firm's cost structure with its strategy and optimising performance of the strategy" (Anderson, 2006, p.482)

The SCM framework is a blending of three themes; VCA, strategic positioning analysis and cost driver analysis, all originally introduced by Porter (1985) into the strategic management literature. As VCA has already been considered in section 3.1.6 above, this section will focus on the remaining two themes.

Strategic positioning analysis is concerned with the alignment of cost analysis with the organisations chosen generic strategy (see section 2.1.3 above). Different strategies require different managerial mindsets and therefore require different perspectives on cost analysis, this in turn requires different designs of MCS. This concept was discussed in some detail by Govindarajan and Shank (1992) where they presented the implications of different strategic missions (build, hold, harvest) on designs of strategic planning processes, budgeting systems and incentive compensation packages. Whilst they asserted that "tailoring controls to strategies has a sound logic" (Govindarajan and Shank, 1992, p.22) they also had concerns in relation to:

1. tailoring systems so closely to current strategy that they inhibit managers from moving to a new strategy when required,
2. problems designing control systems where the combination of mission and competitive advantage require different types of controls to be used, and
3. different controls across business units following different missions in the same organisation may result in administrative problems and dysfunctional behaviour of managers in units following a harvest mission.

Cost driver analysis is concerned with understanding cost behaviour. SCM recognises that other cost drivers exist over and above the volume cost driver associated with TMA. This concept is fundamental to ABC (see section 3.1.1 above). Shank and Govindarajan (1992b) added to Porter's original work on cost drivers introducing the idea of structural cost drivers (which "derive from a company's choices about its underlying economic structure" (Shank and Govindarajan, 1992b, p.12)) and executional cost drivers ("those determinants of a firm's cost position that hinge on its ability to 'execute' successfully" (Shank and Govindarajan, 1992b, p.12)). (see Appendix 1.3.4 for more detail).

At the time of the introduction of the framework Shank (1989) considered SCM to be a paradigm shift in MA but in 2006 he accepted that the paradigm shift had not occurred. He was scathing of the accounting profession for not progressing this "conceptually superior framework for management accounting" (Shank, 2006, p.366). He cited the recent accounting scandals as reasons for diverting accounting resources away from

providing strategic financial information. He concludes by saying that in his opinion the arguments of SCM have been given their chance "but have not carried the day" (Shank, 2006, p.366).

Contrast this with the conclusion of Anderson (2006) who claimed that SCM research was developing albeit in the management literature rather than the accounting literature. She identified two forms of SCM; structural and executional cost management, as follows:

> "Structural cost management employs tools of organisational design (e.g. determination of firm boundaries, scale and governance structures), product design and process design to build a cost structure that is coherent with strategy" and "Executional cost management employs common management accounting tools to measure cost performance in relation to competitive benchmarks so that improvement opportunities are highlighted" (Anderson, 2006, p.482).

She observed that the accounting literature remains focused on executional cost management and the production part of the value chain with developments in structural cost management happening outside of the accounting literature and therefore SCM is not an obsolete field of enquiry. Henri, Boiral and Roy (2014a) used these ideas to investigate the tracking of environmental costs (executional cost management) together with development of environmental initiatives (structural cost management). They concluded that executional and structural cost management can work together to improve financial performance.

In conclusion the SCM framework can be considered a sub-set of SMA. It has a very clear purpose in supporting the strategic process within organisations albeit with only a cost perspective in mind.

3.3.5 Strategic Investment Appraisal

> "Strategic investments involve significant long term financial commitments, slow to materialise benefits and high levels of uncertainty, all of which makes them difficult to evaluate" (Northcott and Alkaraan, 2007, p.199).

According to Northcott and Alkaraan (2007) operational investments decisions, which are concerned with sustaining continuing activities, can be evaluated using routine investment appraisal techniques. In contrast, SIDs are non-programmed and unusual,

substantial, complex, long-term, competitively orientated, uncertain and subjective and therefore require a more in-depth level of appraisal.

Traditional approaches to investment appraisal (net present value (NPV), accounting rate of return, internal rate of return (IRR) and PP) have been criticised for having too much of a short-term focus, ignoring non-financial benefits, having too narrow a focus and failing to take account of the cost of doing nothing (Adler, 2000). Furthermore, Bromwich and Bhimani (1991) criticised these conventional approaches as the reason why investments in AMTs are not being made, with management focusing on the internal benefits in appraising AMT investment when there are also external benefits, such as enhancement of existing products, diversification and risk reduction, which should also be factored into the appraisal process.

Drury (2015) suggested a straightforward solution by ignoring non-financial benefits in an initial NPV calculation and using any resultant negative NPV to calculate the minimum additional annual cashflow benefit they would need to generate to make the NPV positive. Discussions should then take place to see if it was felt that the intangible benefits were worth more than this. Shank's (1996) solution to this problem was to incorporate the SCM framework (see section 3.3.4 above) into the analysis of technology investments so that strategic issues can be evaluated as explicitly and formally as conventional cashflows. Moreover, in their much more extensive empirical study Carr and Tomkins (1996) found that successful companies placed five times as much attention on the issue of competitive advantage, almost three times as much on value chain considerations, and twice as much on cost drivers when making SIDs. This supports the call by Shank (1996) to incorporate SCM into capital budgeting decisions.

SCM was just one of the five "emergent techniques" for strategic investment appraisal tested by Alkaraan and Northcott (2006) in their UK based study of large manufacturing companies. They found that financial analysis techniques still dominate the appraisal of both strategic and non-strategic investments with NPV ranked first in both instances, with intuition and judgement used to assess the strategic implication of investment decisions. They concluded that

> "Overall, these findings suggest that the five recently developed analysis tools considered here have made little impact on strategic investment decision-making practice, despite the growing academic call for the use of such techniques to inform strategic investment decisions." (Alkaraan and Northcott, 2006, p.168).

This survey also supported the earlier findings of Arnold and Hatzopoulos (2000) in relation to the approach taken to deal with the risk inherent in SIDs. Both surveys concluded that simplistic approaches such as sensitivity analysis, adjusting the required rate of return and subjective assessment were preferred over more theoretically sound, but often more complex approaches, such as the capital asset pricing model or probability analysis.

Carr, Kolehmainen and Mitchell (2010), using a contingency approach, summarised how differing contexts may result in different emphasis between financial and strategic considerations when considering SIDs. Large companies were more likely to use sophisticated techniques such as DCF, similarly companies operating in unpredictable business environments and companies facing financial uncertainty were all more likely to adopt sophisticated techniques. Contrary to this, on examining the processes employed in SIDs by managers in an environment of extreme uncertainty, Elmassri, Harris and Carter found that

> "non-financial considerations and objectives take precedence over the technical 'accounting' measures for example net present value" (Elmassri, Harris and Carter, 2016, p.151).

The use of multi-dimensional performance measures was found to have a similar effect on SIDs (Harris et al., 2018). Managers in businesses adopting BSC type performance management approaches were informally incorporating that way of thinking into their SIDs and identified the non-financial aspects of investments that were crucial to their success. It was found that those organisations relying on traditional measures of performance management were still focused on financial appraisal techniques.

It is clear that

> "established financial analyses remain important in appraising investment choices, despite their limiting assumptions and their recognised shortcomings in capturing strategic project dimensions" (Northcott and Alkaraan, 2007, p.218).

but that these are being supported by non-financial analyses to support decision making.

The next section considers competitor monitoring, the use of which will contribute to better informed pricing decisions (Simmonds, 1982).

3.4 Competition Monitoring

As discussed in section 2.5.2 above Guilding (1999) identified five CFA practices of which competitive position monitoring was the most widely used but, despite their prominence in the literature, both competitor cost assessment and strategic pricing ranked lowest (Guilding, 1999). He found that three factors play significant contingent roles in both CFA usage and perceived usefulness; company size, competitive strategy and strategic mission. CFA usage was positively associated with business size; was used more by those following a build strategic mission and by prospector firms. He found no evidence of a relationship between industry sector and CFA usage (Guilding, 1999).

CFA supports the process of competitive analysis. This body of literature, which has its roots in Porter's work (1998), defines competitive analysis as

> "The process by which a company attempts to define and understand its industry, identify its competitors, determine the strengths and weaknesses of its rivals, and anticipate their moves. It embodies both competitive intelligence to collect data on rivals and the analysis and interpretation of the data for managerial decision making" (Zahra and Chaples, 1993, p.8).

Jaworski, Macinnis and Kohli (2002) provided a conceptual framework for the generation of competitor information which they posit will result in improved business performance. They emphasised that a collaborative approach to the process is better than relying on one individual suggesting, that whilst accountants can lead the CFA

process, it requires the input of information from other managers to be successful (Ward, 1992b; Hoque, 2006a).

The proper identification of competitors is considered a necessary precursor to competitive analysis to

> "avoid the dangers of a myopic approach to competitive strategy and will minimise the chances of being blindsided" (Bergen and Peteraf, 2002, p.158).

Their two stage framework is discussed in Appendix 1.4 below (Bergen and Peteraf, 2002). The issue of competition blind spots was considered in more detail by Zahra and Chaples (1993) who identified six blind spots resulting from a poorly designed competitive analysis process. These could lead to inappropriate strategic decisions being made which could have disastrous consequences for the company (Zahra and Chaples, 1993). The blind spots they identified are:

- Misjudging industry boundaries,
- Poor identification of the competition,
- Over emphasis on competitors' visible (as opposed to difficult to identify invisible) competences,
- Over-emphasis on where, rather than how, rivals will compete,
- Faulty assumptions about the competition and
- Paralysis by analysis caused by gathering data on too many competitors. Of relevance for accountants is that number crunching, as a replacement for 'what if' analysis, is seen as a symptom of paralysis.

As strategic costing (section 3.3.4 above) has already been reviewed and strategic pricing is not considered by the Researcher to be a SMA technique the remainder of this section will focus on the remaining three CFA practices identified by Guilding. These are reviewed separately despite a great deal of overlap between the practices (Guilding, 1999).

3.4.1 Competitive Position Monitoring

Simmonds (1981) definition of SMA provided in section 2.1.1 above restricts SMA to competitive position monitoring and competitor cost assessment, what he called "competitor accounting" (Simmonds, 1981, p.28). He identified that understanding the relative costs of competitors (rather than the actual level of our own costs) are more important in strategic decision making. Furthermore, there is a need to understand competitors selling prices, volumes, market share, strategy and resources in order to assess how the competition will react to our own strategic attacks. Simmonds (1986) then provided examples of MA measures, used to assess the movement in a firm's competitive position, which are more useful when considered in relation to the competition. They are sales and market share; relative market share; profits and return on sales of competitors; volumes and relative unit costs; movements in unit selling prices; cashflow; liquidity and resource availability; and future demand.

3.4.2 Competitor Cost Assessment

Bromwich (1990) used the same definition of SMA as Simmonds (1981) and therefore also saw SMA as assessment of competitors using MAI. He used contestable market theory to demonstrate that, for a firm's competitive strategy to be sustainable, it needs to possess cost advantages, over its rivals, that it expects to retain in the future. In order to achieve this, it is necessary to focus on the cost structures of all firms currently in the market as well as those likely to enter the market. This was in contrast to Simmonds who considered that information may only be needed in relation to existing competitors (Simmonds, 1986).

Jones (1988) provided a detailed account of competitor cost analysis at Caterpillar. Throughout this process competitor data gathered is validated with reference to the firm's own costs, as such he considered that reliable internal costs are a pre-requisite to this approach. Using this analysis contributed to a thirty-five to forty percent cost reduction. He warned that, because the competition does not stay still, competitor cost analysis must become a way of life, as opposed to a one-off exercise.

3.4.3 Competitor Performance Appraisal based on published financial statements

Ward (1992b) considered a number of potential sources of competitor information as shown in Figure 12 below. To this list the internet is an obvious additional source of information which has been developed in the intervening period.

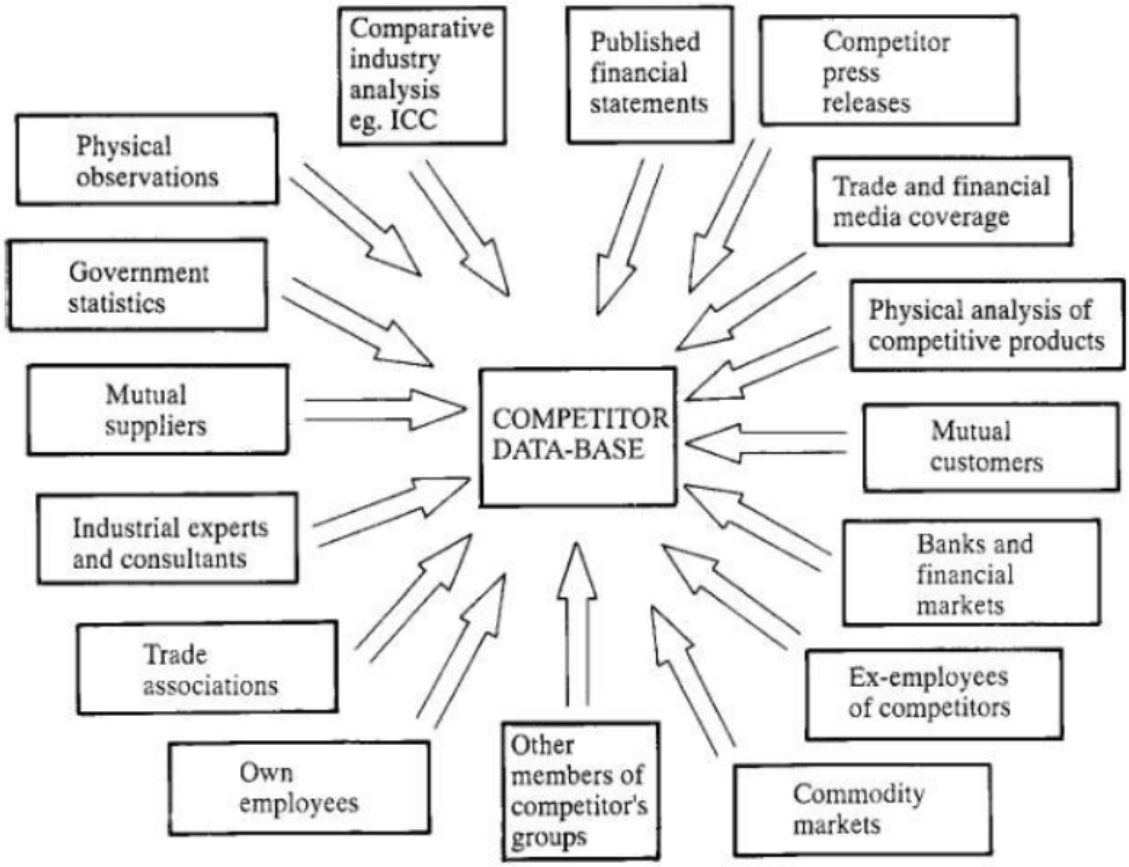

Figure 12: Sources of competitor information
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(Ward, 1992b, p.110)

Bates and Moon (1993) chose to focus their analysis on published financial statements which are:

> "an excellent source document from which to estimate and extrapolate such data [sales, costs and profits] whilst avoiding prohibitively high collection costs" (Moon and Bates, 1993, p.140).

Their four stage 'CORE' (Context, Overview, Ratio and Evaluation) framework used ratio analysis to evaluate how competitive organisations have performed in those areas of key strategic importance as identified in stages one and two (context and overview). This type of analysis now seems to be standard content in accounting textbooks aimed at non-accountants (for example chapter 7 by McLaney and Atrill (2018)).

A common theme in the CFA literature is the need to interpret imprecise data regarding competitors (Ward, 1992b). Rangone (1997) proposed a fuzzy linguistic framework to assess competitors' performance where precise information is difficult to obtain. She concluded that:

> "the fuzzy linguistic framework may represent an effective tool to support managers in: (i) comparing the competitive position of their company relative to competitors; (ii) choosing the 'most suitable' strategy among a given set of alternatives , in terms of the overall impact on organizational effectiveness" (Rangone, 1997, p.217).

The framework is also useful in aiding communication between managers from different disciplines involved in the process by agreeing on factors which are critical to the success of their company (Rangone, 1997).

It can be seen that a competitive analysis process "is the cornerstone of effective strategy formulation and implementation" (Zahra and Chaples, 1993, p.7) and that "an assessment of competitive position based on accounting data and accounting concepts is quite feasible and of significant managerial value" (Simmonds, 1986, p.31). The final section of this chapter reviews the literature in relation to customer accounting (CA)

3.5 Customer Accounting (CA)

McManus (2013) defined CA as:

> "the process of identifying, measuring, communicating and reporting economic information relating to a customer or customer group" (McManus, 2013, p.140).

It is a clashing point between MA and marketing, with the marketing literature being unclear and contradictory in its definitions whilst at the same time being innovative in its thinking (Gleaves et al., 2008). Moreover the MA literature on CA is said to be

"fledgling" (McManus and Guilding, 2008, p.783) when compared to the marketing literature. The same point was made by Gleaves et al. (2008) and emphasised by McManus (2013) who found that the number of accounting based CA studies remains small.

As discussed in section 2.5.2 above Guilding and McManus (2002) identified four techniques associated with CA for their survey of Australian companies. As well as the holistic notion of CA they studied the usage and perceived usefulness of CPA; customer segment profitability analysis; lifetime customer profitability analysis; and the valuation of customers or customer groups as assets. In terms of usage only CPA and customer segment analysis came out above the mid-point score whereas in terms of perceived usefulness all four techniques were above the mid-point score. This survey was replicated in New Zealand by Lord, Shanahan and Nolan (2007) and Tanima and Bates (2015). In terms of usage and perceived usefulness the 2015 survey supported the findings of Guilding and McManus whereas in the 2007 survey all the techniques reported a usage level below the mid-point and only CPA had a perceived usefulness above the mid-point score. Lord, Shanahan and Nolan (2007) attributed their contrary findings to the smaller size of businesses in New Zealand compared to Australia.

The remainder of this section reviews the literature on each of these four individual CA techniques in turn before concluding with a section on CA in general.

3.5.1 Customer Profitability Analysis (CPA)

CPA has been defined as:

> "the evaluation, analysis and isolation of all the significant costs associated with servicing a specific customer/group of customers from the point an order is received through manufacture to ultimate delivery and the revenues associated with doing business with those specific customers/customer group" (Hoque, 2006b, p.125).

It stems from a recognition that "every dollar of revenue does not contribute evenly to net income" (Foster, Gupta and Leif, 1997, p.7) and that "we must recognise that no two customers are the same, even when they are in receipt of an identical product" (Smith, 1993, p.26).

Despite the strong support for CPA in the literature, its use by practitioners seems less clear. Surveys in Australia and New Zealand (see section 3.5 above) found usage levels less than perceived benefits. Brierley (2016) found that 86.5% of respondents used some form of profitability analysis with 55.6% of those using CPA. Drury and Tayles (2006) found that 74% of respondents used CPA. Both surveys concluded that the main use of CPA was to direct attention rather than as a decision-making tool. Some organisations therefore seem to be missing out on the benefits of CPA as identified by Ward (1992b) or Connelly and Ashworth (1994b). Fish et al (2017) considered why this might be the case. They identified an implementation which was only partially completed and never progressed to the point of allocating costs not directly traceable to customers. This was not because of IT problems or other organisational priorities taking precedence, which have been identified as inhibitors to MA innovation in other studies, but due to managers resisting the implementation and preferring to rely on their own intuition in analysing customer profitability.

A process for completing a CPA including a consideration of how overheads can be allocated to customers is included in Appendix 1.5.1.

3.5.2 Customer Segment Profitability Analysis

Like CPA this is a retrospective analysis, unlike CPA the profitability analysis is done for groups of customers rather than individual customers. Individual CPA may not be practical or cost effective when there are many customers and so customers can be grouped together to make the analysis more manageable. Customer classifications for analysis should be chosen to fit the business strategy rather than for the convenience of the data available (Ward, 1992b). According to Ward (1992b) segmentation can be on the basis of distribution channel; by customer size; by the number of sales points of customers; or by sales method. It is possible that organisations could prepare both a segment profitability analysis whilst at the same time preparing a CPA for a limited number of customers. Customer segment profitability analysis, being at a more aggregated level reduces the issue of overhead cost allocation associated with CPA.

Guilding, Kennedy and McManus (2001) demonstrated the usefulness of the technique. A customer segment analysis (business and leisure travellers) identified that lower

contributions on room sales from business travellers were more than offset by increased margins on other activities such as food and beverage sales. They identified a need to change the marketing strategy to be aimed more at business travellers than at leisure travellers, who based on room rates alone, were thought to be more profitable.

3.5.3 Lifetime Customer Profitability Analysis

This is also known as customer lifetime value (CLV) and is what Holm, Kumar and Plenbord (2016) called a prospective, as opposed to a retrospective, CA practice. The analysis is performed at an individual customer level calculating the expected future value of profits a customer relationship may generate. It is defined as the NPV of cashflows that a business expects to receive from a customer overtime (Chang, Chang and Li, 2012). In their review Chang, Chang and Li (2012) found that, whilst a number of approaches to the calculation have been suggested, no superior approach has yet been identified.

Pfeifer, Haskins and Conroy (2004) also considered various methods of calculating CLV and excluded customer acquisition costs from their calculations as they were sunk costs. However, in terms of prospecting for new customers then firms should do so only if the expected probability of acquisition multiplied by CLV exceeds the cost of acquisition. CLV analysis can therefore be used to inform marketing decisions about the best way to spend valuable marketing resources (Chang, Chang and Li, 2012). CLV calculations clearly incorporate assumptions regarding the future behaviour of customers. The implication of miscalculating CLV were considered by Malthouse and Blattberg (2005) and discussed in Appendix 1.5.2.

3.5.4 Valuation of Customers or Customer Groups as Assets

This approach to CA is also referred to as customer equity (CE). Like CLV it is also a prospective CA practice but unlike CLV it takes account of all customers and not just individual customers. It was defined by Hogan, Lemon and Rust (2002) as

> "the total of the discounted lifetime values summed over all the firms customers" (Hogan, Lemon and Rust, 2002, p.6).

Whilst it is not clear from this definition, they include potential customers in the calculation when they stated that CE is a function of the value of existing customers, potential customers and the firm's CE management skills. According to Persson and Ryals (2010)

> "the finance community has not shown any noticeable interest in these increasingly well-established marketing metrics [CLV and CE] and, in fact, few companies have adopted them " (Persson and Ryals, 2010, p.417).

They suggested that this may be because of confused terminology in the marketing literature and reservations, amongst accountants, regarding the reliability of measures of CLV and CE. They proposed a CE scorecard as a basis for including CE statements in financial commentaries, albeit this was discussed from the perspective of improving transparency to an external audience rather than for internal management decision making purposes (Persson and Ryals, 2010).

Guilding and McManus (2002) also found a low usage of both of these techniques, criticising accountants for failing to take a long-term perspective:

> "it appears that CA is another accounting technique where the long-standing criticism of accounting's short-termism tendency is again in evidence" (Guilding and McManus, 2002, p.56).

Customer relationships represent assets critical to organisational success (Guilding, Kennedy and McManus, 2001), actively managing CE as a strategic asset can enhance the value of a firm (Hogan, Lemon and Rust, 2002). Customers represent another asset, along with internal brands, IC and human resources, not valued in financial statements but SMA appears to offer techniques which are able to address this, despite the apparent reluctance of accountants to make use of them.

3.5.5 Customer Accounting revisited

Lind and Strömsten (2006) provided a conceptual framework as to when each of the above four CA techniques should be used. They identified four different customer relationships; transactional, facilitative, integrative and associate, each with its own associated CA techniques as shown in Figure 13 below:

Technical interface to customers \ Organizational interface to customers	High	Low
High	Life time profitability analysis	Customer valuation analysis
Low	Customer profitability analysis	Customer segment profitability analysis

Figure 13: How customer accounting techniques are related to the inter-organisational interfaces of a firm

(Lind and Strömsten, 2006, p.1260).

Empirical evidence largely supported the framework but also demonstrated that firms used a mixture of CA techniques for the same customer relationship (Lind and Strömsten, 2006).

Considering the impact on business profits of adopting CA Holm, Kumar and Plenborg (2016) reported that it was not a source of sustainable competitive advantage. They observed that initial increases in profits in the two years following adoption then started to fall. They reasoned that CA systems make customer knowledge less tacit (more explicit) and therefore more capable of being copied by competitors meaning that increases in profit were only short-lived. In terms of future research, as a result they suggest

> "it could also be interesting to look into how management accounting innovations travel across firms within a sector or an industry – e.g., via the transfer of people and the involvement of consultants or software vendors– so as to establish a more profound understanding of the imitation process and its links with competitive advantage" (Holm, Kumar and Plenborg, 2016, p.27).

Following this suggestion, the involvement of construction firms in networking activities and its influence on the adoption of SMA techniques was considered. Networking was added to the conceptual framework (see Figure 14 below) as a possible contingent variable.

Another study on the use of CA and organisational performance by Al-Mawani, Zainuddin and Ali (2012) concluded that only CPA has a positive relationship with organisation performance. However, the study was of service sector companies listed on the Amman stock exchange and so care must be taken in generalising this finding.

As discussed in section 2.5 several authors have applied a contingency theory approach towards their CA research. Contingent variables assessed are market orientation; intensity of competition; competitive strategy; organisation structure; culture; management style; environmental uncertainty, costing methodology, company size and industrial sector. In summary a positive association was found between a market orientation and the use of CA. This should not be a surprise given the work of Slater and Narver (1994) who explained how a market orientated business has a strong customer focus.

It is clear from the above analysis that CA techniques are important SMA techniques. As Rigby and Bilodeau said "great companies today focus on customers more than on competitors" (Rigby and Bilodeau, 2017, p.10). Used appropriately CA allows that focus to be as sharp as possible.

This chapter has reviewed the twenty-four MATs, as identified in section 2.1.2 above, which conform with the definition of SMA used in this study. The next chapter will present a contingency framework for the use of the SMA techniques in medium sized construction companies.

4 A conceptual framework for the construction industry

Given the above review of the literature the following conceptual framework (see Figure 14 below) was proposed. Subjecting this framework to empirical testing addressed a gap in the literature; namely a lack of research into the use of SMA by medium sized firms in the UK construction industry. The contribution to knowledge made by this research is to extend our knowledge of contingency theory by examining a number of contextual factors which help to explain the use of SMA in medium sized UK construction companies.

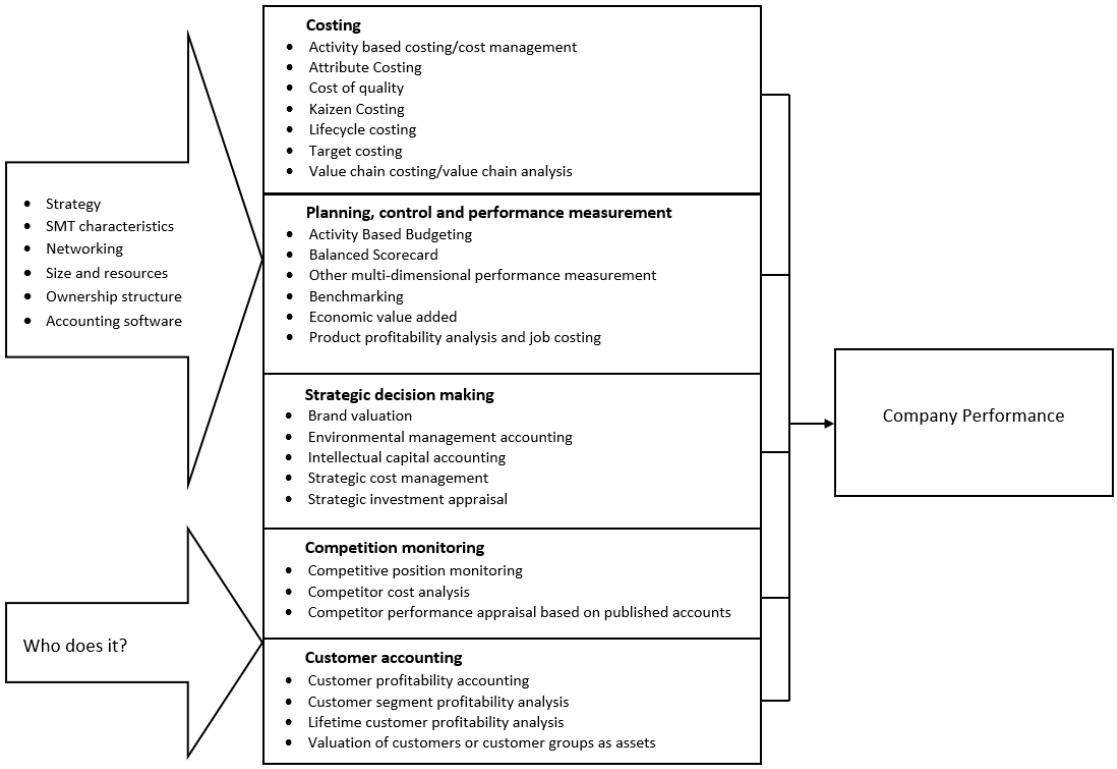

Figure 14: A contingency model of SMA usage in medium sized construction companies

Twenty-four SMA techniques were identified in section 2.1.2 above, all of these have been included in the conceptual framework. Given the prominence of the BSC in the multi-dimensional performance measurement literature (see section 3.2.2 above) this has been included as a technique in its own right.

At this stage all the SMA techniques identified in the literature were included in the conceptual framework and included in the exploratory survey as described in chapter 5 below. Given the focus of this study is medium sized construction companies a number

of the techniques do not seem relevant. Due to the size of the businesses being studied ABC; ABB; EVA; brand valuation and ICA do not seem relevant and, due to the nature of the industry, attribute costing, KC and EMA do not seem relevant. However, should these initial conclusions be incorrect, at this stage they have all been included in the conceptual framework.

A large number of contingency factors affecting the design of MCS were identified in the literature review above. Six which seem relevant to medium sized firms in the construction industry have been included in the conceptual framework above and discussed briefly below.

As discussed in section 2.5.1 above a firm's business strategy has been shown to affect the design of its MCS although authors report ambiguous findings of the effect of strategy on MAPs (Kald, Nilsson and Rapp, 2000), according to Langfield Smith (1997) this is because of the inconsistent way strategy has been operationalised. Ambiguous findings also exist in respect of the effect of strategy on the use of SMA. For example, the findings of Cinquini and Tenucci (2007), who concluded that SMA usage is not strategy driven, were different to the findings of Cadez and Guilding (2008). This study investigated whether, in the construction sector, different strategic choices are associated with the use of different SMA techniques.

Leadership support for MA initiatives seems to be a major factor in their success (Elnathan, Lin and Young, 1996; Innes, Mitchell and Sinclair, 2000; Bangert, 2012). Kalkhouran, Nedaei and Rasid (2017) found that the educational background of the CEO was positively related to the use of SMA techniques, but that CEO experience was not. However, Santini (2013) found no relationship between the qualifications of owners/managers and the use of SMA in SMEs. Fish et al. (2017) investigated the reason for a CPA implementation not being completed, citing managers resistance to the project and their preference to rely on their intuition of customer profitability as major contributory factors. As Hambrick suggested:

> "If we want to understand why organizations do the things they do, or why they perform the way they do, we must consider the biases and dispositions of their most powerful actors-their top executives" (Hambrick, 2007, p.334).

The ‘characteristics’ of the whole SMT were therefore included in the conceptual framework.

As discussed in section 2.3 above, Messner (2016) expected organisational practices to be influenced by (amongst other things) industry conferences or by industry bodies or trade associations, all forms of networking. Holm, Kumar and Plenborg (2016) called for future research on how MA innovations are imitated across sectors, networking could be a part of this imitation process. Kalkhouran, Nedaei and Rasid (2017) found that the participation of the CEO and other directors in networking activities were positively related to the use of SMA techniques. Whilst Eberhard and Craig (2013) identified that networking gave SMEs a credibility and legitimacy they would otherwise lack. The Researcher’s experience (see Appendix 11.9) is that medium sized construction companies are highly involved in networking activities. As a result, networking activities were included in the conceptual framework.

Firm size is a contingent factor regularly investigated in SMA research, generally findings indicate a positive relationship (Guilding, 1999; Cadez and Guilding, 2008; Santini, 2013) although this is not a universal finding (Cinquini and Tenucci, 2007; Lachmann, Knauer and Trapp, 2013). If size is a contingent factor on the use of SMA, then even with a population restricted to medium sized companies, a variation in SMA usage is expected to be found within the sample. Firm size, measured by employee numbers, was included in the conceptual framework.

O’Regan, Sims and Ghobadian (2005) concluded, within their sample of SMEs, that ownership was a key factor in financial performance. Dyer (1997) suggested that owner-managers relied more on intuition in their decision making, whereas managers of subsidiary firms were likely to be subjected to a more structured and logical approach. No research has been conducted into corporate ownership as a contingent factor on SMA usage, but the above findings suggested that this warrants further investigation.

As discussed in Appendix 11.10 the Researcher has a vast experience of selecting and implementing new accounting software. In his experience there are only a limited number of packages designed for use by medium sized construction companies.

Messner (2016) suggested that industry practices might be influenced by software firms offering industry specific software packages. Therefore, the impact of accounting software on the use of SMA and the extent to which this leads to an isomorphism of practices seems to be another contingent factor which merits further investigation.

As seen in section 2.7 above the role of the accountant in SMA has been discussed at great length in SMA research. Aver and Cadez (2009) found management accountants participation in the SMP of construction companies to be low. Santini (2013) found a positive correlation between return on investment (ROI) and the involvement of management accountants, this was despite a minimal use of SMA, suggesting that the involvement of accountants was counteracting the low level of SMA to produce improved ROI. The role played by accountants in the use of SMA by medium sized construction companies seemed to be an interesting objective to pursue in this study.

The association between the use of SMA in the construction industry and organisational performance is suggested on the basis of the findings of previous contingency theory-based research, whose central proposition is that organisational performance depends on the fit between organisational context and structure (Cadez and Guilding, 2008; Abdel Al and McLellan, 2013). A positive correlation between the usage of SMA and business performance was expected to be found.

This conceptual framework was subjected to empirical testing using the research design presented in the following chapter. Given the dearth of previous research into the use of SMA in medium sized construction companies, a mixed methods explanatory sequential design (Creswell and Plano Clark, 2017) was felt to be appropriate to answer the research questions, this approach is justified in full in the following chapter.

5 Research Methodology and Methods

5.1 Introduction

This chapter discusses the research philosophy adopted by the Researcher for this study; contains details, and justification of the mixed methods design of the research project; provides information on the sampling methods used together with details of actual response and participation rates; introduces the methods used to analyse the data and concludes with a review of the ethical considerations relevant to this research. The research has been designed to answer the following research question.

How can the reality gap and contingency theory be applied to assist in understanding the rationale of the use of SMA and its contribution to improved performance in medium sized construction companies based in the East Midlands of the UK?

5.2 Research philosophy and paradigm

A research paradigm is "a philosophical framework that guides how scientific research should be conducted" (Collis and Hussey, 2014, p.43) in particular cases. Two main research paradigms exist, positivism is a paradigm that emerged from the natural sciences, whereas interpretivism emerged as social phenomenon began to be studied as an evolution of the understanding of phenomenology for practical research purposes. These paradigms can be viewed as the two "extremities of a continuous line of paradigms that can exist simultaneously" (Collis and Hussey, 2014, p.45). Table 7 below details the main assumptions within each of these paradigms. There are clear differences but Bryman and Bell (2015) caution about "hammering a wedge between them too deeply" (Bryman and Bell, 2015, p.38).

Philosophical assumption	Positivism	Interpretivism
Ontological assumption	Social reality is objective and external to the researcher.	Social reality is subjective and socially conducted.
	There is only one reality.	There are multiple realities.
Epistemological assumption	Knowledge comes from objective evidence about observable phenomena.	Knowledge comes from subjective evidence from participants.
	The researcher is distant from the phenomena under study.	The researcher interacts with phenomena under study.
Methodological assumption	The researcher takes a deduction approach	The researcher takes an induction approach
	The researcher studies cause and effect, and uses static design where categories are identified in advance	The researcher studies the topic within its context and uses an emerging design where categories are identified during the process
	Generalisations lead to prediction, explanation and understanding	Patterns and/or theories are developed for understanding
	Results are accurate and reliable through validity and reliability	Results are accurate and reliable through verification

Table 7: Philosophical assumptions of Positivism and Interpretivism

(based on Collis and Hussey, 2014, p.46).

According to Scapens (2006) contingency theory based MAR follows a traditional mainstream economic approach adopting a positivist paradigm to MAR. This approach portrays MA as a set of techniques which faithfully represent economic reality which thereby enables it to support the rational decision making of management as underpinned by neoclassical economics theory of the firm (Scapens, 1994). A positivist approach was adopted in this study, based on the assumption that SMA techniques are chosen rationally because they accurately represent reality and are technically efficient (Alcouffe, Berland and Levant, 2008) and therefore provides MAI which allow managers to make rational decisions. The Researcher believed that it was possible to explain the use of SMA by establishing causal relationships between variables which are capable of being measured and observed.

The ontological and epistemological assumptions of each of these paradigms will now be considered. Ontology is described by Gill and Johnson as "the study of the essence of phenomena and the nature of their existence" (Gill and Johnson, 2010, p.241). Objectivism takes the view that social entities should be considered as objective entities that have a reality that is separate from the actors involved with them, whereas constructivism considers that they should be viewed subjectively, being socially constructed from the perceptions and actions of those actors (Bryman and Bell, 2015). Objectivism implies that we can discuss organisations as tangible objects with their own mission statement, set of objectives and procedures for how things are done. Actors are appointed to work in an organised structure where they are pressured to conform to policies and procedures, otherwise they may lose their jobs. The culture of the organisation also exerts an influence on how the actors behave, this culture belongs to the organisation, as such the organisation is an object and can therefore be viewed objectively. The organisation determines how actors behave and restricts their actions by setting boundaries to their behaviour (Bryman and Bell, 2015). This was the view taken by the Researcher in this study with the research methods described in section 5.3 below selected based on this ontological position. On the other hand, an alternative ontological position, constructivism, views organisations as constructs of the actors involved in them. Policies and procedures are important, but it is the reality of how they are interpreted and implemented by actors within the organisation that determines its characteristics. In that way organisations and actors cannot be separated and the social order that is created must therefore be in a state of continual renewal. In a similar way the culture of an organisation is in permanent flux, with the act of organisational problem solving by actors within the organisation continuously determining the culture of the organisation (Bryman and Bell, 2015). This view is the one taken by MA researchers who adopt the alternative interpretivist approaches discussed in section 2.6 above. For example, actor-network theory based MA research is said to contribute to a non-positivist research paradigm (Baxter and Chua, 2003).

Epistemology is a branch of philosophy that is concerned with what constitutes acceptable, valid and legitimate forms of knowledge (Saunders, Lewis and Thornhill, 2016). The epistemological assumption of positivism is that it is possible to make

observations about phenomenon objectively and neutrally, by applying rigorous procedures and protocols to test hypotheses. In this study the Researcher sought to be an objective observer of the use of SMA within medium sized construction companies and designed the research in such a way as to achieve this objective. The researcher considered it to be possible to remain objective in his data collection and analysis as discussed in section 5.3.4 below. An interpretivist approach would reject the above idea that the researcher can remain objective and that they themselves help to construct the phenomena being studied (Bryman and Bell, 2015). Interpretivism assumes that individuals and their institutions cannot be treated like objects in the natural sciences and that their behaviours can only be viewed subjectively. This in turn requires research methods that lead to researchers interacting with their research objects in order to understand human behaviour as opposed to simply explaining that behaviour (Bryman and Bell, 2015).

As discussed in section 5.3.1 below this study used a mixed methods research design, it adopted an positivist paradigm but used research methods to collect data typically associated with both of the paradigms discussed above. A positivist paradigm was adopted because the Researcher viewed businesses as entities which are capable of being viewed objectively and that it was possible to study the use of SMA, and the different contexts affecting its use, by applying a functionalist framework (Burrell and Morgan, 1979). Phase 1 made use of existing instruments to collect data which could be quantified prior to statistical analysis. Phase 2 involved the use of semi-structured interviews and other sources of information to gather qualitative data which the Researcher analysed in order explain the results from phase 1 and identify the contingencies affecting the use of SMA in medium sized construction companies. This approach enabled data to be collected from multiple sources which facilitated an accurate and valid explanation and understanding of the use of SMA in medium sized construction companies.

Two approaches to theory building are said to exist. A deductive approach uses existing theories to develop hypotheses, which are then empirically tested, the results of these tests are then fed back to confirm or reject the hypotheses. Alternatively, in an inductive approach to theory building, observation and findings lead to the generation of new

theory (Collis and Hussey, 2014). As a positivist the Researcher adopted, the more common, deductive approach for this study. This is because there is an existing literature in relation to SMA from which the conceptual framework (see Figure 14 above) was derived and subjected to empirical testing in the construction sector. As a result of this empirical work a revision to the original conceptual was considered necessary (see Figure 23 below). As discussed in section 2.5 above the use of contingency theory to study MA, whilst at its early stages of development (Otley, 2016), is an established theory suitable for exploring the use of SMA and its impact on business performance within the sector. The next section discusses the research design and methods used in more detail.

5.3 Research designs and methods

Bryman and Bell (2015) describe a research design as "a framework for the collection and analysis of data" (Bryman and Bell, 2015, p.49) and identify five different types of design:

- Experimental design;
- Cross-sectional design;
- Longitudinal design;
- Case-study design and
- Comparative design.

Table 8 below summarises the different type of research methods which can be associated with different research designs and strategies.

Research design	Research strategy	
	Quantitative	**Qualitative**
Experimental design	Quantitative comparisons between experimental and control groups	No typical method
Cross-sectional design	Survey Structured observation Content analysis	Qualitative interviews at a single point in time Focus groups at a single point in time Qualitative content analysis on documents relating to a single event
Longitudinal design	Survey on a sample on more than one occasion Content analysis of documents from different time periods	Ethnographic research over a long-time frame Qualitative interviewing on more than one occasion Qualitative content analysis of documents relating to different time periods
Case-study design	Survey on a single case	Ethnographic study Qualitative interviews (both on a single case)
Comparative design	Survey across two or more cases where direct comparisons are made	Ethnography Qualitative interviews (both on two or more cases where direct comparisons are made)

Table 8: Research strategy, research design and typical types of research method (based on Bryman and Bell, 2015, p.77).

Table 9 below is an analysis, by research method, of the previous studies, as identified in section 2.1.2 above, which have investigated a broad range of SMA techniques.

Research design	Research strategy	
	Quantitative	**Qualitative**
Experimental design	None found	None found
Cross-sectional design	Guilding (1999); Guilding, Cravens and Tayles (2000); Cravens and Guilding (2001); Baines and Langfield-Smith (2003); Cadez and Guilding (2007); Cinquini and Tenucci (2007); Cinquini and Tenucci (2010); Fowzia (2011); Cadez and Guilding (2012); Lachmann, Knauer and Trapp (2013); Pasch (2019); Petera and Šoljaková (2020)	Roslender and Hart (2002); Roslender and Hart (2003)
Longitudinal design	Kalkhouran, Nedaei and Rasid (2017)	Cuganesan, Dunford and Palmer (2012)
Case-study design	None found	Rickwood, Coates and Stacey (1990); Coad (1996); Lord (1996); Hoque (2001); Tayles et al. (2002); Tillmann and Goddard (2008); Ma and Tayles (2009); Nixon and Burns (2012)
Comparative design	Hatif AlMaryani and Sadik (2012)	None found

Table 9: Research methods of significant SMA published research

As explained by Bryman and Bell (2015) experimental designed research is rare in business and management so finding no such SMA research is not unexpected. It can be seen that the vast majority of SMA research is either quantitative based and of a cross-sectional design, or qualitative based and of a case-study design. There is a lack of qualitative based cross-sectional studies possibly due to the time-consuming nature of such studies.

Analysing research methods into discrete categories does not imply that different methods cannot be used together in the same research project. Two SMA articles by Cadez and Guilding (2008) and Santini (2013), which do not fit into the analysis above, demonstrate this approach. It is becoming increasingly popular for quantitative and qualitative research methods to be combined in the same research project, an approach referred to as mixed methods research (Saunders, Lewis and Thornhill, 2016).

5.3.1 Mixed methods research

According to Creswell and Plano Clark (2017) mixed methods research has the following core characteristics:

> "In mixed methods, the researcher
> - Collects and analyses both qualitative and quantitative data rigorously in response to research questions and hypotheses,
> - Integrates (or mixes and combines) the two forms of data and their results,
> - Organised these procedures into specific research designs that provide the logic and procedures for conducting the study, and
> - Frames these procedures within theory and philosophy." (Creswell and Plano Clark, 2017, p.5)

Certain types of research problems are best suited for applying a mixed methods approach such as when; one data source is insufficient; results need to be explained; exploratory findings need to be generalised; a second method is needed to enhance a primary method; a theoretical stance requires it and a longitudinal design requires the gathering of different types data at different points in time. It is however not without its challenges; it is time consuming; it requires additional resources; it requires the researcher to have the requisite skills and, as a relatively new method, other researchers may not recognise the need for this approach and may need convincing of its validity (Creswell and Plano Clark, 2017).

Creswell and Plano Clark (2017) recommend three core mixed method designs as follows:

- The convergent parallel design;
- The explanatory sequence design;
- The exploratory sequence design.

The second of these, the explanatory sequence design is a two-phase interactive process. The researcher starts with a quantitative phase in which data is collected and analysed. This is followed up by a second, qualitative phase, the aim of which is to explain the results of the first phase, as depicted in Figure 15 below. This design addresses the issue of the additional resources required for mixed methods research as the two methods of data collection are undertaken consecutively, allowing an individual researcher to conduct this type of design. It also means that the final report can be more straightforward to write and that an emergent approach can be adopted, with the design of the qualitative phase of the project being based on the results of the initial phase (Creswell and Plano Clark, 2017).

This design has specific challenges, the two-phase approach lengthens the amount of time required to complete the project; before the second phase can commence a thorough analysis of the quantitative data is required in order to identify which results need following up in phase two. This time delay may also lead to respondent's circumstances changing, making them less likely to be available for the second phase of the project. Finally, as considered further in section 5.4.2 below, the researcher must decide who to sample in the second phase of the project (Creswell and Plano Clark, 2017).

Step 1	**Design and Implement the Quantitative Strand** • State quantitative research questions and determine the quantitative approach • Obtain permissions • Identify the quantitative sample • Collect closed-ended data with instruments • Analyse the quantitative data using descriptive statistics, inferential statistics, and effect sizes to answer the quantitative research questions and facilitate the selection of participants for the second phase

Step 2	**Use Strategies to Connect from the Quantitative Results**
	• Determine which results will be explained, such as
	  ○ Significant results
	  ○ Nonsignificant results
	  ○ Outliers
	  ○ Group Differences
	• Use these quantitative results to
	  ○ Refine the qualitative and mixed methods questions
	  ○ Determine which participants will be selected for the qualitative sample
	  ○ Design qualitative data collection protocols

Step 3	**Design and Implement the Qualitative Strand** • State qualitative research questions that follow from the quantitative results and determine the qualitative approach • Obtain permissions • Purposefully select a qualitative sample that can explain the quantitative results • Collect open-ended data with protocols informed by the quantitative results • Analyse the qualitative data using procedures of theme development and those specific to the qualitative approach to answer the qualitative and mixed methods research questions
Step 4	**Interpret the Connected Results** • Summarise and interpret the quantitative results • Summarise and interpret the qualitative results • Discuss to what extent and in what ways the qualitative results help to explain the quantitative results

Figure 15: Procedures for implementing an explanatory sequence design

(Creswell and Plano Clark, 2017, p.79)

Whilst not referred to as mixed methods, the studies by Cadez and Guilding (2008) and Santini (2013) mentioned above, are the only two examples of mixed methods research design which could be found in the SMA literature. Cadez and Guilding (2008) conducted ten exploratory interviews following a large scale survey and used the qualitative data

to validate the findings of the survey. Similarly Santini (2013) followed up a survey of forty companies with telephone calls to check the accuracy of the survey answers. This study therefore adds to the very small body of mixed methods based SMA research. This choice was made on the basis that the exploratory survey would give some initial data, from a large sample, in relation to the use of SMA in a sector not previously studied. These preliminary findings could then be used to identify appropriate interviewees to allow an in-depth understanding and explanation of the findings of the survey impossible to obtain by using survey data alone.

The research took place in two distinct phases as follows;

Phase 1. An electronic web-based survey was sent to the head of business (hereafter referred to as the managing director (MD) for convenience) and another to the head of the finance function (hereafter referred to as the financial director (FD) for convenience) of all the medium sized construction companies in the East Midlands. The aim of the survey was to collect some exploratory data to answer the following questions

To what extent are SMA techniques used by medium sized construction companies?

Which contingent variables help to explain the use of SMA in medium sized construction companies?

and used a quantitative approach to data analysis, using SPSS software, to analyse the results.

Phase 2. The results obtained in phase 1 were used to identify potential participant organisations to take part in semi-structured interviews. At the initial design stage, the interviews were to be restricted to participants who had completed the initial survey as it was felt that they would be the best people able to provide explanations of the results of the first phase of the research. However, as explained later, this plan was amended as the number of available participants from the original population was not sufficient to get a broad enough range of responses. The aim of this phase was to collect data to answer the following research questions:

To what extent are SMA techniques used by medium sized construction companies?

Who is responsible for using these techniques?

Which contingent variables help to explain the use of SMA in medium sized construction companies?

Does the use of SMA contribute to an improvement in the performance of medium sized construction companies?

That is, to "interpret and place in context the results of the statistical analysis" (Bryman and Bell, 2015, p.651) of the data gathered in phase 1. It was felt that interview data would be the only way to establish a deep understanding and explanation of the results of phase 1. To quote Brinkmann and Kvale "If you want to know how people understand their world and their lives, why not talk to them?" (Brinkmann and Kvale, 2015, p.1). All the interviews were recorded, transcribed, and data analysis was undertaken using thematic analysis making use of NVivo software.

This approach to the research design has been suggested by other SMA researchers. In justifying their use of a qualitative cross-sectional design approach Roslender and Hart (2003) rejected the use of a survey on the basis that it would be

> "unlikely to produce the necessary level of detail or depth of insight required about developments involving both management accountants and their marketing management counterparts" (Roslender and Hart, 2003, p.262).

They also considered the use of 2 or 3 intensive case-studies, but that approach was

> "also rejected on the grounds that, despite its demonstrated capacity to provide rich accounts of practice and provocative insights, it may not capture the range of such practices and insights" (Roslender and Hart, 2003, p.262).

Whilst the Researcher agreed that surveys could not capture the level of detail to answer the research questions, it was felt that they were an ideal instrument to gather a volume of information to enable an exploratory understanding of the use of SMA in medium sized construction companies. Furthermore, in order to establish which contingencies effect the use of SMA, it was felt that ascertaining this using a survey would make it too

long for respondents to complete, resulting in low response rates. The Researcher also felt that a single case-study design would not allow the scope to investigate the full range of interesting results originating from the survey data furthermore, interviews with participants from a number of different companies would allow data triangulation (Collis and Hussey, 2014).

Langfield-Smith (2008) actually called for an end to surveys of SMA techniques asking for more work on the manner in which these techniques are used in practice and how the change process of their introduction occurs. The second phase of this research addressed her first point, but it was felt that to precede it with a survey was beneficial in two respects. Firstly, such a survey had never been conducted in the construction industry and secondly, it was be used to identify interesting cases for further investigation.

The survey approach alone, whilst popular (as demonstrated in Table 9 above) and a cost effective way of gathering large amounts of quantitative data from a large number of different organisations (Dillman, Smyth and Christian, 2014), has been criticised as an approach to SMA research in SMEs by Santini (2013). He claimed that a lack of understanding of SMA terminology has resulted in the use of SMA techniques being understated. He supported his claims by following up his survey with telephone interviews to all respondents. During these interviews some of the answers to the survey questions were corrected resulting in an increased use of SMA than first recorded. He concluded, “on the basis of these findings, the exclusive use of questionnaires, without interviews, does not seem to be the best way to conduct such studies” (Santini, 2013, p.82).

In respect to CBMA research Otley (2016) concluded that this approach is still in its early stages and progress has been limited. This is due to most research adopting a survey-based approach with little use of combining them with interpretive methods. This view provides further support for the use of the explanatory sequence design adopted in this study. He called for research using middle range thinking, an approach in which theories cannot be tested in a positivist sense but allows them to be changed in the light of new interpretations. He describes them as

> "underlying theories [which] can be seen as a 'skeleton' that give researchers a language to discuss the empirical situation and which are given meaning by the empirical 'flesh'" (Otley, 2016, p.55).

This approach was also recommended by Chenhall (2006) who says that "much can be gained by combining case evidence with surveys within contingency-based frameworks" (Chenhall, 2006, p.194). Others have also called for more qualitative methods to be adopted in researching the reasons for adopting SMA techniques (Sulaiman, Ahmad and Alwi, 2004; Guilding, 1999; Dent, 1990). Merchant and Otley (2007) called for field based research to study the use of MCS in their natural setting in order to develop a rich understanding of the phenomena.

> "This rich understanding often allows the research to go beyond the questions of what (identification) and how (explanation) and into the question as to why certain phenomena exist as they do" (Merchant and Otley, 2007, p.790).

As SMA forms part of a firm's MCS then this view lends yet more support for this research design.

5.3.2 Phase 1: Survey

This section describes the web-based survey and justifies the decisions made during its design. The design process was guided by Dillman, Smyth and Christian (2014), Collis and Hussey (2014) and Bryman and Bell (2015).

Initially one survey was designed to capture both the usage and perceived usefulness of using SMA techniques, the contingent variables thought to affect the usage of SMA techniques, the respondent's perceptions of the performance of their organisation as well as some basic information relating to the respondent and their organisation. The result was a survey with over one hundred individual questions which, it was estimated, would take over thirty minutes to complete. Given the increased risk of bias in the findings of surveys with low response rates (Dillman, Smyth and Christian, 2014) and the need to achieve an acceptable level of response it was decided to reduce the scope of the survey. As a result, two different, shorter, questionnaires were designed, one for the MD, another for the FD which, it was estimated, would each take ten minutes to complete.

The survey for the FD (see Appendix 3) contained questions about their organisations use of the twenty-five SMA techniques included in the conceptual framework, measured on a five-part Likert scale with a range of 'used all the time' to 'not used at all' (Cinquini and Tenucci, 2007). It also asked about the perceived usefulness of using these techniques in helping to deliver the objectives of their organisation. This was also measured on a five-part Likert scale with a range of 'extremely useful' to 'not at all useful'. All the questions about contingent variables were removed from the FD survey due to limitations on the survey length and the ability to collect richer data during phase 2 of the data collection.

In the survey for the MD (see Appendix 4) all the questions about SMA usage or its perceived usefulness were removed. It did, however, contain questions regarding three of the contingent factors included in the conceptual framework; business strategy; networking and the characteristics of the CEO. Data on the remaining three contingent factors contained in the conceptual framework was obtained from the FAME (Bureau van Dijk, 2018) database and during the interviews.

Business strategy was operationalised using the instruments used by Cinquini and Tenucci (2010), Kale and Arditi (2002) and Oyewobi et al. (2016) the last two of which had been used previously in the construction industry. These instruments capture a multi-dimensional perspective on strategy using the three typologies identified in the literature (see section 2.1.3 above) and as recommended by Kald, Nilsson and Rapp (2000).

In the Researcher's own experience networking activities can have a major influence on the use of SMA (see Appendix 11.9). In order to capture the extent to which businesses in the survey were engaged in networking, the Researcher identified eight networking activities and respondents were asked if their business was involved in these activities or not. An opened ended question was also asked to allow respondents to identify any additional networking activities not identified by the Researcher in the original list.

The characteristics of the CEO were measured using the instrument adopted by Kalkhouran, Nedaei and Rasid (2017) as discussed in section 2.5.2 above. This included

a question on their highest level of education and the number of years' experience they had working in their current role and within the sector generally.

Both surveys asked the same three questions about the performance of the business over the previous three years and the extent to which it achieved its strategic objectives over the same period. This approach to evaluate the performance of a business by asking the executives has been used by others in the past and is seen as equally reliable as objective measures of firm performance (Bedford, 2015). Based on the instrument used by Bedford (2015) respondents were asked to assess the performance of their business based on four measures; sales growth; relative market share; profitability and customer satisfaction. Based on the instrument used by Cravens and Guilding (2001) respondents were asked to compare each of these four measures, firstly against their main competitors and secondly against their own business objectives, using a three-part Likert scale of above average, same as competitors/objectives, or below average. For the third question, to what extent do you think your company had achieved its strategic objectives, a seven-part Likert scale was used with 1 being 'not at all' to 7 being 'completely'. Copies of the final survey questions are included in Appendices 3 and 4 below.

In order to aid respondent understanding the original survey design also included a description of each SMA technique prior to asking about their usage. This approach has been used by others in previous SMA surveys such as Guilding, Cravens and Tayles (2000), Cravens and Guilding (2001), Cadez and Guilding (2007, 2008) and Cinquini and Tenucci (2010). However, in this case the provision of this information was adding significantly to the estimated survey completion time and was therefore removed. It was considered important that respondents had access to this information if required and therefore, a separate glossary of terms of SMA techniques was compiled. This was sent to the FD, as an attachment to the email invitation to take part in the survey. Whilst this introduced an "additional potential for measurement error due to the onus placed on respondents to undertake additional reading and interpretation" (Guilding and McManus, 2002, p.57) it was felt that this would make responses to the survey more comparable by reducing respondent's different interpretation of terminology. A copy of the glossary of terms is included in Appendix 5.

Once the surveys designs were finalised, they were transposed into Qualtrics (Qualtrics, 2020), a web-based survey software used for distributing surveys and collecting data from respondents. Prior to distributing the surveys, they were piloted by academics whose feedback was used to make some minor amendments to the final versions of the surveys. Measurement scales for the responses were then designed and added into the Qualtrics software. This allowed appropriate statistical analysis techniques to be used to analyse the data collected. This analysis took place in SPSS (IBM, 2020) using data exported from Qualtrics. The statistical techniques used, and the results obtained are presented in chapters 7 to 10 below.

5.3.3 Phase 2: Case-study/cross-sectional hybrid

This section describes phase 2 of the research design and justifies the decisions made during its design. The design process was guided, amongst others by Yin (2013) and Brinkmann and Kvale (2015), but always with the research questions in mind. The final design was not what was initially envisaged by the Researcher, it evolved during the course of the data collection as a result of being unable to implement the original planned design. The final design comprised of a single case-study together with a number of semi-structured interviews which acted partly as additional triangulation for the case-study, but also as stand-alone data. This final approach is best described as case-study/cross-sectional study hybrid.

Initially the research design for this phase was to purposively sample from the organisations that responded to the survey in phase 1. This design was based on the recommendations of Creswell and Plano Clark (2017) as summarised in Figure 16 below.

Decisions Needed in Data Collection	Recommendations for Designing a Mixed Methods Study
Will the same or different individuals be used in both samples?	Individuals who participate in the qualitative phase should be individuals who participated in the quantitative phase.
Will the samples be the same size?	The qualitative follow-up phase has a smaller sample size then the quantitative phase.
What quantitative results will be followed up?	Consider multiple options depending on the follow-up needed (e.g. significant results, surprising nonsignificant predictors, outliers).
How will follow-up participants be selected?	Select follow-up participants based on initial quantitative results.
How should the emerging follow-up phase be described for institutional review board approval?	Describe the follow-up phase as tentative and file an addendum with the institutional review board as needed.

Figure 16: Decisions needed and recommendations for data collection in an explanatory sequence design

(Creswell and Plano Clark, 2017, p.185).

Initially it was planned that the selection of interviewees was to be drawn from an analysis of the responses to the FD survey. This analysis classified responding organisations into four categories as follows:

High Use of SMA/High Perceived benefit of using SMA;
High Use of SMA/Low Perceived benefit of using SMA;
Low Use of SMA/High Perceived benefit of using SMA;
Low Use of SMA/Low Perceived benefit of using SMA.

It was believed that selecting interviewees to cover organisations from each of these categories would capture a full range of possible different approaches to, and perceptions of the use of SMA within medium sized construction companies. Figure 17 below shows the distribution of survey responses across each of these four categories.

Figure 17: Analysis of average scores of respondent companies

After starting to contact each of the respondents selected using the above method it became apparent that the above approach was not going to be successful and a revised strategy of convenience sampling (Collis and Hussey, 2014) and snowball sampling (Venter, Boshoff and Maas, 2005) was then pursued. This was a practical response to the access problems encountered when contacting the respondents selected using purposeful sampling; one respondent to the initial survey stated that they were 'happy to complete the survey but did not have the time to get further involved'. Company A, by whom the Researcher had previously been employed, agreed to take part in the research as a case-study. According to Yin (2013) case-study research is an appropriate way of conducting explanatory research and understanding complex social phenomena, the findings of which can be used to expand theory, making it an ideal data collection method to answer the research questions of this study. During the interviews contact details of other potential interviewees were obtained, to be followed up later. Potential interviewees, identified in this manner, where approached only if it was felt they could provide additional data to answer the research questions, typically these were commercial directors and other senior managers. Interview participants were sought until it was felt that data saturation had been achieved.

All the interviews were semi-structured. The design of the questions was influenced by the research questions and the results of the analysis of the phase 1 data. Semi-structured interviews allowed the Researcher to cover the main research topics whilst also allowing additional questions, based on the responses of the interviewees to be introduced during the course of the interview (Collis and Hussey, 2014). It was felt that this would enable the Researcher to develop an in-depth understanding of the interviewees opinions on the topics being discussed. Two different sets of open questions were designed, one for FDs and the other for MDs (see Appendix 6 and 7). Where interviewees fell outside of these categories additional questions were prepared bespoke to the role of the interviewee and the data it was expected they would be able to provide. Data gathered from the interviews was triangulated with other evidence wherever possible, as this is said to reduce bias in data collection (Jick, 1979). This included a strategy meeting observation, management accounts and other management information (see Table 20 on page 149 below). All the interviews were organised in advance either by email or telephone. Where possible these were arranged for 10.00am or 10.30am, this was to allow the interviewee time to deal with any urgent matters which might have been a distraction during the interview, but not too late that lunch-time could be used as a reason to conclude the interview before the Researcher had gathered all the data required. This proved to be a good tactic resulting in an average interview recording of one hour and fifteen minutes with all the interviews drawn to a conclusion by the Researcher himself rather than the interviewee. At the start of each interview, interviewees were provided with a hard copy of the participant information sheet and were asked to sign an informed consent form. This was in line with the application for ethical approval discussed in section 5.6 below. All interviewees signed the required consent form and agreed that the interviews could be audio recorded. Before asking to turn on the digital recorder the Researcher took time to gain a level of trust with the interviewee by talking about his recent change of career direction and motivation for the research and about the interviewees background. During the course of the interviews the Researcher tried to maintain a conversational tone, asking for explanations when required and following up interesting areas of discussion before returning to the semi-structured interview questions to ensure they were as covered as fully as possible. After the digital recorder was switched off informal

conversations continued, with one interviewee offering to show the Researcher around his workshop premises. Notes of any discussions, both before and after the interview recordings, were made as soon as practically possible. All the interview recordings and other interview notes were fully transcribed prior to data analysis.

5.3.4 Retrospective Participant Observation

Section 1.3.4 above discussed the Researcher's personal motivation for undertaking this study. This section will discuss how his professional background and experience was used to the benefit of this study. Bulmer (1982) described the role of the retrospective participant observer as follows:

> "As a total participant in this role, the 'observer' was completely immersed in the setting which he or she was studying but had not yet developed a research interest in it. No deception of those studied was involved, no breach of informed consent occurred, since no scientific study was in view at the time the study was carried out."(Bulmer, 1982, p.255).

This role is only possible when the researchers experience, and background are aligned with their research interests. Detailed information of the Researcher's experience in the sector, along with the research data recalled objectively and retrospectively, is provided in Appendix 11. These reflections were discussed with ex-colleagues in order to confirm their validity. It was felt that having over sixteen years' experience of working as a FD in two different companies in this sector, with a year's full-time MBA course sandwiched in between, gave the Researcher a unique position from which to undertake this study. This experience benefited the study in a number of ways. It was noted in communications to both potential survey respondents and interview participants in an attempt to improve response rates. The Researcher's familiarity with both the accounting and commercial discourses of the participants helped the interviews to progress more smoothly and therefore gain more detailed insights from the interviewees than might otherwise have been the case. The Researchers experience was also used as an aid to interpretation of the data, it also provided another source of data enabling, in some instances, additional data triangulation and therefore increased the validity of the study.

Throughout the research process the Researcher was conscious of the impact of his values and experience on his bias and sought to ensure that reflexivity (Attia and Edge, 2017) was practised throughout the research process but particularly when trying to remain objective during the fieldwork data collection and data analysis phases. However, it is accepted in collecting qualitative data that the Researcher is an explicit part of the research process and their values will have an impact on the data collection, analysis and interpretation (Collis and Hussey, 2014). Gathering data from multiple sources during the Phase 2 data collection helped minimise subjectivity in the data analysis to ensure that the results of the study were accurate and reliable (Bryman and Bell, 2015). On balance the Researcher's experience should be viewed as a strength of this study rather than as a weakness.

5.4 Sampling and response rates

This section goes into more detail with regards to how data populations were identified and how samples were selected. It also provides details on the response rates for the survey conducted in the first phase of the research and details of the interview participants and other data collected in the second phase of data collection.

5.4.1 Phase 1

As discussed in section 1.3.2 above, Barton (2019) identified 135 medium sized enterprises engaged in construction activities in the East Midlands. The Researcher contacted the statistician responsible (White, 2016) for the 2016 survey for the details of these enterprises, but the statistician confirmed that, for confidentiality reasons, they were unable to provide this data. Therefore the FAME database (Bureau van Dijk, 2018), which holds financial information records of over four million active companies in the UK and Ireland, was used. This identified one hundred and thirty-three non-dormant companies employing between fifty and two hundred and forty-nine employees, registered with SICs 41, 42 or 43 (engaged in construction activities) and with a registered office with an East Midlands post code. Once the original data file had been reviewed ninety-four companies were identified as potential respondents. This reduction was due to a number of reasons:

- Holding company parents of trading subsidiary companies,
- Companies no longer trading,
- Errors in geographical location in original database and
- Errors in classification, not construction related activities.

Due to the relatively small size of the population it was decided that the surveys would be sent to the entire population. To maximise response rates a preliminary telephone call was made to confirm the email contact details of the MD and FD, a process followed by Cadez and Guilding (2008). Wherever possible a conversation took place in order to explain the purpose of the research and to gain trust with potential respondents. Establishing trust with potential respondents and using multiple methods of contact are seen by Dillman, Smyth and Christian (2014) as a way of improving response rates. This reduced the list by a further eleven businesses for the following reasons:

- Do not take part in surveys (7)
- Sister companies of others on the list with the same SMT (3),
- Do not have time (1).

In total therefore two initial emails were sent to each of eighty-three businesses, one to the FD and one to the MD. Each email contained an invitation to take part in the survey and a link to the on-line survey. The initial surveys were distributed between the 10th and 24th of January 2019, this resulted in a 13.3 percent response rate. A second round of chasing emails and telephone calls was conducted two weeks after the initial emails. In parallel to this several of the Researcher's industry contacts agreed to ask people they knew on the distribution to complete the survey on behalf of the Researcher. As a result of these concerted efforts forty-six useable responses to the survey were received as follows:

FD (Group A)	21	
MD (Group B)	25	
Combination of both (2 per business) (Group C)	13	(included in above numbers)

This represented a response rate of 25.3 percent for group A, 30.1 percent for group B and 27.7 percent overall. When considering group C, those businesses who replied to both surveys, the response rate was only 15.7 percent. In the end, given that the survey was exploratory, the Researcher was satisfied with these response rates which were in the range of other response rates to other surveys of SMA techniques for example, Cadez and Guilding, 49.7% (2007); Cinquini and Tenucci, 42.8% (2010); Ahmad, 17.6% (2014); Cravens and Guilding, 13% (2001). The three groups of responses depicted in Figure 18 below were used to perform different statistical tests the results of which are discussed in chapters 7 to 10 below.

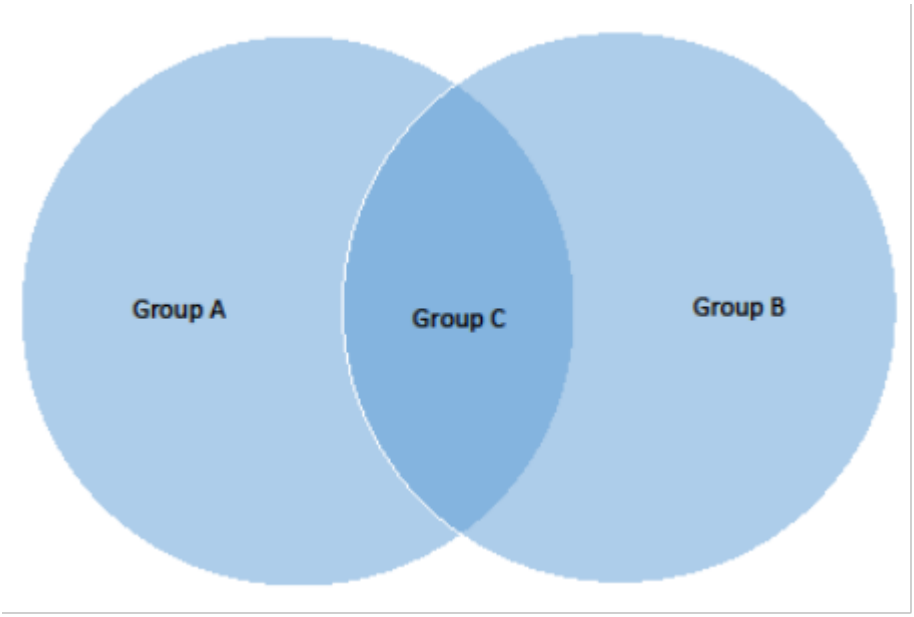

Figure 18: Data sets used for quantitive analysis

For some of the statistical analysis, the respondent businesses were sub-divided according to size. Even though all were medium sized businesses, employing between 50 and 249 people it was felt that a more granular analysis of these business might yield some interesting findings. Therefore, respondent businesses were also classified as follows:

- large-medium sized businesses (181-249 employees);
- medium-medium sized businesses (121 to 180 employees) and
- small-medium sized businesses (51 to 120 employees).

The summary of the entire population using this classification is presented in Table 10 below.

	Population	
	Frequency	Percent
Large-Medium	10	10.6%
Medium-Medium	25	26.6%
Small-Medium	59	62.8%
Total	**94**	**100%**
Average Employee Numbers	**108.9**	

Table 10: Classification of population by size

A summary, by the above size categorisation, of responses to the survey is shown in Table 11, Table 12 and Table 13 below:

	Responses		Population	
	Frequency	Percent	Frequency	Percent
Large-Medium	2	9.5%	10	10.6%
Medium-Medium	4	19.1%	25	26.6%
Small-Medium	15	71.4%	59	62.8%
Total	**21**	**100%**	**94**	**100%**
Average Employee Numbers	**103.6**		**108.9**	

Table 11: Business size of group A respondents

	Responses		Population	
	Frequency	Percent	Frequency	Percent
Large-Medium	2	8.0%	10	10.6%
Medium-Medium	8	32.0%	25	26.6%
Small-Medium	15	60.0%	59	62.8%
Total	**25**	**100%**	**94**	**100%**
Average Employee Numbers	**107.2**		**108.9**	

Table 12: Business size of group B respondents

	Responses		Population	
	Frequency	Percent	Frequency	Percent
Large-Medium	0	0.0%	10	10.6%
Medium-Medium	4	44.4%	25	26.6%
Small-Medium	9	55.6%	59	62.8%
Total	**13**	**100%**	**94**	**100%**
Average Employee Numbers	**94.9**		**108.9**	

Table 13: Business size of group C respondents

This shows that group A and group B respondents are from businesses of a similar size mix to the overall population which provides assurance that the responses are from businesses representative of the population, at least in terms of size. However, in group C there are no responses from large-medium sized businesses which means that care needs to be taken in assuming that results found in the analysis of group C data are representative of the population as a whole.

Table 14, Table 15 and Table 16 below show the qualifications and experience of the group A respondents who provided this information:

	Responses	
	Frequency	Percent
Qualified	17	85.0%
Not Qualified	3	15.0%
Total	**20**	**100%**

Table 14: Number of qualified accountants in group A respondents

	Responses	
Qualification	Frequency	Percent
ACCA	5	31.2%
CIMA	6	37.5%
ICAEW	3	18.8%
Other	2	12.5%
Total	**16**	**100.0%**

Table 15: Accountancy qualification of group A respondents

Years	Responses	
	role	In industry
5 or less	12	9
6 to 10	4	0
11 to 15	3	4
more than 15	1	7
Total	**20**	**20**
Average Years	**6.2**	**13.2**
Median Years	**3.0**	**12.5**

Table 16: Experience of group A respondents

This shows a very high level of recognised UK accounting qualifications and a high level of experience in the industry amongst the group A respondents. This provides further assurance as to the reliability of the responses by group A to the survey.

Table 17 below shows information regarding the group B respondents' tenure in their current role and the length of their career in the industry generally. This demonstrates a very high level of experience amongst group B respondents, providing some assurance as to the reliability of their responses to the survey.

Years	Responses	
	role	In industry
5 or less	6	1
6 to 10	2	0
11 to 15	8	1
more than 15	9	23
Total	**25**	**25**
Average Years	**14.1**	**32.8**
Median Years	**15.0**	**34.0**

Table 17: Experience of group B respondents

In order to test for non-response bias within their survey Cinquini and Tenucci (2010) tested for late response bias. In order to test for this within this survey, the Mann-Whitney U test was used due to the small sample size. The mean levels of SMA usage were compared between early (those who replied before being chased) and late responses. Table 18 and Table 19 below show the results of this test:

Mann-Whitney mean ranks table				
		N	Mean Rank	Sum of Ranks
Average SMA Usage	Early Responses	8	11.44	91.50
	Late Responses	13	10.73	139.50
	Total	21		

Table 18: Mann-Whitney mean ranks table

Mann-Whitney U test statistics[a]	
	Average SMA Usage
Mann-Whitney U	48.500
Wilcoxon W	139.500
Z	-0.254
Asymp. Sig. (2-tailed)	0.800
Exact Sig. [2*(1-tailed Sig.)]	.804[b]
a. Grouping Variable: Late	
b. Not corrected for ties.	

Table 19: Mann-Whitney U test statistics

The results show no significant difference in average SMA usage between early and late responses. From this it can be concluded that there is no non-response bias and therefore that the responses are effectively a random and therefore unbiased sample (Collis and Hussey, 2014) and were representative of the population.

5.4.2 Phase 2

Following the change in approach to obtaining participants described in section 5.3.3 above a total of twenty-seven interviews with twenty-nine interviewees across twelve different organisations were conducted. This resulted in thirty-three hours of audio recordings, with an average recording being one hour and fourteen minutes long and each interview taking an average of one and a half hours to complete. A summary of the interviewees, in the order they agreed to be interviewed, is shown in Table 20 below. Company A is clearly the case-study organisation with all five directors and four senior managers of the business taking part in the research. Table 21 below provides additional information on the businesses taking part in the interviews, this information provides some additional context for the findings presented in chapters 7 to 10 below. In total twenty of the interviewees had also responded to the initial survey; ten to the FD survey and ten to the MD survey. The remaining interviewees were identified through snowball

sampling. Before the interviews took place, all interviewees were sent, in the case of the respondents to the FD survey, resent, the glossary of SMA techniques. This was in an attempt to enhance the interview discussions. However, during the interviews it became clear that many of the interviewees did not look at the glossary before the interviews took place.

Company	Participant 1	Participant 2	Participant 3	Participant 4	Participant 5	Participant 6	Participant 7	Participant 8	Participant 9	Other Data
Company A	Managing Director	Non-Executive Director	Financial Director	Operations Director	SHEQ Manager	Commercial Director	Framework Manager	Operations Manager	Marketing Manager	Strategy review meeting papers. Management Accounts. Business Plan financial forecast. Attended strategy review meeting. Utility Water White Book. SHEQ monthly dashboard. PreQual submission for client. Company X business plan information.
Company B	Operations Director	Managing Director	Financial Director							
Company C	Managing Director	Financial Director								Obtained copy of 3 year plan
Company D	Managing Director	Chief Quantity Surveyor	Financial Controller							
Company E	Managing Director	Financial Director								
Company F	Financial Director									Looked at organogram
Company G	Managing Director	Financial Controller								
Company H	Chairman									
Company I	Managing Director									Copy of business organogram and copy of weekly management report.
Company J	Financial Director									
Company K	Financial Controller	Commercial Director								Looked at organogram and recent set of monthly management accounts
Company L	Financial Director	Commercial Director								Looked at new CVR

Table 20: Summary of interviewees and other data collected

	Main Activity	Number of Employees	Turnover (£m)	Ownership	Average use of SMA	Strategic Pattern	Strategic Mission	Strategic Positioning
Company A	Specialist sub-contractor; Civil Engineering	60	17.0	Managing Director and family	3.0	Defender	Maintain	Stuck in the middle
Company B	Specialist sub-contractor; Fire Protection	100	10.0	Directors	2.7	Defender	Build	Low Cost
Company C	Supplier of specialist capital equipment	121	102.2	Group	3.1	Prospect or	Build	Differentiator
Company D	Specialist sub-contractor; Civil Engineering	54	14.7	Managing Director	4.3	Defender	Maintain	Stuck in the middle
Company E	Principle contractor	102	10.5	Chairman	3.2	Defender	Harvest	Stuck in the middle
Company F	Specialist sub-contractor; House building	73	68.0	Family (not involved operationally)	2.1	NR	NR	NR
Company G	Manufacturer & installer of joinery products	58	8.0	Senior directors	2.2	Defender	Harvest	Stuck in the middle
Company H	Manufacturer and installer of control panels	160	14.8	Chairman	NR	Defender	Build	Stuck in the middle
Company I	Specialist sub-contractor; Piling	142	31.1	Group	NR	Defender	Maintain	Stuck in the middle
Company J	House building	194	129.0	Chairman	2.9	NR	NR	NR
Company K	Principle contractor	57	48.0	Senior directors	2.8	Defender	Harvest	Stuck in the middle
Company L	Principle contractor	86	23.7	Chairman	2.6	Defender	Harvest	Stuck in the middle

Table 21: Addition information about companies taking part in interviews

5.5 Methods of analysis

Because of the mixed methods research design this section is broken down into two separate parts; the first considers the quantitative methods used to analyse the survey data and the second considers the qualitative methods used to analyse the data collected during the field work.

5.5.1 Phase 1

Quantitative data, data which can be counted, is best analysed using statistical techniques. Surveys of SMA usage, analysed using statistical techniques, have been used regularly by other researchers (see section 5.3.2 above). Using an approach which is consistent with this previous work allows a more rigorous comparison to previous results to be made. Providing the data is collected appropriately, analysing it is relatively easy using statistical methods (Bryman and Bell, 2015).

The survey was carefully designed to collect data consistent with previous research and which could be subjected to statistical analysis. Likert scales were used to allow measurement of the usage and perceived benefits of the twenty-five SMA techniques across the respondents to the survey. From this, mean usage of techniques was ascertained. The survey also measured the business performance of the participating organisations, converting this data into a measurable scale allowed correlations between levels of SMA usage and business performance to be calculated.

Care was taken in applying the appropriate statistical tests which matched the variables created in the survey. This was important to ensure the validity of the findings presented below as selection of incorrect statistical tests could lead to invalid conclusions being drawn from the data. Furthermore, the small size of the sample restricted the types of test which could be applied. Due to the small sample size non-parametric versions of statistical tests were used to analyse the data collected (Abu-Bader, 2016). The small sample size also prohibited the use of factor analysis to reduce or summarise the number of SMA variables for analysis purposes.

5.5.2 Phase 2

All twenty-seven interview recordings were transcribed, by the Researcher, using Microsoft Word. This process allowed an initial manual, but high-level analysis of the interview data to be made. Observation notes and comments, made before and after the audio recorder was used, were also transcribed. This resulted in six hundred and ninety-one pages of text and over two hundred and seventy-five thousand words to analyse. The transcripts and other data collected were analysed using thematic analysis (Ryan and Bernard, 2003; Braun and Clarke, 2006). Commonly a theme will be a phrase or topic that is repeated regularly in the data being analysed. Repetition is however, on its own, not a sufficient test for it to be considered a theme, more importantly a theme must be relevant to the research question. Bryman and Bell (2015) summarise a theme as follows:

- a category identified by the analyst in their data,
- relating to the analyst's research focus and possibly their research question,
- building on codes identified in transcripts,
- providing a basis for the theoretical understanding, by the researcher, of their data.

According to Braun and Clark (2006) thematic analysis has a theoretical freedom and provides

> "a flexible and useful research tool, which can potentially provide a rich and detailed, yet complex, account of data." (Braun and Clarke, 2006, p.78).

It was therefore considered to be an appropriate set of tools to use to analyse the data collected in phase 2 of this study. It allowed an initial set of themes to be identified from the literature and transcription process but also allowed themes to emerge from the data during the course of the analysis (Braun and Clarke, 2006). Table 22 below shows the recommended processes to conduct a thematic analysis. How this process was followed is described in the next part of this section.

Phase	Description of the process
1. Familiarising yourself with the data	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas.
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire dataset, collating data relevant to each code.
3. Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme.
4. Reviewing themes	Checking if the themes work in relation to the coded extracts and the entire dataset, generating a thematic 'map' of the analysis.
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme and the overall story the analysis tells, generating clear definitions and names for each theme.
6. Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis.

Table 22: Phases of thematic analysis
Permission to reproduce Table 22 has been granted by the publisher.

(Braun and Clarke, 2006, p.87).

Given the large volume of data, computer assisted qualitative data analysis software was used to code the transcriptions, observation notes and other data collected. Specifically NVivo 12 (QSR International, 2019), a software package provided by Nottingham Trent University was used. An initial set of codes was identified from the Researcher's conceptual framework and during the transcription process. These were created as nodes, a topic or theme found in the data (QSR International, 2019). Before any manual coding of the data took place, the Researcher used features within the software to identify additional nodes. This involved a word search to identify the thirty words which were most regularly used in the interview transcripts. This excluded a number of stop words which are commonly used in everyday speech, such as I, if, and; as well as a number of words frequently used in the text but not considered relevant to this research such as just, starts, taking. From this a word cloud was created, see Figure 19 below, in which the size of the text is an indication of the relative frequency of that word within the interview transcripts, for example, the word businesses was found 1,161 times.

Figure 19: Word cloud for most frequently occurring words

From the word cloud a word tree was created for each word and regularly occurring two- or three-word phrases containing that word were identified. Where these new phrases were considered relevant to answering the research questions and were not already contained in the initial set of nodes, new nodes were added into the software and references to the text were added into the appropriate node. For example, from the word cloud the word 'manager' was selected, this led to 'management' on the word tree and then the phrase 'management accounting' was identified. This phrase occurred 145 times in the data set. In total this process of semi-automatic coding added 1,191 references, across 29 nodes.

The next stage was to review each of these 1,191 references and uncode those not appropriate for the data analysis; the most frequent reason to uncode text during this process was because the text was part of the Researchers question rather than as a response from the interviewee. Furthermore, the text which had been semi-automatically coded was reviewed and additional text added, or superfluous text removed to give the reference more relevance. This resulted in a node hierarchy, see Figure 20 below, which contained 582 references. The size of each box is relative to the number of references contained in each node, for example, 'contingencies' contained 85 references.

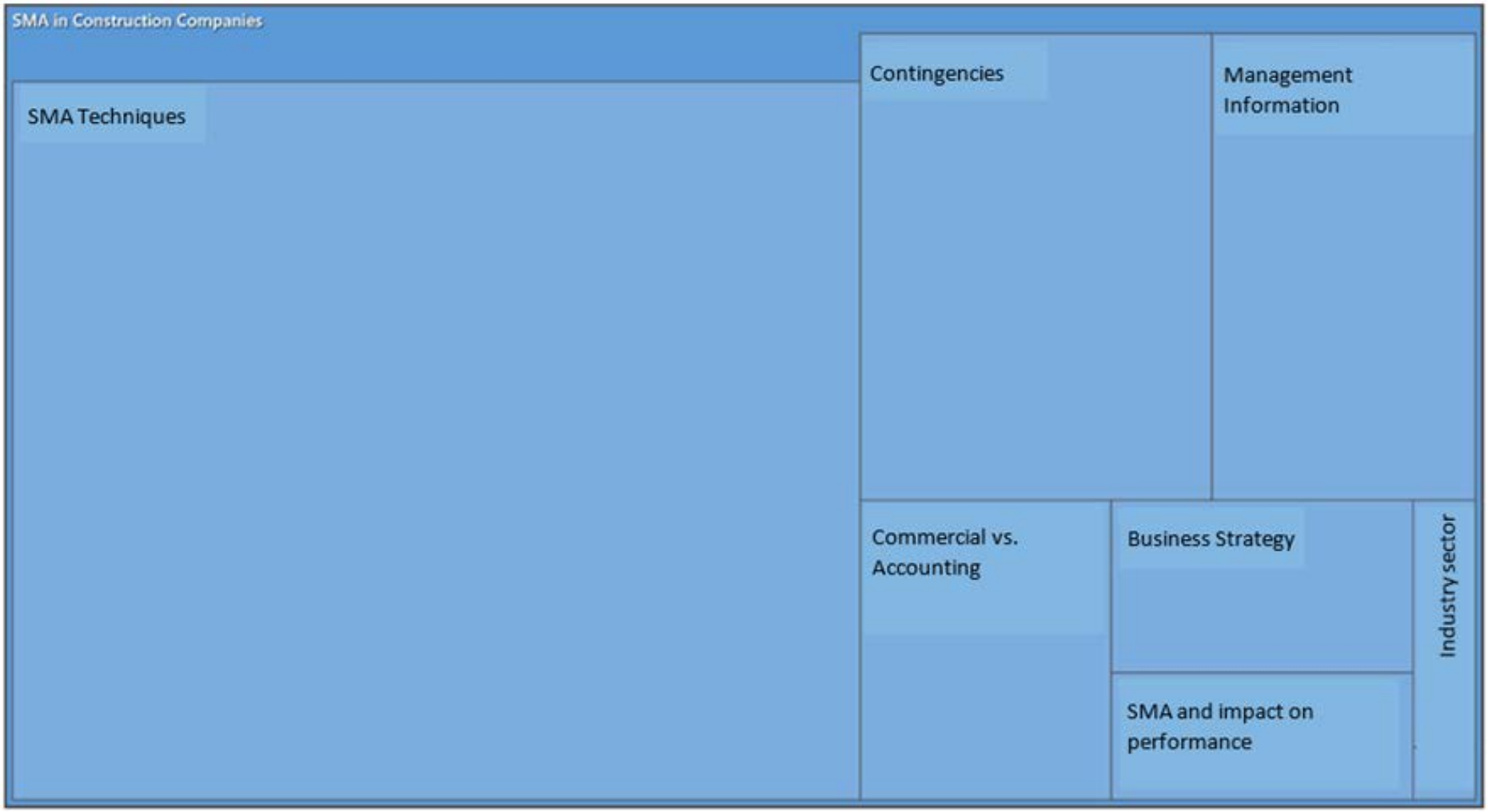

Figure 20: Initial node hierarchy

The next stage of analysis focused on each interview transcript in detail. Each interview was read to review the validity of the semi-automatic coding described above but, more importantly, to code any additional text relevant to answering the research questions but not identified during the initial processes. This resulted in additional nodes and sub-nodes being created, existing nodes aggregated, references uncoded or moved to different or additional nodes. Audio recordings were revisited in cases where the meaning of the interviewee's responses was not clear in the transcription. This was a much longer process than the initial semi-automatic coding but resulted in the Researcher obtaining a much deeper understanding of the data collected. In some cases, in order to validate the Researcher's understanding of the data collected, follow-up communication, mostly by email, took place with interview participants. After this analysis it was identified that only a limited amount of data existed in relation to why some techniques were not used. The Researcher therefore decided to undertake additional data collection, from existing respondents, by telephone and email, to gather additional data on this issue. Figure 21 below shows the node hierarchy once the data analysis was completed, this contained a total of 834 references.

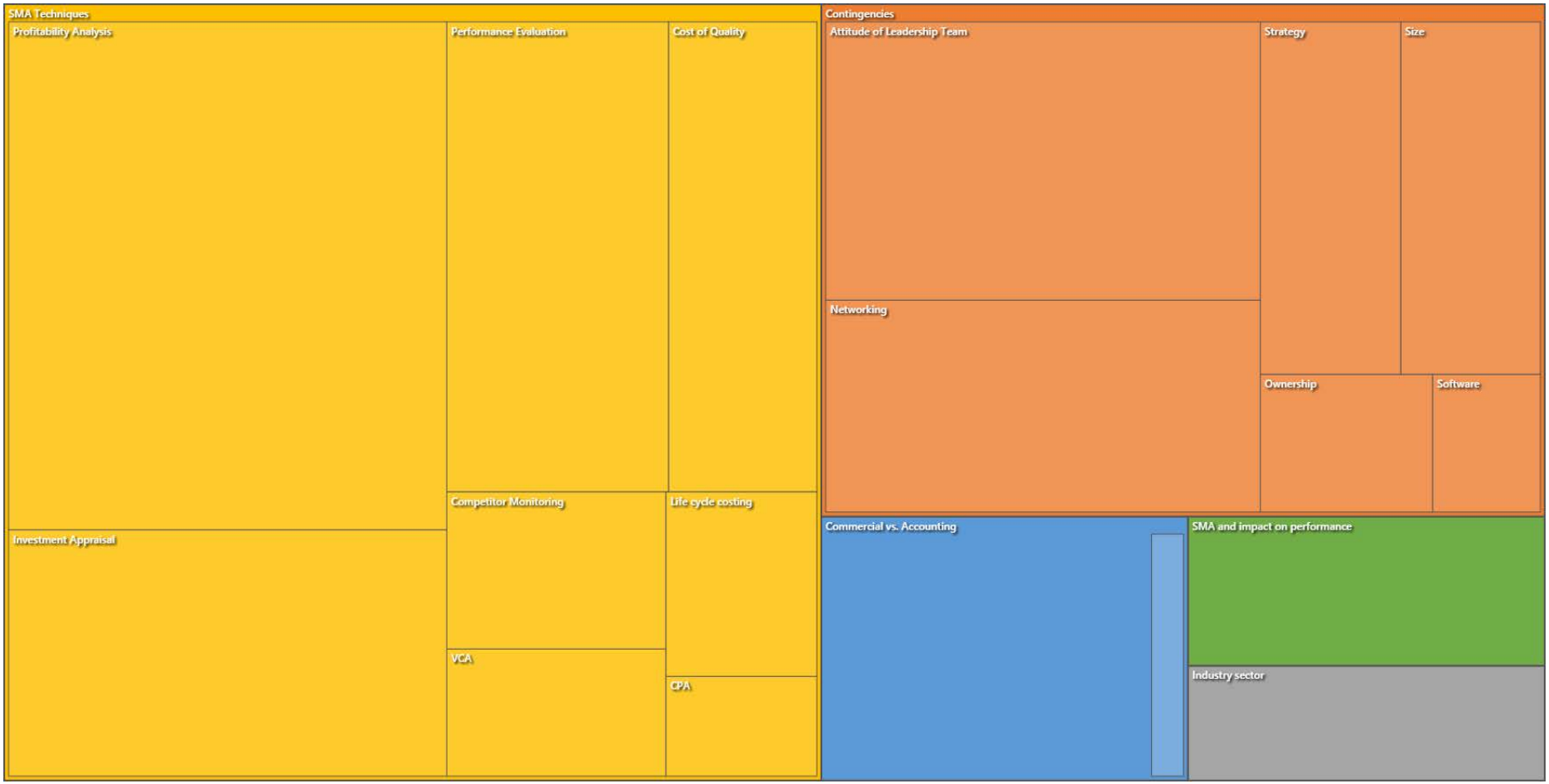

Figure 21: Final node hierarchy

The nodes identified using the coding process described above were then consolidated into themes as follows:

Theme 1, SMA techniques in use,

Theme 2, Who does SMA?

Theme 3, What contingencies affect the use of SMA in medium sized construction companies?

Theme 4, Links between use of SMA and business performance.

Each of these themes were used to structure the findings and analysis in chapters 7 to 10 below.

5.6 Ethical considerations

This research was conducted in adherence with the Social Research Association's ethical guidelines (Social Research Association, 2003), the basic principles of which state that social researchers have an obligation to society; to funders and employers; to colleagues and to research subjects. Specifically, in respect of research subjects the following ethical issues related to the research design outlined above:

Informed consent for respondents to the survey and interviewees was explicit. It was incorporated in the survey design with a simple consent to participate option or a do not consent option which terminated the survey immediately. All interview participants were provided with a participant information sheet and asked to sign a consent form before any interviews took place. All interviewees signed the consent form.

Confidentiality and anonymity of data collected was ensured by using standard procedures during data collection, data storage, data analysis and in the publication of the final thesis and any other work. Anonymity of the identity of respondents and participants ensured that harm or risk to research subjects was minimised. Whilst job titles of each interviewee were retained the name of their employer has been anonymised.

As a student of the College of Business, Law and Social Sciences at Nottingham Trent University the Researcher also had to comply with the college's ethical guidelines which indicate that:

> "Projects involving the collection, storage or processing of primary, unpublished data from, or relating to, living human beings" (Nottingham Trent University, 2017, p.5)

require ethical approval from the College Research Ethics Committee (CREC) before any primary data collection begins. Two separate requests for ethical approval to the CREC were made. The first application was submitted in October 2018, at this stage a request was made for only the surveys being sent in phase 1 of the research design. This was approved in December 2018. A second application was submitted in January 2019, this request was for the semi-structured interviews which were conducted as part of phase 2 of the research design. This was approved in February 2019. It was necessary to seek ethical approval in two stages as the exact design of the second phase of the data collection was not determined until the phase 1 data analysis had commenced.

Furthermore, as a member of the ICAEW the Researcher was bound by their code of ethics (Institute of Chartered Accountants in England and Wales, 2010). This code has five fundamental principles; integrity; objectivity; professional competence and due care; confidentiality and professional behaviour. Whilst the code has been written with practising accounting in mind these principles were also used to guide the Researcher's behaviour throughout the course of the data collection, analysis and reporting.

This chapter has presented the justification for the mixed methods research design used in this study. The next chapter presents a revised conceptual framework based on an analysis of, and the initial findings from, the data collected in phase one and phase two of this research.

6 Revisions to Conceptual Framework Post Initial Fieldwork

This chapter presents and justifies a revised conceptual framework based primarily on the results of the survey data but supported by the interview data and the experience of the Researcher. The revised conceptual framework is significantly as it was before but the number of SMA techniques has been reduced to a smaller number by omitting ones which are considered irrelevant to medium sized construction companies. It was stated in the presentation of the original conceptual framework in chapter 4 that, based on the Researcher's experience and the examination of the literature, not all of the techniques would be relevant to medium sized construction companies. On the basis of the additional information gathered in the field work data collection this was confirmed and, as a result, a number of the techniques were removed from the original conceptual framework. Before discussing the revised conceptual framework, the results of the exploratory survey will be reviewed.

6.1 Survey results of SMA usage

Group A respondents (heads of finance) were asked to provide information about the usage levels of each SMA technique on a five-point Likert scale (where 1 = not used at all, 3 = used sometimes and 5 = used all of the time).

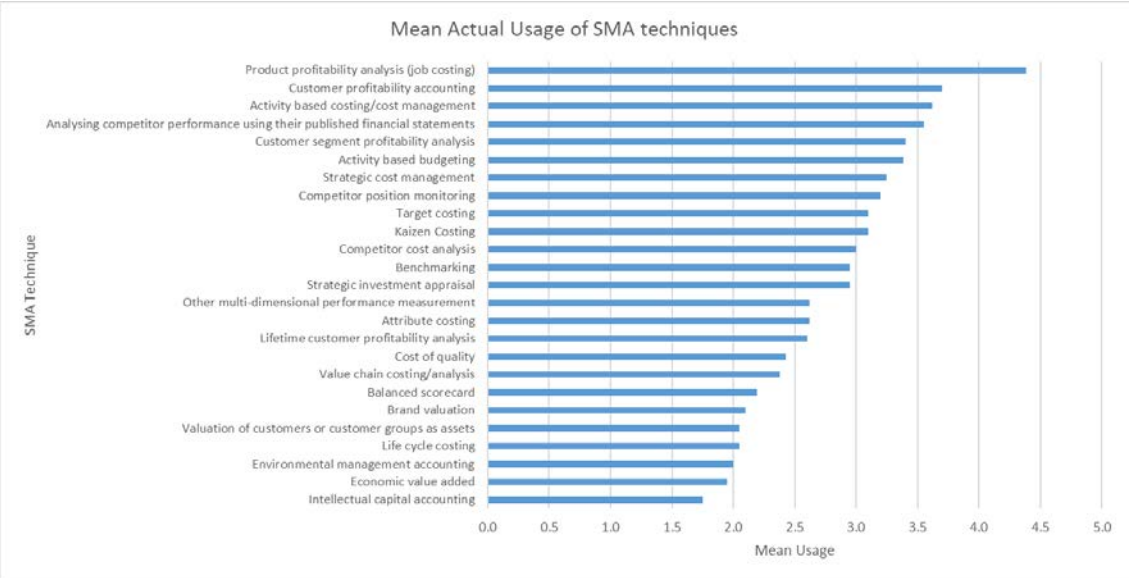

Figure 22: Mean actual usage of SMA techniques

Figure 22 above shows the average use of all twenty-five SMA techniques contained in the survey according to the Group A respondents (full descriptive statistical information is attached in Appendix 8). Eleven techniques were used above the mid-point score (three), PPA appears to be the most frequently used technique, with seventeen respondents (of twenty-one) saying they used the technique on a regular basis. The least used technique is ICA with only two (of twenty) respondents saying that they used the technique on a regular basis. The mean usage of all twenty-five techniques was 2.83, just below the mid-point score. From the above analysis it can be concluded that, whilst there is some use of SMA in the respondent businesses, overall the use of SMA in the sample appears to be low. Therefore, if Simons (1990) and Ward (1993) are correct and SMA is a potential management tool to help to create a competitive advantage then medium sized construction companies appear to have some way to go to realise this potential. Whilst this may be true in total, it can be seen that there are a number of techniques which seem to be used on a more regular basis than others. It is possible therefore that these limited number of techniques offer sufficient information to support the strategic decision making in medium sized construction companies. This was explored in greater depth during the stage two data collection, the results of which are analysed in more detail in the remaining chapters of this thesis.

Utilising the presentation of Cinquini and Tenucci (2007) Table 23 below presents the SMA techniques categorised according to non-adoption (response 1); low adoption (response 2 or 3); or high adoption (response 4 or 5). This data is used in section 6.2 below to support the justification for excluding a number of techniques from the revised conceptual framework.

SMA Technique	Number of Respondents		Frequencies								Median Usage	Mean Usage
Costing			Non-Adoption(1)		Low Adoption (2&3)		High Adoption (4&5)		No Response			
Activity based costing/cost management	21	100%	5	24%	1	5%	15	71%	0		4	3.6
Attribute costing	21	100%	6	29%	8	38%	7	33%	0		2	2.6
Cost of quality	21	100%	5	24%	13	62%	3	14%	0		3	2.4
Kaizen costing	21	100%	4	19%	7	33%	10	48%	0		3	3.1
Life cycle costing	21	100%	8	38%	11	52%	2	10%	0		2	2.0
Target costing	21	100%	4	19%	6	29%	11	52%	0		4	3.1
Value chain costing/analysis	21	100%	7	33%	10	48%	4	19%	0		2	2.4
Planing, control and performance monitoring												
Activity based budgeting	21	100%	5	24%	5	24%	11	52%	0		4	3.4
Balanced scorecard	21	100%	7	33%	10	48%	4	19%	0		2	2.2
Other multi-dimensional performance measurement	21	101%	6	29%	9	43%	6	29%	0		3	2.6
Benchmarking	21	100%	5	24%	8	38%	8	38%	0		3	3.0
Economic value added	21	101%	10	48%	9	43%	2	10%	0		2	2.0
Product profitability analysis (job costing)	21	100%	0	0%	4	19%	17	81%	0		5	4.4
Decision Making												
Brand valuation	20	100%	9	45%	8	40%	3	15%	1		2	2.1
Environmental management accounting	20	100%	10	50%	7	35%	3	15%	1		1	2.0
Intellectual capital accounting	20	100%	13	65%	5	25%	2	10%	1		1	1.8
Strategic cost management	20	100%	3	15%	7	35%	10	50%	1		3	3.3
Strategic investment appraisal	20	100%	3	15%	10	50%	7	35%	1		3	3.0
Competitor Analysis												
Competitor cost analysis	20	100%	2	10%	11	55%	7	35%	1		3	3.0
Competitor position monitoring	20	100%	2	10%	8	40%	10	50%	1		3	3.2
Analysing competitor performance using their published financial statements	20	100%	0	0%	10	50%	10	50%	1		3	3.6
Customer Based												
Customer profitability accounting	20	100%	2	10%	4	20%	14	70%	1		4	3.7
Customer segment profitability analysis	20	100%	2	10%	8	40%	10	50%	1		3	3.4
Lifetime customer profitability analysis	20	100%	4	20%	11	55%	5	25%	1		2	2.6
Valuation of customers or customer groups as assets	20	100%	9	45%	8	40%	3	15%	1		2	2.1

Table 23: Frequency of use of SMA techniques

Comparison of these results with earlier surveys is difficult due to the unique way that SMA has been operationalised within this study. This is often a criticism of SMA survey-based research which has no consistent approach as to which techniques it comprises. This is caused by the fairly rapid evolution of the subject (Cadez and Guilding, 2007) and was therefore considered to be unavoidable if a full range of current SMA techniques was to be investigated in the exploratory data collection phase. The use of different Likert scales also makes comparisons difficult. Nevertheless, Table 24 below summarises the results of past SMA surveys, adjusting for differing Likert scales this seems to show an increasing trend of overall SMA usage over time. Taking the mid-point scores as the benchmark then this study found an overall average usage consistent with the first, second and fourth study but lower than the third and fifth study.

Authors	Number of SMA techniques tested	Likert Scale Used	Glossary Provided?	Average SMA Usage	Average SMA perceived benefit
Guilding Cravens and Tayles (2000)	12	7	Yes	3.41/7	4.41/7
Cravens and Guilding (2001)	15	7	Yes	3.56/7	4.91/7
Cinquini and Tenucci (2007)	14	5	Yes	3.01/5	N/A
Cadez and Guilding (2007)	16	7	Yes	3.74/7	N/A
Fowzia (2011)	14	5	No	3.97/5	N/A

Table 24: Summary of usage levels and perceived benefits in previous SMA surveys

The low usage levels are consistent with the Researcher's experience of using, or rather, not using many of the more advanced techniques such as brand valuation or ICA, which seem irrelevant to medium sized construction businesses. Furthermore, the low adoption of SMA in this study is consistent with the findings of Langfield-Smith whose review of the subject concluded that:

> "SMA or SMA techniques have not been adopted widely, nor is the term SMA widely understood or used" (Langfield-Smith, 2008, p.204).

The findings from the analysis of the interview data also seem to support the conclusion of a low level of SMA usage, however they also support the idea of a limited number of relevant techniques amongst medium sized companies in the sector. This leads to a need to revise the original conceptual framework presented in chapter 4 above.

6.2 Revised Conceptual framework

Based on a combination of data from the survey results presented in section 6.1 above, the Researcher's experience of working for medium sized construction companies and an initial analysis of the interview data it was apparent, as already suggested in chapter 4 above, that a number of SMA included in the original conceptual framework are not relevant to medium sized construction companies. Those with a median usage score of

1 or 2 can be discarded immediately without too much more discussion. These are attribute costing; EVA; brand valuation; ICA; EMA; lifetime customer profitability analysis and valuation of customers or customer groups as assets.

Attribute costing clearly relates to products which are made and sold repetitively and is therefore not relevant in an industry were tendering to a bespoke contract specification is the norm. EVA is not used either because respondents are not familiar with the technique or where they were it was felt that it was adequate to use net profit to measure performance. This view is supported by the literature (Bouwens and Spekle, 2007). Profit was the de facto measure used in determining bonus payments, as will be seen in section 7.4 below. According to the FD of Company B who had not previously heard of the technique

> "I can see why you would want to do that [EVA] but to do it sounds challenging and not worthwhile in a medium sized company, it seems more applicable to companies with external investors wanting to compare performance within their portfolio."

Brands and branding were not evident in the sample and did not appear important in a sector where the opportunity to tender for work is secured through the pre-qualification questionnaire (PQQ) process rather than as a result of brand awareness. Marketing executives do not appear to be employed by medium sized construction companies, instead potential customers are identified by business development executives who identify potential contracts and submit PQQ information with the aim of making the tender list. As the MD of Company A said:

> "I don't think we could put a premium on our quotes because we are Company A. I think we would lose the work; I think people are quite cost conscious in the industry."

The MD of Company I felt it was only appropriate for larger companies, this was confirmed by the Non-Executive Director (NED) of Company A:

> "I have never considered its use; we are not large enough as a business to consider this measure"

Therefore, brand valuation was not considered to be relevant for medium sized construction companies.

ICA ranked the lowest of all the SMA techniques included in the survey with a mean usage of 1.8 and a median usage of 1. No evidence was found of its application during the interviews and one component, human capital reporting, seems to be restricted to recording basic key performance indicators (KPIs) relating to staff numbers, staff turnover and absenteeism. The traditional nature of the sector means that the majority of training and development of employees appears to be restricted to the renewal of non-discretionary training rather than developing new skills and consequently the value of any human capital does not seem to change significantly meaning the recording of it would not be beneficial. The FD of Company A, to whom the Researcher had to explain the concept of ICA, questioned the value of undertaking such an exercise for a company employing only sixty people and did not see how such a calculation would be performed.

> "whether you would be able to actually achieve and actually value how much more the investment has gone up in value because of the training is difficult as well." Company A, Financial Director.

The premise of brand accounting and ICA is that these are both generated from investments made by the company. It was evident that when discussing investment decisions, the participants focus was on tangible rather than intangible assets and therefore the valuation of these intangible assets was not a consideration in their thinking.

EMA was another technique with very low usage scores in the survey. Despite eight of the companies participating in the interviews holding the BS EN ISO 14001:2015 Environmental management systems (British Standards Institute, 2015a) accreditation, environmental concerns amongst interview participants seemed to be minimal. The accreditation appeared to be held for business development opportunities rather than due to a genuine concern for the environment. As with human capital reporting environmental reporting seemed to be restricted to KPI reporting. In Company A this was only once per year and was not used to set targets or inform decision making. It seemed to be driven by compliance with the Certified Emissions Measurement and Reduction Scheme (CEMARS) accreditation which was only held by the company at the request of a strategic customer (see section 9.3.1 below), rather than being held to fulfil a strategic objective.

Both lifetime customer profitability analysis and valuation of customers or customer groups as assets are appropriate techniques to use when a company has repeat business with a recurring customer or customers over a sustained period of time. As it is not typical for the construction industry to operate in this way these techniques would not be relevant to the sector. During the interviews no evidence was found of their application. The two other CA techniques are included in the revised conceptual framework and discussed further in section 7.6.1 below.

Three techniques with a median usage score of 3 were also been omitted from the revised conceptual framework; benchmarking; kaizen costing (KC) and strategic cost management. Limited evidence of benchmarking was found during the interviews other than the informal benchmarking of competitor net profitability which was regularly undertaken. This is a SMA technique in its own right with an average usage score of 3.6 and is included in the revised conceptual framework. 'Tender feedback' which was identified during the interviews is a form of benchmarking not found in the literature, however it was felt more appropriate to include it within competition monitoring (see section 7.5 below). KC is not a costing technique as such, but an approach to incremental cost reduction during a production process where small changes in the process can result in significant cost savings over a period of time. No evidence was found of this amongst the interview participants. The scope for this to operate successfully seems to be in an environment where repetitive tasks are the norm, which is not the case for the construction industry, as the Operations Director of Company A put it:

> "We don't work in a factory and we don't come in one end and go out the other end" Company A, Operations Director,

it was therefore also omitted from the revised conceptual framework. With a low level of overheads any strategic cost management seemed to be restricted to direct costs which are managed through the JPA process discussed in section 7.1 below. It was therefore also omitted from the revised conceptual framework as an SMA technique in its own right.

Two techniques with a median usage score of 4 were also been omitted from the revised conceptual framework; TC and ABB. TC which, despite recording a mean usage of 3.1 in

the survey, was found not to be used in reality. This discrepancy arose because of a misunderstanding of terminology. The industry has a contractual term called 'target cost' which is occasionally use as a method by which final account contract values are determined. This was described by the Commercial Director of Company A and the QS of Company D, both of whom had recently been involved in such a final account agreement. Rather than agreeing a contract value in advance, in a 'target cost contract' the client and contractor agree to share any actual cost saving or actual cost overrun compared to the target cost agreed before the start of the contract. The aim is for the contractor to save money wherever possible and share these cost savings with the client. Both parties benefit if this is the case. It would be easy for respondents not familiar with the TC technique to misconstrue this type of arrangement as TC, but it is not the same as envisaged by the literature. These calculations are the responsibility of the QSs, but accountants are aware of them as the cost records for them are vital evidence to support the final account agreement. This awareness along with the lack of an understanding of TC as an SMA technique resulted in the survey indicating a high usage of the technique when it appears not to be the case in practice.

Budgeting and forecasting are discussed in section 3.2.1 above. From the interviews no evidence of an ABB approach being adopted was found, even though the survey responses indicated that this is the seventh highest used SMA technique. Whilst these findings were contradictory, it appeared that most budgets were built up using gross margin forecasts linked to a forecast sales figure broken down by contract, and overheads were either incremental or flexed to sales volumes:

> "Fixed costs tend to be incremental and costs that vary will be linked to sales volume" Company B, Financial Director.

These findings are supported by the literature which finds little empirical evidence of the use of ABB (Buys and Green, 2007). Abandoning the budget all together, using the beyond budgeting approach, was also not evident within this sample. This supports the findings of Libby and Lindsay (2010) who found that, of seventy-nine percent of respondents who used budgets for control purposes, a massive ninety-four percent planned to continue using them. They also found that respondents were planning to

enhance their budgeting processes by using rolling forecasts or producing less detailed budgets initially whilst at the same time updating them regularly by using ongoing forecasts. This second approach, regular forecasts as updates to the annual budget, was the one adopted by the majority of businesses taking part in this study. This seemed to introduce increased financial analysis into the planning process without being time consuming to produce, both of which Dugdale and Lyne (2006) found to be problematic in traditional budgeting systems. No evidence was found for the rolling forecasts approach. This was consistent with the experience of the Researcher who, following the completion of his MBA, had tried to implement a 12-month rolling forecast process into Company A (see Appendix 11.4) but found resistance from the Commercial Director who argued that forecasting beyond the end of the financial year was difficult, time consuming and had no added value. The idea of a twelve-month rolling profit forecast was abandoned but, as a compromise in order to give greater focus on the plans for the following financial year, the annual budgeting process was brought forward by several months.

Budgeting and forecasting, supported by the contract profitability forecasts (CPFs) process described in section 7.1.2.1 below, appear to be more operationally, rather than strategically, focused and therefore were not included in the revised conceptual framework. Short-term forecasting, to the end of the current financial year, predominated. It was based on CPFs together with anticipated future contracts based on the current workload of the estimating departments. Only Company J took a longer-term view. Their FD explained:

> "We do 5-year plans. So, we are running our budget for 2019 and when we did 2019, we also did 2020 in detail, but then we had a rough plan for 2021, 22 and 23.
>
> You can't [just] look 18 months ahead, because you won't have the land when it comes to needing to build. As I say we do 2 years in detail and we do 5 years in every budget process."

This was a good example of the budgeting process being adapted to fit with the context of the business environment, with the acquisition of land for development taking a long time (see section 7.2 below). Company J, a house builder, required this to be integrated into their financial forecasting which must therefore take a longer-term view.

All other techniques with a median usage score of 4 or 5 have been included in the revised conceptual framework and are discussed in greater detail in chapter 7 below.

The common denominator as to why these techniques do not seem to be used by medium sized construction companies is their relevance. They appear to be irrelevant either, by virtue of the nature of industry, or the size of businesses investigated.

> "I think one of our problems is that every building we build is bespoke, so we have very little repeatable work which I think leads us away from anything other than actual project cost accounting." Company L, Financial Director.

> "I definitely think that as we grow and add extra lines of management it gives me more time to spend on what a finance director/operations director would do and less of the hands-on approach" Company B, Operations Director.

Furthermore, knowledge of many of these individual techniques appeared to be quite low amongst the head of finance interviewees. The FD of Company B who was the most recently qualified accountant interviewed confirmed this, indicating that professional training of SMA it still lacking. This is discussed in greater detail in chapter 8 below but at this point it is worthwhile to note that this was certainly the case for the Researcher prior to completing his MBA. Perhaps more relevant is that, on joining Company A as its FD, after completing his MBA and eager to apply some of his newly developed skills, he could find no requirement by the business for information which would require him to undertake any of the techniques omitted from the revised conceptual framework.

Based on the above discussion the following revised conceptual framework is presented:

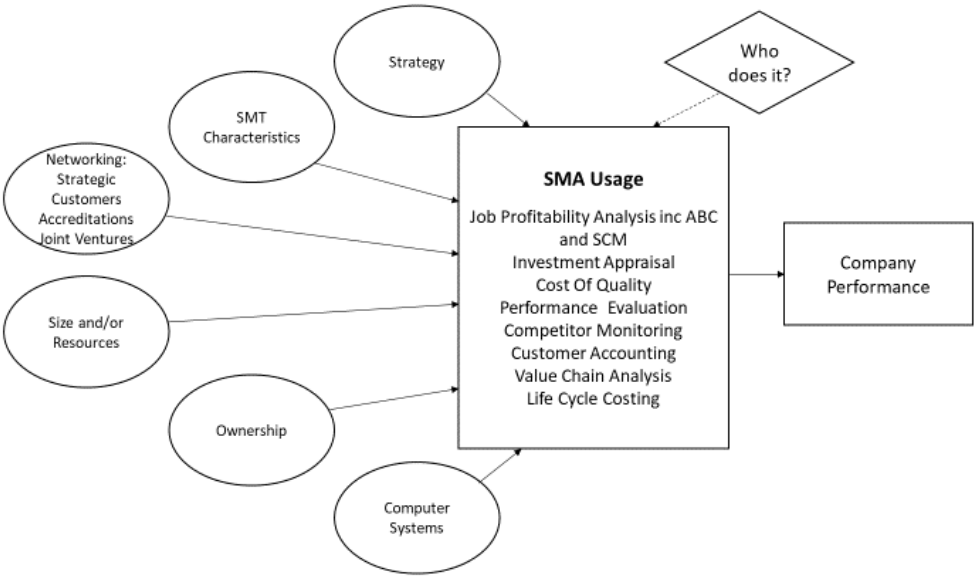

Figure 23: Revised conceptual framework, use of SMA by medium sized firms in the construction industry

Table 25 below shows how the survey respondents viewed the techniques on the revised conceptual framework and Figure 24 below shows those techniques which were coded during the interview analysis process. The size of the boxes is proportionate to the number of times that each technique was coded. For example, profitability analysis was coded two hundred and thirty-nine times whilst CPA was coded just sixteen times.

	Average actual usage	Average perceived benefit
Profitability Analysis	4.4	4.7
Strategic Investment Appraisal	3.0	4.0
Cost of Quality	2.4	3.9
Performance Measurement (average score of two techniques)	2.4	3.7
Competitor Position Monitoring (average score of three techniques)	3.3	4.1
Customer Accounting (average score of two techniques)	3.6	4.0
Value Chain Analysis	2.4	3.3
Life-Cycle Costing	2.1	2.9

Table 25: Survey results of eight relevant SMA techniques for construction industry

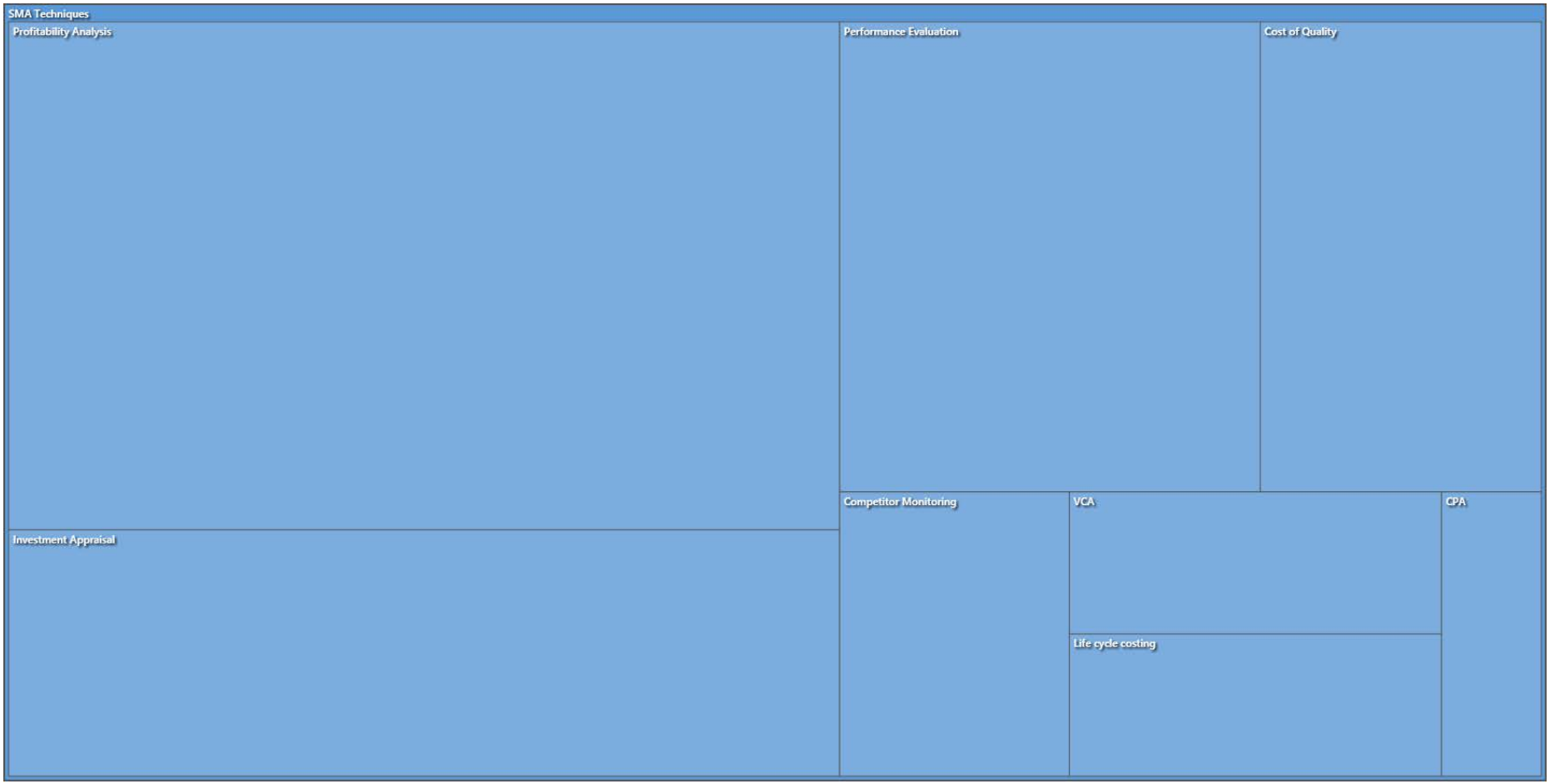

Figure 24: Node hierarchy of SMA techniques

Both Table 25 and Figure 24 demonstrate why these eight techniques have been identified as being relevant to the industry. Either because, according to the survey, they were used on a regular basis or were perceived as offering potential benefits, or because they were discussed frequently by the interviewees. The need to revise the conceptual framework is a demonstration of the reality gap in management accounting (Scapens, 1994) discussed in section 2.6.1 above. The literature review identified a number of techniques which adhered to the definition of SMA adopted for this study, the theory. Analysis of the data collected identified that a large proportion of these techniques where not being used by the respondents, the practice. Amongst the reasons found for this were:

- unfamiliarity with the technique,
- difficulties with practical application,
- no relevance to the construction sector,
- no relevance to medium sized businesses.

The first of these reasons was identified by Trahan and Gitman (1995) and Tucker and Lowe (2014) who claimed that it was caused by academics publishing their work in journals not accessible to practitioners. Trahan and Gitman (1995) also found that the practical application of sophisticated techniques was a barrier to implementation as identified in the second point above. Consideration of the relevance of SMA techniques to specific industries is not common in the literature, for this reason Messner (2016) called for more studies on management accounting practice in specific industries. This study has contributed to this request and found a large reality gap in relation to the use of SMA by practitioners in medium sized construction companies.

Chapter 7 below discusses the interviewees responses to questions examining, in greater depth, the use of these eight SMA techniques. These findings come mostly from the analysis of the data collected during the second stage of data collection together with data from the Researcher's own experience.

7 Analysis and Findings Theme 1: SMA techniques in use in respondent companies

The next four chapters present the findings and analysis of the data collected as described in Chapter 5 above. This will be done by the following four themes:

- Theme 1, SMA techniques in use,
- Theme 2, Who does SMA?
- Theme 3, What contingencies affect the use of SMA in medium sized construction companies?
- Theme 4, Links between use of SMA and business performance,

each of which relate to specific aspects in the revised conceptual framework presented in chapter 6 above. The aim of this first analysis chapter is to answer the following research question:

To what extent are SMA techniques used by medium sized construction companies?

Each of the following sections will discuss, in turn, the techniques included in the revised conceptual framework presented in chapter 6 above. These are profitability analysis; investment appraisal; COQ; performance evaluation and monitoring the competition. These five techniques are considered relevant to all medium sized construction companies. The chapter will conclude with a review of three further SMA techniques, CA; VCA and LCC, which are techniques relevant to medium sized construction companies but only in certain contexts.

7.1 Profitability Analysis

In order to reflect the output of the construction sector being a job as opposed to a product, the Researcher coined the term 'job profitability analysis' (JPA) as the construction industry equivalent of PPA. It is the most frequently used technique by respondents to the survey with thirteen (out of twenty-one) saying they use it all the time and seventeen (out of twenty-one) saying they perceive it to be extremely useful. No one said that it was never used. It was coded two hundred and thirty-nine times

during the interview analysis. The following quotes emphasise its importance to the interviewees.

> "We wouldn't be able to get any insights as to how we are progressing as a business on an individual contract by contract basis if we just pooled all of our sales and cost of sales into a pool and reported on a gross margin on a monthly basis. We could do that, but we are unlikely to get any better if we are not highlighting which jobs we do well and which jobs we do badly." Company A, Financial Director.

> "I think that is the most important discipline, how on earth do we hope to get insights from what work we are doing if we are not job costing?" Company A, Financial Director.

> "If you don't understand your costs you have got no chance [of keeping control of contracts], I don't believe you have got any chance." Company D, Managing Director.

> "The information for contracts is so important to us. So being able to recognise what costs every job incurs is very important." Company F, Financial Director.

These quotes emphasise both a strategic and operational aspect to the JPA process which is depicted in Figure 25 below. It will be demonstrated that whilst the JPA is used to support operational management it also offers significant support in the strategic decision-making process. The remainder of this section will discuss each of the individual steps in this process, starting with job costing systems.

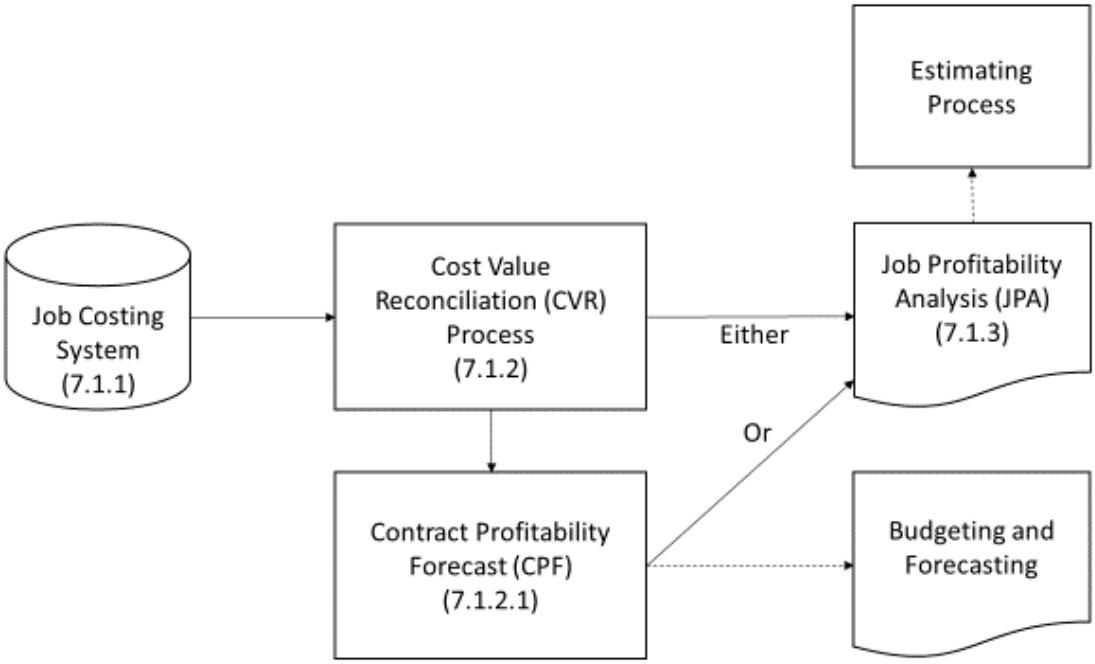

Figure 25: Profitability analysis in the construction sector

7.1.1 Job Costing Systems

Job costing systems are operated and maintained by the accounting function. “I suppose the accounts department is the custodian” Company K, Financial Controller. However, the information that it provides is used elsewhere within the business, even though in a number of cases direct access to the information is only available to the accounts department.

> “there is only the accounts team that have access to that. I can get our finance manager to download the costs for me on any particular scheme” Company D, Quantity Surveyor.

The job costing system is a slight misnomer as it actually collects transactions in relation to both contract income and contract costs. The information provided by the system forms the basis for the cost value reconciliations (CVRs) and contract profitability forecasts (CPFs) and thence the JPA and profit forecasting within the businesses interviewed.

With the exception of Company G, who uses spreadsheets, all the job costing systems of participating businesses are computerised, a number of different software packages

are in use as shown in Table 43 on page 269 below. Within these, job costing is typically a separate module which is integrated with other modules within the accounting software, what Drury (2015) referred to as an integrated accounting system. Transactions are posted into the job costing module from other modules, such as labour from the payroll; materials and plant hire from the purchase ledger and sales income from the sales ledger. At the same time these costs are updated to the cost codes within the nominal ledger. Other costs can also be posted directly into the job costing module, for example the costs of plant, which is owned by the business would be job costed.

The way costs are categorised within the job costing system is bespoke to each business, depending on their individual requirements, with costs coded to cost heads typically labour, plant and materials. These cost heads are sub-analysed according to the requirements of the business in question. The Commercial Director of Company K described this for their business as follows:

> "Everything is coded, prefixed by the project number and then an attribute cost which is the code following the job number is pre-fixed by a letter. The letter will depict whether it is a prelim cost or a sub-contractor cost. Then a further code of a 4-digit number, typically 0 something, something, something. The surveyor has to code each sub-contractor, the codes are linked on the sub-contractor, we have got a long list of sub-contractor trades., so therefore groundworks might be code F0001."

One significant distinction in costing philosophy is evident between participants, that is, the treatment of manufacturing overhead (Drury, 2015) or production support costs (Halpin and Senior, 2009). Most participants code an element of overheads ("prelims" Company L, Commercial Director) to job costs but not everyone does so. This would result in differences in how gross profits are calculated. Those that cost overheads talk about prelims, as opposed to overheads when they are referring to salaried staff and other fixed costs being job costed, this will subsequently be referred to as 'prelim' costs. The FD of Company E provides a list of the salaried roles being job costed:

> "Site agents, QSs, Engineers, Contracts Managers, they are all costed to jobs."

These staff maybe running a number of contracts at the same time and are required to account for their time by completing a timesheet. This is used to allocate their time to

individual job costs. This is an example of TDABC (Kaplan and Anderson, 2004) as discussed in section 3.1.1 above, it allows greater visibility on how a significant proportion of overhead is being consumed by contracts and reduces the value of unallocated overheads, thereby enhancing decision making.

Those participants that do not allocate prelim costs chose to only job cost site-based personnel to jobs. This is described by the FD of Company J as follows:

> "Anyone who physically works on site. Most of our engineers, commercial guys all work in the office and go out. So, I am talking about site agents, assistant agents, forklift drivers, labourers, sub-contractors and any materials associated with the house build."

Those companies choosing to job-cost prelims are effectively reducing the amount of unallocated overhead, restricting it to G&A overhead only. Allocation of G&A overhead to jobs is only done by Company J. This is discussed further in section 7.1.3 below.

The FD of Company A, which at the time of the interviews was having a new job costing system installed, is considering creating activity codes when setting up their new costing system. This was at the suggestion of the newly appointed Operations Manager who wants to refine their current TDABC and analyse costs into activities, rather than to simply analyse them to jobs. The benefit of this would be to allow better comparison of actual costs to cost estimates built up during the tendering process. If successful, this would satisfy two of the requirements of Halpin and Senior (2009) for a contract costing system, that is:

- Actual costs must be compared to budgeted costs in order to determine whether the project is on the cost profile originally predicted.
- A good cost control system can be the basis for accurate calculation of unit costs, which can be used for pricing future work.

This feedback loop between tendered costs, actual costs and back to future tender costs is seen as important additional information by the MD of Company A

> "we have got no real method of comparing our actual costs against the estimating cost other than in total. We don't do it activity by activity if you see what I mean. I think one of the things we're looking at when we go for this new accounting system is perhaps revising our analysis codes, so we use the same codes in the estimating package as in the management accounting and reporting. Which will allow us to do those comparisons more easily."

From a strategic management perspective, the benefit of doing this is in establishing a basis for more accurate cost estimates in the tender process and thereby providing more accurate information to support pricing decisions. With medium sized contractors running a small number of contracts (generally between five and ten) at any one time, it seems that, for the participants, all their tender submissions are strategically significant. Typically, the directors of the business are the ones making collective decisions about the final price to be submitted, the forum for this decision being called the "tender adjudication meeting", Company A, Commercial Director or "tender settlement meeting" Company E, Managing Director. This forum

> "also takes, quite rightly, the ultimate responsibility away from the estimators, to the decision on x percent on the bottom line." Company E, Managing Director.

This highlights the strategic importance of pricing decisions in these businesses, by not delegating pricing decisions to more junior members of staff, specifically the estimating teams. These strategic decisions being supported by cost information from the job costing systems.

The non-costing of 'prelims' is an issue for the MD of Company G, who wants to change their current process because of the inconsistency and therefore the comparability of profits between projects using employed or sub-contract staff.

> "If we have a freelance project manager or a freelance site manager his weekly cost will go against that project. If I put a directly employed project manager on that job, nothing is recorded. When you look at a job you can see that a job has made more money if it has got a directly employed staff on, because it has not picked up that overhead which then becomes part of the overhead recovery."

This seems to be a valid concern but not one expressed by other interviewees, possibly because they do not use freelance or sub-contract staff. The treatment of 'prelims' is

not the only concern, about job costing systems, raised by participants. The timeliness of the availability of job costs; their accuracy and direct access to them by the commercial team were all concerns voiced by non-accountant interviewees. The following comments demonstrate these issues:

> "It currently takes too long to get costs though onto Sage" Company A, Commercial Director.

> "These are costs from the accounts system. So, there is a huge delay. We have been caught out before [now]" Company D, Quantity Surveyor.

> "You'd be surprised how many 'errors' happen" Company A, Operations Manager.

> "There is only the accounts team that have access to that [job costing system]" Company D, Quantity Surveyor.

The solution to this problem in Company A and D is a duplicate, unofficial, manual costing system maintained by operational and commercial staff. The Operations Manager at Company A referred to 'weekly cost tracker reports' prepared by his site teams. These reports include details of deliveries of materials to site, plant and labour usage, both directly employed and sub-contractor labour. The Operations Manager feels that this information is absolutely vital to controlling costs on site which, according to Halpin and Senior (2009), is one of the major functions of a contract costing system.

> "If you are running a live site, you can't rely on an effective cost tracking system from a corporate base or an office-based scenario [a monthly based system]" Company A, Operations Manager.

Company D is also running a duplicate costing system. The QS describes the job costs from the accounts team as being available only "four, five or six weeks after a job has finished." In his view the duplicate system gives:

> "a 99% accurate idea of the cost that any particular scheme has incurred before all the invoices then start to come in for that scheme and go through the accounts process."

The accounting functions are aware of these duplicate costing systems with the FD of Company A citing investment in their new accounting software as a solution to eliminating the duplicate system. The Operations Manager, however, gave the

impression that even with the new job costing system, the need for the duplicate system would not go away.

Unlike the FD at Company A, whose solution is to implement new accounting software, the Financial Controller at Company G recognises concerns about inaccurate job-costs but feels that the solution lies outside of the accounts function, and therefore not fully under their control:

> "Providing the information we are getting, the information to book that time correctly, then the accounts are going to be correct. The problem you have got is if you have got rubbish going in you are going to get rubbish coming out. It's making sure that everyone is aware that booking the labour to the right job, to be raising the purchase orders against the individual jobs is important."

The way job-costing systems operate appears to be consistent with that described by Halpin and Senior (2009) and Drury (2015). The only exception was in the treatment of 'prelims' prescribed by Drury, what he called 'manufacturing overhead', with some companies allocating these to job costs whilst others did not. Halpin and Senior (2009) argue that construction businesses need to focus their attention on direct costs due to the low level of overhead in the construction industry and therefore these differences are irrelevant. The vast majority of the companies operate an integrated cost accounting function (Drury, 2015). Job costing systems do not seem to be without their issues but, as will be seen in the next three sections, are an essential foundation to the CVR, CPF and JPA processes. Furthermore, for the accounts department, they are fundamental for financial accounting purposes in calculating and reporting work in progress and cost accruals.

7.1.2 Cost Value Reconciliations (CVRs)

The use of CVRs was not a part of the survey, as this was not identified as an SMA technique in the literature, and therefore there is no survey data to demonstrate its importance. However, the term is referred to forty-nine times during the interviews and all but Company C, who is the only company not engaged in site-based work, use them as an integral part of their MCS.

CVRs mean two significantly different things depending on which of the companies taking part in the research is asked. For one group a CVR is exactly what its name implies, a reconciliation between value, the income generated on a contract to date and the costs incurred on that contract to date. It therefore gives an indication of the profit earned on a contract at a specific point in time. This is the process discussed in this section. For others a CVR is much more, it takes the value earned and cost incurred up to that point in time but also forecasts the remaining value to be generated and costs to be incurred in completing the contract. In order to distinguish between these two processes, the Researcher has coined the term 'contract profitability forecasting' for this process (see section 7.1.2.1 below). The MD of Company B summarises this dual role as follows:

> "It's two things. It is a snap shot in time to where you currently are based on the value you have received against the costs you have paid out, … and then it is also forecasting of where you are likely to be, based on what you know you have got left to do and what the costs are going to be."

In both cases it is a time consuming and involved process undertaken by the QSs within the business utilising the job costing information, as discussed in section 7.1.1 above. All of the businesses using CVRs do them on a monthly basis, except Company J who currently only does them every three months due to the time they take to complete. Although their FD said that "we are pushing to move them into bi-monthly and then eventually into monthly." The Commercial Director of Company A describes the process used within their organisation as follows:

> "We still currently shut-down, close down [the ledgers] and then the reports [job cost reports] are sent out. The QSs will then look at a particular report for a particular job, they will reconcile that against site costs [weekly returns], just to see if there are any major differences. There quite often is. They will take a view on it. In theory, you have got your actual costs to a point, you have got an accrual for something that might be missing, and then it is forecasting from that point to the end."

This process was common amongst the other companies interviewed. When completed the CVRs or CPFs are used as part of the MA process, to report JPA (see section 7.1.3 below). The accountants also use this information for financial accounting purposes to reconcile back to the trail balance and calculate under or over invoiced income, cost

accruals or work in progress. The accountants are not able to validate the information on the CVRs until the contract is at or near its end, as the FD of Company E said:

> "You will never know fully until the job is finished; I find. You are just taking their word for it at the time and their thought process, and without sitting and going through ten CVRs with that QS and drilling into every figure you are really relying on their view of the job at the time."

The CVRs appear to be impenetrable 'black boxes' to accountants, a situation which the Researcher recalls being very uncomfortable with during their time with Company T. This is discussed in more detail in chapter 8 below.

Although used for financial reporting purposes, the real value of CVRs to the business appears to come from the way they are used by the management team to support both operational and strategic decision making. The Operations Director of Company C said:

> "We carry out CVR's on all our projects on a monthly basis. So we can look at individuals projects and see how they are performing, and not just the high level, we're making money, which is great, but identifying projects where we are making money and identifying those where we are not making as much money as we expected. We can then drill down and work out why that is the case."

This is evidence of MA, if not management accountants, regaining its relevance, contrary to the comments made by Johnson and Kaplan (1991) who claimed that MA had become driven by financial reporting and therefore was of little use in helping managers reduce costs and increase productivity. Here there seems to be a process operating, driven by commercial decision making whilst also benefiting financial accountants.

7.1.2.1 Contract Profitability Forecasts (CPFs)

Before discussing JPA it is necessary to discuss CPFs as either CVRs or CPFs are both used in reporting job profitability. As discussed above CPFs can either be an integral part of the CVR process or undertaken as a discrete activity after the CVR is completed.

The Commercial Director of Company K emphasises the role played by CPFs in their JPA process, in that that it highlights areas for improving future profitability:

> "That will enable us to ascertain what the current performance of the job is, in terms of where it is likely to end up, what are the potential opportunities in the project, what the potential risk is against the project."

This view is also represented by the MD of Company E, who whilst accepting the need for a CVR process, does not like their narrow focus on a single month, preferring to focus on the forecast final outcome of the contract:

> "I try to focus everybody on the job. We have got a job; we have got a client. Where are we going to be at the end of it, before we get there. Do we need to correct the course, or change anything to ensure that we reach the goal?"

He is not "one hundred present [sure] what value it [a CVR] adds to the overall picture." He, like others, refers to the ability of QSs to manipulate the results shown by a CVR.

> "I would describe it as a game QSs play. I will hold some value back from the CVR until the end of the job so that it all looks good and rosy at the 11th hour. I don't like that."

This can be solved, to a certain extent, by extending the CVR process to incorporate a CPF to the end of the contract. As discussed earlier, to some this is an inherent part of the CVR process whereas to others it is a separate process. Preparing a CPF provides the business with, in the words of the Commercial Director of Company K. "a balanced view." By this he is talking about smoothing out the monthly reported profits by basing them on a CPF rather than a CVR prepared up to a point in time.

> "What we would look to do is provide a nice even view of where things are without the monthly report saying; I've made £50,000 this month; I've lost £50,000 this month. It has to be a balanced view in terms of forecasting as to where the job's going to end up."

This is an approach also adopted by Company A. Incorporating QSs' forecasts about future income and costs results in the CPF 'black box' becoming even less transparent than the CVR 'black box'. This increases the accountant's reliance on the skills and judgement of their QS colleagues and diminishes their own input into management reporting even further.

Company L applies a sensitivity analysis to its CPF process, their Commercial Director describes it as “more of an art than a science”. This incorporates a CVR and an additional document called a project appraisal. The Commercial Director describes this as:

> “Every month, every single contract has a project appraisal. In addition to the outturn margin that we are predicting we have also got the best, most likely and worst case on it, taking account of risks and opportunities.”

He is critical of relying on a CVR as the basis for monthly reporting:

> “Your CVR, as a snapshot in time, if you are not careful it will give you a false picture because it will show that you are making lots of money at the moment, whereas you should only be trading a profit in line with the predicted outturn profit. Straight line forecasting.”

In their case they use the CVR as the basis for their monthly profit reporting but reduce this, where necessary to ensure that they never report more cumulative percentage margin than the forecast percentage margin.

It seems that there are different views on what exactly is meant by a CVR/CPF and subsequently how they are used. All the businesses interviewed produce monthly management accounts, except company G who currently do them quarterly. Either the CVR or CPF forms the basis of the JPA reported within those management accounts. The use of CPFs can eliminate fluctuations in monthly profit reporting associated with CVRs. this is the subject of the next section.

7.1.3 Job Profitability Analysis (JPA)

Using the CVR as the basis for preparing the JPA within the monthly management accounts can cause some problems of under or over reporting and a “seesaw effect” Company E, Managing Director. This can be addressed by using the CPF instead, what the Commercial Director of Company L refers to as “straight line forecasting”, meaning that they base the profit for the month on the forecast profit which was less likely to vary significantly from one month to the next. The ability of the management accountant to validate the gross margins reported on a monthly basis also appears to be in doubt, leading to Commercial Director of Company K claiming that the monthly management accounts belongs to him as opposed to the Financial Controller who publishes them.

In all but one case the JPA is produced to gross margin level, that is, the gross profit of the company is reported at a job by job level. The one exception is Company J who reports JPA to net profit using full cost, based on an allocated overhead.

> "For every pound that we spend [on a house] we assume that there is 17p of other overheads. So, the cost of selling that plot and getting that plot from a brick to a house. Things like, the finance function, the commercial department, the engineers, the architects, the advertising budget, the legal conveyancing, the salesgirls, the flags, the show homes, literally everything." Company J, Financial Director.

They do this by adding seventeen percent of direct cost to each job cost to allow for G&A overheads. Elsewhere JPA is done to gross profit level and is the responsibility of the commercial team through the CVR or CPF process. However, in Company J because of the perceived added complexity of allocating overheads, job profitability is calculated by the accounting team,

> "we job cost at net [before overheads] …. So, surveyors only care that I have spent £100,000 on my bricks, or my roof or my thingy. So, they think about net. When it goes into the accounts, we do the jiggery pokery that talks about including overheads. The surveyor, it would just blow their brains if you started talking about this has got overheads and that hasn't, and this should be 8% and this should be 9%. We do all the jiggery pokery in finance."

This seems a strange justification based on what other companies do and the numeric skills of QSs. It appears that in this situation the accountant is trying to gain back some control over their monthly profit reporting, a level of control that is diminished by relying on CVRs or CPFs to produce monthly management accounts.

Company B also reports net profits but at a divisional rather than job level, their MD is conscious of how an incorrect allocation of overheads to divisions might lead them to make incorrect strategic business decisions. This is unique amongst the interviewees and seems to be necessary given the differing types of construction activity Company B is undertaking with differing levels of gross profit margin. The allocation is currently based on turnover which he recognises might be unfair in assessing the performance of some divisional managers. He discusses his desire to make the allocation more accurate but is getting resistance from the Operations Director.

> "[The Operations Director's] argument was it doesn't directly affect us [the company total net profit], but I'm not bothered, I know it doesn't directly affect us, but I want to know so I can manage things better." Company B, Managing Director.

The way they describe how they want to identify which part of the business "is actually sucking up a big chunk of that overhead" is, in all but name, ABC (Cooper and Kaplan, 1988). This seems a grand ambition given the Operations Director's views and no evidence of its use by any of the other interviewees.

This approach to overhead allocation to divisions is similar to the Researcher's experience at Company T, which during his tenure as FD, grew from three divisions (profit centres) to ten and became a large company with over 250 employees (see Appendix 11.3). This required increasingly equitable and therefore sophisticated allocations of overhead which also needed to be transparent to divisional directors whose performance was judged based on divisional net profit targets. Allocations of G&A overheads were calculated annually based on annual budgets. G&A cost centres were treated as providing a service to the divisions depending on how the service was consumed, for example IT was based on the budgeted number of PCs in each division. Once calculated the allocations, as percentages, were fixed for the year and applied to actual overhead costs on a monthly basis. In that way the cost of maintaining the allocation process was minimised. Whilst this could not be described as ABC it nevertheless had some of the hallmarks of an ABC system. Costs were allocated to cost centres rather than cost pools, but their allocation was based on cost drivers, such as the use of PCs and the number of vehicles being driven. However, it did not result in any form of ABCM (Cooper and Kaplan, 1991) and the G&A budgets remained incrementally based rather than using ABB (Hansen, Otley and Van der Stede, 2003).

Other than the TDABC of 'prelims' no other evidence of ABC is found in the interview data. This supports the findings of Drury and Tayles (2006) who concluded that

> "the adoption of ABC and more complex costing systems does not seem to have permeated much to data included in routine profitability analysis" (Drury and Tayles, 2006, p.413).

This concern over the allocation of overheads seems to reflect a difference in approach between managers. Those with a commercial bias, want accurate information for decision making purposes and those with an accounting bias who seem to be more concerned with the accuracy of their financial statements. It also seems to undermine the argument of Halpin and Senior (2009), that direct costs should be the main focus of contract costing systems.

The use of contribution or full profit in PPA was found by Drury and Tayles (2006) to be split 50/50. Most construction businesses seem to have developed a hybrid approach whereby prelims are costed to jobs, but G&A overheads are not. This leaves a lower percentage of overhead not job costed and therefore, in a sector with already low levels of overhead (Halpin and Senior, 2009), it seems difficult to make the argument for implementing a costly and time-consuming ABC system.

The allocation of overheads is not an issue for the MD of Company E who, when asked about ABC said:

> "For the size that we are, we know what is left after each job has got to pay for those overheads. After it has paid for those overheads, that is what is left, profit wise. It's just a lump sum figure that goes into a big pot at the end of the day. I think that we are quite happy with that process."

The implication being that job costing, including prelims, gives them accurate enough information for decision making purposes. With a low level of overheads in the industry, Halpin and Senior (2009) claim they are less than 5%, these findings suggest that reporting JPA to gross profit after prelims appears to provide an adequate proxy for net profitability. However, where overheads are higher, for example Company J uses a seventeen percent addition to direct costs to arrive at full cost, Halpin and Senior's argument appears to be invalid. Using a blanket overhead rate in a multi-product environment may lead to distorted product costs (Brierley, Cowton and Drury, 2001). However, this seems appropriate for Company J who are effectively producing a single product and as such using a blanket overhead rate might not distort net build costs enough to be a major concern. Those building bespoke products would be unwise to use a blanket rate and in fact no evidence was found that they did. This discussion is relevant to the findings of Brierley (2016) who identified that PPA was used for decision making

if it was felt to be accurate, but when it was felt to be inaccurate then special studies were undertaken for the purpose of decision making. Although these findings related to manufacturing industry it seems they can be transferred to the construction sector where most medium sized companies, with low levels of overhead, feel that JPA, whether based on pre or post-prelim costs, gives them accurate enough information for decision making purposes.

7.1.3.1 The strategic use of JPA

In section 7.1.1 above the strategic use of data from the job costing system to support the pricing of tender submissions was discussed. From the interview data it is also clear that the MAI supplied by the JPA influences the strategic business development activities of the organisations interviewed.

The Commercial Director of Company A describes the strategic decision making that took place within their regular tender review meeting

> "we review tenders that have arrived in the recent period and decide if we are doing it [going to price it]."

One factor in this decision is the type of work involved in the potential job and the Commercial Director's knowledge of the different levels of profitability achieved on different types of work. This knowledge is obtained from the JPA and the CPFs. A similar comment was made by the Commercial Director of Company K.

> "strategy wise we only price jobs in the right areas at the right times, that we are prepared to do, and that we are not taking on undue risk. It's a continuous review, we have a monthly strategy review into making sure."

The decision making in this strategy review meeting is supported by their JPA.

Even before decisions about which tenders to submit the knowledge of differing levels of profitability on different types of work, obtained from the JPA, is used to direct business development activities into securing the right type of tendering opportunities. Scarce business development resources appear to be targeted at securing types of work with the best opportunity to make high margins. These strategic decisions are based on margins achieved on similar types of work in the past, as indicated in the JPA.

> "That to me is where business development comes into it … this is talking about profitability analysis. If you understand your sweet spot you know which way to push your business development team, otherwise you could be really busy fools or pursue opportunities you can't make money from" Company L, Commercial Director.

Similarly, the Commercial Director of Company K emphasises the use of their JPA to be selective in their business development activities towards securing profitable types of work.

> "There is no point in contacting loads of clients and getting loads of tenders in. One, we haven't got capacity to price them all; two, by the nature of who the client is or what type of work is involved."

During his time at Company A the Researcher was involved in a similar strategic decision based upon information contained within the JPA. This was in relation to ground working activities (specifically preparing foundations for house builders). At the time this was a type of work Company A considered to be one of its core activities but, as demonstrated by the JPA, was a type of work on which gross profit margins were deteriorating. At the same time a competitor seemed to be thriving by focusing on this type of work. This was demonstrated by analysing their financial statements and knowledge of their tender successes when they were competing with Company A. After analysing the operational activities related to this type of work, it was evident that Company A could not reduce its costs sufficiently, on this type of work, to be successful in tender submissions and achieve its targeted levels of gross profit. As a result, the directors of Company A made a strategic decision that it would no longer pursue these types of tender opportunities and focus the business development resources on securing tender opportunities with potentially higher profit margins.

The importance of job costing, CVRs, CPFs and JPA to medium sized construction companies is not in doubt. They are used as both as operational and strategic management tools. Strategically they are used in pricing decisions and directing business development activities to support the achievement of strategic objectives.

7.2 Investment Appraisal

In the survey this SMA technique ranks only fourteenth in terms of usage (usage score of 3.0) whereas it rises to eighth in terms of perceived benefits (perceived benefit score of 4.0) the seventh largest difference. In the interviews it is the second most highly coded technique. Most of the interviewees have at least one example of making capital investments they could discuss. Company A had made a recent strategic investment which is discussed in some detail in section 7.2.1 below, whilst Company J is making regular SIDs in the form of 'land sign offs'.

The volume of capital expenditure varies significantly within the sample. Company J is making six to eight purchases of land every year of between two and twenty million pounds each whereas the largest investment described by Company L is sixty thousand pounds. This is reflective of the requirements of their different types of construction activity rather than anything else. Company L is a principle contractor employing sub-contractor specialists who use their own plant and equipment, its need for capital expenditure is limited to its office space, IT equipment and office furniture. Furthermore, most construction plant equipment is available for hire, making it possible to operate without significant capital investment. A major factor when choosing between buying or renting and whether to replace worn out equipment seems to be estimates of future utilisation levels. The MD of Company A cites a forecast of eighty percent utilisation level as the threshold for deciding to purchase rather than rent equipment. The MD of Company E said that they own seventy percent of the plant they use and hire the remaining thirty percent. Their main capital expenditure is to replace old inefficient plant and, according to their FD, the maximisation of tax-free capital allowances is a major factor when considering the timing of these replacements. Company D is a specialist sub-contractor using specialist equipment which it prefers to buy rather than hire, here operational flexibility seems to be the major area of concern in their decision making:

> "Part of our business is very specialist, in surfacing there are very few companies that hire that sort of equipment. In some cases that equipment is being used 24 hours per day, 7 days a week. It needs to be at the best of its condition and therefore you just wouldn't hire." Company D, Managing Director.

Despite these differences in investment strategies the businesses have one thing in common, a very low use of financial investment appraisal techniques, with PP being the most advanced technique identified. That is not to say that these investment decisions are not considered in some detail, with high levels of very senior management scrutiny, often the final decision is taken by the MD. The most comprehensive approach is described by the FD of Company J. The process of "land sign off" required before land is purchased for their "strategic land bank" is as follows:

> "We get a piece of land that is bought to us. The first thing we do is we review the planning, if it has planning, and what is required of the planning. We then design the site up, in broad terms, have discussions with the planning department to make sure that it is in broad terms acceptable. Then from that we stack it up, based on our known GTO costs [costs to build] and also the engineering. So, we measure off the roads, we get an engineering solution, we get a ground report to tell us what the ground is going to be like. Then from that you work out a residual value as to what you can afford to pay for the land."

This process can take up to three months culminating in a four to five hour "land sign off meeting" attended by all the directors of the business. The two main criteria for it being approved is whether the planned development is forecast to achieve the desired profit margin (this was not disclosed) and it is consistent with their five-year business plan.

Company I is described as "very capital intensive" by its MD. Along with Company J this is the only other company to have a specified 'hurdle rate' for capital expenditure approval. This requires a sixteen percent "return on capital investment" imposed by their parent company, another profit-based measure. However, the sixteen percent threshold can be reduced in certain circumstances where there is seen to be "added value across the group" by which he means intangible benefits which are not possible to value. The FD of Company A also refers to intangible benefits when discussing a recent strategic decision to upgrade their accounting software:

> "It's so difficult to quantify the cost savings you are going to be able to make from it [IT investment]. It's the intangible benefits the sort of, the morale, the time and energy saved by our team and possibly the QSs going here, there and everywhere to find information. The easy things it was possible to quantify was this is what Sage Construct, Sage Payroll is costing us, this is

what Redsky is going to cost us. There was an additional cost of using Redsky, but this is where the non-quantifiable benefits come into it."

He said the project would not have proceeded "had it not been for the fact that I was able to persuade [the MD] that there were intangible benefits." This is similar to the approach suggested by Drury (2015), calculate the negative financial impact of any potential investment and then discuss the intangible benefits to see if it is felt that they offset that negative impact.

Whilst PP is mentioned several times the only other investment appraisal technique mentioned was DCF. Only one interviewee mentioned it, and this was in relation to its possible application in the future following their acquisition (Company C) by an American listed parent. He compares this to their previous owner, a private German company, who had approved a thirteen-million-pound expenditure on a new factory and offices "in a twenty-minute conversation with the owner, we did that over lunch." Company C, MD.

It can be seen that investment decisions seem to be supported by a minimal amount of financial information and very much based on the impact on profit rather than on cashflow, even payback calculations are based on profits rather than cashflows. The impact on working capital on investment decisions is rarely mentioned and then only fleetingly.

The following case-study demonstrates the process by which Company A decided to invest in a new business venture, a change in strategy, based upon a business case presented by one of their senior managers.

7.2.1 Investment in new business venture: a case study

This investment was considered to be strategic both by virtue of the amount invested and its impact on the activities of the business. It involved the creation of a new subsidiary company (Company Z) to provide 'no dig' construction services to Company A, a fellow group company, and to new external clients. Before the investment Company A was outsourcing specialist 'no dig' pipeline repairs to a third-party sub-contractor. This

work was commissioned and managed by the Framework Manager of Company A. Whilst working with the third-party sub-contractor the Framework Manager discovered that they had made one-hundred thousand pounds gross profit on a job which he had procured for two-hundred thousand pounds, a one hundred percent mark-up. According to the MD "this opened up [the Framework Manager's] eyes to the possibility of getting into it ourselves."

The Framework Manager describes the process for getting his proposal approved.

> "The first process was putting together a paper that explained the whole process, what the benefits to the business would be, what the benefits to clients would be, which I put together. I did comparative costs of what we are sub-contracting out to other sub-contractors and if we bring that back in house. I did all the calculations on this is where it would be on the bottom line, that's where it is on the top-line."

This paper, a three-year business plan, was prepared by the Framework Manager assisted by the NED and the FD who was "sense checking though the numbers and the assumptions in the model as to the margin that could be achieved on the proposal." The directors of Company A approved the investment in October 2017 and the new company started trading in January 2018. The initial investment requested was one-hundred and eighty-four thousand pounds per quarter as the business expanded. A review of the year one financial plan, including a detailed monthly profit and loss account and monthly balance sheet, shows a small opening overdraft position increasing to one-hundred and forty-four thousand pounds after four months but showing cash in hand of one-hundred and four thousand pounds after twelve months. The financial plan therefore considers both purchases of fixed assets and working capital requirements. This was the extent of the financial justification that was produced. No investment appraisal techniques were used.

This case and the "land sign off" of Company J both exhibit the characteristics of a SID as defined by Northcott and Alkaraan (2007) and discussed in section 3.3.5 above. Both exhibit long term financial commitments, slow to materialise benefits and high levels of uncertainty. The literature would suggest that these decisions could be supported by emergent appraisal techniques such as sensitivity analysis, fuzzy set theory or real

options analysis (Northcott and Alkaraan, 2007). It is also suggested that there are circumstances when non-financial factors are being incorporated into SIDs or even taking precedent over accounting measures. These findings demonstrate that not only are emergent appraisal techniques not used but even traditional methods of investment appraisal are not widely used with non-financial factors dominating the decision-making process. This contradicts the findings of Northcott and Alkaraan (2007) who found that financial analysis still dominates the appraisal of investment decisions, whereas the above findings demonstrate that non-financial factors dominate supporting the findings of Elmassri, Harris and Carter (2016). The different findings could possibly be due to the size of these organisations, as suggested by Carr, Kolehmainen and Mitchell (2010) who found that large companies were more likely to use sophisticated techniques, such as DCFs, to support investment decisions. Drury et al (1993) found that smaller companies ranked PP, IRR and intuitive management judgement, first, second and third in order of importance in evaluating major projects. Although IRR is not mentioned by interviewees the findings of this study would support a preferred use of payback and management intuition in investment appraisal decision making.

The use of payback using profit rather than cashflow identified in this study is not surprising given the way in which these decision makers are rewarded with bonuses awarded on the basis of short-term financial performance (see section 7.4 below). This seems to lead to decision makers using measures which indicate how quickly projects add to bottom line profits. Furthermore, it is interesting to note that Company A's investment in new accounting software was made taking into account intangible strategic benefits to the business, such as the morale of the accounts team. Whilst this contradicts the findings of Carr and Tomkins (1996) who suggested that UK companies tended to focus on financial analyses when making investment decisions, it supports the findings of Harris et al (2018) in relation to the use of non-financial performance indicators. Whilst bonuses in Company A are calculated based on net profit, it also uses a variety of KPIs to measure its achievement of objectives and this seems to be making its way into their SID making. Lucas, Prowle and Lowth (2013) suggested that there is scope for raising the awareness, amongst SME managers, of capital expenditure appraisal techniques, this study would support these findings with managers possibly

making incorrect long-term decisions by not incorporating DCF and other appraisal techniques into their SIDs.

7.3 Cost of Quality (COQ)

This section highlights that, whilst quality (defects) is a significant issue for the construction sector, reporting the cost of defects is not a priority amongst interviewees. It is argued that management accountants are ideally placed to improve the reporting of the COQ and uses forcefield analysis (Pojasek, 2001) to suggest how this might be introduced. The results of the survey indicate that heads of finance thought COQ has the biggest potential benefit of all the SMA techniques surveyed. (Usage score of 2.4 compared with a perceived benefit score of 3.9). During the analysis of the interview transcripts it was coded seventy-five times confirming it as a significant issue for interviewees. The FD of Company A thought that:

> "from a finance point of view, it would be worth trying to highlight the amount of rectification work we are doing to bring it to people's attention."

Quality issues are clearly a major issue within the industry:

> "Quality seems to be a very low factor in this business and the industry" Company F, Financial Director.
>
> "Quality is massive. One thing construction companies are plagued by" Company K, Commercial Director.

For Company J quality is of such great importance that they had just terminated the employment of a contracts manager due to his low commitment to quality. Further proof that defects are such a significant issue is that the industry has a standard mechanism for dealing with them. Following the practical completion of the contract (the handover of the project to the client) the client will retain an amount of money (known as retention; commonly 2.5 percent of the contract sum) for a minimum period of twelve months, until the point at which the client issues a making good defects (MGD) certificate. The MGD certificate confirms that all known defects have been dealt with by the contractor. This is not a measure of the COQ but a mechanism to force contractors to return to correct defects in their work, otherwise they do not get paid the retention.

Despite it being a major issue in the sector only a small minority of the interviewees formally report the cost of correcting their defects. The FD of Company L describes the reporting of defects as "anecdotal"; the FD of Company F shares this frustration:

> "it's not valued, it's not assessed, it's not analysed. You know, there is no hard stuff there, which an accountant lives by, which determines how much of a problem it is and therefore how much of a resource to dedicate to it to sort it out."

These views are surprising given that post-practical completion defects cost information is readily available through job costing systems.

> "[Defect costs] get costed to old jobs. We leave the jobs open, we don't close the jobs" Commercial Director, Company K.

The cost of putting right defects pre-practical completion are more difficult to measure. Any costs incurred are not separately identified from the normal contract costs, according to the Commercial Director of Company L this is not be possible:

> "The difficult bit is to measure the costs of defects up to practical completion. It becomes a bit subjective then, is the non-recoverable, because of the defect or is it because of something else that has changed on site…. it just becomes a bit more subjective. I'd love to have that information but it's not one that I can collect."

The FD of Company A also mentions "fear" as an obstacle to measuring and reporting pre-completion defects.

> "We have got to drill the discipline down to make sure the consequences of trying to hide rectification are worse than disclosing rectification work."

This comment is interesting in that the suggestion is to replace a fear of reporting defects into a fear of not reporting defects, rather than promoting a change in the culture of the business. These findings indicate that the cost of defects incurred during the contract build appear to be an unknown in the industry, given the evidence of the scale of the COQ from other industries (Porter and Rayner, 1992) deploying this SMA technique should be a priority for FDs in medium sized construction companies.

Company J has the most sophisticated reporting mechanism for the COQ, this results in them identifying a significant proportion of their costs relating to quality issues. They

allow three percent of build costs for defects in cost estimates compared to 0.3 percent of contract value for Company L. Company J is a housebuilder dealing with the general public, they have an external, independent measure of their quality based on customer feedback to the National House-Building Council (NHBC). A high NHBC quality score is an important feature of their sales and marketing strategy and it allows them to charge a premium price because "the customer perceives that they are getting more for their money" Company J, Financial Director. To maximise their NHBC score the company has a customer care process aimed at correcting defects before they are seen by their customers. Using the Prevention-Appraisal-Failure (PAF) framework (Porter and Rayner, 1992) discussed in Appendix 1.1.3 these costs would be classified as appraisal costs and internal failure costs, although the interviewee does not allude to them in this way. The purpose of this sophisticated system is to minimise external failure costs however, these external failure costs are not calculated as a part of this process, possibly because like pre-completion defects costs, they would be subjective or difficult to calculate, such as lost sales.

Porter and Rayner (1992) suggest that prevention costs should be viewed as an investment and appraised using NPV techniques. No evidence of this approach is found during the research, in fact prevention seems to be a low priority amongst the interviewees with most resources allocated to detecting defects rather than preventing them from happening in the first place. The reason for this might well be the high use of sub-contractors and the ability to get them to put right their mistakes at their own cost, leading the principle contractors to believe that COQ is small and not worth reporting. An alternative explanation could be that they believe that collecting pre-completion defects costs is difficult, because they are subjective, or the culture of the industry is not one in which mistakes are reported for fear of punishment. Either way the hidden COQ is worthy of further examination given the figure of eighteen percent of turnover as the median COQ (Porter and Rayner, 1992).

It is clear from both survey and interview data that, whilst defects are a much-discussed topic in the board room, measuring and reporting them is low. Much lower than the thirty-four percent reported by Sower, Quarles and Broussard (2007) who gave four possible reasons for this low adoption rate (see section 3.1.3 above). Lack of IT systems

to capture the data is not an issue in this sample and the perceived benefit of doing so is recognised, by accountants at least. The reason appears to be a lack of support from the business leadership who do not seem to be asking their finance teams to prioritise the provision of the cost of defects within their businesses. It has already been reported that senior managers recognise the issue, even to the extent of being frustrated by it but nevertheless they do not seem to prioritise it. The Operations Director of Company A acknowledges that they currently did not know the COQ but sees a role for the accounts department in addressing this:

> "Perhaps accounts can get better information about what is our wastage levels are, because we don't really know what our wastage levels are." Company A, Operations Director.

Accountants should take up this challenge and take responsibility to drive the recording and reporting of COQ. The data supports the view that they already perceive its benefits and being the custodians of the job costing system, they have a mechanism which enables them to do so, but perhaps it is not high enough up in their list of priorities (Bangert, 2012).

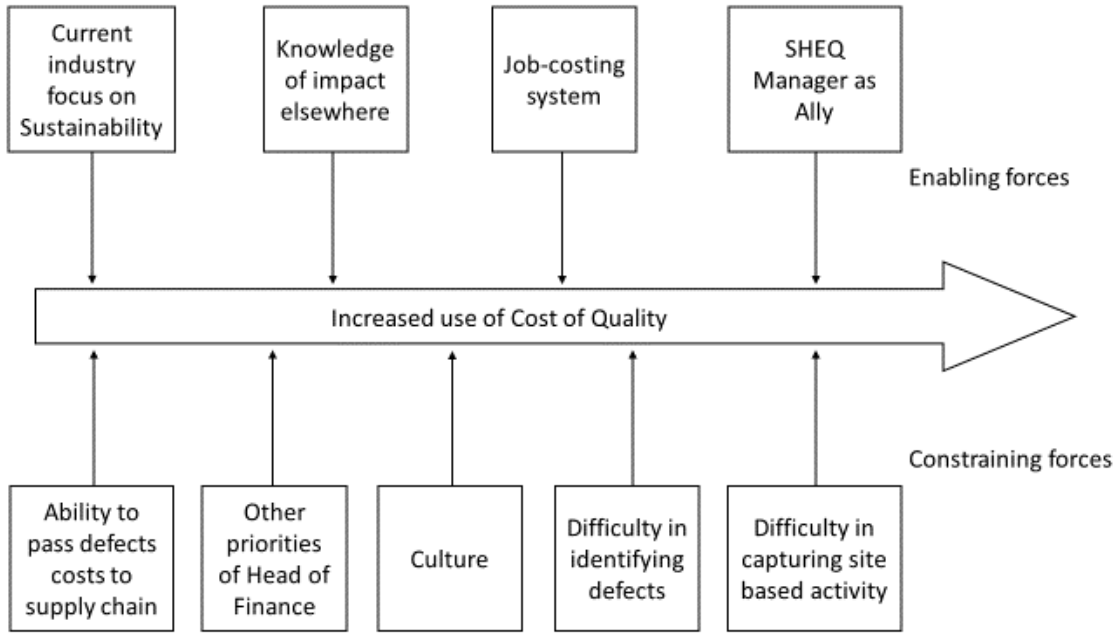

Figure 26: Forcefield analysis for implementing cost of quality

At the moment it appears that the forces constraining the use of COQ are greater than the enabling forces, resulting in a very low usage of the technique amongst medium sized construction companies. In order to change the current situation a number of options are available as shown in the forcefield analysis in Figure 26 above. Accountants could use the discourse around sustainability to promote its use, using the safety, health, environmental and quality (SHEQ) (or equivalent) manager as an ally in this would be advisable. Maintaining the quality management system is a part of the SHEQ manager's role and this would need modifying to introduce new defect reporting processes within the business. Accountants should also familiarise themselves with existing empirical evidence of the scale of COQ in other settings to support their argument. On the other side of the equation constraining factors would need to be reduced, first and foremost the culture of the organisation must be changed with a commitment from senior management to support the initiative as identified by Sower, Quarles and Broussard (2007). At the same time there also needs to be a relaxation of the command and control culture starting at the highest levels of management, otherwise reporting will not be complete. Amongst the reporting procedures that would be required to capture pre-completion defects there would need to be clear definitions to remove some of the subjectivity around their identification. This would require accountants to work closely with the QSs in the organisation. It can be seen that most of the issues which need resolving are not technical accounting issues but involve working collaboratively with colleagues outside the accounting function. The ability of accountants to achieve this has been a matter of much debate in the literature (see section 2.7 above), chapter 8 below discusses this in much greater depth.

The prize of introducing COQ reporting into medium sized construction companies seems beyond doubt, the challenge to implement it is huge, but it is possible given senior management support and a change in culture.

7.4 Performance Evaluation

This section considers the measures used by the interviewees to monitor both the performance of their business and of individuals employed in the business. Unsurprisingly discussions about individual performance measures quickly turned to

bonus payments and the basis on which they were awarded. The survey included two questions about the use and perceived benefits of the BSC and of other multi-dimensional performance measurement. These two techniques demonstrate the second highest paradox after COQ. The survey results and number of times each is coded during the interview analysis are shown in Table 26 below, together these are summarised as performance evaluation techniques.

	Average actual usage	Average perceived benefit	No of times coded
Balanced Scorecard	2.2	3.5	18
Other Multi-Dimensional Performance Measurement	2.6	3.9	112

Table 26: Performance Evaluation Techniques

The use of non-financial performance measures appears to be commonplace in the industry. KPIs are used by all the participating companies, the following are some of the different measures used:

- Tender success measures; Company A and Company I,
- Repeat business; Company B,
- Customer Satisfaction; Company B,
- Ratio of workshop chargeable to non-chargeable work; Company C,
- Staff turnover; Company E,
- Site safety visits by directors; Company A,
- Turnover/day/employee (a proxy for productivity); Company F and Company I,
- Client visits per week; Company I,
- Percentage of customers completing NHBC surveys; Company J.

The non-financial measures most commonly mentioned are H&S related such as number of RIDDORS (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013) (Health and Safety Executive, 2020); number of hours without a RIDDOR and number of site inspections per week. In Company A this information is included in a monthly 'H&S dashboard' which is circulated to all directors and displayed at all places

of work. This focus is clearly as a result of legislation but also important to an industry where the construction site environment is a particularly dangerous place to work. In addition a majority of the businesses interviewed are accredited to the ISO45001 occupational health and safety standard (British Standards Institute, 2018) which states that:

> "In order to achieve the intended outcomes of the occupational health and safety management system, the processes should be monitored, measured and analysed" (British Standards Institute, 2018, p.36).

Compliance with this standard is also a major driver for the collation of H&S KPIs.

Site inspections are used, not only to monitor H&S performance but also to monitor their adherence to the company's other policies and procedures, often enshrined in the company's ISO9001 quality management system (British Standards Institute, 2015b) or ISO18001 environmental management system (British Standards Institute, 2015a). The SHEQ Manager of Company A describes how these site inspections are turned into scores to monitor the performance of the Site Managers:

> "If they score 2 it means it is in-house compliant and legally compliant. If its 3 it means they have gone above and beyond expectations. They get a minus 3 if there is an improvement required or there is an illegal breach, or they can get a minus 6 if it's really bad."

The businesses interviewed produce non-financial performance information for which targets could be established and then summarised onto a BSC. The Operations Director of Company B confirms this view:

> "I think it's essential to give that more rounded view of the company's performance but it's definitely something that we don't do much at the moment. But actually, we could quite easily adopt it [BSC], we have a lot of the information there anyway. The way ISO9001 is certified so we have got a lot of processes in terms of customer satisfaction, monitoring etc that we already have the data there."

In most of the businesses interviewed performance measures exist for all of the four perspectives; financial, customer, internal business, and innovation and learning introduced by Kaplan and Norton (1992). Despite this only one of the businesses

interviewed has taken this information and used it to introduce a BSC, this was attempted by the FD of Company L who had experience of it in a previous role:

> "Rather than just be, we are going to make £1m, we had targets, we had health and safety targets; we had staff engagement targets; family feel targets, to try and keep a lower turnover of staff; order book targets; work winning targets, targets to gain some frameworks, so not just any turnover but specific kinds of turnover."

He introduced this at the same time as a human resources (HR) manager was recruited to introduce formal HR policies and procedures as well as implement a new bonus system which was linked to achieving the targets on the BSC:

> "There will be a pool of money, but the company has to hit its targets first. Therefore, its targets were a collection of finance and non-finance targets, to try and get that balanced scorecard" Company L, Financial Director.

That was three years ago and the BSC is no longer in use, two reasons are given by the FD for this:

> "At that stage the other directors were all the people from the 'old school'. They weren't particularly that enthused, they had nearly all been here for 20 years" and

> "[The bonus] has never paid out, because it came in just as we started hitting some really lousy results."

The first of these reasons is one of the drivers of BSC usage identified by Wiersma (2009), that is "the receptiveness of managers to new types of information" (Wiersma, 2009, p.250). Furthermore, although referring to an ABC implementation, Mitchell and Sinclair (2000) found that top management support was an important factor in determining success. It is clear from the FD's comments that he did not get the support from his fellow directors for the BSC initiative and the literature suggests that this would be a major factor in why it was not a success. Fitzgerald (2007) identifies three generations of users of the BSC, Company L was a third generation user as it incorporated the BSC into an incentive system. Second and third generation users are said to get the biggest performance benefit from introducing the BSC, however, in the case of Company L linking it to their bonus system seems to have been a step too far, with the failure of the

company to generate a bonus pot, being a second major contributory factor in its demise.

When asking about individual performance evaluation, responses quickly turned discussions about bonus schemes. All the participants run a bonus scheme, most also have employee appraisal schemes but, it was interesting that, with the exception of Company J and L all bonus calculations are based solely on profitability rather than linked back to other non-financial measures. This is surprising given the abundance of other performance measures and targets available with which to drive behaviours linked to strategic objectives. Company J, by linking their bonus scheme to a variety of measures linked to strategic objectives and tailoring it to individual performance do appear to have succeeded in creating what Kaplan and Norton (2000) had suggested in relation to strategy maps.

> "At that appraisal they set specific targets for the coming year and they are bonused on achievement" Company J Financial Director.

Discussing their own bonus scheme the FD's objectives are described as "more techy" but they are also:

> "expected to be involved in health and safety. I have to do four health and safety visits per year. I am a finance person; how much can I contribute? But I have to go, we are expected to show our commitment to the company's commitment to provide a safe environment."

This comment demonstrates the effectiveness of setting objectives and linking targets to financial remuneration (Fitzgerald, 2007). It is evident from the FD's comments that they feel unable to contribute directly to improving H&S and, it is only because it is linked to their bonus that they have the motivation to do any H&S visits. Contrast this to the Researcher's experience at Company A where a similar target for directors to conduct regular site visits was in place (see Appendix 11.6). Here bonus payments were purely related to financial performance and whilst the KPI for directors site visits was displayed on the monthly 'H&S dashboard' no action was ever taken if these targets were not achieved. Indeed, the Researcher never completed a H&S site visit during the whole of his tenure and was never taken to task for not doing so. This was not because he did not recognise the value of H&S to the business, but other tasks carried a greater priority.

This supports the view of Fitzgerald (2007) that performance measurement alone is not enough, it also needs to be managed. One way to do that could be to pay bonuses based on individual objectives linked back to strategic objectives utilising the idea of strategy maps (Kaplan and Norton, 2000).

Only one instance of the use of the BSC is found in the study, however, a variety of non-financial performance measures are evident, often linked to the strategic objectives of the business. It is clear however that the overriding performance measure is profitability and more often than not this is the basis of bonus calculations. Herein lies a contradiction, the apparent importance of non-financial measures is undermined by the use of profit as the sole basis of bonus payments. As if to underline this contradiction the MD of Company E, when asked about how performance is measured, laughed and said,

> "Profit, how much is left at the end of the year. We are in business aren't we. We're not a charity."

7.5 Competition Monitoring

This section introduces a new source of competitor information specific to the construction sector. 'Tender feedback' provides information on tenders submitted by competitors and therefore potentially on their costs and cost structures when used in conjunction with other monitoring techniques identified in the literature. The survey included three questions about the use and perceived benefits of techniques used by businesses to monitor their competitors, the results of which are summarised in Table 27 below:

	Average actual usage	Average perceived benefit	No of times coded
Competitor Position Monitoring using their Financial Statements	3.6	4.3	37
Competitor Position Monitoring	3.2	4.1	
Competitor Cost Analysis	3.0	3.9	

Table 27: Monitoring the Competition

Taken as an average these topics score 3.3 on usage and 4.1 in relation to their perceived benefit. Competitor Position Monitoring using their Financial Statements is perceived as the third most useful SMA technique and perhaps not surprisingly, given the familiarity of the technique to qualified accountants (Guilding, 1999), is the most widely used competitor monitoring technique. During the interview analysis these topics were coded thirty-seven times.

Unsurprisingly the heads of finance talk about analysing the financial statements of their competitors:

> "I will say to [the other directors] tell me the names of our competitors, we will pull off their accounts, we will look at their margins they are achieving" Company A, Financial Director.
>
> "We have an annual strategy day, in April normally, the directors go off site. I always go through, who I see, or who we collectively see, as our twenty most common competitors. I just analyse the last three years accounts, turnover, actual profit, profit margins, cash balances, net assets balances, ROCE type stuff and just see where we are in the pack, and are we heading in the direction as everybody else?" Company L, Financial Director.

The FD of Company A does, however, recognise the limitations of such an approach:

> "We look at net margin more than the gross margin because it puts things in different boxes in this game depending on whether it is the site agents or the QSs or whoever."

This reflects the varying treatment of 'prelims' for job costing purposes (see section 7.1.1 above) which, it also seems, can be treated differently in published financial statements. The FD of Company L explains how the analysis of the financial statements is taken further by looking at other sources of data:

> "[name of competitor] they've gone forward another 20% on turnover and looking at their web-site you look at what they have been doing this year. They have been doing a lot of fast track retail work for Whitbreads or Nandos type things or Costa Coffees. Also, they have continued to do loads of work on the South Wales Council framework."

This additional analysis is not uncommon, this is because "you don't know what is behind the figures" Company A, Managing Director. The MD of Company H who is "always looking at the accounts [of competitors]" also uses information from Plimsoll who provide additional sector analysis:

> "At Plimsoll we do company and market analysis differently… a subscription gives you a clear insight into the health, value and prospects of the 1,500 leading UK Construction companies." (Plimsoll Publishing Limited, 2020).

Anecdotal sources of competitor information are also used:

> "Word of mouth. Between a few of us in here we know just about everybody in the area or across the UK. All the big ones, Tarmac, Aggregate Industries, Cemex, Hanson. I know all the directors. It is very difficult to understand what they are doing profitability wise, but we can have a pretty good guess" Company D, Managing Director.

Another source of information, that seemed to be unique to this sector is 'tender feedback'. The QS at Company D describes this as follows:

> "We get [tender] feedback from clients. They give you a percentage score of where you are in relation to your competitors…. we don't get the actual prices, but you can have a pretty good idea, they give you a scoring system. So can reasonably have a good idea where you were in relation to where they are. Again, quality is part of our submission and, say if we get 40% and the next person gets 39.9% you know we are pretty close on quality. So, it gives you a benchmark of where you are on your price and quality. We try to analyse where their costs are and then use that to change our own and think; what can we do to improve our quality or our price?"

When asked about how they get competitor information the MD of Company G replied:

> "Predominantly by losing work. We always ask for tender analysis. We are keen that if we price a job, we expect the client to come back and say [where we were].

In the Researcher's experience receiving actual (as opposed to relative) tender prices submitted by others is also possible (see Appendix 11.7), although when this is not available it should not diminish the value of tender feedback as relative costs are just as important as actual cost information in strategic decision making (Simmonds, 1981). Tender feedback seems to be an incredible opportunity to gather additional information about competitors on a regular basis rather than restricting it to a one off exercise perhaps as part of a strategic awayday (Jones, 1988). Company D, for example, seemed to be making the most of tender feedback by reflecting this information back into future tender submissions.

From the interviews it is apparent that a collegiate approach to gathering competitor information, as recommended by Jaworski, Macinnis and Kohli (2002) is being used. It appears that participants neither rely on one individual to provide that information nor on one source of information. Many of the sources of competitor information suggested by Ward (1992a) are used by the businesses interviewed; trade associations; ex-employees of competitors; mutual suppliers; physical analysis of competitor products (in the case of Company J, a housebuilder). Most commonly used are financial statements, perhaps because they are relatively cheap to obtain (Moon and Bates, 1993) and the analysis is straightforward for accountants to undertake. Tender feedback was not mentioned by Ward (1992a), but maybe this is because it is a source of competitor information which is unique to the industry.

Bergen and Peteraf (2002) identify the importance of correctly identifying competitors, in Company A and Company K the FDs rely on colleagues to provide that information, however none of the interviewees mention looking at indirect or potential competitors (Bergen and Peteraf, 2002). This means that they may not be taking full advantage of the competitor monitoring to gain the competitive advantage they are seeking, specifically they could be missing the new entrants into the market from their analysis. This is particularly relevant as the industry has very few barriers to entry creating a potential blind spot (Zahra and Chaples, 1993) which is important as new entrants could

also have a lower cost base, a significant competitive advantage, compared to existing businesses.

Company I is able to undertake a detailed competitor cost assessment as described by Bromwich (1990). The MD describes how this was possible:

> "We know how many metres [of piles] they can drive, we know how many men they have got, we know salary levels, because we see salary levels on their CVs. It is very quick to put up an approximation on overhead, it's very, very quick to put an approximation on cost base. We know how much their rigs cost to hire because we all hire from one another, when we are busy. So, over a period of a few months you can very quickly put a picture together, it doesn't take very long at all."

It seems that this particular niche of the construction industry, piling, is very close in respect of information on competitors and that Company I appear to be making full use of this data. Of course, this also puts their competitors in a similar position to exploit this information which could mean that no one gains a competitive advantage as a result.

It would appear that medium sized construction companies are very interested in gathering information about their competition. This is available from a variety of sources including financial statements. Tender feedback is unique in this sector and provides information on competitors costs and quality. If used appropriately, and in conjunction with other sources of information, this can provide valuable information about the competition for use in future pricing decisions. Care must however be taken when identifying competitors ensuring that potential competitors are also identified otherwise blind spots in competitor monitoring might exist.

7.6 Other SMA techniques

This section will discuss the three remaining SMA techniques in the revised conceptual framework; CA, VCA and LCC. The use of these techniques is not widespread, but they seem to be relevant in certain contexts.

7.6.1 Customer Accounting (CA)

Four SMA techniques, under the heading of CA, were included in the original conceptual framework but on the basis of the survey findings this was reduced to two in the revised conceptual framework; CPA and customer segment profitability analysis. CPA has a mean usage score of 3.7 and a mean perceived benefit score of 4.1. These findings are similar to those found by Lord, Shanahan and Nolan (2007). However, during the interviews, it became clear that these two CA techniques were not an important feature of the SMA reporting within medium sized construction companies. It appears that this anomaly is caused by a misunderstanding of the terminology used in the survey, with respondents interpreting their JPA as CPA. The FD of Company F explains his high usage score for CPA as

> "I'm surprised I put that. I wouldn't say that it's that high. I suppose it's a small leap of faith to get there because every contract is measured profitability wise. We know that all these contacts go with these customers, but we don't actively talk about CPA."

Whilst JPA does indicate how much gross profit has been made at a customer by customer level, no evidence is found of participants attempting to aggregate this information by customer or to allocate overheads to customers in the way envisaged by CPA (Hoque, 2006b). The following comments explain why this might be:

> "We have our report line by line so for each individual job we have got the gross margin on a cumulative basis, but I suppose we know just from gut feel which customers are hard on us and where there is more margin to be made." Company A, Managing Director,
>
> "We never attempt to differentiate between one customer and another in terms of overhead expenditure. What is the benefit at the end of the day? I don't see the point in employing an army of people to do all that to give us information, for a company of our size, that's not really going to change anything." Company D, Managing Director.

This "gut feel" approach to CPA is supported by Fish et al (2017) who found that executives preferred to rely on their own intuition rather than implement a CPA. These views might also be exaggerated by the relatively low level of overhead in the sector as discussed in section 7.1.3 above. The Commercial Director of Company L is slightly more

positive about the potential usefulness of undertaking a CPA analysis preferring to take an analytical approach rather than relying on gut feel:

> "If you understand your sweet spot you know which way to push your business development team, otherwise you could be really busy fools or pursue opportunities you can't make money from."

Given that all the companies have gross profit by contract and therefore by customer, it is nevertheless, surprising that no summary of gross profit by customer is compiled. This finding is however, consistent with that of Brierley (2016) who found that more respondents used other forms of profitability analysis (in this case JPA) compared to CPA. Brierley concluded that "CPA will not be prepared if it does not provide some contribution to the control and management of the operating unit." (Brierley, 2016, p.91). This conclusion was based on a finding that businesses that sold a single bespoke product to each customer did not produce a CPA in addition to a PPA, essentially because in these circumstances they are one and the same thing. This is the case in the construction sector where the majority of contracts are bespoke and sold to individual customers. Repeat clients do occur, specifically Company L has repeat business with a pub-chain and a group of nursing homes. This might also explain why their Commercial Director is keener than others to understand their "sweet spot". Despite a high usage score in the survey no evidence is found of the use of Customer Segment Profitability Analysis. Company J (the housebuilder) might be the most likely to do so, given the nature of their business and the fact that they completed a JPA to net profit however, they do not.

> "We don't subdivide, we don't look at first time buyers we don't look at empty nesters, we don't look at second homeowners, we don't subdivide, we just look at the site as a whole." Company J, Financial Director.

They went onto to explain that to compare different groups of buyers across different sites would be meaningless due to the different levels of profitability on each site, caused by, for example, differing ground conditions or local market conditions.

It would seem that, on the whole JPA in the sector provides sufficient information for decision making meaning that CPA is not required. One possible exception to this might

be where a business has repeat business replicating similar contracts on different sites but for the same customer.

7.6.2 Value Chain Analysis (VCA)

This technique has a very low score for usage (2.4) and perceived benefit (3.3). Given the nature of the industry, with many different contractors and suppliers working together on an individual contract, the potential for using VCA to reduce cost by eliminating non-value adding activities seems immense. It might be that the transient nature of these business relationships, often restricted to one contract, is the reason why VCA is not used much nor seen as having a great potential. This conclusion is supported by Dekker (2003) who demonstrated the importance of strong relationships between organisations when undertaking an interfirm VCA. This could be the case for company L with its repeat clients mentioned in section 7.6.1 above but even in that circumstance it does not seem to be being used, their FD cites cost savings resulting from "the learning curve" but not from working together with their client or sub-contractors in a more collaborative manner.

While they are not formal VCA exercises, two examples in which costs are eliminated from the supply chain are discussed during the interviews.

Company I has recently undertaken an outsourcing exercise for some of their support activities the MD said:

> "We try and outsource as much as we can, so it's on an on-demand basis, so we are not layered with staff just sat there waiting for something to happen. So, we outsource parts of our company that we know we can do without risk."

Off-site manufacturing is referred to by the Commercial Director of Company K, this is an example of VCA where modular components are built in a factory environment (more efficiently than a building site) and then shipped to site where they are installed by the contractor:

> "We do a lot of bathroom pods, fitted out in China, shipped over and put together in a meccano set to create a student accommodation and we put

> an envelope around it and plug the M&E [plumbing and electrical services] in to it. ” Company K, Commercial Director.

This requires volume and repetition and is therefore only viable in a limited number of build environments such as hotels, apartment blocks or student accommodation. Furthermore, for this technique to be used requires the co-operation of all parties to the contract, something not typical of the sector (Nicolini et al., 2000).

7.6.3 Lifecycle Costing (LCC)

In the survey LCC is the fourth least used SMA technique and ranks third lowest for perceived value. This is surprising given:

> “an increasing body of evidence citing the application of lifecycle costing concepts to buildings (construction and use)” (Woodward, 1997, p.335).

The way contracts are awarded in the industry, by competitive tender, is viewed by the Commercial Director of Company L as being a barrier to the use of LCC by contractors.

> “Typically, it seems to be that if you are in a competitive environment, the first thing the client looks at is the bottom-line figure, and they will talk to the bottom two and off you go. Whereas that’s pushing against looking at the lifecycle because you might have done all this but then you are not in the bottom two.”

This reduces the ability of contractors to build with more expensive materials or using more expensive techniques, whilst this would reduce post completion running costs (downstream costs) it would mean they are not providing the lowest possible tender price (first costs). One way to overcome this is to “be in dialogue with the client” Company L, Commercial Director but commercially this is often not possible. Contractors are very keen to consider innovative ways to build their projects “I love getting involved in the front end of these jobs and helping clients influence it in the right way” Company K, Commercial Director, but again these opportunities seem to be the exception rather than the rule. Changing the way procurement of building contracts works would seem to be one way to ensure more LCC takes place in the sector (Wübbenhorst, 1986).

In addition, the intentions of the client seem to have an influence on the use of LCC:

> "a lot of it depends on how the client is going to use the building. If they are a speculative developer who is going to build it, to flip it, to sell it, they're not that bothered. If it's someone that is going to be running it for ten or fifteen years, then that is a different conversation." Company L, Commercial Director.

At face value this comment seems reasonable but speaking to a local commercial estate agent it seems that premium selling prices are possible for properties where future running costs are cheaper than otherwise comparable properties, meaning that even speculative developers could be factoring LCC into their development costs.

Despite this, there are examples found where LCC was used by the participants, even if they did not necessarily refer to it those terms. The Operations Director of Company A refers to them working with a client to provide TOTEX solutions. This is discussed in more detail, in the mini case-study, in section 9.3.1 below. The MD of Company C refers to the "total cost of ownership" of the equipment they are supplying into the industry:

> "So, our crushing and screening equipment, for instance, has the best fuel efficiency in the market. We do total cost of ownership, we do those cost models for the customer to say, yes, we are £50,000 more expensive but over the life of the machine, over 3 years you will save £150,000 in fuel."

The same equipment is also much quieter to operate than that of their competition which results in longer operating times in noise conscious city centre environments. This approach is supported by Shank and Govindarajan (1992b) who identified that designing products to reduce post acquisition costs of consumers will give competitive advantage. The British Standard issued in 2017 with the stated aim of helping to

> "unlock the real value of effectively doing LCC in construction" (British Standards Institute, 2017, p.vi)

seems to have had very little impact on the activities of medium sized construction companies, who are ideally placed to take part in LCC initiatives but require the co-operation of their customers and end users of their projects to enable this to happen. It seems that in using the tender process to secure the cheapest prices (first costs) clients are not securing the best value for money over the extensive life of the asset they are acquiring, this is because a "reduction in downstream costs almost automatically results in an increase in first costs" (Wübbenhorst, 1986, p.89).

7.7 Conclusions

This chapter has answered the following research question:

To what extent are SMA techniques used by medium sized construction companies?

From the survey responses it appears that there is a low overall usage of the twenty-five techniques however, on closer examination it appears that this is because some have little relevance or utility for medium sized construction companies. There are eight SMA techniques which could be considered relevant for medium sized construction companies to use. The results indicate that these can be categorised into high and low relevance as follows:

- **High relevance:** job profitability analysis; investment appraisal; cost of quality; performance evaluation and competitor monitoring.
- **Low relevance:** customer accounting; value chain analysis and lifecycle costing.

The highly relevant techniques, it is argued, seem to have a utility for all for medium sized construction companies, the low relevance techniques seem to have a utility only in limited contexts. Within the highly relevant techniques three processes have been identified which seem to be unique to the construction sector. The use of CVRs and CPFs is ubiquitous in the sample, accurate and timely job costing information is fundamental to their operation. Not only are they used for strategic decision-making purposes but the information they provide is used operationally to control costs, the key to profitability within the sector (Halpin and Senior, 2009). In converting CVRs or CPFs into JPA little use is made of overhead allocation to report JPA at net profit level, it is argued that this would add little value nor would it be beneficial to use ABC. The use of tender feedback is the third process which seems to be unique to the sector, this is found to play an important part in competition monitoring and, when used with other competitor information, could be a source of sustainable competitive advantage.

The use of the BSC is not in evidence although the use of non-financial performance measures in the form of KPIs is widespread. An opportunity seems to exist for most businesses in the interview data set to incorporate these into their objective setting

linked to bonus payments and leverage the benefits of true performance management as opposed to performance measurement.

Two techniques, COQ and SID classified as of high relevance are argued to have greater utility than their current use suggests, these represent further examples of the reality gap (Scapens, 1994) between management accounting theory and practice.

This seems to be particularly true for COQ which has an average usage score of 2.4 compared with a perceived benefit score of 3.9. One cause of this reality gap is associated with the practical application of the technique particularly in respect of the identification of defects costs incurred before practical completion. Here, illustration of practical construction sector related applications by academics, as recommended by Tucker and Lowe (2014), would be a way of reducing this barrier to greater implementation of the technique in the industry.

Examples are provided of SIDs which are carefully considered by senior executives using non-financial factors but supported by a limited use of financial appraisal techniques. This supports the findings of Arnold and Hatzopoulos (2000) who found that older approaches to capital budgeting have "numerous endearing qualities which modern techniques seem unable to provide" (Arnold and Hatzopoulos, 2000, p.622). For this study it was concluded that SID making could be enhanced by closing the reality gap and using more advanced and theoretically sound financial appraisal techniques.

Job costing systems are used by all participants but the way in which they are operationalised is a further example of the reality gap. The treatment of 'prelim costs' varies between organisations taking part in the study, with some treating them as direct costs, as envisaged by Drury (2015) and others treating them as indirect costs in relation to job costs. Participants do not however, seem to consider this to be an issue preferring to rely on "simpler rule of thumb techniques" (Arnold and Hatzopoulos, 2000, p.622) when it comes to apportioning overheads, no evidence of the use of ABC was found.

Of the three low relevance techniques CA is not regularly used but it was argued that this was understandable when bespoke contracts are supplied to one off customers, meaning that JPA essentially provides the same information. CPA could be beneficial for

businesses having repeat customers (Brierley, 2016). For the remaining two techniques VCA and LCC, both require greater co-operation from others in the supply chain to make their application successful. However, in an industry epitomised by one off contracts this is difficult. Section 9.3.1 below provides a case-study example of where these two techniques are successfully applied in Company A in cooperation with others in their supply chain.

Whilst these eight techniques form a generic list of SMA techniques relevant for medium sized construction companies to deploy it will be argued in chapter 9 that no best configuration of these techniques exists, with the precise use dependent on the unique circumstances facing each individual business. However, it is suggested that the minimum requirement must be to produce a JPA analysis using information from a robust job costing system providing accurate and timely information into a CVR/CPF process. Before that the next chapter investigates who is responsible for using SMA in these businesses and the implications of this for FDs.

8 Analysis and Findings Theme 2: Who is responsible for using SMA techniques in medium sized construction companies?

8.1 Introduction

This chapter will use the interview data set and reflections by the Researcher on his time working in the industry, to answer the following research question:

Who is responsible for using SMA techniques in medium sized construction companies in the East Midlands?

The chapter starts by discussing the role of accountants in applying the SMA techniques discussed in chapter 7, and the role they play in the SMP of medium sized construction companies. It then goes on to discuss the value accountants bring to these organisations and highlights the different between 'accountants' and 'strategic' FDs.

The role played by accountants in providing SMA information and getting involved in the SMP is a regular topic within the literature, for example (Burns and Baldvinsdottir, 2007), (Aver and Cadez, 2009) or (Lambert and Sponem, 2012). (See section 2.7 above for a full discussion). No clear consensus is apparent from the literature, but the conclusion of this study is that accountants are, on the whole, not the people applying the SMA techniques in use in medium sized construction companies. This function is performed, on the whole, by the commercial team, often the QSs reporting into a Commercial Director or, in some cases, directly to the MD. That is not to say that accountants are excluded completely from getting involved in some of the techniques, for example, analysing the financial statements of competitors, but they seem to be concentrating their activities on TMA as opposed to SMA. A summary, based on the interview data, of who does what, by the SMA techniques discussed in chapter 7 is contained in Table 28 below:

Chapter Number	SMA Technique	Who is responsible?
7.1.1	Job Costing System	Head of Finance
7.1.2 and 7.1.2.1	Cost Value Reconciliations and Contract Profitability Forecasting	Quantity Surveyors reporting to Commercial Director/Managing Director or Contract Engineers
7.1.3	Job Profitability Analysis	Commercial Director/ Head of Finance
7.2	Investment Appraisal	Managing Director
7.3	Cost of Quality	Commercial team in the one company which formally reported defects' costs
7.4	Performance Evaluation	Finance related: Head of Finance
		Accreditation related: SHEQ or equivalent
		Employee related: Human Resources
		Customer Related: Commercial team
7.5	Competition Monitoring	Analysis of financial statements: Head of Finance
		Tender feedback: Estimating team
		Other: Everyone
7.6.1	Customer Accounting	N/A
7.6.2	Value Chain Analysis	Case study: Project team of operational and commercial staff
7.6.3	Life-cycle Costing	Case study: Project team of operational and commercial staff

Table 28: Who is responsible for SMA in medium sized construction companies?

8.2 Job Costing, CVRs and CPFs

Job costing systems are the sole preserve of the accounting function, in many cases others are not even allowed access to the system and where they are, it is on a 'read only' basis only. Job costs are managed within the accounting software, the domain of the accounting team, where the role of the accountants is to "collate everything and allocate it [to job numbers] properly" Company A, Commercial Director. The commercial team rely on the job costs to be accurate and timely in order to be able to produce their CVRs and CPFs.

> "in order for you to report correctly you need to be getting accurate information back from your accounts function, so can actually forecast if that job is making or losing money." Company C, Managing Director.

CVRs and CPFs are the responsibility of the QSs, whose professional training makes them far better placed to perform this role than accountants. They rely on the job costing information provided by the accounts department, although in two cases, duplicate job costing systems are being maintained by the operational teams to assist with the cost control and CVR processes. The reason given for this duplication is the lack of timely and accurate job costing information supplied by the accounting team. The Operations Director of Company A is scathing about the information provided by the accounts department:

> "All the accounts function does is confirm what we believe to be the case anyway."

When asked if he found that to be reassuring, after a long pause he added:

> "Yes, but it doesn't add any value particularly. It doesn't drive any decision making."

To the heads of finance, the CVR and CPF processes are a 'black box' the results of which must be taken at face value.

> "Until that job is completely finished you will never know. Profit might fall out at the end of the job that they were holding back because they weren't sure about something. You are just taking their word for it at the time and their thought process, and without sitting and going through ten CVRs with

> that QS and drilling into every figure you are really relying on their view of the job at the time." Company D, Financial Director,
>
> "As an accountant here, you have to trust that the commercial managers are managing those costs there and you won't know until the job is finished. That's the truth of it, there's always the great unknown." Company K, Financial Controller.

The FD of Company J compares this to a football match "I am keeping the score, but they are telling me what goes into the score." These views would be supported by the Researchers own experience (see Appendix 11.8), one which left them feeling vulnerable at times, especially during the year-end audit. In preparing the monthly management accounts or annual statutory accounts, accounting adjustments are required to be made whereby accountants rely exclusively on information provided by the commercial team, information which they are unable to verify for accuracy. In the Researcher's experience this created a tension and frustration between himself and the commercial team. This is similar to the findings of Lefley (1996) who found conflict between accountants and engineers or Williams, van der Wiele and Dale (2000) who describe accountants taking an adversarial position with quality managers in relation to quality costing. This may offer an insight as to why this study has identified a low level of SMA adoption. In order to develop more of the techniques a closer working relationship between the accounts team and operational or commercial teams might need to be developed, as was the case with the 'marriage' between clinicians and accounting professionals cited by Cooper (1996b).

In order to open up the 'black box' The FD of Company A has recently proposed an upgrade to their accounting system which would include a CVR module. Typically, CVRs are produced in spreadsheets outside of the accounting software. At the time of writing, implementation of this new software is underway, so it is too early to say if this has made the CVR process any more transparent. Company J's response to this black box situation is to

> "have my finance team in with my commercial department, they need to be hand in glove just because you need to hear what's going on and know what's going on and hear the problems and make sure they are not doing anything they shouldn't be doing really." Company J, Financial Director.

This solution seems to be unique, typically the accounts team sits separately from the commercial and operational teams, a significant barrier to encouraging closer working relationships.

Two of the contracting companies interviewed, Company D and Company I do not employ QSs. In both instances the reason given for this is a lack of disputes with their clients.

> "We don't need them [QSs] in our business, because we don't have contentious clients." Company D, Managing Director.
>
> "We try and keep away from using QSs. We don't do that many high-profile projects where you need an NEC (New Engineering Contract) type of administration team. We try and keep it as engineering focused as we can do." Company I, Managing Director.

In both of these cases the operational function, that is Contracts Managers, are responsible for monitoring sales and cost of sales and providing profit forecasts on the contracts for which they had responsibility. Neither company employs a commercial director but in both cases the accountants still take no part in the CVR or CPF processes. This situation reflects the thoughts of Cooper:

> "It is easier to bring management accounting to the functional specialist than it is to bring functional knowledge to the management accountant" (Cooper, 1996b, p.25).

Cooper expected that:

> "the need for management accountants will fall while the need for management accounting will rise" (Cooper, 1996c, p.35)

and that this would lead to management accountants losing their jobs unless they developed more general business skills such as strategic thinking or knowledge of marketing. Amongst the accountants within the interview data set this development of additional skills was not apparent. The overriding impression from the interviews with the accountants is that they did not seem overly concerned with developing these new skills and enhancing their roles in the SMP.

8.3 Other SMA techniques

With regards to investment appraisal it was shown in section 7.2 above that there is little financial appraisal undertaken in investment decisions. This seems to be an ideal opportunity for qualified accountants to use some of the techniques they learnt during their training to enhance the financial input into these important decisions.

As discussed in section 7.1.1 above strategic pricing decisions are facilitated by a tender adjudication meeting or a tender settlement meeting. These meetings are typically attended by senior executives of the company, generally directors, but in most cases, there is no representative from the accounting team present at these meetings. The one exception is Company L where the FD attends the final tender adjudication meeting. According to Nagle and Holden (2002) strategic pricing requires co-ordination between a multi-functional group of decision makers. This is certainly on evidence in the sample population, however the financial input envisaged by Nagle and Holden appears to be provided by the commercial team rather than the finance team.

Company J is the only business reporting COQ, this information is being provided by the commercial and build teams. The costs of defects are recorded in the job-costing systems, although not always identified as such. With accountants being the custodian of the job-costing ledger, it would seem an ideal opportunity for them to instigate robust processes to identify costs relating to defect work and then to use the data collected to report the costs of defects. Given the potential magnitude of COQ as identified by Porter and Rayner (1992) this might go some way in addressing the criticism of the Operations Director from Company A that the accounts function does not add any value to the business. Figure 26 on page 199 above demonstrates a suggested approach for accountants to adopt to make this a success and for them to become more involved in the SMP of their businesses.

Multi-dimensional performance information is being provided by a variety of personnel within the participating businesses, as shown in Table 28 above. Again, there seems an opportunity for accountants to increase their added value by collating and publishing this information, perhaps in the form of a BSC (Kaplan and Norton, 1992) and leading the discussion about changing the basis of bonus scheme calculations to move from a

performance measurement system to a performance management system in order to secure resultant business performance improvements seen by others who adopt this approach (Fitzgerald, 2007).

In section 7.5 above the value of the multi-functional involvement in competitor monitoring is discussed, the accountant's role in analysing their competitors financial statements plays to their clear strengths. It is argued that by using tender feedback information obtained by the estimating team it would be possible to estimate the direct costs, overhead costs and expected profits of all competitors for a specific contract. This would undoubtedly involve a certain amount of estimation, a lack of precision which accountants might be uncomfortable with (Partridge and Perren, 1994) and which may be a reason why tender feedback is not used more frequently.

8.4 The involvement of accountants in the SMP

In addition to the opportunities identified above for accountants to become more involved in the application of specific SMA techniques their role in the wider SMP could also be expanded. Aver and Cadez (2009) found that participation by management accountants in the SMP was relatively low in the construction sector, the ranking in five aspects of the SMP is shown in Table 29 below.

SMP Activity	Ranking of management accountants in construction sector (out of 8 industry sectors)
Identifying problems and proposing objectives	6th
Generating options	6th
Evaluating options	7th
Developing details about options	7th
Taking the necessary actions to put strategic change into place	8th

Table 29: Management accountants' participation in strategic management processes rankings for construction sector

(Aver and Cadez, 2009, p.318).

They conclude that this supported the view that the industrial sector in which a business operates is an important contingent factor in the design of MCSs. Unfortunately, they do not offer any conclusion as to why the involvement of management accountants in the construction sector was low, although they argue that a relatively high involvement was indicative of a competitive industrial sector. Given that participants view this sector as competitive (see section 1.3.3 above) it is surprising that Aver and Cadez (2009) did not to find evidence to support the view of a strong involvement by accountants in the SMP of construction companies. Therefore, it is possible that Aver and Cadez's conclusion is wrong and that the level of competition is not a significant factor in explaining the low participation of accountants, but that the employment of QSs, more commercially aware professionals, working in these organisations offers a better explanation. Differences in the nature of the data collected means that a direct comparison between the findings of Aver and Cadez and this research is not possible.

8.5 The value of accountants in medium sized construction companies

Within the sector the commercial team appear to have a prominence over the accounts team, when it comes to their perceived importance to the business, particularly in the respect of being able to influence the creation of profit. The Commercial Director of Company K explains this as follows:

> "I would say the difference between the two and why the commercial will always gravitate above the accountant in a construction world is purely because the commercial man is the one that's influencing the business every day. The accountant won't be influencing the business other than doing what he does to record what is happening and what costs are being incurred and what value is being recovered. He is not influencing the profitability of the business, he is not influencing the direction of the business, strategically. The commercial function of the business controls how the business performs, whereas the accountant isn't a controlling factor."

The MD of Company C (a QS by training) explains this in a slightly different way:

> "Accountants are looking backwards and QSs looking forwards. All you do looking backwards is get a bit of a stiff neck. If you spend too much time looking backwards and not actually looking at what's coming up, you will never be able to get in front of it. You need to be spending the majority of your time actually focusing on what's coming up to make sure you can make that as profitable as you can. Anything that has gone behind you, it's gone now, it's done."

These comments indicate that by focusing on the recording and analysis of historical costs the accountant is not able to contribute to the generation of profit within the business.

This does not mean that accountants are not valued in these companies, but they seem to be valued for their operational skills within the accounts function rather than strategic skills applied to the SMP. Commercial Directors and MDs see them as an important part of the team even though decision making information is supplied by others "the commercial team is probably the one that provides the decision-making information" Company J, Financial Director. When asked if all they needed from an accounts department was accurate job costing information the MD of Company E responds:

> "No, we want confidence that the whole process is sound. Yes, the job costing is part of it but so is ensuring that the suppliers are paid on time and

> people [employees] are paid on time and that all the other accounting support functions that sit under that umbrella. It just as important to have confidence in them, it does affect your credit rating."

Heads of finance are clearly under pressure from their bosses to ensure the smooth day to day operation of the accounts function. Due to the size of the business they are usually the only qualified accountant employed by the business. The Researcher was the first qualified accountant ever employed by Company A (see Appendix 11.2) a company which at that point had been established for forty-five years. Other pressures also influence the priority accountants, in medium sized businesses, allocate to tasks:

- from their professional accounting bodies to ensure compliance with their ethical and other regulations;
- from government to ensure compliance with statutory regulations and tax regulations such as Corporation Tax, VAT, PAYE and CIS;
- from auditors to ensure compliance with financial reporting standards and
- from banks to ensure compliance with overdraft and other loan covenants.

The priority heads of finance give to ensuring these areas are properly dealt with is perhaps also a part of the explanation as to why accountants are not more involved in providing SMA information. Set against all these 'compulsory' activities and the lack of other resources (see section 9.4 below) to do them, the 'voluntary' nature of SMA means it never stands a chance. This is encapsulated in the following comment made by the FD of Company J:

> "I think because our business is so wide and so varied, if the [management] reporting was all out of finance, finance would never get anything [else] done. So, a lot of the reporting needs to come from other areas. So, cost of quality comes out of commercial and build. Profitability analysis and job costing, well that all comes out of commercial."

Furthermore, there is no widespread criticism of the work being undertaken by accountants nor is there a demand from the business leaders interviewed for their accountants to deliver any additional MAI. It would seem therefore that any additional use of SMA within these businesses will need to be driven by the accountants themselves rather than be demanded by the rest of their colleagues.

8.5.1 Accountant Financial Directors or Strategic Financial Directors?

The MD of Company C makes a distinction between what he calls "Accountant Financial Directors" and "Strategic Financial Directors". In a previous role, outside of the sector he had worked with Jeremy:

> "Jeremy was a very, what I would call, strategic financial director. You know, he had the accounts department reporting to him, but he was very much alongside me, commercially."

They put their current FD in the first category:

> "[name withheld] is more of, he won't mind me saying it, is more of an accountant finance director. So, he looks after the numbers, if [name withheld] says that's the number then that's the number."

This prescribes to the notion of 'backwards looking' and 'non-value adding' described earlier in this chapter. The consequence of this shortcoming for Company C was that they have recently recruited a new member of staff:

> "I have also got a commercial analyst which I have put into the business, and they are doing a lot more analysis for me, digging into SAP [their computer system]. SAP is a wonderful system, the information is in there, but you have got to get it out. You have got to know what the question is to get it out. Why I've called it [job title] a commercial analyst is because actually that starts driving our decision making." Company C, Managing Director.

The ("accountant") FD of Company C describes the role of his accounts department as follows:

> "We are there to clean up after them. In a way that's what you always do. We report how it's finished. Nobody comes to us and says: oh, we've got this possibility of a machine to [name of customer withheld], this deal, do you think it's worth doing? There is a standing joke here that we are finance, but we don't count."

In this case the FD has worked for the company for over forty years and qualified with CIMA in 1998, before SMA was introduced into the syllabus. Talking with this interviewee along with a number of other FDs left the Researcher with the impression that they were not really interested in getting more involved in the SMP than they currently were and did not see themselves as "strategic accountants" (Cadez and Guilding, 2008, p.839). Responses to the question about where they might go to get

additional information about SMA are extremely vague. Given the interviewees were survey respondents, who had apparently not been intrigued to learn more about the subject prior to the interview, this is interpreted as a general lack of engagement in SMA specifically and the SMP more broadly. This is particularly obvious when compared to interviews with heads of business. Firstly, it was much easier to arrange interviews with them compared to FDs, indicating a greater level of interest in the subject. Secondly, they seemed much more engaged with the conversation and on occasions the Researcher left feeling that he might have taught them something about the information that SMA can provide to support their SMP. The 'accountant financial director' role seems to be consistent with what Coad (1996) calls a performance orientation which

> "often results in a reluctance to experiment with new approaches for fear of poor outcomes and the consequent negative evaluations of abilities and performance" (Coad, 1996, p.389).

whereas the 'strategic financial director' role seems consistent with a learning orientation (see section 2.7 above). From the interview evidence the majority of FDs interviewed could be characterised as 'accountant financial directors'.

Table 30 below provides background information relating to the heads of finance who participated in the interviews:

Company	Job Title	Professional Qualification	Year Qualified	Years in Construction Sector
Company A	Financial Director	ACA	2004	2
Company B	Financial Director	CIMA	2012	13
Company C	Financial Director	CIMA	1998	41
Company D	Financial Controller	ACCA	2000	20
Company E	Financial Director	AAT	2000	15
Company F	Financial Director	CIMA	2000	5
Company G	Financial Controller	CIMA	2004	5
Company J	Financial Director	CIMA	1995	23
Company K	Financial Controller	ACCA	1993	3
Company L	Financial Director	ACA	1990	23

Table 30: Interview participants accounting qualifications

This indicates that a large period of post qualification experience appears to be necessary to attain the senior financial roles in these businesses. In the Researcher's experience it is also true that this post qualification experience needs to be construction industry related (see Appendix 11.2). Messner (2016) identifies that job mobility is less in industries where differences are strong, as seems to be the case with construction. This may be the reason that more recently qualified accountants have yet to reach positions where they can have an influence on the design of MCSs and the use of SMA. The qualification dates fall, on the whole, before SMA was introduced into the professional bodies' exam syllabuses, this might be another reason that SMA techniques are not being practised by the accountants within these businesses. Age may also be an explanation with younger accountants more like to adopt innovative MATs (Naranjo-Gil, Maas and Hartmann, 2009). Although age was not a set of data collected, the average experience in the industry of the Group A respondents of 13.2 years perhaps indicates a group of accountants with a low inclination to experiment. No clear association can be identified between the different qualifications of the heads of finance and their involvement in the SMP, indicating that differences in technical training do not appear to be a factor in their use of SMA or involvement in the SMP.

8.6 Conclusions

If the findings of Simmonds (1981) are accepted and the collection and analysis of strategic data is either done by skilled management accountants or done badly, then it would appear that some members of commercial teams, primarily QSs, are skilled in MA. Perhaps, in some cases, even more skilled in MA than some of their qualified accountant colleagues. This conclusion is supported by the negative views of the profession's role in SMA of Partridge and Perren (1994), Roslender (1995) or Otley (2008). It seems that, in a sector described as "old school" (Company J, Financial Director), accountants are valued for their ability to keep accurate score and ensure compliance with accounting and other regulations, rather than using SMA techniques to provide information for strategic decision making purposes. Accountants seem to be valued for their operational prowess rather than for their input into the SMP. With senior executives not demanding change it will be for the accountants to push this agenda themselves if they are to "stop acting like bean-counters" (Lucas, Prowle and

Lowth, 2013, p.11) and ensure that they are not frozen out of the SMP. This seems to be an additional aspect of the reality gap (Scapens, 1994). SMA theory, in the form of MA textbooks (for example (Ward, 1992b; Drury, 2015)) and academic journals (for example (Cooper and Kaplan, 1988; O'Hanlon and Peasnell, 1998)) represent techniques with an implication that they will be performed by management accountants. This study has identified, for the reasons highlighted above, a significant gap in the expectations of theory and of management accounting practice in medium sized construction companies. One possible reason for this may be due to a time lag between recently qualified management accountants with a knowledge and understanding of SMA techniques achieving positions of authority in the organisations interviewed. Another reason might be that accountants are not fully engaged with the SMP within their organisation possibly due to their prioritisation of operational matters. As a consequence, they may not recognise the need for additional MAI to support the strategic decision making processes within their organisations,

In order to narrow this aspect of the reality gap accountants will need to develop the new skills recommended by Cooper (1996a) and learn to work in a more collaborative way with their colleagues in the commercial department (Pavlatos and Kostakis, 2018). The Researcher achieved this by undertaking an MBA programme, which gave him the marketing, human resources and organisational behaviour skills he previously lacked and gave him the confidence to take a more active role in the SMP at Company A compared with Company T. If not, as seems the case in this sample, maybe a greater involvement will only happen once accountants who trained in the era since SMA was introduced into professional syllabi attain the senior positions in which they are able to determine their own priorities. This may take some time in an industry where sector specific experience is required in its senior managers.

9 Analysis and Findings Theme 3: What contingencies affect the use of SMA in medium sized construction companies?

This chapter will answer the following research question:

Which contingent variables help to explain the use of SMA in medium sized construction companies?

Whilst it will use the whole data corpus it will focus primarily on the interview data. Otley (2016) calls for more CBMA research to be conducted using interpretative methods as early studies had focused on arm's length surveys resulting in fragmented results and a lack of cumulative knowledge. Based on the original and revised conceptual frameworks it will examine the impact of the following six contingent factors on the use of SMA in medium sized construction companies:

- Strategies being followed;
- The characteristics of the business leader and the SMT;
- Networking;
- Size and resources;
- The influences of ownership; and
- Accounting software.

Figure 27 below shows coding of the interview data set in relation to these six contingencies. Each of these is the subject of its own section in this chapter. As before the size of the boxes indicates the number of times each topic was coded, for example 'the attitude of the leadership team' was coded one hundred and thirty-two times and 'ownership' coded twenty-six times. This indicates the relative importance of each factor to the interviewees.

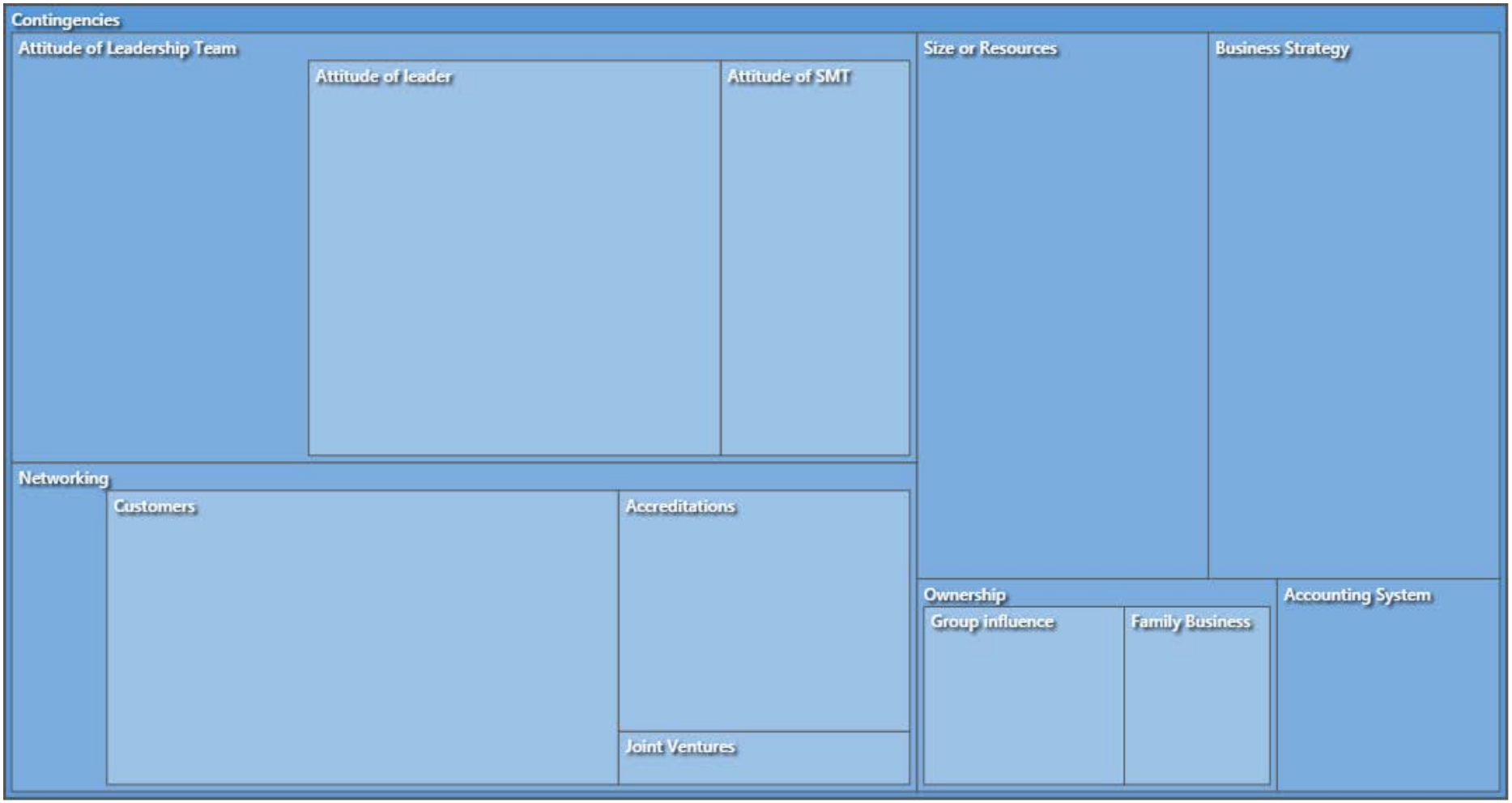

Figure 27: Coding of interview data; contingencies

Strategy is considered first as it one of the most widely studied contingent factors in the use of SMA even though previous results have been inconclusive, possibly due to the differing ways in which strategy has been operationalised (Langfield-Smith, 1997). The order of the remainder of the chapter is determined by how often each contingent factor was coded. Section 9.3.1 below introduces the concept of a 'strategic customer' a customer which is considered fundamental to a business delivering its strategic objectives or even drives a change in business strategy. Whilst each factor is the subject of each separate section it will be noticed that these cannot always be considered as operating independently, for example, the size of a business may determine its ability to invest in new accounting software or a strategic customer may lead to changes in accounting software.

9.1 Strategic typologies and their impact on SMA

Group B respondents were asked a number of questions in order to identify the strategies being followed by their business. Table 31 and Table 32 below show an analysis of the strategies being followed by the responding businesses based on their responses to the survey. As explained in section 5.3.2 above three typologies of strategy are used; strategic pattern, strategic mission and strategic positioning. To identify strategic pattern and mission, respondents were asked to select which statement (of three) best described their business. The responses are used to categorise the business strategies as follows:

Strategic Pattern		
	Frequency	Percent
Prospector	1	4.0
Analyser	4	16.0
Defender	20	80.0
Total	**25**	**100.0**

Table 31: Strategic pattern of Group B respondents

Strategic Mission		
	Frequency	Percent
Build	5	20.0
Maintain	12	48.0
Harvest	8	32.0
Total	**25**	**100.0**

Table 32: Strategic mission of Group B respondents

This indicates a rather conservative approach to business strategy amongst companies in Group B, with most businesses seeking to defend and harvest/maintain their current position in the industry and only a small percentage looking to build. These strategies might be in response to the highly competitive nature of the industry (see section 1.3.3 above) where maintaining market share and preserving cashflow is prioritised over business growth. The literature suggests that businesses following a prospector or build strategy are pre-disposed to innovation and therefore are more innovative in their use of advanced MAPs (Guilding, 1999; Cadez and Guilding, 2008) and therefore the high proportion of businesses adopting a conservative strategy might help to explain the low levels of SMA usage identified in section 6.1 above.

To identify strategic positioning, respondents were asked a series of nine questions on a five-point Likert scale based on survey instruments previously used in the construction industry (Kale and Arditi, 2002; Oyewobi et al., 2016). The responses were converted into a continuous variable with possible scores ranging from minus four (low cost) to plus four (differentiator) as shown in Figure 28 below:

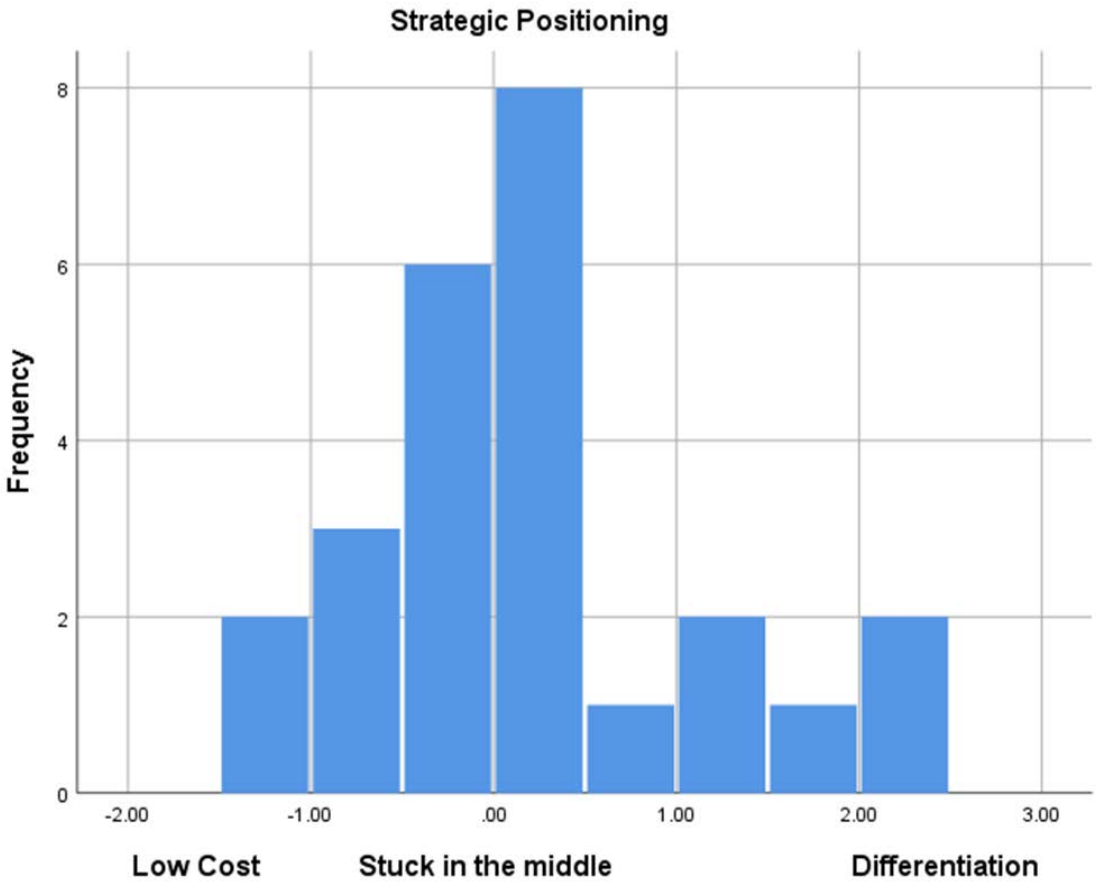

Figure 28: Strategic positioning of Group B respondents

This shows that most of the businesses in Group B tend to be "stuck in the middle" (Porter, 1980) focusing neither on a low cost approach nor seeking to differentiate their service from their competitors. This may be explained by the nature of the industry where contracts are awarded based on submitted tenders. When cost is the overriding deciding factor used by potential customers, but quality of service is a major factor in determining which businesses are asked to submit tenders for consideration, then this is perhaps not surprising. The quality of service of potential suppliers is assessed by clients through a PQQ. In the words of the Marketing Manager for Company A:

> "You would do a PQQ which establishes that you are at a certain level or suitable to tender for something. The number of potential tenders would be whittled down and then the selected ones would do the full tender."

This is one possible explanation for the strategic positioning exhibited by Group B respondents. The fact that they must demonstrate, both a level of quality, to be allowed

to tender, and then a competitive price to be successful at the tender stage, leaves them "stuck in the middle" (Porter, 1980).

A number of researchers have examined the relationship between the use of SMA and the business strategies being followed, for example (Chenhall and Langfield-Smith, 1998b; Cinquini and Tenucci, 2007; Cadez and Guilding, 2008). However, the findings have been inconclusive. Using the Group C data set this section examines the relationship between those strategic typologies and the use of SMA techniques. As shown in Table 13 on page 145 above Group C does not contain any large-medium sized businesses, as a result, it is not representative of the population as a whole and therefore the analysis which follows cannot be generalised to the whole population.

Strategic Pattern			
	Frequency	Percent	Average SMA Usage
Prospector	1	7.7	3.16
Analyser	2	15.4	3.14
Defender	10	76.9	2.88
Total	**13**	**100.0**	**2.94**

Table 33: Strategic pattern and SMA usage of Group C respondents

Table 33 above shows a slightly increasing average usage of SMA on the Defender-Analyser-Prospector continuum which is what might be expected as more advanced MATs are required to support a more 'aggressive' strategy (Cadez and Guilding, 2008). Table 34 below shows that no clear pattern of overall usage of SMA exists on the strategic mission continuum. Those following a maintain strategic mission have the highest use of SMA, this is contrary to expectations as it would be anticipated that those following a build mission would use more SMA techniques relative to others (Guilding, 1999).

Strategic Mission			
	Frequency	Percent	Average SMA Usage
Build	2	15.4	2.94
Maintain	6	46.2	3.30
Harvest	5	38.5	2.50
Total	**13**	**100.0**	**2.94**

Table 34: Strategic mission and SMA usage of Group C respondents

The relationship between strategic position and average SMA usage (both of which are continuous variables) was investigated using the Spearman's rank correlation co-efficient, due to the small sample size (Abu-Bader, 2016). The results of this are shown in Table 35 below:

			Strategic Position
Spearman's rho	Average SMA Usage	Correlation Coefficient	0.226
		Sig. (1-tailed)	0.229
		N	13

Table 35: Correlation between average SMA usage and strategic position

It is not possible therefore to conclude that any significant relationship exists between average SMA usage and strategic positioning within Group C. This supports the findings of Cinquini and Tenucci (2007) who conclude that SMA adoption is not strategy-driven. However, this is contrary to the findings of Abdel and McLellan (2013) who found a positive association between differentiation strategies and the use of advanced MAPs. Cravens and Guilding (2001) also found an association between strategy and SMA albeit using eight sub-dimensions of competitive strategy. There is however an issue with these comparisons. Both Abdel and McLellan (2013), and Cravens and Guilding (2001), used a one-dimensional instrument to identify business strategy. This research, as with Cinquini and Tenucci (2007), uses a multi-dimension instrument to capture information on three typologies of strategy as recommended by Kald, Nilsson and Rapp (2000).

When looking at individual SMA techniques several relationships, that are significant at $p<0.05$, were visible. These are shown in Table 36 below:

Spearman's Rho Correlation co-efficeient (N=13)		
	Porter_CEO	Sig. (1-tailed)
Life cycle costing	-.513*	0.037
Balanced scorecard	-.517*	0.035
Customer profitability accounting	.481*	0.048
Customer segment profitability analysis	.530*	0.031
Lifetime customer profitability analysis	.600*	0.015
Valuation of customers or customer groups as assets	.554*	0.025
*. Correlation is significant at the 0.05 level (1-tailed).		

Table 36: Correlation between individual SMA usage and strategic position

The use of both LCC and the BSC seem to be favoured by businesses following a low-cost strategy. It is surprising that some of the advanced costing techniques are not more strongly associated with those adopting this strategic position. On the other hand, all four CA techniques show a positive relationship, implying that differentiators use more advanced CA information compared to those following a low-cost strategy. This is to be expected as their strategy requires them to better understand the needs of their customers in order to identify what services they value and tailor them to match their specific needs. This finding is similar to that of Guilding and McManus (2002) who found a positive association between market orientation and three of the five CA concepts; CA as a holistic notion, lifetime customer profitability analysis and valuation of customers or customer groups as assets. With most respondents being "stuck in the middle" between these two extreme positions it is perhaps not surprising that no clear association with SMA usage could be identified within the survey dataset.

The interview data is equally as ambiguous, even though all of the participants are able to summarise their business strategies, no clear conclusions can be drawn between those strategies and the use of SMA. The MD of Company I epitomises the "stuck in the middle" characterisation demonstrated above when he describes his strategy as one of

> "Low cost base, high capability, react quickly to your customer and always put engineering at the forefront of what we do."

The high frequency of maintain missions and defensive patterns observed in the survey are re-enforced by the interview participants with comments such as “playing to our strengths” or “turnover is vanity, profit is sanity” or “we are here for the long-term.” This indicates a satisfaction with current levels of turnover and profitability whilst trying to make them sustainable in the longer-term through framework agreements and repeat business clients. Company C exhibits the most aggressive strategy with almost a disregard for profit in targeting increased market share as their immediate goal:

> “Our strategy is to be the market leader in the brands that we provide, what does market leadership mean? 100% market share.” Company C, Managing Director.

This company has an average SMA usage of 3.15 just above both the midpoint score and the average of all respondents. Given the findings of earlier research in respect to a prospector strategic pattern, this should not be a surprise (Guilding, 1999; Cadez and Guilding, 2008).

On the whole the participating businesses seem to be following a deliberate strategy, as evidenced by regular strategy review meetings and the production of three- and five-year business plans. One clear exception to this was Company H whose Chairman described several business acquisitions which seem to be very opportunistic in nature. With the benefit of hindsight, a clear strategic pattern seems to have emerged where the acquisitions appear to form a pattern of vertical integration justified using an informal VCA. Cadez and Guilding (2008) identified a positive association between the formation of a deliberate business strategy and the use of SMA to support it. The low use of SMA in this sample is contrary to that finding, unless the conclusion that the participating businesses seemed to be following a deliberate strategy is flawed.

Like previous studies these findings are inconclusive. There is evidence that the businesses are following conservative business strategies. It is possible that this leads to a conservative approach to MA resulting in the use of the restricted set of SMA techniques discussed in chapter 7 above. Using Porter’s (1980) classification of business strategy most businesses tend to be “stuck in the middle”. Those following a differentiation strategy appear to make greater use of CA to support that strategy,

however there is no evidence of a relationship between those following a low-cost strategy and the use of advanced costing techniques.

9.2 The characteristics of the business leader and the senior management team (SMT)

Kalkhouran, Nedaei and Rasid (2017) use quantitative techniques to examine the effect of CEO characteristics on the use of SMA. This section uses the same approach using the survey data but enhances this by using interview data to examine the effects of the characteristics of the wider SMT.

The characteristics of the business leaders are measured using their level of educational achievement and the number of years they have worked in the industry. A summary of these characteristics for Group C respondents is shown in Figure 29 below and Table 37 below.

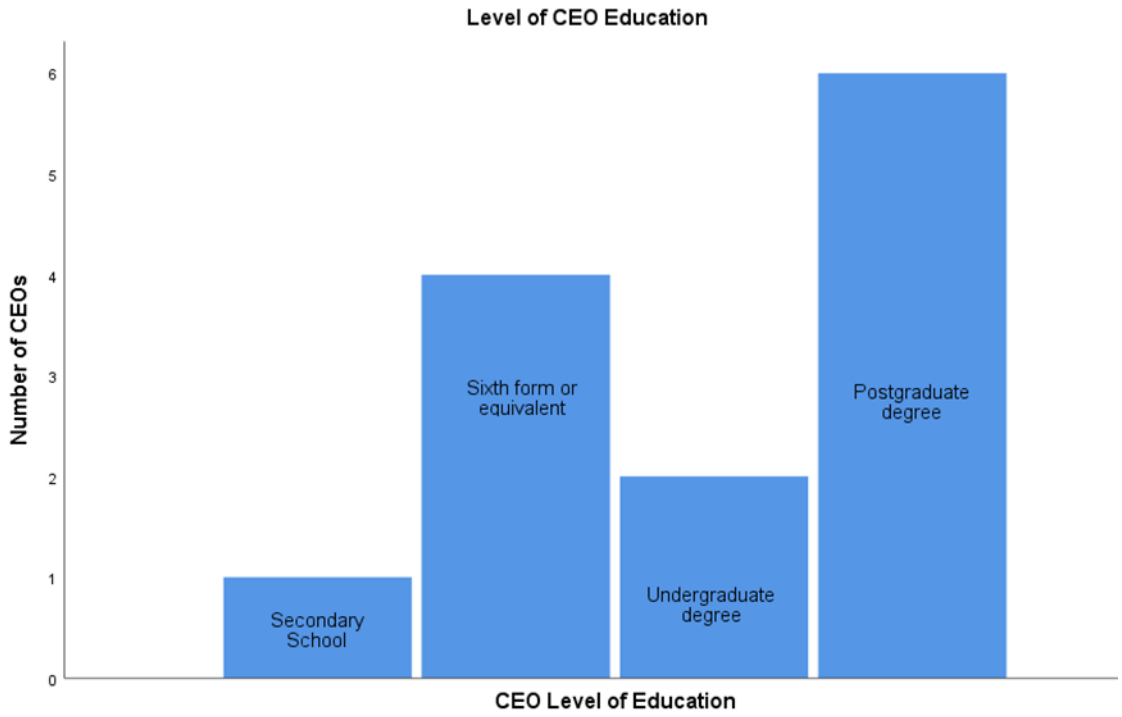

Figure 29: Group C Level of CEO education

Years in Industry	Responses	
	Frequency	Percent
10 or less	1	7.7%
11 to 20	2	15.4%
21 to 30	6	46.1%
31 to 40	2	15.4%
more than 40	2	15.4%
Total	**13**	**100.0%**
Average Years Experience	**28.5**	
Median Years Experience	**30.0**	

Table 37: Group C Experience of CEO

This indicates both a high level of educational achievement and a high level of experience of working in the sector. Correlation tests were conducted on these responses to see if any relationship existed between these two measures of CEO characteristics and the use of SMA in their business. Scatter diagrams of this data are shown in Figure 30 and Figure 31 below.

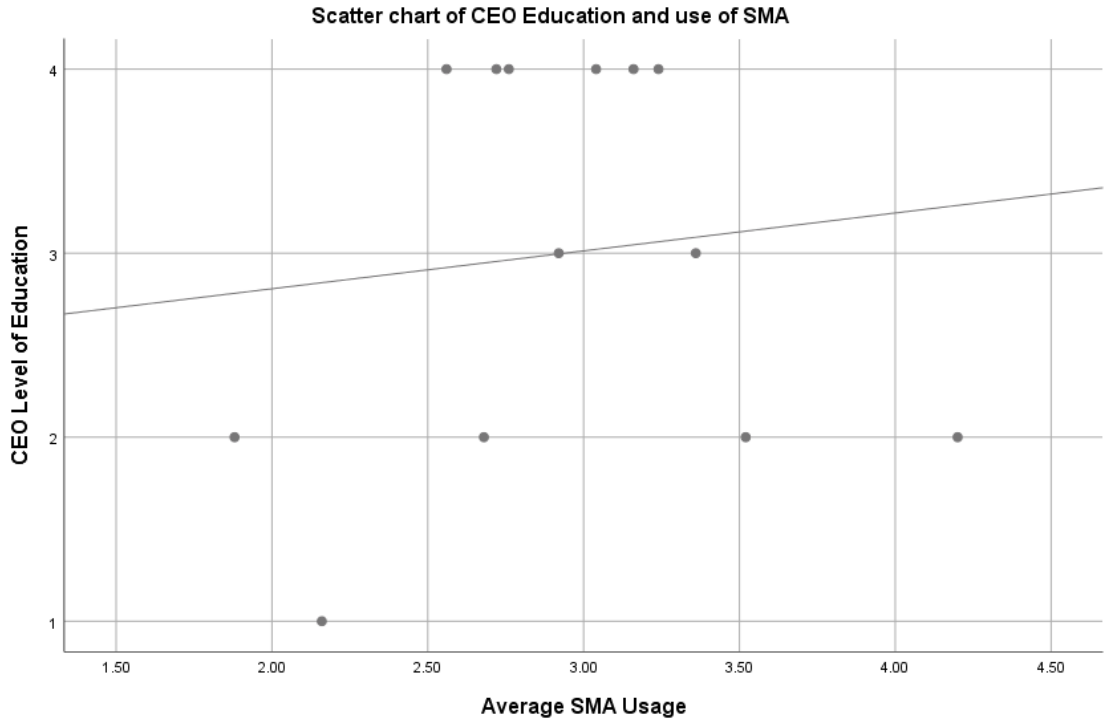

Figure 30: Scatter graph of CEO education and use of SMA

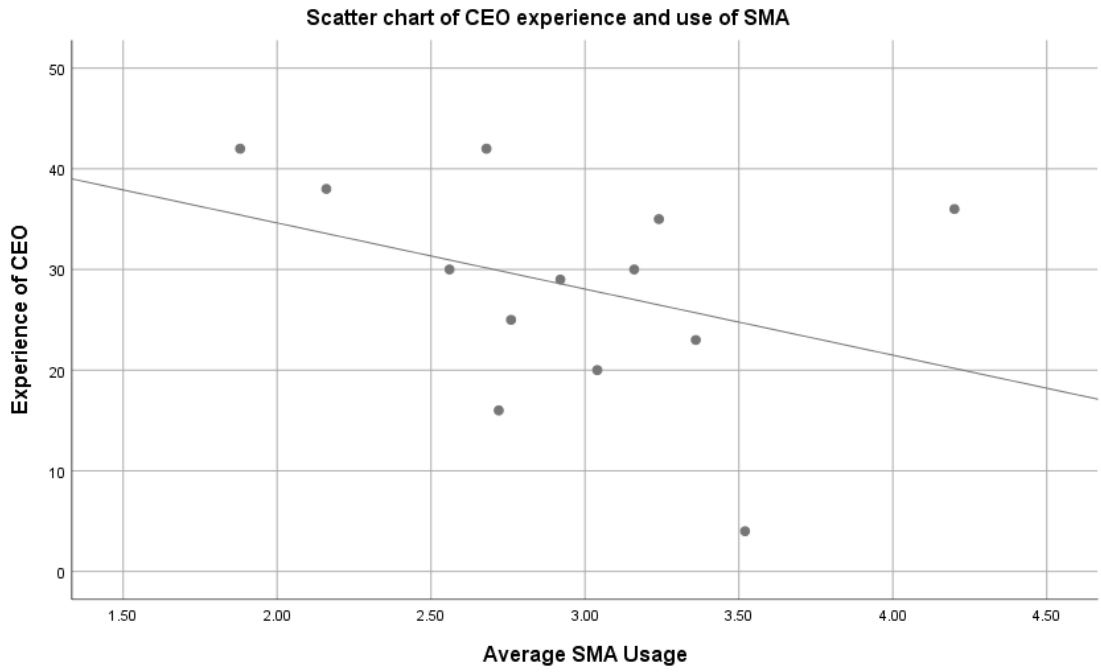

Figure 31: Scatter graph of CEO experience and use of SMA

No correlation is found to exist between CEO achieved level of education (Spearman's rho correlation coefficient of 0.038), this is similar to the results found by Santini (2013) but contrary to the results found by Kalkhouran, Nedaei and Rasid (2017). Both of these studies also took place in SMEs so size does not explain the different findings however, it might be that differences in complexity between industry sectors is the explanation. Santini (2013) found SMA usage was greater in more highly complex businesses and Kalkhouran, Nedaei and Rasid's (2017) study was based in the service sector, arguably a more complex sector than the construction industry.

A small negative correlation is found to exist between CEO experience and the use of SMA (Spearman's rho correlation coefficient of -0.369). Therefore, as the number of years of CEO experience of the sector increases then the businesses' use of SMA decreases. One explanation of this is that more experienced CEOs rely less on data provided from SMA and more in their intuition to inform their strategic decision making (Pavlatos and Kostakis, 2018). This seems to be supported by the interview data:

> "Between us we will get a gut feel for what we think is right, whatever that percentage would equate to be, it's about getting a feel for what we think it's worth to us" Company K, Commercial Director.

> "I mean [name withheld] suits the role of MD very much so because he's all about the strategy and although it might sound silly but the sort of a gut approach to where we should be going, and it will work out. There are sometimes where it doesn't necessarily but generally that gut approach does work." Company B, Operations Director.
>
> "I suppose we know just from gut feel which customers are hard on us and where there is more margin to be made." Company A, Managing Director.

Another interpretation could be that as they are experienced in the sector, they are older and therefore may not be aware of the more recently developed SMA techniques available to support their decision making, this is particularly relevant as none of the business leaders were qualified accountants and might therefore be less inclined to keep up to date with advances in MAPs. Once again this finding is contrary to that of Kalkhouran, Nedaei and Rasid (2017) who found no link between experience and SMA usage. Differences in average experience of business leaders between the two studies might explain this. The average experience in this study is 28.5 years which is double that of the study of Kalkhouran, Nedaei and Rasid (2017). It is possible that less experienced, and therefore younger, leaders are less inclined to rely on intuition, are more familiar with SMA techniques or are more open to investigating the use of innovative MAPs (Naranjo-Gil, Maas and Hartmann, 2009).

Moving onto the interview data, Table 38 below shows the education and experience of the business leaders who participated in the interviews.

Participating Company	Highest level of education attained by leader of business	Other qualifications	Number of years of industry experience
Company A	Undergraduate Degree		29
Company B	Undergraduate Degree		16
Company C	Postgraduate Degree (MBA)	Chartered Engineer	30
Company D	6th form or equivalent		36
Company E	Postgraduate Degree (MBA)		35
Company G	6th form or equivalent	HNC Construction	38
Company H	6th form or equivalent		45
Company I	Undergraduate Degree	Chartered Director	30

Table 38: Qualifications and Experience of the business leaders interviewed

Two of these business leaders, who had both founded their respective companies over twenty years ago, (Company D and Company H) have little use for SMA in their business. The MD of Company D

> "I would say I am probably seventy percent of that [responsibility for setting strategy] and the other 30% is through the main management board, the directors."

The Chairman of Company H describes the unsuccessful recruitment of an MD appointed to allow him to step back from the business

> "I had to wake up and stop playing golf and come back in and start looking at everything and it's probably because I didn't have the controls in place."

Santini (2013) would describe this as a very high level of ownership pressure and expected this to be negatively associated with SMA usage, which appears to be supported by this study. However, contrary to his expectations and contrary to these findings he concluded that there was no association between SMA and ownership pressure. Ownership structures as a contingent factor in the use of SMA are discussed in greater detail in section 9.5 below. The consequences of a high level of ownership pressure at Company F is seen, by the current FD, as a major contributory factor to its current very poor financial situation. Recently the CEO, founder and major shareholder has been forced to suddenly leave the business due to poor health. According to the current FD, appointed to assist with the recovery of the business, there is a "vacuum of information" with "no particular focus, or requirement, or urgency to look at some of the basic accounting and measuring of the business."

These three business leaders have been in the industry a long time and have overseen the growth of their businesses and seem to be relying on their intimate knowledge of their business to make successful decisions. Perhaps, rather than rely on formal information provided by SMA they are able to rely on informal information gathered through their day to day involvement in the company. The success of these businesses is supported by upper echelons theory (Hambrick, 2007) that is that top executives greatly influence what happens to their organisations. Talking with the leaders of Company D and H the Researcher is left with the impression that they are in complete control of their business and discuss how they have created successful businesses from nothing with little need for the techniques being discussed.

The other business leaders seemed to behave in a more collegiate manner, involving the other directors in their SMP and decision making. In these cases, a focus on the top management team characteristics would yield stronger explanations of their impact on the use of SMA than focusing on the leader alone (Hambrick, 2007). The MD of Company A exemplified this more open approach to leadership.

> "I wouldn't be averse to looking at those [SMA] and the impact of them and utilising techniques that give us a better analysis."

However, their FD stresses the need for the business leader to support the introduction of new SMA initiatives when discussing the COQ:

> "It needs to come from the top down, I think. To say this is the new behaviour, if you are doing rectification work, we need to know about it, and we need to be coding it as rectification work."

The FD of Company L provides an example where, despite the support of their Chairman, a lack of board room support was one element which contributed to the failure of their BSC initiative. They felt that this support was not forthcoming because:

> "At that stage the other directors were all the people from the old school. They weren't particularly that enthused, they had nearly all been here for 20 years." Company L, Financial Director.

It would seem that where an open, collegiate style of decision-making is being used then the support of the whole board, not just the business leader is a necessary requirement for the successful implementation of new SMA initiatives. It also seems that experience can be counter-productive when it comes to the introduction of new ideas into a business. The NED of Company A reflects on the experience of two of the directors of the business as both a strength and weakness.

> "I think that we are very fortunate to have people like [Operations Director] and to have people like [Commercial Director] but both of them have worked in the business for an inordinate period of time, over 20 years. [Commercial Director] has just clocked up 25 years in the business, which is great, but you tend to become very blinkered."

The NED was discussing the difficulty of introducing new ideas into the business, these thoughts seem to be supported by the negative association between CEO tenure and SMA usage found in the survey data reported above.

One solution to the longevity of existing executives resulting in a stagnation of new ideas is demonstrated by Company A who has recently created a new position and appointed an Operations Manager.

> "The hope that I have, that he is able to bring some of that different knowledge and different skills and different experience to bear on our business which will then drive our business forward." Company A, NED.

This different experience was evident when the Operations Manager was interviewed and discussed accounting improvements required to the job costing system, the CVR/CPF processes and introducing more KPIs and targets with which to monitor site performance. Citing their experience in Australia they also suggest a move to daily cost tracking with an aim of becoming more reactive at a site level.

> "There is no point doing it weekly or monthly, because if you have a stuff up on a Monday but it is still costing you on a Friday that is a whole week that you have blown, 10, 20, 30, 40, 50 grand. 10 per day whereas if you catch it on a Monday then you can recover for the rest of the week."

This frequency of cost tracking would need to be done by site managers, as information from the job costing system would not be timely enough to achieve the desired outcomes.

This research would support the central premise of upper echelons theory

> "that executives' experiences, values, and personalities greatly influence their interpretations of the situations they face and, in turn, affect their choices." (Hambrick, 2007, p.334).

In some cases, an experienced leader or one exerting a high level of ownership pressure will result in a low use of SMA. Given the impact of this on the short-term prosperity of Company F the sustainability of this approach seems doubtful. In other cases, where the leader operates in a more collegiate style, the backgrounds of the other members of the SMT will also have an impact on the use of SMA with the right blend of operational experience, openness to new ideas, creativity and communication being important (Pavlatos and Kostakis, 2018).

9.3 Networking

This section starts by analysing the responses to the question about networking activities in the survey sent to the head of business. Using the interview data and Researcher's experience dataset it then considers the impact of three specific networking activities; customer alliances, accreditations and joint ventures on the use of SMA in the participating businesses. These three networking activities were selected because it was felt they make a contribution to the understanding of networking as a

contingent factor in the use of SMA in the construction sector and there is no literature which specifically relates to them. Using the ideas of institutional isomorphism (DiMaggio and Powell, 1983) it might be expected that increased exposure to external organisations may result in the introduction of new ideas into the participating businesses. The survey which was sent to the heads of business included a question about their involvement in eight networking activities. The twenty-five responses are summarised in Table 39 below.

Networking Activity	**Number of businesses involved with these activities**
1. External accreditations such as ISO or Investors in People	23
2. Part of a joint venture	10
3. A member of any industry trade association	25
4. Customer alliances	19
5. Supplier alliances	18
6. Bench-marking activities	14
7. Used consultants or business advisers	16
8. Used specialist construction software packages	21
9. Any other business type "partnership". Please provide details_____	4

Table 39: Responses to involvement in networking activities

It can be seen that all of the companies were a member of an industry trade association and twenty-three held an externally validated accreditation. This is discussed further in section 9.3.2 below. The four responses to the open-ended question either relate to specific customer alliances or supplier alliances, which were already the subject of activities 4 and 5, so no additional networking activities are identified in the survey. Excluding item 9 from the analysis (see Figure 32 below) shows that seven respondents consider that they are involved in all eight networking activities. With a mean of 5.84

activities it can be concluded that a high level of networking activities is undertaken by the respondent companies. This is not unexpected as networking is a means by which medium sized companies can gain credibility and legitimacy for the goods and services that they supply (Eberhard and Craig, 2013), this in turn allows them access to markets they might otherwise be excluded from.

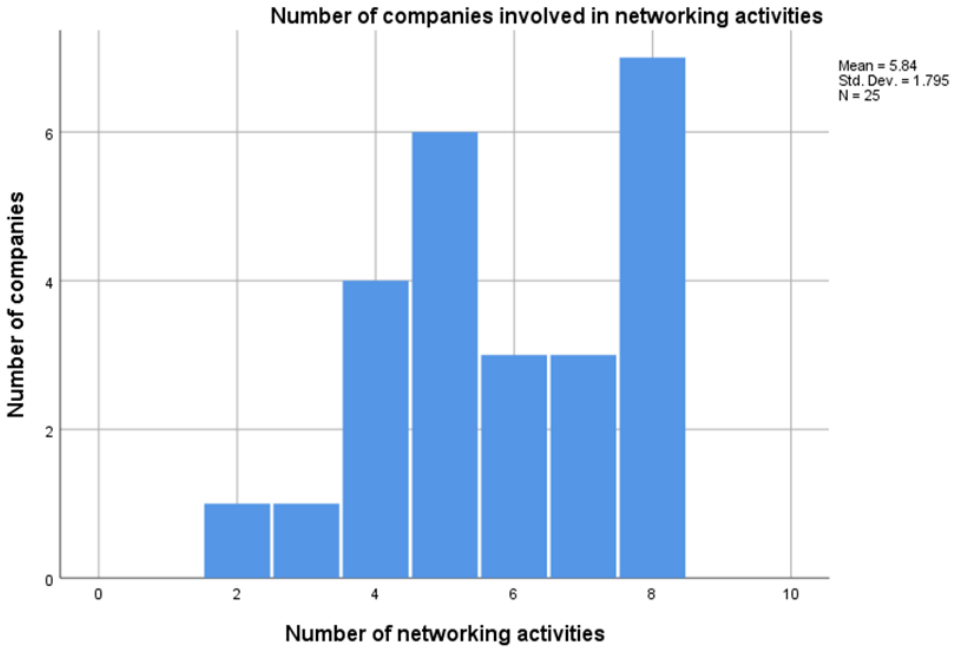

Figure 32: Number of respondent companies involved in networking activities.

A Spearman's Rho correlation analysis (Abu-Bader, 2016) was undertaken, on the group C responses, between the use of SMA and the involvement in networking activities. No correlation can be found, which is surprising and is contrary to the findings of Kalkhouran, Nedaei and Rasid (2017) who found a strong positive correlation, although they measured networking activities in a different way than the one used in this research. The scatter graph in Figure 33 below demonstrates the lack of correlation between these two variables:

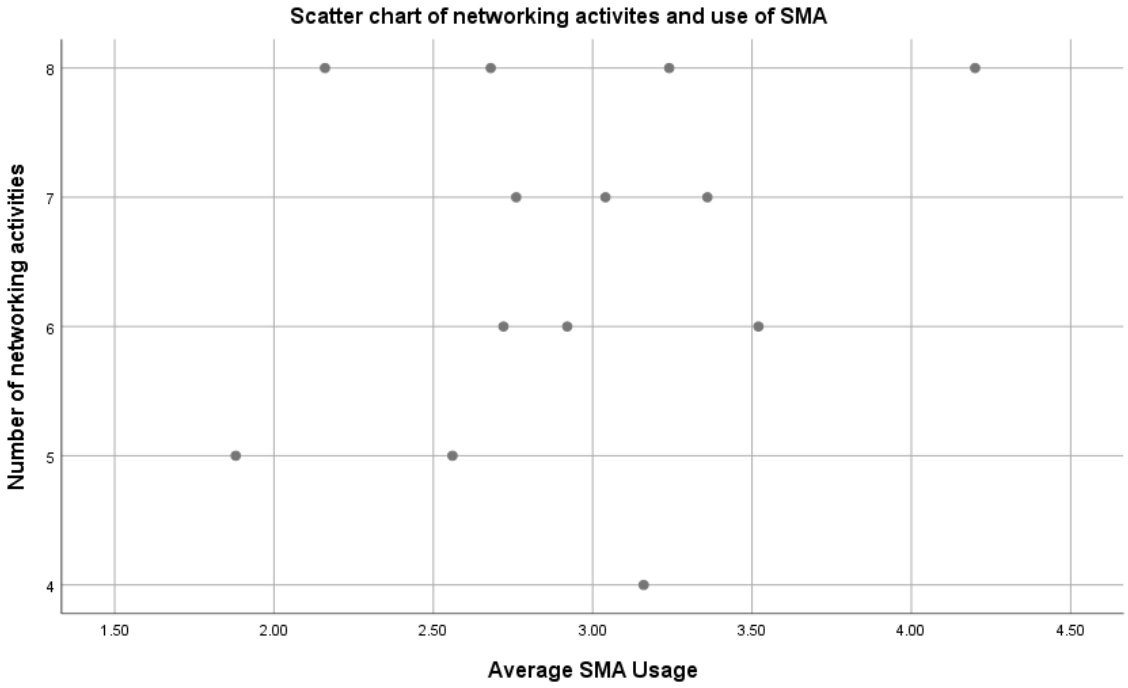

Figure 33: Scatter graph of networking activities and average SMA usage

Nineteen of the Group B respondents indicate that customer alliances are part of their networking activities. The MD of Company A chose to add one specific customer alliance as their response to the open-ended question even though a category for customer alliances already existed, indicating the importance of this customer to their business. The effect of this customer renamed 'Utility' for confidentiality purposes, on the SMA practices of Company A is discussed in the next section.

9.3.1 Utility a 'Strategic customer'

This section discusses the effect a single customer, hereafter called a 'strategic customer' can have on the SMA practices of a business. It considers the creation of the "White Book" (The Alliance Partners, 2015), a process Company A, and three others (The Alliance) was required to take part in as a consequence of becoming a preferred bidder to Utility in November 2014. Utility is a major water utility company serving the Eastern region of England. In its annual accounts to the end of March 2019 it reports a turnover of £1.355 billion; net tangible assets of £10 billion and has 4,764 employees (Bureau van Dijk, 2018). This was a very significant contract for Company A as it was anticipated that

this contract would represent 20% of its turnover in 2015/2016 and allow it to make some long-term recruitment and investment decisions.

> "With that longer-term approach we are able to plan ahead more and invest in the equipment that would ultimately make us more efficient at carrying out that work" Company A, Managing Director.

The following describes the use of a number of SMA techniques used during the process to complete the White Book, this includes reflections on the Researcher's involvement with the process (see Appendix 11.9) along with interviews with the MD and the Operations Director of Company A together with extracts from the White Book itself.

Although the White Book cost savings were itemised according eight different cost saving initiatives, it could quite easily have been structured according to the SMA techniques employed to calculate their potential cost savings. Three SMA techniques were used; LCC, VCA and COQ, although if this terminology had been used it is doubtful that anyone involved in the process, excepting the Researcher, would have understood what it meant.

One of the eight cost saving initiatives 'Reactive to Maintenance' included a focus area called 'Project Manhole'

> "To develop a process whereby manhole covers can be replaced or removed based on the most cost effective solution to reduce failure opportunities and the need for repeat maintenance" (The Alliance Partners, 2015, p.27).

This approach used the principles of LCC, what Utility called the 'TOTEX' (Total Expenditure) approach. The aim of this approach was to consider the replacement cost of a manhole cover over the lifetime of that manhole as opposed to a one-off cost. Utility wanted to adopt the TOTEX approach as opposed to distinguishing between 'CAPEX' (Capital Expenditure) budgets and 'OPEX' (Operating Expenditure) budgets. At that point in time each budget was the responsibility of different managers and with each manager wishing to reduce their costs in the short-term actually caused Utility to increase their costs in the longer-term. The solution was to stop using tarmac for manhole replacements and use "Ironguard" (Dantex Limited, 2020) a liquid asphalt product.

> "It's more expensive to carry out the repairs initially but the firm that are supplying the product give a 10-year guarantee on the repair. Long-term that should save the client money" Company A, Managing Director.

This initiative was implemented almost immediately and is considered to have achieved all of its objectives. Other LCC initiatives identified after the White Book was completed, for example the no dig technology employed by Company Z (see section 7.2.1 above) have been more difficult to implement:

> "The argument I am having with them is; well you are not really doing a TOTEX approach then. You are not looking at the whole life cost. You are looking at 5-year costs. If we get to year 3 of the AMP, they are saying; well, just do enough to fix it for the next 2-years. TOTEX they say TOTEX5, is what they now call it. We are now designing stuff to last 5 years. To me that is so wrong." Company A, Operations Director.

The irony in this case is that having introduced the Alliance contractors to LCC and "forced" them to use it (Company A, Operations Director), the Alliance client is now not taking that approach themselves.

The whole White Book process could be described as a VCA. The 'Enablers' cost saving initiative included a focus area called 'Environment' which is a good example of a VCA.

> "The delivery route operates as a unified organisation beneath the [Utility] brand. Our people will be co-located at strategic operational and back office sites and utilise common IT and communication solutions to streamline operations and support the efficient transfer of information" (The Alliance Partners, 2015, p.27).

This initiative envisaged the Alliance partners sharing resources to eliminate non-value adding activities caused by them being separate legal entities.

> "It's about a system called systems thinking. What you do then is you start almost with a blank piece of paper and you go; right, in the ideal world how would I deal with this job? Take all the barriers out of the way that prevents you doing things and you go; well, that's what I would really like to do. Then you have to build back in; well how can that actually operate effectively within an organisation like [Utility]?" Company A, Operations Director.

They give one example of this; a recent pilot programme to direct customer calls (Utility customers) away from their central call centre to a specialist from within the Alliance. This specialist, located in a hub staffed by Alliance employees, had access to all of

Utility's asset information and all the work schedules of the Alliance field technicians. The specialist was in a better position, than Utilities call centre operatives, to identify the cause of the customer's problem and to identify the field technician with the most appropriate skills and most closely located to enable them to respond quickly. This resulted in a

> "More dynamic, much more efficient, much better service. In that particular region, when they started to manage it centrally, there was no 'peak lopping' [outsourcing of work to external suppliers to cope with excess demand] required. All the jobs got done in normal hours. The collection manager [Utility employee], who is responsible for the area, said it was the most stress-free time he has ever had, he actually had time to look at the jobs, he had time to speak to his people" Company A, Operations Director.

At the time of the interview no decision to expand this pilot has been made:

> "it is ready for AMP7 [starting in April 2020]. We do want to do it for AMP7. [However], there is resistance still" Company A, Operational Director.

The resistance they refer to is coming from senior management within Utility. This is another example of the customer forcing the use of SMA onto their contractors then being hesitant to implement their recommendations made as a result.

The 'zero-waste' cost saving initiative to implement "the standardisation of policy, governance and data collection to drive consistent reporting" (The Alliance Partners, 2015, p.75) adopts the COQ SMA technique. As described in section 7.3 above the recording and reporting of the COQ in the industry is poor. In preparing this section of the White Book all the Alliance partners, including the client, struggled to provide accurate information upon which to calculate the potential cost savings (Porter and Rayner, 1992). This indicates that issues with identification of the COQ are not restricted to the construction sector, nor indeed to SMEs. The first action point for this initiative was to recruit a 'Waste and Carbon Manager'. The following two tasks were envisaged to fall within their job description:

> "Implement a single method of data recording to allow consistent reporting of carbon and environmental performance indicators and footprints to be established"

> "Develop metrics and governance to clearly and consistently report on progress, performance and compliance" (The Alliance Partners, 2015, p.84).

This is a further example of SMA techniques being applied by non-accountants as discussed in chapter 8 above.

The COQ initiative required the use of KPIs to monitor the performance of the Alliance in achieving its targets. Other KPIs were also imposed on the Alliance contractors by the client, who itself is subject to financial penalties from The Water Services Regulation Authority (OFWAT) for not achieving these outcome delivery initiatives (ODIs). These include the number of pollution incidents cause by sewage, the number of customer properties flooded by sewage and customer satisfaction scores. At the same time as achieving cost savings identified in the White Book, the contractors are expected to achieve these cascaded ODIs. In company A the responsibility for achieving these targets and for recording and reporting these falls upon the operational team responsible for this contract.

Despite the use of these SMA techniques in the White Book exercise there is no evidence that they have been adopted in other parts of Company A. This is perhaps because the contract with Utility is 'ringfenced'. The contract is operated with a specific team of employees, from field-based operatives to office-based staff including administrators, a dedicated QS and dedicated Contracts Manager. The contract is administered on a dedicated IT system separate from the company's other contracts. Furthermore, the contract value is not a fixed price like the company's other contracts but is cost reimbursable with an element of gain-sharing (Prowle and Lucas, 2016) between the Alliance partners. This 'ringfencing' and the unique commercial nature in which the contract operates results in a company within a company mentality and means that initiatives implemented by the Utility contract team are not always shared with other parts of the business. According to Pavlatos and Kostakis (2018) better communication between managers in different departments is essential to improve business performance. So, whilst external networking with the Alliance led to an increased use of SMA within part of Company A, the lack of internal networking results in this not being extended to the remainder of the business.

This section has demonstrated how 'strategic customers' can be a contingent factor in the use of SMA, encouraging, or in the words of the Operations Director of Company A, "forcing" them to behave in a specific way.

> "A lot of this happens with the big companies and gets forced down on us, all this sort of thinking, all the stuff they do. You can see why they do it, because of the impact it has on them as a business, as a much larger organisation than us, whereas we won't do a lot of this"

In this case

> "it has been deemed to be a success. We have been the most successful one [alliance] for all four years." Operations Director, Company A.

This is despite Utility not always following the advice that it is given. In the view of the Operations Director of Company A this is because "there are all those politics [that] go on as well" with departmental managers protecting their budgets, for example.

The impact of strategically important customers as a contingent factor on the use of SMA has not been considered before in the literature, this case-study is the first to do so.

9.3.2 Accreditations

Of the twenty-five responses to the networking question within the survey, twenty-three respondents say they held an externally validated accreditation (see Table 39 on page 249 above). This section uses the interview dataset to explore if these accreditations, a form of networking activity, have any effect on the use of SMA techniques within these businesses. The details of the wide variety of accreditations held by the interview participants are shown in Table 40 below. These details were extracted from the companies' websites or by emailing the participants where the information was not available from their website. There is a high focus on H&S accreditations with at least one of BS ISO 45001:2018 Occupational health and safety management systems; the Contractors Health and Safety Assessment Scheme (CHAS); the worksafe contractor or the safe contractor accreditation, being held by twelve of the thirteen businesses taking part in the interviews.

	Main Activity	ISO9001	ISO14001	BS18001/ ISO45001	Other	Other	Other	Other	Other
Company A	Specialist sub-contractor; Civil Engineering	Yes	Yes	Yes	Construction Line	CHAS	Safe Contractor	RoSPA Gold Medal Award	CEMARS
Company B	Specialist sub-contractor; Fire Protection	Yes	Yes	Yes	Construction Line	CHAS	Worksafe Contractor	firas	
Company C	Supplier of specialist capital equipment			In progress					
Company D	Specialist sub-contractor; Civil Engineering	Yes	Yes			CHAS	Safe Contractor		
Company E	Principle contractor	Yes	Yes	Yes					
Company F	Specialist sub-contractor; House building	Yes			Construction Line		Worksafe Contractor		
Company G	Manufacturer & installer of joinery products					CHAS	Safe Contractor	Forest Stewardship Council	
Company H	Manufacturer and installer of control panels	Yes	Yes	Yes					
Company I	Specialist sub-contractor; Piling	Yes	Yes	Yes	Construction Line		Worksafe Contractor	RoSPA Gold Medal Award	Acclaim
Company J	House building								HBF 5 star
Company K	Principle contractor	Yes	Yes	Yes					
Company L	Principle contractor	Yes	Yes	Yes	Construction Line	CHAS		RoSPA Gold Medal Award	

Table 40: Accreditations held by participating companies

Three International Organization for Standardization (ISO) accreditations seem to be favoured amongst medium sized construction companies:

- BS EN ISO 9001:2015 Quality management systems (British Standards Institute, 2015b),
- BS EN ISO 14001:2015 Environmental management systems (British Standards Institute, 2015a),
- BS ISO 45001:2018 Occupational health and safety management systems (British Standards Institute, 2018).

It would appear that these afford the holders a degree of credibility and legitimacy amongst their potential clients (Eberhard and Craig, 2013) and provide supporting evidence for the quality element of their tender submissions.

> "These 3 bits, it more or less exempts you [from PQQs], if you have got the three that we have got, [ISO] 9001, 14001 and 18000." Company A, Marketing Manager.

When asked if holding these standards forces their business to do anything they otherwise would not, the MD of Company A replied

> "Yes, I would say that they do actually. Certainly, with the ISO audits …I think the fact that we are being audited does instil that discipline into the business that otherwise may not be there."

This was discussed in more detail with the SHEQ Manager of Company A who confirmed their role as being:

> "to provide the company with policies and procedures to align us with the British Standards for health, safety, the environment and quality."

These procedures include the recording and reporting of KPIs relating to these three focus areas as discussed in section 7.4 above. The SHEQ Manager also refers to the CEMARS accreditation which Company A holds. To retain the accreditation the business has to pass an annual audit and demonstrate a year on year reduction in carbon emissions. This accreditation is a requirement of working with Utility but the information the business is required to produce does not seem to be used other than to satisfy the annual CEMARS audit:

> "I think, if [Utility] didn't say we want you to have this audit, we probably wouldn't have it." Company A, SHEQ Manager.

In this example the information is required for the business as a whole, not just the work undertaken for Utility, but it is not converted into KPIs or targets to manage the performance of the business in relation to emissions. This is despite care for the environment being part of the company's mission statement. The SHEQ Manager refers to a recent purchase of company cars with hybrid engines but confirms that the CEMARS accreditation was not a direct factor in this decision. It appears that some strategically important MAI is being produced as a result of an external accreditation, but that management do not use that information to help deliver one of its strategic objectives. The SHEQ Manager confirms that this information is only provided on an annual basis:

> "We don't do it until year-end. To try and get all this information on a quarterly basis would just be too time consuming to be honest."

This supports the conclusion that the CEMARS information is not considered to be of strategic significance to Company A, otherwise it would be monitored and reported on a more regular basis. However, the other KPIs produced as a consequence of the other accreditations held by Company A do appear to be monitored on a regular basis, via the 'H&S dashboard' and it can be seen therefore that external accreditations seem to be a contingent factor in the use of multi-dimensional performance measurement.

9.3.3 Joint ventures

One final networking activity and its impact on SMA usage was considered during the phase 2 data collection. It was felt that by being involved in joint ventures (JVs), businesses might be directly exposed to new MAPs that they might adopt in their own MCS. Two of the participating organisations Companies D and H have recently become involved in JV arrangements both with much bigger JV partners. This has enabled them to work with clients which would otherwise be inaccessible to them (Eberhard and Craig, 2013). In both cases there is evidence of the transfer of accounting information, but this is of a financial accounting nature. Larger JV partners might be expected to use more SMA by nature of their size (see section 2.4 above) and that this might result in exposure to these techniques and their subsequent adoption by the junior partners. However,

there is no evidence of Company D or H implementing new management reporting initiatives as a result of their involvement with the joint venture. In both cases these arrangements have only happened recently, and it might be that trust relationships have not yet developed sufficiently for sharing of MA information to have started.

The participating businesses seem to undertake a high level of different networking activities, but the survey data reveals no significant relationship between that and SMA usage. The interviews reveal a different picture. For example, the 'strategic customer' who exerts a great deal of influence on Company A's use of SMA. The use of accreditations is widespread in the industry, often used as a marketing tool, they require the reporting of many non-financial performance indicators even if these are not necessarily linked to the calculation of bonus payments as discussed in section 7.4 above. JVs are another way medium sized construction businesses gain access to new clients however, the sharing of information between JV partners does not seem to extend to MAI but this may due to the early stages of the relationship.

9.4 Size and resources

One contingent factor which has regularly been shown to positively affect the usage of SMA is firm size (for example (Guilding, 1999; Joshi, 2001; Cadez and Guilding, 2008; Santini, 2013). Various measures of size have been used; Guilding (1999) and Joshi (2001) used asset values; Cadez and Guilding (2008) used revenues; whereas, as with this study, Santini (2013) used employee numbers.

A Kruskall-Wallis H test (Abu-Bader, 2016) was conducted to test if there is a significant difference in average SMA usage between the three categories of firm size introduced in section 5.4.1 above. The results of this test are show in Table 41 and Table 42 below:

Means Rank for SMA usage by Firm Size			
		N	Mean Rank
Average SMA Usage	Small-Medium	15	10.60
	Medium-Medium	4	10.25
	Large- Medium	2	15.50
	Total	21	

Table 41: Means rank for SMA usage by size of business

Kruskal-Wallis H Test Statistics[a,b]	
	Average SMA Usage
Kruskal-Wallis H	1.173
df	2
Asymp. Sig.	0.556
a. Kruskal Wallis Test	
b. Grouping Variable: Firm Size	

Table 42: Kruskal-Wallis H test statistics

These results show that there is no significant difference amongst the three means, indicating that SMA usage does not vary within the three different categories of medium sized firms. This is collaborated when testing for correlation between firm size and SMA usage where no significant correlation was found to exist (Spearman's rho equals 0.016). These results are consistent with the findings of Cinquini and Tenucci (2007) and Lachmann, Knauer and Trapp (2013) but inconsistent with the studies mentioned at the start of this section. The scatter chart showing employee numbers and SMA usage is shown in Figure 34 below.

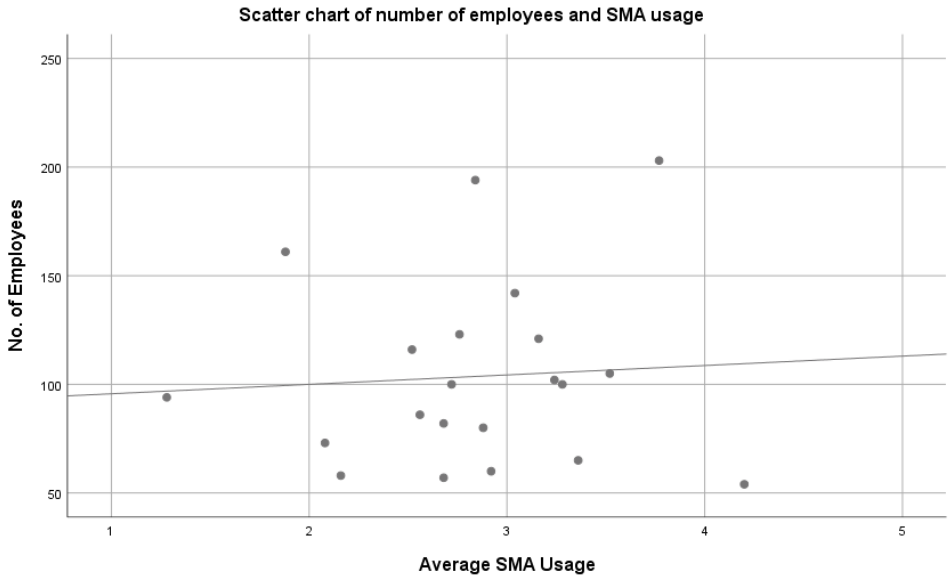

Figure 34: Scatter chart of number of employees and use of SMA

In order to make the results comparable to the earlier work of Guilding (1999) and Joshi (2001) or Cadez and Guilding (2008) the FAME database was revisited to extract total asset and revenue details of the Group A respondent companies. Once again, unlike the findings of these earlier studies, no significant correlation, using Spearman's rank correlation co-efficient, is found to exist. (Spearman's rho was 0.100 for total assets and 0.159 for revenue). Given the findings of these previous surveys these results are surprising. This study has focused on medium sized companies, it is possible therefore that the effect of size on SMA usage only starts to take effect above 250 employees. Lucas, Prowle and Lowth (2013) refer to a tipping point. For the survey respondents it seems that this tipping point has not yet been reached and it is possible that for the construction sector the complexity, the communication and control problems associated with growth (Hoque and James, 2000) that drive the need for greater use of SMA only occurs when employee numbers exceed 250.

Previous studies have equated increased size with the availability of resources to invest in using more advanced MATs (Chenhall and Langfield-Smith, 1998a; Abdel-Kader and Luther, 2008). For the interview participants it seems that their most scarce resource is a lack of time. When asked why they thought the SMA paradox (See Appendix 9) existed or that some SMA techniques were used infrequently participants cite a lack of time as by far the major reason:

> "I think one of the main ones is time constraints. You know you come to the end of the month and you think, if I had more time I would be able to delve deeper into what's produced these numbers and then going forwards how I could set out to achieve more in the future. You just then just get caught up in the next month and the next month." Company A, Financial Director.
>
> "Sounds a poor excuse but probably time is probably the major issue. You know it's one of the traits of an SME isn't it, you know. We spend all our time working **in** the business as opposed to spending anytime working **on** the business." Company A, NED.
>
> "To try and get all this information on a quarterly basis would just be too time consuming to be honest." Company A, SHEQ Manager.
>
> "From my point of view as a director in a small, medium sized company that has grown so much, the main limitation has been time, in terms of what time I've had to be able to set aside for the strategic side and also the amount of data we necessarily had to feed into the planning." Company B, Operations Director.
>
> "I haven't got the time to sit back and think about SMA. If I could sit down and take these guys [finance department] off for a day and understand SMA I think it would be a long-term benefit, but it would take away from the day job and they [other directors] would be up in arms." Company F, Financial Director.
>
> "There is a limit to quite how much I can do!" Company J, Financial Director.

This last comment is particularly interesting as Company J is the largest of the companies interviewed (with 194 employees and a turnover of £129 million) and still seems to struggle with a lack of time to devote to SMA. Perhaps the issue therefore is not one of time or resources but priorities, and that whilst Heads of Finance perceive benefits from using more SMA techniques they do not actually see a cost benefit from doing so and therefore do not prioritise them.

> "I think that often, as much as they might have a benefit, we are limited as to how much time we can spend on management accounting anyway. I mean its only part of the role of, my role or a financial director's role in a company generally. So, I think often, as much as they might be useful, in terms of priority they are not. We just can't fit them all into the time that we have got available and actually should we therefore prioritise the ones that we think will have the greatest benefit to the business?" Company B, Operations Director.

Company A's solution to addressing this lack of time was to invest in new accounting software in order to make routine tasks more efficient and to release their FD to have

> "the time to actually think about the long-term strategy and the methods that I can [use to] analyse the company's results." Company A, Financial Director.

The QS at Company D had previously worked at a much larger contracting company (Tarmac Contracting) and was reflective of this size difference when considering the use of SMA in general and reporting the COQ in particular,

> "Tarmac being the size it was, is that everything had to be reported back to the directors, who weren't in the office that you were doing the work at. Here, the directors are just around the corner. So, mouth to mouth word, and directors talking to each other and conversation eliminates that official process. So, why would you want to fill out a form and get somebody to sign it, another director to sign it, because all the directors are in the same building. The directors are all within two yards of each other. You don't need that process. But, without having that process you don't get the monitoring How does the business know how much it has lost through workmanship? They know it happens and they talk about it but does anyone put the figures to it."

This once again supports the idea of the tipping point mentioned by Lucas, Prowle and Lowth (2013). All the participants are from organisations with only one office, their head office, and seem to work locally to that, Company A for example has a preference to work within a radius of one and a half hours of travelling time. Growth in the business may result in the need to extend geographical working boundaries in the search of new clients and contracts and necessitate the need to open regional offices. Company A, for example, opened up a regional office with a new regional manager in the East of England shortly after the interviews were completed. Therefore, it is perhaps not size as measured by turnover or employees that directly affects the use of SMA in the construction sector but as, Lucas, Prowle and Lowth (2013) suggest, the emergence of de-centralised decision making which is an indirect consequence of growth.

It would seem that a lack of time to prioritise SMA is a common feature in medium sized construction companies. Despite the fact that heads of finance perceived a benefit of using SMA more frequently (see Appendix 9) they do not seem to have the time to do so, especially given the priority of other tasks discussed in chapter 8 above. Following Cadez and Guilding (2008) it might have been expected that some increase, linked with firm size, in resources to devote to the use of SMA would be evident in the population

surveyed however, there was no statistical evidence to support this proposition. Taking this and the interview data, it could be concluded that that increased use of SMA only occurs when the tipping point has been reached, perhaps when regional offices are opened or maybe the tipping point for construction companies occurs in businesses employing more than 250 employees.

9.5 Influences of ownership

Analysing the interview data, the ownership structure of the businesses taking part in phase 2 of the study seems to be a contingent factor in their use of SMA. Table 21 on page 150 above provides the ownership details, obtained from the FAME database (Bureau van Dijk, 2018), of the business which participated in the interviews.

This was discussed briefly in section 9.2 above where the impact of the leaders who had founded their businesses and exerted had a high degree of ownership pressure (Santini, 2013) was discussed. In this section this is examined further considering the effect of listed parent companies and family ownership on the use of SMA.

9.5.1 Listed Parent Companies

Company C was acquired in 2017 by an American listed company with an annual turnover of $39 billion and 74,400 employees, prior to that it was owned by a large family-controlled business based in Germany with an annual turnover of $3 billion (Deere & Company, 2020). Company I is a subsidiary of a Danish listed company with an annual turnover of £1.7 billion and 6,800 employees (Per Aarsleff A/S, 2020). There is one specific SMA technique identified where these parent companies exert an influence: strategic investment appraisal. In addition, the parent companies determined the frequency and format of group management reporting and forecasting.

Company I have to submit regular profit forecasts as updates to their annual budgets which had been approved by their parent in August prior to the start of their financial year in October. Three updated profit forecasts were required during the year; P2 (prognose2) after quarter 1 actual results and incorporating a nine-month forecast; P3 at the half-year and P4 in the final quarter.

Both Company C and Company I are subject to a prescribed capital expenditure approval process. Under the new ownership regime, the MD of Company C has to seek approval for expenditure above £1m.

> "We haven't done one yet, but it will be the full DCF, ROI everything. In a very prescribed format."

They compare this to the previous regime:

> "That was unheard of within [previous family run group] when I joined the business. Before it was a lot easier with the owner. A privately-owned business. You know, this is a £13m investment [referring to new offices and workshop] and that was a twenty-minute conversation with the owner, we did that over lunch."

The MD of Company I has a much lower limit of £50,000 above which they need to seek approval from their parent:

> "We run a system of ROICs. Return on invested capital. We have to prove, in a business case, that what we invest, over a certain value, will give 16% back for every pound that we invest."

These approaches to investment appraisal are very different to those operated by the other participating businesses (see section 7.2 above). They are based on financial appraisal techniques which have very clear hurdle rates which must be reached before investments are approved.

Company C is also heavily influenced by the Sarbanes Oxley compliance requirements of their US parent. The MD has frustrations with this as he fells it is limiting their ability to share financial information with his managers. He also fells that the information he has to report was "not detailed enough [for decision making purposes]" he continues

> "[New parent company] don't give a monkeys about whether we are profitable. It does seem that way because of compliance. As long as we've ticked all the boxes and we can go and stand up and say that the accounts are accurate they don't care. That's quite restrictive in terms of the behaviour of those individuals, because they are not being asked to drive the performance of the business, they are being asked to make sure it complies"

Company I, is not subject to such restrictions with a great level of local information available to his SMT which they also share with the MD's line managers based in the parent company:

> "What I do is, every single week, on a Saturday morning, in my own time, or a Sunday morning. I put together a snapshot email or a weekly report of what we have done, what we have priced. A little bit of narrative, this is every single week. Who we have seen, what clients we have seen, business development and then every single job has got its margin against it. It is a private board report. Any issues any concerns, pipeline, any concerns on the pipeline, all the project data. Every single job has got its own narrative. This doesn't go to the staff it just goes to the board, to Lars and Stig. Any issues in the marketplace, anything with clients, whose folding, whose got problems. What staff are on the market, the whole thing. It's basically a deep dive, every single week. We've got it down to such a fine art that it's not a time-consuming thing, it's just a matter of a couple of hours work for someone."

The source of all this information is an internal weekly report which is completed every Friday with input from all areas of the business and reviewed by the SMT every Monday morning.

It can be seen that parent companies have a direct and powerful influence on the use of some SMA techniques within their subsidiaries. However, this does not seem to be consistent. In the cases above both companies are owned by listed companies but who are based in different countries. Legislative differences seem to explain differing levels of detail required in the reporting of management information. In Company C the difference in investment appraisal decision making between their current owner and their previous owner was striking. This was highlighted by the MD who has obvious frustrations with the increasing regulation being forced upon them by their new owner who operates under Sarbanes Oxley controls.

9.5.2 Family businesses

Companies A, E, and L are family businesses. A family business is described as having

> "the presence of a controlling family and the active involvement of family members in the ownership, governance, and management." (De Massis et al., 2014, p.344).

Company A is in a period of transition, what the NED of Company A describes as "growing up" and what Santini (2013) might call a relaxation of high levels of ownership pressure. This is being driven by a realisation that future generations of the family do not want to be involved in running the business. This is requiring the MD to plan their exit strategy and create a sustainable business by involving the other directors in the SMP.

> "The control of the family has been, I think, too tight and I think that there is now the beginning of an understanding to some of those leashes being released. Which allows people to be accountable and stand up and say, yes, I got it right or no I didn't, but I'll take accountability for it. That allows the opportunity to use some of the techniques that you are looking at." Company A, NED.

Similarly, the interviewees in Company L have a positive perception on the use of SMA. It has just recruited a new Commercial Director reporting to the Chairman, the third generation of the family to run the business. The Commercial Director (since promoted to MD) is having a clear impact on the SMA techniques in use in that organisation, by enhancing the CVR and CPF processes and has plans to introduce CPA which was "something on the radar to do more of."

On the other hand, Company E does not appear to desire a great deal of change and sees no need to implement new SMA techniques. It has reached its desired level of turnover and is only looking to sustain that in the future, ready to pass the management of the company onto the next generation of the family who are already employed by the business as FD and Business Development Director. According to the MD

> "successful planning is in place to ensure the next 40 odd years happens, as we all pass the baton on in due course."

It would seem that a family business that has a clear succession plan is content to carry on with a 'business as usual' approach to their business strategy and as a result do not see a need to implement additional SMA techniques. Whereas a family business wishing to grow or change their ownership considers it necessary to develop their management information systems and make more use of SMA. This is consistent with a reducing level of ownership pressure (Santini, 2013). High levels of ownership pressure are associated with lower levels of profitability and decreased levels of efficiency within the MCS. This

study has found that as family businesses include more professional and non-family members in the decision-making processes, they appear to increase their use of SMA to support this process. This is contrary to the findings of Santini (2013) who did not find any association between ownership pressure and the use of SMA.

9.6 Accounting software

The use of accounting software was not a question asked in the survey but was discussed during the interviews with heads of finance. Table 43 below summarises the accounting and job costing software in use. All these, with the exception of SAP are off the shelf packages with very little facility for customisation, which means MAPs in these businesses will be heavily influenced by the specific way the software works (Messner, 2016). All the packages mentioned (except Microsoft Nav 2009 used by Company G) included a job costing module but not a CVR process.

	Accounting Software used
Company A	Sage Construct and Protean (moving to Summit from Red Sky)
Company B	Sage
Company C	SAP
Company D	Sage Construct
Company E	N-Vision
Company F	Connect IT
Company G	Microsoft Nav 2009
Company J	Dema from Red Sky
Company K	Dema from Red Sky

Table 43: Use of accounting software by interview participants

According to Messner (2016) industry practices can be influenced by firms that offer solutions for a particular industry. In selecting new software, which the Researcher did during his first year at Company T (see Appendix 11.10), the directors wanted to ensure

the basics (job costing, for example) operated in a manner consistent with current practices but in areas of new functionality (customised report writing or electronic purchase orders, for example) were guided by the software vendors in terms of current best industry practice. In these later areas the MAPs of Company T were redesigned around the functionality of the new software once it was implemented.

New accounting software is also being installed by Company A at the time of the interviews. It is referred to by almost all of the SMT, in response to questioning about the information provided by the current system, as a solution to their current issues relating to job costing. As mentioned in section 9.4 above the FD of Company A is hopeful that this new system will allow them more time to use more SMA. The other directors of the business each have their own desires from the new system.

> "I think one of the things we're looking at when we go for this new accounting system is perhaps revising our analysis codes, so we use the same codes in the estimating package as in the management accounting and reporting. Which will allow us to do those comparisons more easily." Company A, Managing Director.

They are hoping to be able to provide more feedback to their estimators in respect of actual build costs compared to their original tender submissions. This is currently only available at a total contract level due to inconsistencies between the job costing and estimating software. The desire is to analyse costs to different activities within the contract allowing a more detailed comparison with the way estimates are compiled. Having this data should result in an improved level of accuracy in future tender cost calculations. Other benefits are also mentioned:

> "[The aim is] to try and improve the quality of the information we get out but on a more timely basis. To give us more time to be able to then concentrate on those other things that are equally as important within the business. Which is the longer-term strategy of the business." Company A, NED.

> "[The new IT system will] create enough headroom and space for people to just look at stuff better and for a bit longer and go; well, what are we wasting on materials? We have no idea but perhaps accounts and through the reporting we can get better information about what is our wastage levels, because we don't really know what our wastage levels are." Company A, Operations Director.

> "I'm am not completely sure how it is going to work but I am hoping [it will be able to help produce CVRs]." Company A, Commercial Director.

There is one voice of dissent, the newly appointed Operations Manager who is concerned it will not be able to supply the daily cost information he fells is necessary for his site managers to control their costs and input accurate information into CVRs.

> "If you are running a live site, you can't rely on an effective cost tracking system from a corporate base or an office-based scenario. Companies have tried it. I did a 12-month sabbatical with accompany called Bridey in Australia, and they changed their system, their accounting system, I forget what they changed it to. They were trying to put more onus, take it away from site [but it didn't work]." Company A, Operations Manager.

From this comment it seems that the duplicate costing system will remain in use at Company A, despite the investment in new software. At this stage it is not possible to gauge if the hoped for benefits of this new accounting system will be realised, however it seems that it may still be unable to provide information with the timeliness to be helpful to site based teams wanting to track their costs on a daily basis.

The MD of Company C also has issues with their current accounting software. They are using SAP software which was implemented at the request of their former German parent company.

> "It's one of our biggest frustrations is how its set up. It is very good for factories, it's very good for machine sales, its actually quite hard to work out profitability on things like how my workshop is doing and how my field service is doing." Company C, Managing Director.

What was once fit for purpose is no longer helpful in analysing new business activities as the business strategy has changed from a pure sales organisation to one which now provides a service and breakdown facility. Unlike the directors of Company A the MD of Company C has no concerns over the level of precision required in this information.

> "I guess it's a bit like throwing the dart at a dart board. I get in the twenty, is that good enough, yes it tells me that I am in the right spot, does it get me to a treble twenty, no. It probably does enough to get me in the right segment." Company C, Managing Director.

This indicates that any additional information, even if not completely accurate would be of benefit to Company C however, once this is established, accuracy may become more important, as it seems to be within Company A.

The accounting software in use might also be a function of the size of the business, with bigger businesses having the resources to be able to invest in more integrated systems with greater functionality to provide the information needed for SMA (Chenhall and Langfield-Smith, 1998b; Abdel-Kader and Luther, 2008). This is the view expressed by the QS of Company D who had a big company background.

> "When I came here it was almost like going back in time compared to what I had available to me in Tarmac. It's not really an integrated system here, from one side of the business to the other. I have brought in my knowledge. We can do that differently; we can bring you into the 21st century hopefully and introduce this and introduce that. Get it a bit more structured." Company D, Quantity Surveyor.

The Commercial Director of Company L, also from a bigger company background, has similar thoughts

> "At the moment its [CVR process] very, very, very spreadsheet driven. A lot of companies are very spreadsheet driven but the trouble with a spreadsheet it is very easy for someone to press delete on a cell, delete a formula or you can fill a spreadsheet in incorrectly, either on purpose or by mistake. Whereas if it's baked into a finance system it tends to be a bit more robust. You get checks and balances in there. That's what I am used to."

Having said that it is unlikely that even the most advanced software packages would extend beyond job costing or semi-automating the CVR process, that is, routine processes. SMA techniques are by definition adhoc, non-routine and un-programmed and therefore may be uneconomic to include in off the shelf accounting software. However, non-industry specific software packages supporting ABC or forecasting are available, should they be required.

It would seem that the use of a suitable accounting software is a contingent factor in the use of SMA, albeit a factor that is itself, contingent on the resources available to the business to invest. Software with greater functionality is not only more expensive but

requires expertise to implement and use effectively, an expertise which may not exist within all medium sized construction companies.

9.7 Conclusions

This chapter has explored the influence of a number of contingent factors on the use of SMA in medium sized construction companies and answered the following research question:

Which contingent variables help to explain the use of SMA in medium sized construction companies?

No clear association between strategy and the use of SMA is found. From the sample it can be concluded that following a conservative business strategy results in a lower level of SMA usage but given the structure of the sample it is not possible to generalise this to the entire population. Those businesses following a differentiation strategy seem to use more CA techniques but the same cannot be said for businesses following a low-cost strategy and the use of advanced costing techniques.

SMA appears to be used less frequently in businesses where the experience of the CEO and SMT is greatest. In these circumstances change is difficult to implement, and new ideas can be introduced by the recruitment of new managers into the business. Similarly, businesses where the CEO is a major shareholder and exerts a high level of ownership power seem to rely less on the information provided by SMA and more on intuition to support their decision making, a situation which resulted in near financial ruin for one of the participating businesses.

Based on survey results no relationship is found between networking activities and usage of SMA. However specific examples are presented; 'strategic customers' and accreditations both cause an increase in the use of SMA which otherwise might not have been the case. Contrary to expectations involvement with a larger JV partner has not yet resulted in the sharing of MAPs.

Size is a contingent factor which features regularly in the literature. For this dataset no statistical relationship can be found between size and SMA usage, it is concluded that

the so-called tipping point must therefore happen when construction businesses employ more than 250 employees. The interview data supports the idea that increased use of SMA in larger companies results from greater access to resources, a lack of time amongst respondents being the resource which appears to have the most adverse impact on the greater use of SMA. Associated indirectly with size is access to resources to invest in sophisticated accounting software systems. Medium sized construction companies have access to a range of industry specific off the shelf packages which do not contain any SMA functionality other than job costing and at the higher end CVRs.

Differing forms of ownership also seem to have an impact on the use of SMA. Parent companies exert an influence not only on financial reporting and forecasting but on the use of SMA specifically in respect to investment decision making. Two companies participating in the interviews are family businesses transitioning away from high levels of ownership pressure and seem to be utilising more SMA as a result, this is contrary to the findings of Santini (2013) as discussed in section 9.2 above.

This chapter has considered the impact of six contingent factors on the use of SMA in medium sized construction companies and supports the view of contingency theory that context shapes the design of management control systems (Chenhall, 2006). In the case of Company A its involvement with a 'strategic customer' changed the context of the normal commercial practices of the sector (Nicolini et al., 2000). This enabled the use of the SMA techniques of lifecycle costing and VCA not seen in other businesses participating in this study. The 'strategic customer' is therefore a new contingent factor identified in the use of SMA in medium sized construction companies. This can be added to Otley's (2016) list of contingent factors as discussed in section 2.5 above.

The central proposition of contingency theory is that organisational performance depends on the fit between organisational context and structure (Cadez and Guilding, 2008; Abdel Al and McLellan, 2013). The next chapter will examine this in more detail and investigate if an appropriate fit of SMA has a positive impact on the performance of medium sized construction companies.

10 Analysis and Findings Theme 4: Links between SMA and business performance

This chapter will use the survey data collected in an attempt to answer the following research question:

Does the use of SMA contribute to an improvement in the performance of medium sized construction companies?

The statistical analysis identifies a significant positive correlation between the average use of SMA and both performance and the achievement of business objectives. It also demonstrates that a number of individual SMA techniques show a strong correlation with both performance and the achievement of business objectives. This is discussed in greater depth in section 10.1 below. This level of analysis is unable to demonstrate causality between these variables. Is it that increased use of SMA results in an increase in performance and the better achievement of objectives? Or does an increased performance and achievement of objectives lead to an increase in the use of SMA caused by an increase in the availability of resources to invest in it? Multiple regression analysis (Abu-Bader, 2016) must be used to answer these questions. Due to the small sample size obtained in this study this is not possible as discussed in section 10.2 below.

10.1 Analysis of Phase 1 results

Both surveys asked the respondents to self-assess the performance of their businesses over the previous three years. As noted in section 5.3.2 above this is considered to be an equally reliable way to assess business performance compared to more objective methods. The results are shown in Table 44 and Table 45 below:

Relative to Main Competitors	Group A				Group B			
	Above	Same	Below	**Average**	Above	Same	Below	**Average**
Sales growth	9	10	1	**0.40**	11	12	2	**0.36**
Relative market share	10	9	1	**0.45**	7	17	1	**0.24**
Profitability	8	7	5	**0.15**	13	9	3	**0.40**
Customer Satisfaction	12	8	0	**0.60**	21	4	0	**0.84**
Average	**9.75**	**8.50**	**1.75**	**0.40**	**13.00**	**10.50**	**1.50**	**0.46**

Relative to Own Business Objectives	Group A				Group B			
	Above	Same	Below	**Average**	Above	Same	Below	**Average**
Sales growth	5	11	4	**0.05**	8	11	6	**0.08**
Relative market share	6	11	3	**0.15**	7	12	6	**0.04**
Profitability	6	7	7	**-0.05**	11	6	8	**0.12**
Customer Satisfaction	5	14	1	**0.20**	7	17	1	**0.24**
Average	**5.50**	**10.75**	**3.75**	**0.09**	**8.25**	**11.50**	**5.25**	**0.12**

Table 44: Responses to performance questions

Achieved Strategic Objectives	Not at all						Completely	
	1	2	3	4	5	6	7	**Average**
Group A	1	1	2	1	9	5	1	**4.75**
Group B	0	2	1	1	7	12	1	**5.12**

Table 45: Responses to achieving strategic objectives question

Both Group A and Group B show a similar pattern of responses, although overall the heads of business respondents appear to be slightly more positive in their responses than their head of finance colleagues. The average performance measures show that the respondent companies appear to be performing better than their nearest competitors on all four measures, particularly on levels of customer service. However, when it comes to performance against their own targets, it seems that the businesses are only just achieving their objectives (average score for Group A of 0.09 and 0.12 for Group B). In respect of achievement of strategic objectives, the vast majority of responses are above the mid-point score of four (Group A 15 of 20 and Group B 20 of 25). This indicates that both sets of respondents consider that their businesses are achieving their strategic objectives to a greater extent than they are not.

In the Group C respondents there is a very strong correlation between the head of finance and the head of business views on performance (spearman's rho of 0.719) and their views on achieving their strategic objectives (spearman's rho of 0.793). This means that the self-assessment responses do not differ significantly between Group A and

Group B. The correlation tests which follow have therefore been performed on the Group A responses rather than using the smaller number of Group C responses.

Adding the responses to both performance questions together the range of possible scores was from minus eight (below nearest competitors and below own targets on each measure) to plus eight. The Group A responses are shown in Figure 35 below, whilst Figure 36 shows the Group A responses to the achievement of strategic objectives question.

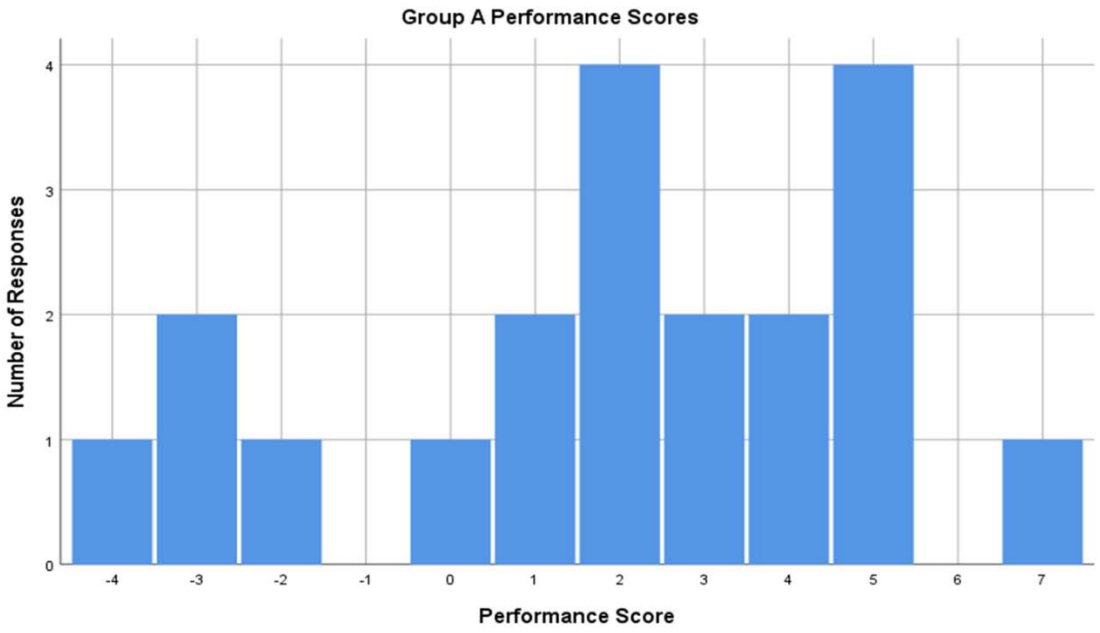

Figure 35: Group A Self-Assessment of Performance Scores

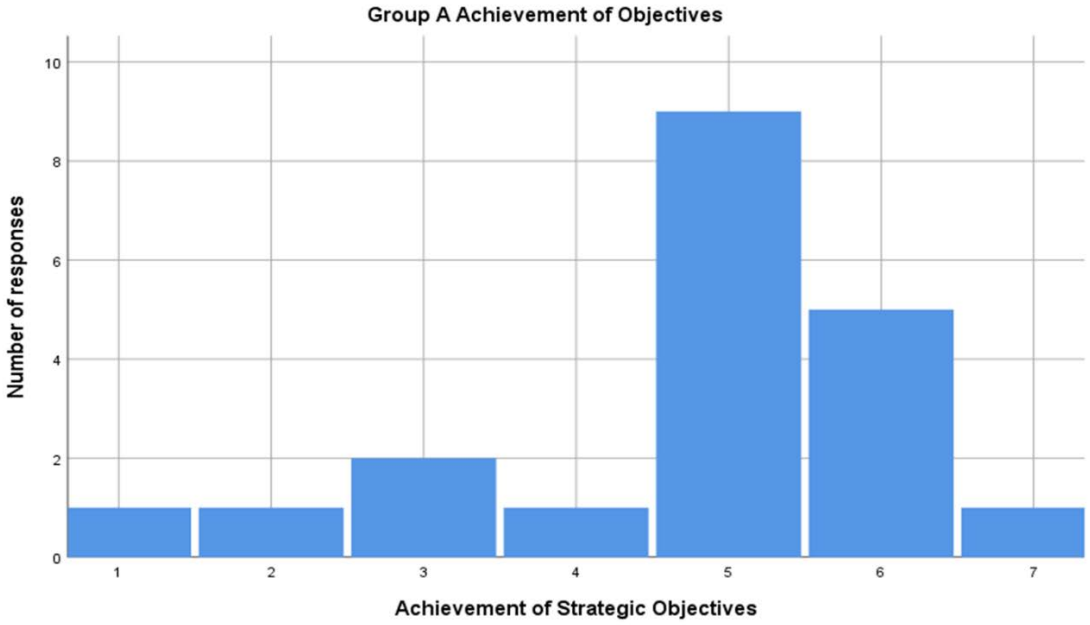

Figure 36: Group A Self-Assessment of Achievement of Objective Scores

The relationship between the overall mean usage of the twenty-five SMA techniques and these two dependant variables is investigated using the Spearman's rank correlation co-efficient (due to the small sample size). This test is suitable as the mean of all three variables is found to be normally distributed using Fisher's skewness co-efficient at a one percent level of significance. The results of this are shown in Table 46 below:

		Performance	Achievement of Objectives
Average SMA Usage	Correlation Coefficient	.529*	.527*
	Sig. (2-tailed)	0.017	0.017
	N	20	20
*. Correlation is significant at the 0.05 level (2-tailed).			

Table 46: Correlation between average use of SMA and performance/achievement of objectives

The results show a significant positive relationship between average SMA usage and business performance ($r= .529$, $p<0.05$) and between average SMA usage and achieving business objectives ($r= .527$, $p<0.05$), as demonstrated in Figure 37 and Figure 38 below:

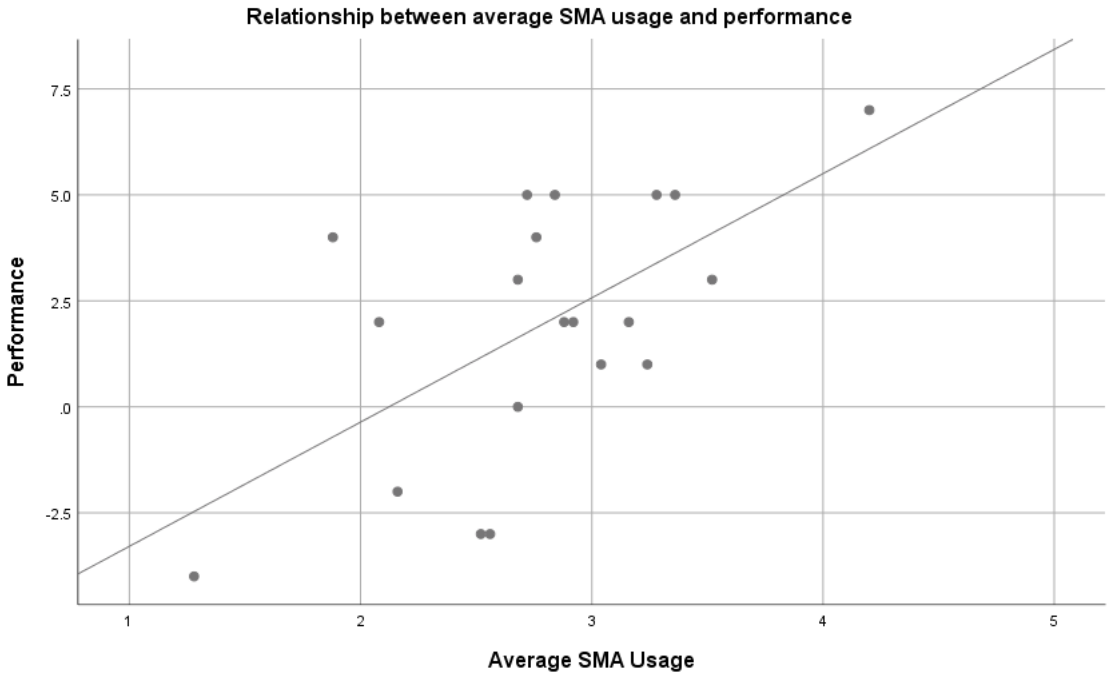

Figure 37: Relationship between average SMA usage and performance

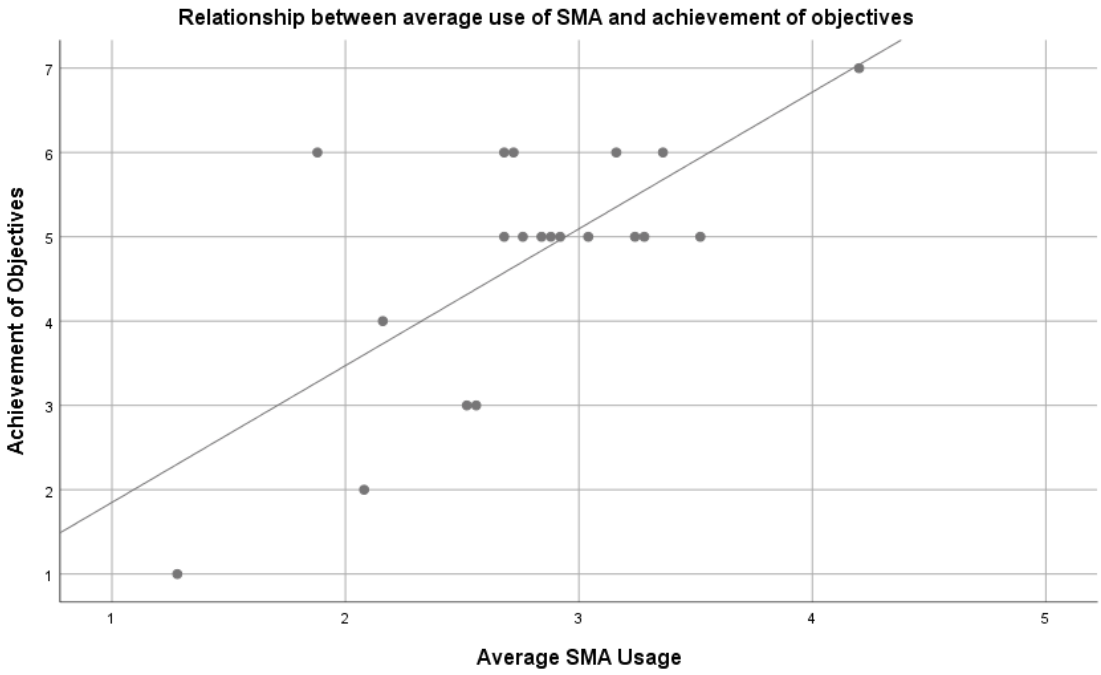

Figure 38: Relationship between average SMA usage and achievement of objectives

Therefore, it can be concluded that businesses responding to the survey who have a higher average use of different SMA techniques demonstrate both a higher level of performance and a greater level of achievement of their business objectives. Two conclusions are possible. Either, that using more SMA techniques contributes to an increase in business performance and better achievement of objectives by providing more information leading to more informed strategic decision making. Or, increases in business performance lead to an increased use of SMA as improved business performance results in a greater availability of resources to invest in the use of SMA. It has already been demonstrated in section 9.4 above that lack of time was frequently given as a reason for not using SMA more frequently.

Table 47 below shows the relationship between the use of individual SMA techniques and business performance and achievement of business objectives. Eight techniques show a significant positive correlation with both performance and achieving business objectives, with a ninth, strategic investment appraisal, showing a significant positive correlation with performance.

Spearman's rho Correlation co-efficeint (N=21)	Performance		Achieving Objectives	
	Spearman's rho	Sig. (1-tailed)	Spearman's rho	Sig. (1-tailed)
Activity based costing/cost management	.477*	0.017	.390*	0.045
Activity based budgeting	.460*	0.021	.536**	0.007
Product Profitability Analysis (Job Costing)	.735**	0.000	.635**	0.001
Strategic Cost Management	.567**	0.005	.447*	0.024
Strategic Investment Appraisal	.446*	0.024		
Competitor Cost Analysis	.413*	0.035	.495*	0.013
Competitor Position Monitoring	.575**	0.004	.553**	0.006
Customer Profitability Accounting	.391*	0.044	.488*	0.014
Customer Segment Profitability Analysis	.379*	0.050	.452*	0.023
**. Correlation is significant at the 0.01 level (1-tailed).				
*. Correlation is significant at the 0.05 level (1-tailed).				

Table 47: SMA techniques with a significant correlation to performance and/or achievement of objectives

Of these product profitability analysis/job costing shows the strongest correlation to both business performance and the achievement of business objectives. Competitor position monitoring shows the second strongest correlation in both categories. These two techniques together with 'Competitor Position Monitoring using their Financial

Statements' and 'other multi-dimensional performance measurement' are found to be in use frequently by the businesses interviewed (see sections 7.1, 7.4 and 7.5 above). Correlating the usage of these four techniques against business performance reveals an even stronger correlation, this can be seen in Table 48 below. These four techniques have an average usage of 3.43 well above the average usage of 2.83 of all twenty-five techniques in the survey. They also have an average perceived benefit of 4.24, also well above the average perceived benefit of 3.70 for all twenty-five techniques. This further demonstrates the importance of these four techniques to the businesses surveyed.

		Performance
Average SMA Usage (4 techniques only)	Correlation Coefficient	.552*
	Sig. (2-tailed)	0.012
	N	20
*. Correlation is significant at the 0.05 level (2-tailed).		

Table 48: Correlation between four SMA techniques and performance

Assuming that using more SMA leads to improved business performance and achievement of objectives it would seem, therefore, that it is possible to increase these outcomes by using only a restricted set of SMA techniques.

10.2 Conclusions

The statistical analysis presented above demonstrates a significant positive correlation between the average use of SMA and both performance and the achievement of business objectives. One conclusion drawn from this is that increased use of SMA techniques leads to an improvement in business performance and better achievement of business objectives. If this conclusion is correct it would support the central proposition is that organisational performance depends on the fit between organisational context and structure (Cadez and Guilding, 2008; Abdel Al and McLellan, 2013). This conclusion is supported by the findings of others, for example (Santini, 2013; Lachmann, Knauer and Trapp, 2013; Kalkhouran, Nedaei and Rasid, 2017).

Furthermore, it is demonstrated that a number of individual SMA techniques show a strong correlation with both performance and the achievement of business objectives

and that a restricted number of techniques are more strongly correlated to business performance than the entire list. One possible conclusion is that, in the context of medium sized construction companies, the use of only a limited number of SMA techniques is sufficient to achieve improved business performance.

The simple statistical techniques employed above are not suitable for the investigation of causal relationships (Petera and Šoljaková, 2020). In order to statistically demonstrate that the increased use of SMA techniques leads to an improvement in business performance and better achievement of business objectives requires the use of multiple regression analysis as used by Cinquini and Tenucci (2010). The purpose of multiple regression analysis is to examine the effect of multiple independent variables (predictors) on one independent variable (outcome) (Abu-Bader, 2016). In this study multiple regression analysis could have been employed to identify what set of SMA techniques best predicts improved levels of business performance or greater achievement of objectives. However, the Group A data set only contains 21 responses and Abu-Bader (2016) recommends a rule of thumb sample size of N>= 50 + 8m (where m is the number of predictors included in the multiple regression analysis). Therefore, due to the small sample size, it is not possible to utilise this advanced statistical technique in this study. As a result, although the data does not rule out support for the central proposition of contingency theory, the data is insufficient to reach such a conclusion. As discussed in section 11.4 below this enables the opportunity for this study to be replicated amongst a larger population in order to achieve a larger sample size and utilise multiple regression analysis in order to determine the causality of the positive relationship between SMA usage and business performance or achievement of business objectives.

11 Conclusions and Recommendations

The objectives of this study were

- to investigate the extent of the usage of SMA,
- to understand the rationality for this,
- to identify new contingent factors which affect the use of SMA in the construction sector and
- to empirically test if there is a correlation between organisational performance and the use of SMA.

The research is conducted in medium sized construction companies based in the East Midlands of the UK. This final chapter will present the overall conclusions to be drawn from the findings and analysis contained in chapters 7 to 10 above. This will be done by the theme of each chapter which answered the four subsidiary research questions. Taken together the answer to each of these four questions provide an answer to the overall research question which is:

How can the reality gap and contingency theory be applied to assist in understanding the rationale of the use of SMA and its contribution to improved performance in medium sized construction companies based in the East Midlands of the UK?

The chapter will then discuss the theoretical and practical contribution to knowledge made by this research and will conclude by highlighting the limitations of this research and will recommend some areas for future research.

11.1 Major Findings

The main objective of this study is to examine the use of SMA in medium sized construction companies, to identify the contingencies affecting its use and to understand its impact on business performance and achieving strategic objectives.

Its main conclusion is that whilst there is a low level of overall usage of SMA, a limited number of techniques appear to be relevant to medium sized construction companies. The QSs in these organisations are found to contribute more SMA information than their colleagues in the accounts team. Accountants seem to be more valued for their

operational skills in dealing with accounting related compliance issues as opposed to their strategic management skills.

The effect of organisational context on the use of SMA is explored by examining the influence of six contingent factors on its use within medium sized construction companies. The contingent factors examined are:

- Strategy;
- CEO and SMT characteristics;
- Networking;
- Size and resources;
- Ownership structures;
- Accounting software.

Each factor is found to influence the use of SMA to varying degrees. A new contingent factor 'the strategic customer' is identified and is found to have a strong influence on the use of SMA within one of the organisations taking part in the research.

Whilst a significant correlation between the average use of SMA and both performance and the achievement of business objectives is found, the causality of this relationship could not be established.

The next sections summarise the major findings as they relate to each of the subsidiary research questions.

11.1.1 To what extent are SMA techniques used by medium sized construction companies?

Chapter 6 demonstrates that there is a low level of use of the twenty-five SMA techniques included in the original conceptual framework, with an average usage score of 2.83 below the mid-point score of 3 which is "used sometimes". As discussed in 6.1 above this is below or consistent with, but never above, usage levels identified in previous studies covering a number of industries (Guilding, Cravens and Tayles, 2000; Cravens and Guilding, 2001; Cinquini and Tenucci, 2007; Cadez and Guilding, 2007; Fowzia, 2011). A number of SMA techniques are found to be irrelevant and offer little or no utility to medium sized construction companies. This results in a revised

conceptual framework containing five SMA techniques highly relevant to medium sized construction companies and three of lower relevance.

JPA, supported by the CVR/CPF process and facilitated by an accurate and timely job costing system, is identified as being fundamental to the SMP within medium sized construction companies. The importance of timely information is underlined by examples of duplicate job costing systems being created outside of the accounting function to overcome the limitation of the 'official job costing system.' Accurate and timely job costing information is the foundation of the CVR and CPF processes. Both of which can be classified as SMA techniques, not previously identified in the SMA literature. The JPA provides essential information for the strategic decision-making processes within medium sized construction companies, supporting strategic pricing decisions and informing business development activities.

It is found that SIDs involve a high level of senior management scrutiny, but only a small component of the information used to support these decisions is financially based. This is contrary to the findings of Carr and Tomkins (1996) or Northcott and Alkaraan (2007) who found that financial analysis dominates the appraisal of investment decisions but supports the findings of Elmassri, Harris and Carter (2016) who found that non-financial factors are dominant. When financial appraisal techniques are used, they are very basic. Payback calculations use profit figures rather than cashflows, NPV and DCF are never used. Where hurdle rates are used for investment decision making purposes, they are based on profit margins or return on capital investment, and in one case can be overwritten if a case for unquantified intangible benefits could be made. As suggested by the literature (for example, Alkaraan and Northcott (2006) or (Lucas, Prowle and Lowth (2013)), there seems to be scope for greater use of financially based investment appraisal techniques to improve long-term investment decision making.

It was clear from both the survey and interview data that, whilst defects are a much-discussed topic in the board room, measuring and reporting them is low. Much lower than the thirty-four percent reported by Sower, Quarles and Broussard (2007). It is identified that the COQ is seen by Heads of Finance as having the biggest potential, as measured by the gap between actual usage levels and perceived benefits, of all the SMA

techniques included in the survey. The literature also identifies quality as a significant hidden cost, Porter and Rayner (1992) quote a figure of eighteen percent of turnover as the median quality cost. If this is also to be true for construction companies then the Heads of Finance would be correct in their assessment of its perceived benefits. A forcefield analysis (Pojasek, 2001) on the use of COQ results in the forcefield diagram presented in Figure 26 on page 199 above with constraints currently exerting a greater influence than the enablers. The culture of the business has a large constraining influence; business leaders are not demanding this information and the traditional nature of the industry leads to a reluctance or "fear" (Company A, Financial Director) to report defects. The Head of Finance can be influential by unfreezing this situation, making the change happen and then refreezing in this new position (Lewin, 1997). By doing so they could become more involved in the SMP within these organisations.

The interviews revealed that the BSC is not currently used by the interview participants, although one failed attempt was discussed. However, a myriad of non-financial performance measures are in use across the four perspectives of the BSC; financial, customer, internal business, and innovation and learning introduced by Kaplan and Norton (1992) This means that a BSC could easily be produced by most of the businesses taking part in the interviews. Care would need to be taken to ensure that the measures, objectives and targets are aligned to the strategic objectives of the business so that those tasked with achieving them are able to see their relevance in delivering the strategic objectives of their business. This could be achieved by utilising strategy maps (Kaplan and Norton, 2000). All but Company J pays bonuses based solely on achieving profit targets so there appears scope to enhance performance management systems in medium sized construction companies by linking these objectives to bonus schemes. This is what Fitzgerald (2007) called a third generation user, who should yield the biggest performance benefits from the introduction of the BSC. The experience of Company L should, however, serve as an example of the risks associated with this approach.

A number of techniques are deployed to monitor the competitors of the respondent companies and the responsibility for gathering this information is shared amongst the managerial teams as advocated by Jaworski, Macinnis and Kohli, (2002). The use of 'tender feedback' is identified as a novel source of competitor information to add to the

list presented by Ward (1992a) as shown in Figure 12 on page 108 above. Tender feedback has the potential, when coupled with other sources, of providing valuable information regarding competitors. As with Company D this information could be an additional factor in future strategic pricing decisions. The overreliance on this however could lead to blind spots (Zahra and Chaples, 1993) in competition monitoring as new entrants to the industry appear to face few barriers to entry.

The final three SMA techniques in the revised conceptual framework are relevant to the sector but only in certain contexts. CA techniques would seem to only be relevant in the context of a construction business having repeat clients, and some way of allocating G&A overheads to these clients would need to be devised, perhaps by using ABC (Cooper and Kaplan, 1988) techniques, in order to provide a CPA. For others JPA seems to be a suitable proxy for CPA. VCA and LCC would seem to be highly relevant to the industry but require the cooperation of the whole supply chain and a change in existing commercial practices (Nicolini et al., 2000) to be applied successfully. In the case of Company A this is seen to be the case when they are working in an Alliance with a 'strategic customer' and their competitors.

The use of SMA in medium sized construction companies provides an example of the reality gap (Scapens, 1994) between management accounting theory and practice. This is apparent in the need to revise the conceptual framework (as discussed in section 6.2 above) to remove a number of SMA techniques. The reasons found for this are:

- unfamiliarity with the technique,
- difficulties with practical application
- no relevance; due to the sector,
- no relevance; due to the size of the business.

The first of these reasons is identified by Trahan and Gitman (1995) and Tucker and Lowe (2014) who claim that the gap is caused by academics publishing their work in journals not accessible to practitioners. Trahan and Gitman (1995) also found that the practical application of sophisticated techniques is a barrier to implementation as identified in the second point above. Tucker and Lowe (2014) recommend that academics provide

illustrations of practical applications of sophisticated techniques as a way of reducing this barrier. This may provide management accountants with additional confidence to implement COQ reporting discussed in section 7.3 above.

Consideration of the relevance of SMA techniques to specific industries is not common in the literature, for this reason Messner (2016) calls for more studies on management accounting practice in specific industries. This study contributes to this request and finds a large gap reality gap in relation to the use of SMA by practitioners in medium sized construction companies.

11.1.2 Who is responsible for using SMA techniques in medium sized construction companies?

The findings reveal that the commercial team, specifically QSs, are the main providers of SMA information in medium sized construction companies, Simmonds suggests that

> "the collection and analysis of the appropriate strategic data are either carried through by someone with highly developed skills in management accounting or are done poorly" (Simmonds, 1981, p.26).

Lord (1996) found evidence that non-accountants were providing SMA information. This study would support both of these views, indeed QSs seem to have highly developed management accounting skills.

Furthermore, because of their commercial bias, the QS role appears to be valued above that of accountants. The findings suggest that the reason for this is their ability to directly influence the performance of the business by looking forwards, whereas the accountants are seen merely as a business resource with a backward-looking attitude who are valued for their ability to ensure the business complies with accounting and other regulations rather than for their input into the SMP. This seems to be an additional aspect of the reality gap (Scapens, 1994). SMA theory, in the form of MA textbooks and academic journals represent techniques with an implication that they will be performed by management accountants. This study has identified, for the reasons highlighted in chapter 8 above a significant gap in the expectations of theory and of management accounting practice in medium sized construction companies. The low level of involvement of accountants in the use of SMA in medium sized construction companies

seems to be restricted to maintaining the job-costing system, calculating financial performance measures and analysing the financial statements of their main competitors.

For FDs to provide more SMA and be viewed more as a 'strategic finance director' (Coad, 1996) rather than an 'accountant finance director' they will need to add value to the business. An example of this is provided for the introduction of COQ as discussed in section 7.3 above. Heads of Finance indicate in the survey that they see the potential in using COQ and by successfully introducing this technique to reduce the cost of defects they could enhance their reputation in the business and become more of a 'strategic finance director'. This might not be possible without developing some additional skills. For the Researcher this meant completing an MBA, for accountants who qualified in the era when SMA was part of their syllabus this might mean dusting off their old textbooks. It would also mean working in a more collaborative way (Roslender and Hart, 2006) with other members of the SMT.

11.1.3 What contingent variables help to explain the use of SMA in medium sized construction companies?

It is argued that only a limited number of SMA techniques are relevant for medium sized construction companies to be adopting. However, it is impossible to be overly prescriptive in recommending their use due to the different contingencies faced by these businesses. These contingencies would influence the appropriateness of different techniques depending on the circumstances facing each business.

In chapter 9 it is concluded that SMA does not seem to be driven by the type of strategy being followed, whether it is measured by strategic pattern, by strategic mission, or by strategic position it has no relationship with the use of SMA. Therefore, it is concluded that strategy is not a contingent factor in the use of SMA for the sample. However, as this was a result of a statistical analysis of an unrepresentative sample it is not possible to generalise this finding to the population as a whole. This conclusion is supported by the findings of Cinquini and Tenucci (2007) who also conclude that SMA adoption is not strategy-driven. However, this is contrary to the findings of Abdel and McLellan (2013) who find a positive association between differentiation strategies and the use of

advanced MAPs. Cravens and Guilding (2001) also find an association between strategy and SMA albeit using eight sub-dimensions of competitive strategy.

Chapter 9 also discusses a number of other contingencies affecting the use of SMA in medium sized construction companies. The characteristics of the CEO are measured by their highest level of education and industry experience. Educational background is found to have no correlation to the use of SMA, this is similar to the results found by Santini (2013) but contrary to the results found by Kalkhouran, Nedaei and Rasid (2017). However, experience in the industry is found to have a negative correlation, with long tenured business leaders preferring to rely more on their intuition rather than relying on information provided by SMA (Pavlatos and Kostakis, 2018). It is demonstrated that, when ownership pressure is reduced, the experience of other members of the SMT also has an influence on the level of SMA used, this is contrary to the findings of Santini (2013) as discussed in section 9.2 above.

For medium sized companies the existence of 'a strategic customer' (in this context a long-term customer delivering a significant proportion of turnover and profit) is identified as a new contingent variable not previously discussed in the literature. A case-study analysis is presented (see section 9.3.1 above) which demonstrates how the potential award of a new contract by Utility forced Company A and its Alliance partners to embrace the use of VCA and LCC techniques it otherwise would not have adopted. By adopting these techniques, the Alliance was able to identify potential cost savings and strategic benefits within the 'White Book' process and thereby secure a long-term contract of potentially fifteen years in duration.

Another networking activity; accreditations are shown to influence the collection and reporting of non-financial performance measures. Three key accreditations are identified as ISO9001, ISO14001 and ISO45001, these are seen as adding value in the eyes of the business leaders. However, an example is also identified where an accreditation appears to be maintained only because it is requested by a strategic customer, with the information it provided, capable of, but not being used to deliver the strategic objectives of the business.

Business size is recognised as a contingent factor in the use of SMA (for example (Guilding, 1999; Joshi, 2001; Cadez and Guilding, 2008)). Using both employee numbers and turnover as a proxy for size, no correlation is found to exist between firm size and the use of SMA. Whilst the lack of correlation would seem to be at odds with the literature, it could lead to the conclusion that the 'tipping point' (Lucas, Prowle and Lowth, 2013) for the wider use of SMA only happens once construction businesses become large, that is having over 250 employees. Heads of finance cite time constraints and the priority of other tasks as the main reason for not using SMA more frequently.

11.1.4 Does the use of SMA contributed to an improvement in the performance of medium sized construction companies?

A significant positive correlation is found between the increased use of SMA techniques and business performance and achieving strategic objectives. Therefore, it can be concluded that businesses responding to the survey who have a higher average use of different SMA techniques demonstrate both a higher level of performance and a greater level of achievement of their business objectives. Eight techniques show a significant positive correlation with both performance and achieving business objectives, with a ninth, strategic investment appraisal, showing a significant positive correlation with performance. Restricting the analysis to four techniques; JPA, competitor position monitoring, competitor position monitoring using their financial statements and other multi-dimensional performance measurement, increases the strength of the correlation between SMA usage and business performance. This indicates that, for medium sized construction companies, some SMA techniques appear to have a stronger correlation to business performance than others.

In considering these correlations two conclusions are possible. Firstly, that using more SMA techniques contributes to an increase in business performance and better achievement of objectives by providing more information leading to more informed strategic decision making. This conclusion is supported by the findings of others, for example (Cadez and Guilding, 2008; Santini, 2013; Lachmann, Knauer and Trapp, 2013; Kalkhouran, Nedaei and Rasid, 2017). Or secondly, increases in business performance lead to an increased use of SMA as improved business performance results in a greater

availability of resources to invest in the use of SMA. As time constraints are cited by heads of finance as a main reason for not using SMA more frequently, then this also seems to be a plausible conclusion.

To prove this first conclusion and identify what set of SMA techniques best predicts improved levels of business performance or greater achievement of objectives would require the use of multiple regression analysis (Abu-Bader, 2016) as used by Cinquini and Tenucci (2010). This is not possible in this study due to the small sample size obtained from the survey. This offers the opportunity to replicate this study in a larger population in order to achieve sample size where a regression analysis could be conducted.

11.2 Contribution to Knowledge

This study adds to the SMA debate from two perspectives; medium sized businesses and the construction industry, both of which have previously been under investigated in MA research. This is the first academic study to provide evidence-based insights into the use of SMA in the construction sector and therefore responds to a significant gap in the literature. The following two sections discuss the theoretical and practical contributions of the study.

11.2.1 Theoretical Contribution

The study makes four theoretical contributions to knowledge. Firstly, it presents a new definition of SMA and utilises this to provide a contemporary and comprehensive list of SMA techniques. Secondly, it adds to the dearth of literature on management accounting in medium sized construction companies. Thirdly, it adds to the discussions relating to the reality gap in management accounting and finally, it adds to the contingency theory conversation.

In studying the use of SMA in the construction sector it was necessary, as there is no agreed definition of the term (Prowle and Lucas, 2016), to provide a working definition of SMA (see section 2.1.1 above). This consolidates a number of definitions used in previous research, for example (Simmonds, 1981; Bromwich, 1990; Tomkins and Carr, 1996a; Guilding, Cravens and Tayles, 2000). This definition is then used to identify a

contemporary and comprehensive list of SMA techniques (see Table 3 on page 24 above) using the list prepared by Cadez and Guilding (2008) as a starting point. In testing the use of those techniques within the sector the study identifies the CVR/CPF process as new SMA techniques (see section 7.1.2 above), which because of the idiosyncrasies of the sector, have not previously been identified within the SMA literature. Furthermore, the study adds 'tender feedback' (see section 7.5 above) to Ward's (1992b) list of sources of competitor information. This may be unique to the sector but nevertheless is a potential source of competitive advantage available to construction companies who utilise the information appropriately.

As demonstrated in sections 2.3 and 2.4 above there is limited literature about either management accounting generally in the construction sector or on the use of SMA in SMEs. This is the first SMA study to focus exclusively on the construction sector, a sector which is both economically significant to the UK economy and, as discussed in section 1.3.3 above, has some distinctive practices which make it worthy of closer scrutiny (Messner, 2016). Within the population of medium sized businesses it seems that the tipping point (Lucas, Prowle and Lowth, 2013) at which a higher level of SMA usage might be expected has not been reached. Based on previous studies which identify a positive association between size and SMA usage (Guilding, 1999; Cadez and Guilding, 2008; Santini, 2013) this suggests that the tipping point is only reached when construction companies become large in size.

The study adds to the conversation about the reality gap in management accounting (Scapens, 1994). The low level of overall use of the SMA techniques identified in the original conceptual framework is presented as an example of this reality gap, with an unfamiliarity with the technique (Trahan and Gitman, 1995; Tucker and Lowe, 2014) and lack of practical examples (Trahan and Gitman, 1995) being factors contributing to the gap. Relevance is another factor contributing to the reality gap. Many of the techniques do not seem relevant to medium sized construction companies. This is either because of the size of the businesses (for example, EVA or ICA) or because the techniques are focused on businesses with repetitive production processes (for example, KC) making mass produced products (for example, attribute costing).

In relation to CBMA research Otley (2016) has called for more "qualitative, interpretative, field studies" (Otley, 2016, p.52) as opposed to quantitative research approaches which have come to define it. This study answers that call and in doing so has increased our understanding of a number of contingent factors which influence the use of SMA in medium sized construction companies and adds a new contingent variable, 'the strategic customer' to Otley's (2016) list of contingent factors presented in section 2.5 above. It also develops our understanding of the role of the SMT as a contingent factor. Previous research had focused only on the characteristics of the CEO (Kalkhouran, Nedaei and Rasid, 2017), whereas this study develops this approach to include other members of the SMT. The effect of accreditations; the influences of ownership and the availability of business resources including suitable accounting software are also discussed as contingent factors in the use of SMA in medium sized construction companies.

The 'strategic customer' is a contingent factor not previously identified in the literature. A case-study analysis demonstrates how the potential award of a new contract by Utility forced Company A to embrace the use of SMA techniques it would otherwise not have adopted and how these techniques helped to improve the financial performance of all members of the Alliance. This would not have been possible without the innovative commercial practices (Nicolini et al., 2000) implemented by Utility, and accepted by the Alliance, to manage the contract.

11.2.2 Practical Contribution

From a practical perspective the study also improves our understanding of who performs SMA in these organisations. The study adds to the conversation about who is best placed to apply these techniques started by Simmonds (1981) as discussed in section 2.7 above. Specifically, it highlights a low level of involvement of accountants in its use and identifies that the commercial teams provide the majority of strategic MAI in medium sized construction companies. For those FDs who may wish to increase their involvement in the SMP in their organisation, the study offers recommendations that enable them to do so. In that way they will be seen less as bean-counters, and more as value-adders and be viewed as "strategic accountants" (Cadez and Guilding, 2008,

p.839). Using COQ as an example, it is demonstrated how forcefield analysis (Pojasek, 2001) can be used to identify enablers and constraints to its introduction. In an industry where defects are a major issue, setting up processes, within the job costing system, to record and report the COQ is a value adding exercise that can be undertaken by Heads of Finance.

The study explores the contribution that SMA can make in improving business performance and delivering the strategic objectives of medium sized construction companies. The evidence points to a number of techniques having little or no utility for medium sized construction companies. It appears that businesses could reap the benefits of SMA by concentrating on specific small number of techniques relevant to medium sized construction companies. However, whilst a number of these relevant techniques were identified, due to the impact of company specific contingencies, it is not possible to provide definitive guidance, but merely to identify them as of high and low relevance to medium sized construction companies.

11.3 Limitations

Like any piece of research, this study has limitations. Case-studies are an appropriate way of conducting explanatory research and understanding complex social phenomena, the findings of which can be used to expand theory (Yin, 2013). However, the findings of this study are used to recommend the blanket use of COQ within the sector. Given the nature of the data collected this recommendation might not be generalisable to all medium sized construction companies, although there is no apparent reason why it should not be, as excessive defects seem to be common throughout the sector.

Additional questions could have been added to the Head of Finance survey, although this would have increased its length which may have resulted in a lower response rate. The date of their accountancy qualification would have enabled a statistical analysis to be conducted to identify if any difference exists in the use of SMA by accountants qualifying before and after the introduction of strategic thinking into the professional syllabus. Similarly, a question aimed at identifying their level of involvement in the SMP would have allowed this to be analysed as another contingent factor in the use of SMA,

although this measurement might be difficult to operationalise within a survey instrument.

Finally, the lack of Group C responses in the 'large-medium' size category means that the results of analysis involving this group cannot be generalised to the population as a whole.

11.4 Recommendations for Future Research

Given the first two limitations above future studies could duplicate the study using a slightly amended version of the survey instrument, perhaps in a different geographical region of the UK. The East Midlands region is used as the population for this study because it is considered to be representative of the UK construction sector, replicating the study in different geographic regions would be a valid test of this assumption. Furthermore, adding an international dimension to the study might also yield some interesting comparisons. In addition the amended survey instrument could be used in a mixed methods research design to investigate the use of SMA in large construction companies with follow up interviews used to identify if a tipping point for the greater use of SMA exists when construction companies increase in size beyond 250 employees.

In Chapter 10 the potential use of multiple regression analysis to identify which set of SMA techniques best predicts improved levels of business performance or greater achievement of objectives was discussed. This analysis cannot be conducted on the data collected in this study due to the small sample size achieved. As discussed above replicating this study in different regions of the UK would result in a bigger sample size and thereby enable a multiple regression analysis to be conducted. This would enable the central proposition of contingency theory that organisational performance depends on the closeness of fit between the use of SMA techniques and context, to be tested.

In addition, a longitudinal study of Company A, which was in the process of implementing a new accounting package, including a CVR module, could investigate the impact of the new computer software on its SMA practices. The FD is anticipating that the new software would release the accounts department from some of its more mundane tasks and subsequently allow more of their own time to be invested in SMA.

Other directors have other expectations of the new system. It would be interesting to research this implementation and assess its impact over an extended period of time. The results of this approach might be useful information for those medium sized construction businesses looking to enhance future business performance through the enhanced use of accounting software technology.

Finally, given the Researcher's experience of working in the sector, future research adopting an action research approach (Eden and Huxham, 1996), would seem to be appropriate. The need for medium sized construction companies to measure and report the cost of quality was discussed in section 7.3 above. The Researcher would design a research project with the objective of implementing a management process, with the assistance of previous colleagues, to collect and report cost of quality management information and assess the impact of this on the performance of the business taking part in the study.

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Appendix 1 Supplementary literature related to specific SMA techniques

This appendix contains additional literature relating to each of the SMA techniques included in chapter 3 above and included in the original conceptual framework (Figure 14 above) and included in the survey sent to FDs.

A1.1.1 Activity Based Costing (ABC)/ Activity Based Cost Management (ABCM)

Despite the popularity of ABC/ABCM in the literature there is an ABC paradox (Gosselin, 2006). Why, if ABC has demonstrated so many benefits, do more firms not employ it? It is argued that low adoption rates amongst traditional industries is due to resistance to change and that investment in ABC to replace established costing systems was not justified from a cost-benefit perspective (Prowle and Lucas, 2016). Innes, Mitchell and Sinclair (2000) used a longitudinal survey to consider if the implementation of ABC was as a result of a bandwagon effect rather than being a useful process. They found a slight reduction in adoption rates between 1994 and 1999 with success ratings amongst adopters remaining high but with non-adopters citing technical problems amongst the reasons for not implementing it. They concluded that it was too early to say that the decline they found was the start of a downward trend which would indicate that ABC was indeed a fad.

Major (2007) identified some of the issues associated with an ABC implementation which might go some way to answer why adoption rates are low:

- It is costly in terms of human and physical resources,
- It can cause significant disruption in organisations,
- The selection of cost drivers is a time consuming and complex process,
- It can provoke managerial resistance, a consequence of which is that accurate recording of time spent on activities is not achieved.

Furthermore, not all implementations have been successful. Shields (1995) identified six independent variables linked with successful implementations. Here success was

measured in terms of whether a financial benefit had been received as a result of adopting ABC. The six variables are behavioural and organisational rather than technical, such as the choice of software or the use of consultants. Innes, Mitchell and Sinclair (2000) found that top management support was an important factor in determining success but found no evidence that the involvement of accountants in the design impacted on success.

A1.1.2 Attribute Costing

In attribute costing economic theory is used to support the argument that

> "only products which yield the maximum amount of a specific bundle of characteristics for the amount of money the consumer wishes to spend will survive in a well organised market with well-informed consumers" (Bromwich and Bhimani, 1994, p.140).

This means that the strategic choices made by firms must include not only the price they sell their products at, but also which benefits will they include in those products, both physical items and aspects such as performance, reliability and after sales service. At this stage no practical example of the application of attribute costing was offered (Roslender and Hart, 2003) although in a later publication Bromwich and Bhimani (1994) provided an example of a fast food supplier to demonstrate the technique.

A1.1.3 Cost of Quality

Porter and Rayner (1992) cited Feigenbaum's PAF (Prevention-Appraisal-Failure) as a model that is a widely accepted framework for categorising the COQ. This topology analyses the COQ as follows:

Prevention costs: costs associated with the prevention of non-conformance such as training, process enhancements, planning and quality reporting.

Appraisal costs: include inspection and testing. Together with prevention costs these are called costs of conformance. If the prevention part of the quality system fails, then

Failure costs (the costs of non-conformance) are incurred. These can be classified either as internal; defective products identified before being sent to customers or external; the

costs of dealing with customer complaints, e.g. warranty costs, returned materials and goodwill payments to customers.

Conformance costs and non-conformance costs are linked. As appraisal and/or prevention costs increase then failure costs will decrease. Conventional thinking is that there is an optimum level of quality, the point at which total COQ is minimised. This is demonstrated in Figure 39 below.

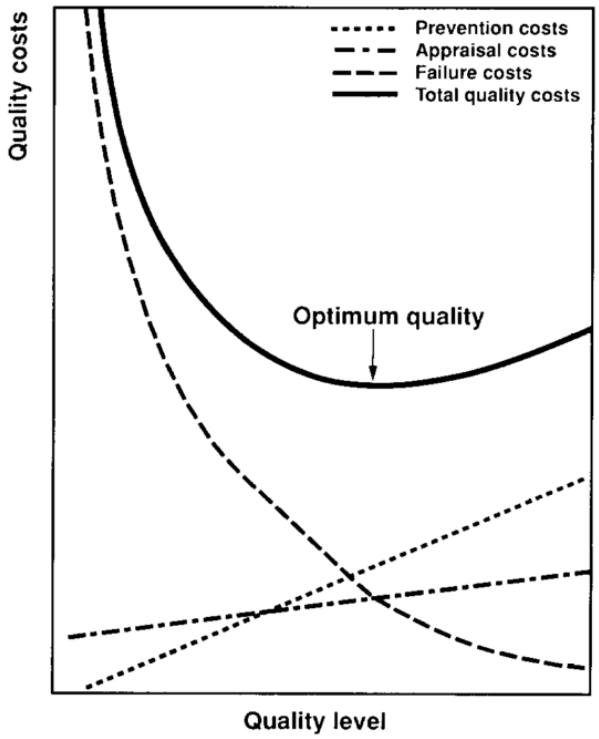

Figure 39: The traditional view of the relationship between appraisal, prevention and failure costs

Permission to reproduce Figure 39 has been granted by the publisher.

(Porter and Rayner, 1992, p.70)

Modern conceptual thinking dismisses the idea of an optimum level of quality and argues that total COQ will continue to fall as progress is made towards 100 percent compliance (zero defects) (Sower, Quarles and Broussard, 2007). This view is consistent with the TQM philosophy as illustrated in Figure 40 below.

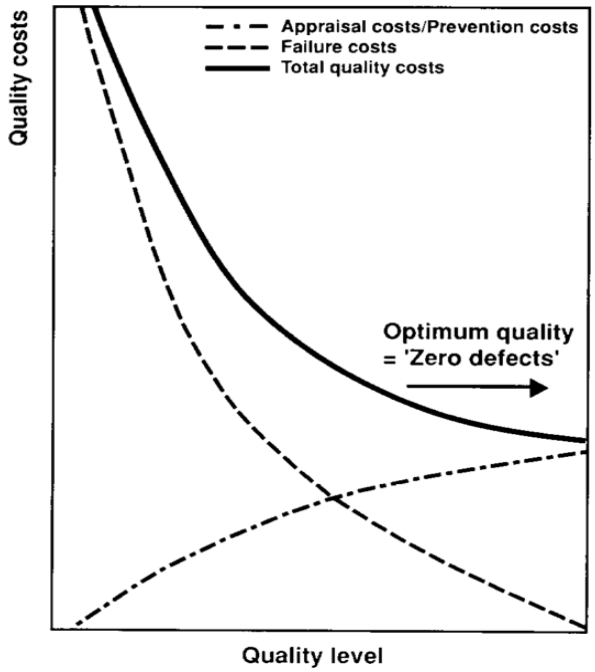

Figure 40: The relationship between appraisal/prevention costs and failure costs in a TQM philosophy

(Porter and Rayner, 1992, p.71)

As well as tangible costs this approach considers intangible costs, such as the loss of customer goodwill or the loss of staff morale. It claimed that the opportunity cost of lost sales caused by customer dissatisfaction with the level of quality provided has either been understated or ignored from the calculation of failure costs previously. This approach led to a suggested change to the PAF model, Heagy (1991) argued that, despite the difficulty in calculating the cost of lost sales, estimating them for inclusion in external failure costs results in improved decision making by forcing executives to bring the marketplace into their quality process.

Other criticisms of the PAF model exist. One significant criticism relates to the calculation of these costs both in terms of the difficulty in identifying them within existing accounting systems and of the level of accuracy required in their calculation (Porter and Rayner, 1992). Porter and Rayner go on to argue that prevention costs should be treated as investments which will generate future benefits such as reduced failure and appraisal costs as well as increased market share. Prevention activities should therefore be appraised using NPV calculations like any other capital project.

A1.1.4 Kaizen Costing

Cooper and Slagmulder (2004) question the assumption made by TC that a large percentage of a products costs are locked in at the design stage. Their case-study identified "significant cost reductions in manufacturing" (Cooper and Slagmulder, 2004, p.45). This was achieved using a combination of KC and "functional group management". This later technique broke the factory into profit (rather than cost) centres to encourage, not just cost reduction, but in some cases, cost increases to deliver increased outputs and therefore increased profits. They concluded that, whilst firms with products with a short lifecycle can benefit from efforts aimed at making the production process more efficient (including KC),

> "firms that have products with a long manufacturing phase should be especially active in exploring the value of integrating multiple cost-management techniques during manufacturing" (Cooper and Slagmulder, 2004, p.52).

The authors recognise the issues with single site case-studies and assumptions regarding the generalisation of their conclusions in respect of other locations but argue that the techniques reported are worthy of consideration for other organisations.

A1.1.5 Lifecycle Costing

There are many issues associated with the practical application of the LCC concept. With the boundaries of the definition of lifecycle expanding to include societal costs and to include disposal/recycling costs, many more uncertainties are being introduced into the calculation. Furthermore, a lack of reliable data is often cited as a constraint of implementing this technique more widely (Dunk, 2004; Goh and Sun, 2016). According to Goh and Sun (2016) Monte Carlo simulation and sensitivity analysis are both solutions which have been used to deal more effectively with these uncertainties.

Systems with long lifecycles, such as buildings, also add to the complexity of the calculation. Gluch and Baumann (2004) provided a very good summary of these and other issues when using LCC in investment appraisal decisions in relation to construction projects. In this respect Addis offered the following definition of LCC

> "the present value of the total cost of that asset over its operational life. This includes initial capital cost, finance costs, operational costs, maintenance costs and the eventual disposal costs of the asset at the end of its life." (Addis, 2001, p.1).

The incorporation of discount factors into LCC calculations is an area addressed by Gluch and Baumann (2004) who suggested a system of three different discount rates to resolve the differing levels of uncertainty related to expected future costs, particularly future environmental costs.

A1.1.6 Target Costing

The motivational aspect of TC is discussed by Monden and Hamada (1991). They considered consultation between employees and managers in establishing fair target costs to be very important. Employees need to be motivated to achieve the targets set. Cooperation between departments is also required and therefore the organisation needs to encourage and facilitate cooperative working styles. They summarised, "people involvement is very important in Japanese companies for executing target costing" (Monden and Hamada, 1991, p.33).

Whilst early TC literature emphasised its use in new product development, Shank and Fisher (1999) presented a case-study in which they demonstrated that the approach could also be applied to existing products by encouraging innovation in long established production processes. The technique therefore does not seem to be restricted to new products, although the authors acknowledged the possibility of small sample size bias in their study.

A1.1.7 Value Chain Costing/Value Chain Analysis

Hergert and Morris (1989) supported Porter's (1985) view relating to the inability of accounting systems to support a VCA (see section 3.1.6 above) saying that accounting systems are designed for external reporting and routine decision making but not for providing information for strategic decision making, concluding that

> "instead of trying to use a universal accounting system for all purposes, strategic planning requires a system designed specifically to facilitate strategic cost analysis" (Hergert and Morris, 1989, p.176).

They proceeded to identify a number of obstacles in obtaining the accounting data for a VCA as envisaged by Porter (1985). With value chain activities being analysed at strategic business unit (SBU) level this is often not the way organisations are structured for financial reporting and so getting accounting data at SBU level can be difficult. Furthermore, critical activities might not be the same as responsibility centres and with accounting data being reported at responsibility centre level it is difficult to identify costs and assets at activity level. Also, as markets for intermediate products do not always exist, assessing the value created by some activities can be problematic. Another problem identified was that non-factory costs are often treated as period costs and therefore identifying them with activities was also an issue.

In line with the increased focus on sustainability issues in businesses in recent years Soosay, Fearne and Dent (2012) demonstrated the benefit of using a sustainable value chain which combines VCA and the environmental sustainability of the supply chain by using lifecycle analysis (LCA). LCA is a standard methodology to evaluate the environmental impacts of products and services across the lifecycle of a product (Miah, Koh and Stone, 2017). Whilst it belongs in the same category of life cycle tools as LCC (see section 3.1.4 above) there are major differences which results in difficulties when trying to combine the two approaches together in a combined analysis (Miah, Koh and Stone, 2017). In their study Soosay, Fearne and Dent concluded that integrating LCA into a VCA supports value chain partners decision making which improves their competitiveness, brand reputation and access to new markets. However, they also said that it is expensive, time consuming and requires co-operation between all stakeholders in the value chain.

A1.2.1 Activity Based Budgeting (ABB)

Some authors (Connolly and Ashworth, 1991; Cooper and Slagmulder, 2000a; b; Liu, Robinson and Martin, 2003; Buys and Green, 2007) view ABB as a simple reverse of the ABC process. However, according to Stevens (2004) the closed loop system is fundamentally different than ABC which takes a cost decomposition approach compared to the cost consumption approach used by the closed loop system. However, he does state that this system delivers ABC as a by-product.

Connolly and Ashworth (1994a), proponents of an activity-based approach to budgeting, claimed that ABB will result in a budget that will help to achieve; an effective implementation of an organisations strategy; the optimum allocation of scarce resources consistent with agreed objectives and plans; a focus on continual improvement initiatives and a high degree of managerial commitment to manage the budget. They did however envisage the use of a combination of two different approaches, ABB for volume related, value adding primary activities and a priority-based budgeting system (Zero based budgeting) for non-volume related support activities. Cooper and Slagmulder (2000a; b) preferred ABB over conventional budgeting because it has the potential to be more accurate and provides greater insights into why the demand for resources is not linear with production volumes. They went on to give four detailed reasons why ABB is not a simple reverse of ABC.

> "Unfortunately, a simple reverse approach does not work well. Typically**,** the estimates for resource demand that are obtained in this way are hopelessly inaccurate. Due to fundamental differences between ABC and ABB" (Cooper and Slagmulder, 2000a, p.85).

Although they did not suggest any remedial actions to overcome these issues.

In their analysis Sandison, Hansen and Torok (2003) cautioned that whilst the closed loop system can address some budgeting problems it cannot overcome a lack of budget training, a lack of knowledge by some decision makers and a lack of resources to run the budgeting process. Adding to the list of benefits of ABB they claimed that, as the approach is flexible, it is appropriate for use in an uncertain business environment.

In their case-study report Liu, Robinson and Martin (2003) documented the demise of a ABB project which was a reverse process of an already implemented ABC system. Their recommendation was that the, computer based, ABB system should be maintained separately from the ABC system. However, they acknowledged that even this would not have overcome some of the behavioural problems encountered by the case-study organisation.

A1.2.2 The Balanced Scorecard

Cooper, Ezzamel and Qu focused on how the BSC, being "unworthy of careful examination" (Cooper, Ezzamel and Qu, 2017, p.992), became so widely accepted and "offer a theoretical informed history of how the BSC became popular and influential" (Cooper, Ezzamel and Qu, 2017, p.999). They used actor-network theory to explain how Kaplan and Norton managed to keep control of the innovation and how the BSC evolved by identifying problems and subsequently offering itself as the solution. Kaplan and Norton promoted their ideas by using case-studies of successful implementations from the prestigious Harvard Business School using their status to gain credibility for the concept. They also identified how the use of visual representations (see Figure 9 and Figure 10 above) helped to strengthen the theorisation of the BSC. The language of science (e.g. trials and experiments) used in Kaplans and Norton's writing has also given it credibility. In a similar vein, Busco and Quattrone (2015) defined the BSC as a rhetorical machine to explain why "a technique, whose economic benefits are doubtful, is so widely adopted" (Busco and Quattrone, 2015, p.1259). They identified that the lack of clarity in Kaplan and Norton's description and the ambiguity of the concept criticised by Nørreklit (2000) allows an organisation a flexibility in its implementation which has added to its popularity.

Others have also debated the theoretical underpinning of the BSC. Nørreklit and Falconer (2007) questioned if the cause and effect relationships, which are an essential part of the concept, between the four perspectives are, in fact, more likely to be interdependencies and if this is the case then the BSC is no different from many other performance management approaches and may lead to the selection of incorrect performance indicators leading to sub-optimal performance. They also argued that it is not a valid strategic management tool as the basis of the BSC assumes that the selected strategy is the correct one. Kaplan and Norton do allow for this in the double-loop learning mechanisms but Nørreklit and Falconer (2007) argued that this is inconsistent with the top-down approach inherent in the BSC. Furthermore, Nørreklit and Falconer (2007) identified that Kaplan and Norton disregarded any implementation issues, specifically, gaining the acceptance of managers and employees for the concept. In

summary Nørreklit and Falconer (2007) found the concept ambiguous and lacking in detail. Antonsen (2014) found that contrary to Kaplan and Norton's claim of double-loop learning, the introduction of the BSC reduced the time available for reflective learning amongst managers, leading to a reduction in organisational learning.

A1.2.3 Benchmarking

Watson (1993) discussed the selection of functional areas to benchmark included at stage 1 of the benchmarking process described in section 3.2.3 above. He argued that, as benchmarking is time consuming, it should be restricted to the CSFs that are linked to a company's core competencies. He used Rockart's definition of CSFs as being

> "the few key areas where "things must go right" for the business to flourish." (Rockart, 1979, p.85).

In 2005, Denrell (2005) highlighted concerns regarding step 2 of the benchmarking process (see section 3.2.3 above). He identified the risk of selection bias which arises by only considering successful organisations to benchmark against. He concluded

> "managers in pursuit of high performance are more likely to attain their goal if they give the stories of their competitors' failures as full a hearing as they currently do the stories of their successes" (Denrell, 2005, p.119).

Likewise, Lere (2009) raised issues in relation to steps 2 and 3 when selecting overseas benchmarking partners. Concerns that cultural differences can result in differences in accounting practices means that caution must be shown when selecting a company to benchmark against. Hyland and Beckett (2002) also recognised the cultural issues associated with external benchmarking and suggested that internal benchmarking, facilitated by the internal audit function, has significant benefits compared to adopting practices from external sources.

Askarany and Yazdifar (2015) used the diffusion of innovation theory to consider the adoption of innovative management techniques (including benchmarking). They identified twelve organisational factors (as part of an overall general diffusion model) that are attributes of adopters of managerial innovation. Their survey identified the level of clear commitment from senior managers in the institution to be the most influential

factor in determining managerial innovation, but that all the twelve factors were significant. In relation to continuing to use benchmarking after the initial implementation four of the twelve factors were found to be significant. These are employee awareness, ability to afford the investment required, the level of uncertainty associated with outcomes and clear commitment of senior management.

Siverbo (2014) also considered benchmarking to be a MAI but went further than the technical and institutional issues with its implementation. This was a case-study approach within a local government networking group in Sweden and found that the introduction of benchmarking was a threat to certain actors, as it had the potential to highlight their underperformance. He concluded therefore that benchmarking was not a neutral technique but one which primarily serves the interests of the initiator.

A1.2.4 Economic Value Added

O'Hanlon and Peasnell (1998) demonstrated that the present value of future EVAs was equal to the NPV of future cashflow and, as it is widely recognised that economic value ultimately depends on future cashflows, then EVA is theoretically a good proxy for the creation of shareholder value. Bouwens and Spekle (2007) agreed with the theoretical justification of EVA as a financial measure but that other measures, such as share price or free cashflows can achieve the same goals. However, as the performance of individual managers cannot be directly linked to these measures then EVA is better for monitoring individual performance.

Stangeland (2006) was critical of the use of EVA and demonstrated that in certain circumstances using EVA to make investment decisions could lead to projects with a positive NPV being rejected and projects with a negative NPV being accepted. In a similar vein Wallace (1997) found that adopters of EVA reduce new investment and increase the disposal of assets. Stangeland (2006) concluded that EVA is only a short-term measure and should not be used as the basis for bonus scheme calculations. He proposed an alternative measure, cashflow minus amortised capital (CFMAC), claiming that this was less open to manipulation then EVA. Stangeland (2006) therefore recommended that EVA is not used to measure value added as only NPV can do that and

if an annual performance measure is required then another measure such as CFMAC should be used.

A1.2.5 Product Profitability Analysis and Job Costing

Lukka and Granlund (1996) found that one of the expected benefits of ABC was more accurate information about product profitability. However, in a study from the same country Malmi (1997) showed that the application of ABC does not necessarily lead to a significant change in product costs. The benefits of using ABC in profitability analyses seem to be equivocal perhaps explaining their low use in practice.

Drury (2015) gave details of how the accounting entries for a contract costing system should be processed, including the treatment of manufacturing overheads, which are costed to contracts and non-manufacturing overheads, which are not. He demonstrated how this information could be used to produce a costing profit and loss account. Job costing systems can either be integrated or interlocking accounting systems. Integrated systems, his preferred option, combine the costing and financial accounts in one set of accounts, whereas in an interlocking system the cost and financial accounts are maintained independently resulting in the duplication of transactions.

A1.3.1 Brand Valuation

Hart and Roslender (2002) introduced the term 'brand management accounting' into the literature and identify brands as part of the intellectual capital (IC) of a company. Developing this further Roslender and Hart (2003, 2006) promoted it as an interdisciplinary approach which will result in a range of metrics originating from three complementary information sets; marketing information; accounting information and interfunctional information. The metrics chosen will be specific to each organisation and will be based on the provision of relevant information as opposed to its reliability. These metrics would be in addition to information provided by any existing brand valuation exercises. They suggested that IC frameworks or the BSC are appropriate means of communicating such a wide-ranging set of information. In their conclusion Roslender and Hart (2006) questioned the willingness of management accountants to adopt such an interdisciplinary approach. They argued that management accountants risk their

dominant position amongst professions if they adopt an interdisciplinary approach. However, they seemed to be encouraged by recent developments:

> "One of the defining characteristics of the new management accounting has been a willingness to explore inclusive developments in fashioning a more relevant, even strategic, management accounting discipline" (Roslender and Hart, 2006, p.243).

A1.3.2 Environmental Management Accounting

The literature identifies a number of strategic benefits resulting from undertaking EMA; future proofing investment and other long-term decisions by ensuring all foreseeable future costs are recognised; supporting sustainable business and enhancing customer value (Bennett and James, 1998). It enables environmental costs, which are normally 'hidden' in general overheads, to be identified and therefore fully included in strategic decision making (Jasch, 2003). It contributes to the sustainable development of an organisation (economic, social and environmental benefits, the so called 'triple bottom line') and the strategic business opportunities associated with this important issue (Hart and Milstein, 2003).

Soonawalla (2006) commented that, as environmental issues have become more strategic, they have made their way onto other SMA tools such as the BSC, LCC and ABC. Its integration with the BSC, in particular, has been considered in the literature. Figge et al. (2002) showed how the three pillars of sustainability (economic, social and environmental) could be incorporated into mainstream business activities via the BSC. They proposed three possible approaches and detailed the circumstances when they might be implemented. Firstly, integration into the existing four BSC perspectives; secondly adding a new perspective (a non-market perspective) to take account of environmental and social aspects, or thirdly to create a completely separate sustainability BSC. By incorporating environmental and social aspects in this top down approach their strategic relevance can be emphasised and the production of a strategy map can demonstrate their cause and effect relationships with an organisation's strategy. Länsiluoto and Järvenpää (2010) also considered the BSC ideal for incorporating environmental performance measures especially if it is already in use. They found that environmental issues were taken more seriously once the connection

between environmental performance and profitability had been made and that the BSC was a means of communicating this to all employees.

A1.3.3 Intellectual Capital Accounting

In addition to the 'Skandia Navigator' (see section 3.3.3 above) various other models of IC measurement have been proposed. Pires and Alves (2009) provided a list of such models, analysing them between holistic and money related (Market-to-Book Values, the Tobin's Q, EVA™, and the Hidden Value); analytical and non-monetary related (BSC, the Skandia Navigator, the Intangible Asset Monitor and the Value Chain Scorecard) and others (the IC-Index and the Value Added Intellectual Coefficient).

A1.3.4 Strategic Costing/Strategic Cost Management

Shank and Govindarajan (1992b) provided a list of five structural cost drivers (scale, scope, experience, technology and complexity) and six executional cost drivers (employee involvement, TQM, capacity utilisation, plant layout efficiency, product configuration and linkages with suppliers/customers). For each structural cost driver more is not necessarily better whereas for executional cost drivers it is (Shank and Govindarajan, 1992b). Subsequent publications focused on specific cost drivers. Shank and Govindarajan (1994) considered the executional cost driver, TQM, from a SCM perspective. They recognised that spending more in one area to the benefit of overall cost reduction is acceptable, e.g. increasing prevention costs to lower the overall COQ. This is a theme which is common throughout the SCM framework. Shank (1996) considered the structural cost driver of technology in relation to investing in new technologies, the benefits of which are hard to quantify. More recently Henri, Boiral and Roy (2014a) considered environment costs from both a structural and executional cost driver perspective.

A1.3.5 Strategic Investment Appraisal

Adler described strategic investment decision (SID) making as

> "the process of identifying, evaluating, and selecting amongst projects that are likely to have a big impact on a company's competitive advantage" (Adler, 2000, p.15).

Examples of such SIDs include mergers and acquisitions, the introduction of new product lines, investments in long term marketing initiatives, investment in significant production capacity and investments in advanced manufacturing or information technologies (Northcott and Alkaraan, 2007).

A1.4 Competition Monitoring

Bergen and Peteraf (2002) provided a two stage framework for undertaking a competitor analysis; firstly to identify a firms competitors and secondly to predict their reactions to strategic attack. The first framework (see Figure 41 below) which used market commonality and resource similarity to identify competitors, analysed as direct competitors, potential competitors and indirect competitors (substitutes).

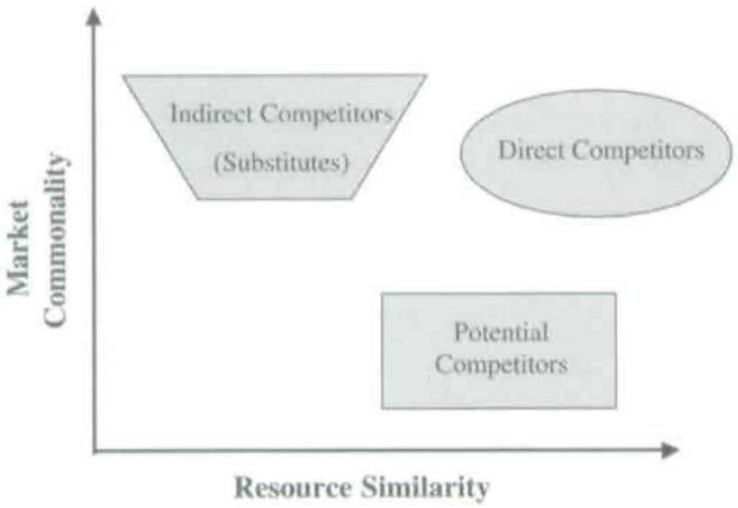

Figure 41: Mapping the competitive terrain
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(Bergen and Peteraf, 2002, p.160)

In the second framework they utilised the concept of resource equivalence:

> "the extent to which a given competitor possesses strategic endowments capable of satisfying the same customer needs as the focal firm" (Bergen and Peteraf, 2002, p.162)

to provide a framework which could be used to predict the probability of reactions by competitors to strategic attack. Therefore managers will be in a better position to anticipate the potential moves of rivals leading to improvements in their own business's competitive position and performance (Bergen and Peteraf, 2002).

A1.5.1 Customer Profitability Analysis

Van Raaij, Vernooij and van Triest (2003) proposed a six-stage process for implementing a CPA, see Figure 42 below, which they applied to their case-study.

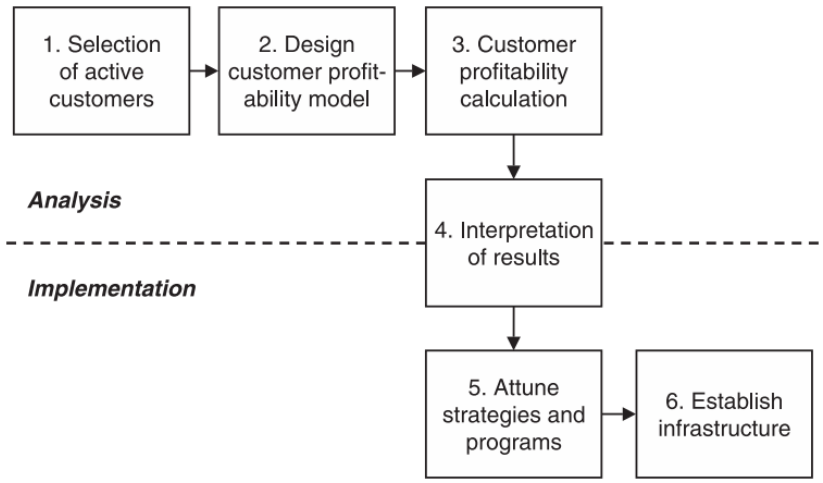

Figure 42: An overall implementation approach for CPA
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(van Raaij, Vernooij and van Triest, 2003, p.575)

The case-study organisation presented the results of their CPA analysis as a customer pyramid. Their largest twenty percent of customers accounted for ninety-three percent of revenues and ninety-five percent of profits, contradicting the 20/80 rule. The results of the CPA were also presented as a Stobachoff curve (a graphical distribution of profitability). Differently shaped Stobachoff curves indicate different levels of customer subsidising or customer dependency as shown in Figure 43 below. In this case there were very few loss-making customers and therefore the Stobachoff curve rose very quickly to one hundred percent but was then very flat, peaking at one hundred and five

percent of overall profits. However, Helgesen (2005) presented a case where the peak of the graph was at two hundred percent of profits for the top seventy-three percent of customers, demonstrating that twenty-seven percent of customers had negative profits, putting them in the 'room for action' box in Figure 43 below.

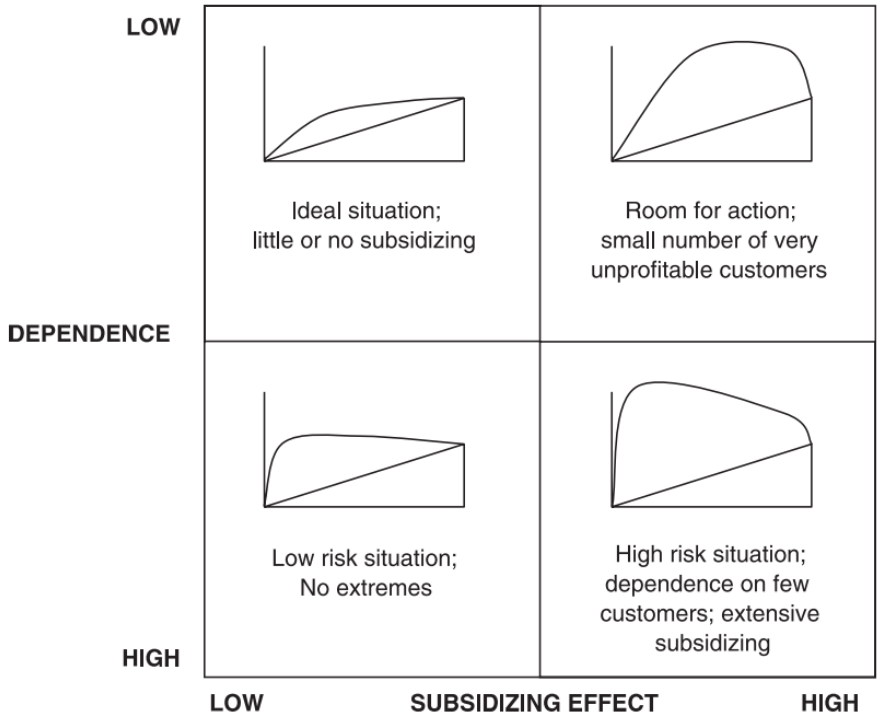

Figure 43: Stobachoff curves for varying levels of subsidising and dependence
Permission to reproduce Figure 43 has been granted by the publisher.

(van Raaij, Vernooij and van Triest, 2003, p.579).

This process of segmenting customers into tiers based on profitability should not be confused with customer segment profitability analysis as discussed in section 3.5.2 above. The service levels offered to customers can be configured depending on which tier of the customer pyramid they occupy (see Figure 44 below). They suggested that customer segmentation based on the 20/80 rule does not give sufficient differentiation whereas a four-tier system does. They concluded

> "customer profitability can be increased and managed. By sorting customers into profitability tiers (a Customer Pyramid), service can be tailored to achieve even higher profitability levels. Highly profitable customers can be pampered appropriately, customers of average profitability can be cultivated to yield higher profitability, and unprofitable customers can be either made more profitable or weeded out" (Zeithaml, Rust and Lemon, 2001, p.141).

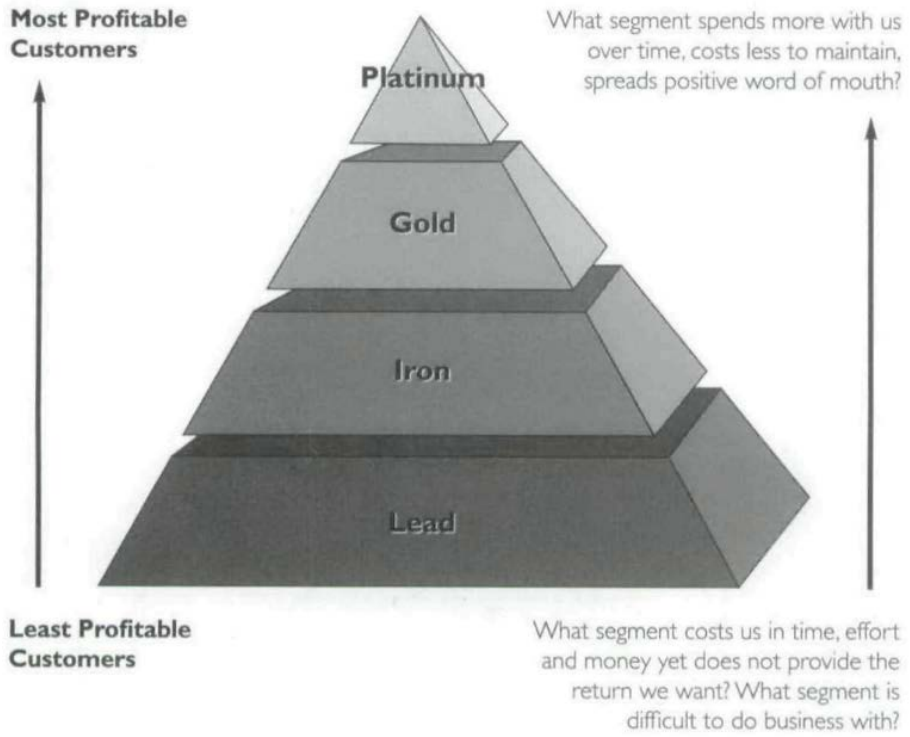

Figure 44: The Customer Pyramid
Permission to reproduce Figure 44 has been granted by the publisher.

(Zeithaml, Rust and Lemon, 2001, p.125).

Helgesen (2005) described such an approach to segmentation based profitability alone as one dimensional. He suggested that customers could also be segmented based on a two-dimensional matrix approach, such as relative cost to serve and relative product margins achieved. This two-dimensional approach is claimed to give additional insights into how to tailor marketing strategies to different customer segments in order to improve overall profitability.

ABC techniques are generally prescribed as the method by which the resources consumed by customers should be allocated in a CPA, with the customers as the cost object (Connolly and Ashworth, 1994b; Hoque, 2006b; Drury and Tayles, 2006; van Raaij, Vernooij and van Triest, 2003; Cokins, 2015). However, Ward advocated the use of attributable costs which are

> "the cost per unit that could be avoided, on the average, if a product or function was discontinued entirely without changing the organisational structure"(Ward, 1992b, p.128).

Using this approach negates the concerns of Smith (1993) and van Raaji (2005) who highlighted the risk of allocating fixed costs to customers then 'firing' unprofitable customers whose allocated costs cannot then be saved. However, Smith and Dikolli (1995) concluded that:

> "a more accurate ABC model, tracking resource consumption by customers, is likely to cause fewer customer-cost distortions than are non-ABC alternatives" (Smith and Dikolli, 1995, p.7).

Whilst academics generally support the use of ABC to perform CPA there is no agreement about which costs should be allocated to customers. Some propose allocating all costs enabling a reconciliation back to the businesses overall net profit (Hoque, 2006b). However, others allocate only customer related costs such as sales, marketing and distribution costs and ignore facility sustaining costs (Connolly and Ashworth, 1994b; Smith and Dikolli, 1995; van Raaij, Vernooij and van Triest, 2003).

A1.5.2 Lifetime Customer Profitability Analysis

Malthouse and Blattberg (2005) considered the implications of miscalculation when undertaking a CLV and thereby misclassifying customers for receiving different types of marketing treatment. This can lead to wasted cost supporting low profit customers and lost opportunities in not supporting profitable customers. Using data from four case-study organisations they considered how accurately CLV can be assessed and came up with two rules. The 20-55 rule; of the best twenty percent of customers, fifty-five percent will be misclassified and therefore not receive special treatment and the 80-15 rule; of the remaining eighty percent of customers, fifteen percent will be misclassified and receive unnecessary special treatment. They concluded:

> "a firm cannot assume that high-profit customers in the past will be profitable in the future nor can they assume that historically low-profit customers will be low-profit customers in the future" (Malthouse and Blattberg, 2005, p.2).

Appendix 2 Bain and Company management tools survey 2017

	Usage	Satisfaction
Strategic Planning	48%*	4.03
Customer Relationship Management	48%*	4.01
Benchmarking	46%*	3.94
Advanced Analytics	42%*	4.06
Supply Chain Management	40%*	4.05
Customer Satisfaction Systems	38%*	4.03
Change Management Programs	34%*	3.90**
Total Quality Management	34%*	4.09*
Digital Transformation	32%	4.07
Mission and Vision Statements	32%	4.00
Employee Engagement Systems	31%	3.87**
Core Competencies	30%	3.92
Internet of Things	30%	4.07
Balanced Scorecard	29%	3.93
Business Process Reengineering	28%	4.02
Customer Segmentation	27%**	4.06
Strategic Alliances	25%**	3.93
Agile Management	24%**	4.00
Mergers and Acquisitions	24%**	3.90
Organizational Time Management	22%**	3.96
Price Optimization Models	20%**	4.06
Scenario and Contingency Planning	19%**	3.99
Customer Journey Analysis	18%**	4.06
Complexity Reduction	17%**	3.88
Zero-Based Budgeting	10%**	3.82**

*Significantly above the overall mean (usage=30%, satisfaction=3.99)
**Significantly below the overall mean

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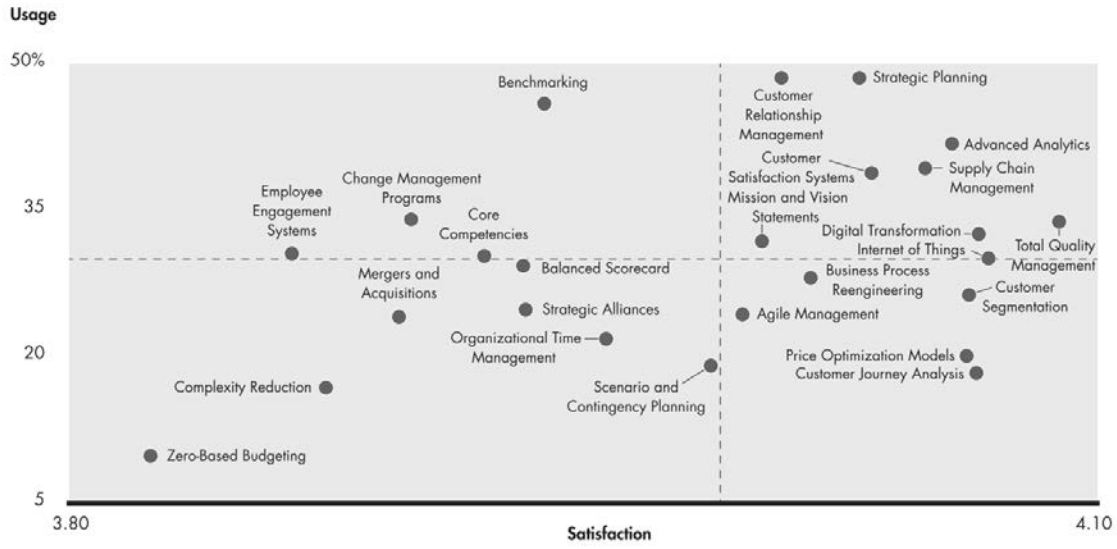
(Rigby and Bilodeau, 2017, p.3)



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(Rigby and Bilodeau, 2017, p.5)

Appendix 3 FD survey questions

Welcome to the research study. Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. If, after completing or partially completing the survey you would like your submission to be removed from my records and not used in the analysis then please contact me by email (mark.taylor@ntu.ac.uk) or call on me 0115 848 2439. After you have submitted your data it will be stored securely and only accessible by myself. All the details you provide together with the answers you give will remain confidential at all times.

By consenting to take part in this research, you acknowledge that your participation in the study is voluntary, that you are 18 years of age or older, and that you are aware that you may choose to terminate your participation in the study at any time and without providing any reason.

O I consent, begin the study

O I do not consent; I do not wish to participate

Strategic management accounting (SMA) is defined as ***the provision and analysis of future orientated financial and non-financial information on the organisations business environment, products and internal processes, as well as both its current and potential competitors' products, cost structures and strategic intentions and the costs of its value chain as necessary to plan, implement and monitor its own business strategy.*** As such I have identified a number of accounting techniques which I have classified as SMA techniques. The next few questions will seek to understand the use your company makes of these techniques, how useful you perceive them to be in helping to achieve the objectives of your company or, if you do not use them, how useful you perceive they could be to your organisation in the future.

The next set of questions relates to the usage and **perceived** usefulness of Strategic Management Accounting costing techniques within your business.

Q1 To what extent does your business use the following SMA costing techniques?

	Used all the time (5)	Regularly Used (4)	Used Sometimes (3)	Rarely Used (2)	Not Used at all (1)
Activity based costing/cost management	O	O	O	O	O
Attribute costing	O	O	O	O	O
Cost of quality	O	O	O	O	O
Life cycle costing	O	O	O	O	O
Target costing	O	O	O	O	O
Value chain costing/analysis	O	O	O	O	O

Q2 How useful do you **perceive** these costing techniques are, or could be (if you do not currently use them) in helping to deliver the objectives of your business?

	Extremely useful (5)	Slightly useful (4)	Neither useful or not useful (3)	Of limited use (2)	Not at all useful (1)	Not sure (0)
Activity based costing/cost management	O	O	O	O	O	O
Attribute costing	O	O	O	O	O	O
Cost of quality	O	O	O	O	O	O
Life cycle costing	O	O	O	O	O	O
Target costing	O	O	O	O	O	O
Value chain costing/analysis	O	O	O	O	O	O

The next section focuses on the usage and **perceived** usefulness of Strategic Management Accounting techniques to assist with planning, controlling and monitoring performance within your business.

Q3 To what extent does your business use the following Strategic Management Accounting techniques for planning, control and performance monitoring purposes?

	Used all the time (5)	Regularly Used (4)	Used Sometimes (3)	Rarely Used (2)	Not Used at all (1)
Activity based budgeting	O	O	O	O	O
Balanced scorecard	O	O	O	O	O
Other multi-dimensional performance measurement	O	O	O	O	O
Benchmarking	O	O	O	O	O
Continuous improvement techniques	O	O	O	O	O
Economic value added	O	O	O	O	O
Product profitability analysis (job costing)	O	O	O	O	O
Advanced construction technologies	O	O	O	O	O

Q4 How useful do you **perceive** these techniques are, or could be (if you do not currently use them) in helping to deliver the objectives of your business?

	Extremely useful (5)	Slightly useful (4)	Neither useful or not useful (3)	Of limited use (2)	Not at all useful (1)	Not sure (0)
Activity based budgeting	O	O	O	O	O	O
Balanced scorecard	O	O	O	O	O	O
Other multi-dimensional performance measurement	O	O	O	O	O	O
Benchmarking	O	O	O	O	O	O
Continuous improvement techniques	O	O	O	O	O	O
Economic value added	O	O	O	O	O	O
Product profitability analysis (job costing)	O	O	O	O	O	O
Advanced construction technologies	O	O	O	O	O	O

This section focuses on the usage and **perceived** usefulness of Strategic Management Accounting techniques which support the strategic decision-making processes within your business.

Q5 To what extent does your business use the following Strategic Management Accounting techniques to support the decision making process?

	Used all the time (5)	Regularly Used (4)	Used Sometimes (3)	Rarely Used (2)	Not Used at all (1)
Brand valuation	O	O	O	O	O
Environmental management accounting	O	O	O	O	O
Intellectual capital accounting	O	O	O	O	O
Strategic cost management	O	O	O	O	O
Strategic investment appraisal	O	O	O	O	O
Strategic pricing	O	O	O	O	O

Q6 How useful do you **perceive** these techniques are, or could be (if you do not currently use them) in supporting the decision-making process in your business?

	Extremely useful (5)	Slightly useful (4)	Neither useful or not useful (3)	Of limited use (2)	Not at all useful (1)	Not sure (0)
Brand valuation	O	O	O	O	O	O
Environmental management accounting	O	O	O	O	O	O
Intellectual capital accounting	O	O	O	O	O	O
Strategic cost management	O	O	O	O	O	O
Strategic investment appraisal	O	O	O	O	O	O
Strategic pricing	O	O	O	O	O	O

The next set of questions relates to the usage and **perceived** usefulness to your business of Strategic Management Accounting techniques which focus on analysing your competitors.

Q7 To what extent does your business use the following Strategic Management Accounting techniques to assess your competitors?

	Used all the time (5)	Regularly Used (4)	Used Sometimes (3)	Rarely Used (2)	Not Used at all (1)
Competitor cost analysis	O	O	O	O	O
Competitor position monitoring	O	O	O	O	O
Analysing competitor performance using their published financial statements	O	O	O	O	O

Q8 How useful do you **perceive** these techniques are, or could be (if you do not currently use them) in assessing your businesses' competitors?

	Extremely useful (5)	Slightly useful (4)	Neither useful or not useful (3)	Of limited use (2)	Not at all useful (1)	Not sure (0)
Competitor cost analysis	O	O	O	O	O	O
Competitor position monitoring	O	O	O	O	O	O
Analysing competitor performance using their published financial statements	O	O	O	O	O	O

The next set of questions relates to the usage and **perceived** usefulness of Strategic Management Accounting techniques in relation to customer accounting.

Q9 To what extent does your business use the following customer accounting techniques?

	Used all the time (5)	Regularly Used (4)	Used Sometimes (3)	Rarely Used (2)	Not Used at all (1)
Customer profitability accounting	O	O	O	O	O
Customer segment profitability analysis	O	O	O	O	O
Lifetime customer profitability analysis	O	O	O	O	O
Valuation of customers or customer groups as assets	O	O	O	O	O

Q10 How useful do you **perceive** these customer accounting techniques are, or could be (if you do not currently use them) in helping to deliver the objectives of your business?

	Extremely useful (5)	Slightly useful (4)	Neither useful or not useful (3)	Of limited use (2)	Not at all useful (1)	Not sure (0)
Customer profitability accounting	O	O	O	O	O	O
Customer segment profitability analysis	O	O	O	O	O	O
Lifetime customer profitability analysis	O	O	O	O	O	O
Valuation of customers or customer groups as assets	O	O	O	O	O	O

This section aims to establish the level of performance achieved by your company. Firstly in comparison with your main competitors and secondly compared to your own business objectives.

Q11 Rate the performance of your company, on the following dimensions, compared to that of your main competitors over the past three years

	Above average (1)	Same as competitors (0)	Below average (-1)
Sales growth	O	O	O
Relative market share	O	O	O
Profitability	O	O	O
Customer Satisfaction	O	O	O

Q12 Compared to your business objectives how well has your company performed in the following areas over the past three years?

	Above expectations (1)	In-line with expectations (0)	Below expectations (-1)
Sales growth	O	O	O
Relative market share	O	O	O
Profitability	O	O	O
Customer Satisfaction	O	O	O

Q13 To what extent do you think your company has achieved it's strategic objectives over the last three years?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Not at all	O	O	O	O	O	O	O	Completely

This final section will collect information about yourself and your qualification. This will be used for analysis purposes only.

Q14 Some general questions about yourself.

O What is your current job title?

_____

O How many years have you been in your current role?

_____

O How many years in total have you worked in the construction industry?

_____

Q15 Are you a qualified accountant?

O Yes

O No

O Training/Part qualified

Q16 Which qualification do you hold/are you training for?

O AAT

O ACCA

O CIMA

O CIPFA

O ICAEW

O ICAS

O Other

If you would like to receive a copy of the final report please provide your email details below

_____

I may wish to contact you to follow up on your answers. If you are willing for me to do so could you please provide a telephone number below

_____

Appendix 4 MD survey questions

Welcome to the research study. Your participation in this research is voluntary. You have the right to withdraw at any point during the study, for any reason, and without any prejudice. If, after completing or partially completing the survey you would like your submission to be removed from my records and not used in the analysis then please contact me by email (mark.taylor@ntu.ac.uk) or call on me 0115 848 2439. After you have submitted your data it will be stored securely and only accessible by myself. All the details you provide, together with the answers you give, will remain confidential at all times
By consenting to take part in this research, you acknowledge that your participation in the study is voluntary, that you are 18 years of age or older, and that you are aware that you may choose to terminate your participation in the study at any time and without providing any reason.

O I consent, begin the study

O I do not consent, I do not wish to participate

A number of factors are deemed to influence the design of strategic management systems in organisations. This section of the survey aims to establish the nature of two of these factors within your business. The factors I am interested in are
1. The type of business strategy your business is following
2. The extent to which your business is involved in networking or partnership activities

I will ask a small number of questions in relation to each of these factors.

This group of questions aims to establish the business strategy your business is following. As strategy can be characterised in a number of ways three sets of questions will be presented. As each question is equally important please answer **all** of the questions.

Q1 Please indicate which of the following 3 options best describes your business

O We continually search for new business opportunities. Business development and marketing are prioritised over finance and operational functions. Whilst important, efficiency and profit are not as important as identifying market opportunities for high growth or using new construction techniques and/or materials to maintain leadership in the industry.

O We introduce new construction techniques and/or materials after they have been proven to be effective elsewhere. We do not want to be the first in the industry

to offer an unproven technique and/or material, but we try to be close behind with a similar competitive technique or material.

O Efficiency and profit maximisation are a priority in our day to day operations. We prefer to operate in markets that we are familiar with, using construction techniques and materials that we have experience of. Maintaining our existing market share is a priority for us.

Q2 Please indicate which of the following 3 options best describes your business

O Our goal is to increase sales and market share with a willingness to accept, if necessary, low profitability in the short to medium-term, in order to achieve these goals.

O We seek to maintain market share and obtain a reasonable level of profitability.

O We aim to maximise profitability and cashflow in the short to medium-term and we are willing to accept a reduced market share, if necessary, to achieve these goals.

Q3 To what extent does your business emphasise the following?

	Never (1)	Sometimes (2)	About half the time (3)	Most of the time (4)	Always (5)
Achieving on-schedule performance in construction operations	O	O	O	O	O
Attempting to deliver constructed facilities ahead of schedule	O	O	O	O	O
Achieving high quality beyond the requirements in the specifications	O	O	O	O	O
Being highly responsive to client's requests	O	O	O	O	O
Applying innovative technologies in construction operations.	O	O	O	O	O

Q4 To what extent does your business emphasise the following?

	Never (1)	Sometimes (2)	About half the time (3)	Most of the time (4)	Always (5)
Reducing costs in construction operations	O	O	O	O	O
Reducing costs in administrative activities	O	O	O	O	O
Improving the cost-efficiency of the contracting services offered	O	O	O	O	O
Bargaining down the purchase price on construction related purchases	O	O	O	O	O

Q5 To what extent does your business emphasise the following?

	Never (1)	Sometimes (2)	About half the time (3)	Most of the time (4)	Always (5)
Serving specific geographic construction markets	O	O	O	O	O
Operating in specific construction market segments	O	O	O	O	O
Offering a limited range of project delivery systems	O	O	O	O	O
Serving a specific group of clients	O	O	O	O	O

Involvement in networking can introduce a business to innovative new ideas which it might consider introducing. The next section focuses on the extent to which your company gets involved in networking activities.

Q6 In the last three years, has your business, or anyone in your business, been involved in any of the following?

	Yes (1)	No (0)
External accreditations such as ISO or Investors in People	O	O
Part of a joint-venture	O	O
A member of any industry trade association	O	O
Customer alliances	O	O
Supplier alliances	O	O
Bench-marking activities	O	O
Used consultants or business advisers	O	O
Used specialist construction software packages	O	O
Any other business type "partnership". Please provide details	O	O

This section aims to establish your view on the level of performance achieved by your business. Firstly, in comparison with your main competitors and secondly, compared with your own business's performance.

Q7 Rate the performance of your business, on the following dimensions, compared to that of your main competitors over the past three years

	Above average (1)	Same as competitors (0)	Below average (-1)
Sales growth	O	O	O
Relative market share	O	O	O
Profitability	O	O	O
Customer Satisfaction	O	O	O

Q8 Compared to your business objectives how well has your business performed in the following areas over the past three years?

	Above expectations (1)	In-line with expectations (0)	Below expectations (-1)
Sales growth	O	O	O
Relative market share	O	O	O
Profitability	O	O	O
Customer Satisfaction	O	O	O

Q9 To what extent do you think your business has achieved its strategic objectives over the last three years?

	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)	
Not at all	O	O	O	O	O	O	O	Completely

This final section will collect information about your business and yourself. This will be used for analysis purposes only.

Q10 For approximately how many years has the business been operating?

_____

Q11 From the drop down box below please select the highest level of education you have completed?

Secondary School
Sixth Form, A levels or equivalent
Undergraduate degree
Postgraduate degree or above
Prefer not to say

Q12 Do you hold a professional qualification?

O Yes

O No

Q13 What is that professional qualification?

Q14 Finally 3 questions about your experience in the construction industry

O What is your current job title?

_____

O How many years have you been in your current role?

_____

O How many years in total have you worked in the construction industry?

_____

If you would like to receive a copy of the final report please provide your email details below

_____

I may wish to contact you to follow up on your answers. If you are willing for me to do so could you please provide a telephone number below

_____

Appendix 5 Glossary of SMA terminology

Costing

Activity-based costing: a costing method that assigns cost activities to cost objects such as products, services and customers, based on two main stages. The first stage pools costs to activities according to each activity's consumption of resources. The second stage assigns costs to cost objects (e.g. specific contracts or customers) based on their use of those activities.

Activity-based cost management: uses the results of an activity-based costing exercise to identify and evaluate the activities an organisation undertakes, and to take action to eliminate or re-engineer these activities to reduce costs if necessary.

Attribute costing: from the point of view of the customer, identify the perceived benefits (attributes) of the goods or services provided and identify the costs of providing those attributes. Customers will only pay for these perceived benefits whilst costs incurred in providing other attributes need to be eliminated or minimised.

Cost of quality: the cost of making a good or providing a service which is not right first time, this extends to costs of prevention, such as training and costs of appraisal, such as quality inspection. Some businesses also try and identify the opportunity cost of lost sales associated with poor quality.

Lifecycle costing: the present value of the total cost of an asset over its operational life. This includes initial capital cost, finance costs, operational costs, maintenance costs and the eventual disposal costs of the asset at the end of its life. All future costs and benefits are reduced to present-day values by the use of discounting techniques.

Target Costing: an activity which is aimed at reducing the lifecycle costs of new products whilst ensuring quality, reliability and other customer requirements, by examining all possible ideas for cost reduction at the product planning, research and development, and prototyping phases of production.

Value chain costing: costing each activity within the linked set of value creating activities, from basic raw materials sources to the ultimate product or service that is delivered to customers. This extends to activities outside a specific business.

Value chain analysis: takes the results of the value chain costing exercise and uses them to make decisions regarding where in the value chain activities are best performed and to eliminate activities which do not add value from a customer perspective.

Planning, control and performance monitoring

Activity based budgeting: aims is to identify the cost of resources required to perform the activities required to meet the budgeted production and sales volume. Where differences occur between costs identified through this process and actual costs then actions are required to eliminate these differences.

Balanced Scorecard: a strategy performance management tool which uses four perspectives; financial, customer, internal business processes, innovation and learning to help identify business objectives and financial and non-financial performance measures which are aligned with the strategic goals of the business.

Benchmarking: improves performance by identifying and applying best demonstrated practices to operations and sales. Managers compare the performance of their products or processes externally with those of competitors and best-in-class companies, and internally with other operations that perform similar activities in their own firms. Companies then improve their performance by tailoring and incorporating these best practices into their own operations.

Continuous improvement / kaizen costing: a cost reduction approach applied to existing products, services or processes. It is similar to target costing which is applied to products and services before they are introduced. It is often associated with making processes 'lean'.

Economic value added: was designed as a single measure to capture the economic performance of an organisation and as a measure of managerial performance. It makes management accounting adjustments to accounting profit, in an attempt to limit the impact of financial accounting policies on reported profits and takes off a capital charge.

Product profitability analysis: shows the product revenue, product costs and therefore the profitability of all products sold by an organisation. For the construction industry this is also known as 'job costing' or 'contract profitability'.

Use of advanced construction technologies: this includes innovative forms of construction techniques, construction processes or construction equipment.

Strategic decision making

Brand valuation: the valuation of internal brands, not for financial reporting purposes but to measure the effectiveness of management in maintaining or increasing the value of this intangible asset. It aids strategic decision making by providing information on where to use scarce marketing resources.

Environmental management accounting: includes procedures for internal decision-making both physical procedures for material and energy consumption, flows and final disposal, and monetarised procedures for costs, savings and revenues related to activities with a potential environmental impact.

Intellectual capital accounting: management accounting with the purpose of understanding, measuring and reporting knowledge resources such as employee competencies, customer relationships, brands, financial relationships and information and communication technologies.

Strategic costing / strategic cost management: deliberate decision making aimed at aligning the firm's cost structure with its strategy and optimising the performance of the strategy.

Strategic investment appraisal: the process of identifying, evaluating, and selecting projects that are likely to have a big impact on a company's competitive advantage. Often the financial benefits of such investments are hard to quantify.

Strategic pricing: the coordination of interrelated marketing, competitive, and financial decisions to set prices profitably. It requires the establishment of a coherent set of pricing policies and procedures, consistent with its strategic goals for the company.

Competitor focused accounting

Competitor cost analysis: the provision of regularly updated estimates of a competitor's costs based on, for example, appraisal of facilities, technology, economies of scale. Sources include direct observation, mutual suppliers, mutual customers and ex-employees.

Competitive position monitoring: is the analysis of competitor positions within the industry by assessing and monitoring trends in competitor sales, market share, volume, unit costs, and return on sales. This information can provide a basis for the assessment of a competitor's market strategy.

Competitor appraisal based on published accounts: used as part of the above analysis, this is the numerical evaluation of the published financial statements of competitors.

Customer accounting

Customer profitability analysis: this involves calculating profit earned from a specific customer. The profit calculation is based on costs and sales that can be traced to a particular customer. This technique is sometimes referred to as ''customer account profitability".

Customer segment profitability analysis: This is the practice of performing a CPA (as defined earlier), on a market segment or customer group basis. It is often used where there are a great number of customers and individual CPA would be uneconomic to perform.

Lifetime customer profitability analysis: involves extending the time horizon for customer profitability analysis to include future years. The practice focuses on all anticipated future revenue streams and costs involved in servicing a particular customer.

Valuation of customers or customer groups as assets: the calculation of the value of customers to the company. For example, this could be undertaken by computing the present value of all future profit streams attributable to a particular customer or group of customers.

Appendix 6 FD semi-structured interview questions

1. An introduction as to the purpose of the project and the role of the interviewee. Ethical issues will be discussed and informed consent paperwork signed. Ask if can record.

2. Can you give a brief description of your background? How long have you worked in the industry, for this specific business, do you own the business? When did you qualify? Who are your major customers, and competitors? Have there been any recent major changes in the business or business environment? What is the SMP and what is your role in strategic management process

3. Review responses to usage of SMA techniques prior to interview. Why are high scoring techniques used? Why are low scoring techniques not used? Ask to look at some of the management information generated to support their answers. What specifically is stopping you using these techniques?
   Prompts: not aware of them, too much time involved, too difficult to implement

4. Review responses to differences between SMA usage and perceived benefits prior to interview. What specific benefits do you foresee in utilising a technique more? For the big differences could you explain why these are not being used if such a benefit is perceived to exist?

5. How do you keep up to date with management accounting developments? How are new ideas introduced into the business? Training, networking, conferences, professional journals, partnerships/customers, monitoring what the competition is doing, NED.

6. Size of organisation. How has any recent growth increased the requirement for information of the type produced by SMA?

7. How would you describe the level of competition faced by your business? Do you feel this influences your use of SMA? In what way?

8. Consider other possible contingent factors from the conceptual framework which have not already been discussed earlier in the interview.

9. Responses to the survey indicate a positive relationship between SMA usage and performance. Do you see a link here? Do you think there is a cause and effect relationship? Why? i.e. do you think greater use of SMA leads to a better business performance? Seek specific examples

10. Responses to the survey indicate a positive relationship between SMA usage and achievement of business objectives. Do you see a link here? Do you think there is a cause and effect relationship? i.e. do you think greater use of SMA leads to a better business performance? Seek specifics examples

11. Are there any other points you wish to make?

12. Could you think of anyone else in the organisation that might have a view on any of the items we have just discussed? Are you able to introduce me to them? Would it be possible for me to contact you again once I have listened back to your answers? Can I have a look at the documentation you referred to earlier?

Appendix 7 MD semi-structured interview questions

1. An introduction as to the purpose of the project and the role of the interviewee. Ethical issues will be discussed and informed consent paperwork signed. Ask if can use recording device.

2. Can you give a brief description of your background? How long have you worked in the industry, for this specific business, do you own the business? Who are your major customers, and competitors? Have there been any recent major changes in the business or business environment?

3. Discuss analysis of strategy being followed as per survey answers. How is strategy developed? Who gets involved? Thinking about recent strategic decisions. What were they? What information is used to make strategic decisions? Who provides this information? What input does the accounting department have? Can I see and evidence of the type of information produced? Can I have a copy of the mission statement if available?

4. Using answers to networking in the survey. Do you think the level networking activity has any possible impact on the use of SMA techniques? Why?

5. Size of organisation. How has any recent growth increased the requirement for information of the type produced by SMA?

6. How would you describe the level of competition faced by your business? Do you feel this influences your use of SMA? In what way?

7. Consider other possible contingent factors from the conceptual framework which have not already been discussed earlier in the interview.

8. Responses to the survey indicate a positive relationship between SMA usage and performance. Do you see a link here? Do you think there is a cause and effect relationship? Why? i.e. do you think greater use of SMA leads to a better business performance? Seek specific examples

9. Responses to the survey indicate a positive relationship between SMA usage and achievement of business objectives. Do you see a link here? Do you think there is a cause and effect relationship? i.e. do you think greater use of SMA leads to a better business performance? Seek specifics examples

10. Are there any other points you wish to make?

11. Could you think of anyone else in the organisation that might have a view on any of the items we have just discussed? Are you able to introduce me to them? Would it be possible for me to contact you again once I have listened back to your answers? Can I have a look at the documentation you referred to earlier?

Appendix 8 Descriptive statistics of actual use SMA techniques

SMA Technique	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Product profitability analysis (job costing)	21	2	5	4.38	0.921	-1.313	0.501	0.726	0.972
Customer profitability accounting	20	1	5	3.70	1.218	-1.102	0.512	0.715	0.992
Activity based costing/cost management	21	1	5	3.62	1.658	-0.850	0.501	-1.048	0.972
Analysing competitor performance using their published financial statements	20	2	5	3.55	0.999	0.024	0.512	-0.933	0.992
Customer segment profitability analysis	20	1	5	3.40	1.314	-0.377	0.512	-0.838	0.992
Activity based budgeting	21	1	5	3.38	1.627	-0.458	0.501	-1.391	0.972
Strategic cost management	20	1	5	3.25	1.209	-0.733	0.512	-0.131	0.992
Competitor position monitoring	20	1	5	3.20	1.281	-0.247	0.512	-1.086	0.992
Target costing	21	1	5	3.10	1.338	-0.467	0.501	-1.112	0.972
Kaizen costing	21	1	5	3.10	1.300	-0.495	0.501	-0.870	0.972
Competitor cost analysis	20	1	5	3.00	1.257	0.177	0.512	-0.931	0.992
Benchmarking	21	1	5	2.95	1.322	-0.335	0.501	-0.947	0.972
Strategic investment appraisal	20	1	5	2.95	1.146	-0.360	0.512	-0.574	0.992
Other multi-dimensional performance measurement	21	1	5	2.62	1.359	0.251	0.501	-1.120	0.972
Attribute costing	21	1	5	2.62	1.396	0.278	0.501	-1.292	0.972
Lifetime customer profitability analysis	20	1	4	2.60	1.095	-0.149	0.512	-1.220	0.992
Cost of quality	21	1	4	2.43	1.028	-0.093	0.501	-1.083	0.972
Value chain costing/analysis	21	1	5	2.38	1.322	0.643	0.501	-0.542	0.972
Balanced scorecard	21	1	4	2.19	1.123	0.524	0.501	-1.038	0.972
Brand valuation	20	1	5	2.10	1.252	0.865	0.512	-0.233	0.992
Valuation of customers or customer groups as assets	20	1	5	2.05	1.234	1.015	0.512	0.134	0.992
Life cycle costing	21	1	4	2.05	1.024	0.516	0.501	-0.874	0.972
Environmental management accounting	20	1	5	2.00	1.257	1.061	0.512	0.112	0.992
Economic value added	21	1	4	1.95	1.071	0.642	0.501	-0.975	0.972
Intellectual capital accounting	20	1	5	1.75	1.293	1.817	0.512	2.466	0.992
Average_Usage	**21**	**1.28**	**4.20**	**2.83**	**0.656**	**-0.275**	**0.501**	**0.817**	**0.972**

Appendix 9 The SMA Paradox

Group A respondents were asked to provide information about their perception of the use or potential use of each SMA technique on a five-point Likert scale (where 1 = not at all useful and 5 = extremely useful). A response of 'not sure' was also allowed, any such responses have been removed from the analysis below. Figure 45 below shows the perceived benefit of using the SMA techniques in the responding businesses, whilst Table 49 below gives the full descriptive statistical information on the responses.

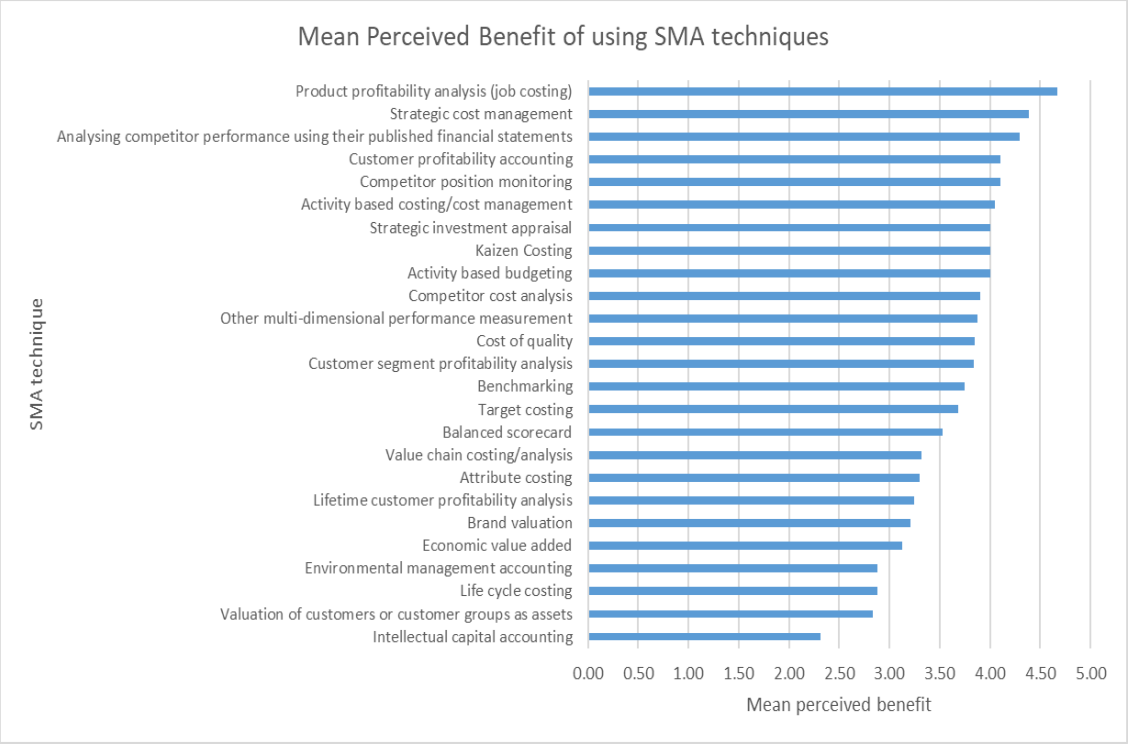

Figure 45: Mean perceived benefit of using SMA techniques

SMA Technique	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Product profitability analysis (job costing)	21	2	5	4.67	0.796	-2.583	0.501	6.408	0.972
Strategic cost management	18	1	5	4.39	0.979	-2.617	0.536	8.588	1.038
Analysing competitor performance using their published financial statements	20	2	5	4.30	0.733	-1.445	0.512	3.979	0.992
Customer profitability accounting	20	1	5	4.10	1.410	-1.445	0.512	0.686	0.992
Competitor position monitoring	20	2	5	4.10	0.852	-0.771	0.512	0.354	0.992
Activity based costing/cost management	21	1	5	4.05	1.564	-1.299	0.501	-0.065	0.972
Strategic investment appraisal	18	1	5	4.00	1.237	-1.679	0.536	2.480	1.038
Kaizen costing	20	1	5	4.00	1.257	-1.415	0.512	1.503	0.992
Activity based budgeting	20	1	5	4.00	1.414	-1.241	0.512	0.181	0.992
Competitor cost analysis	20	1	5	3.90	1.334	-0.982	0.512	-0.434	0.992
Other multi-dimensional performance measurement	16	1	5	3.88	1.147	-1.239	0.564	1.456	1.091
Cost of quality	20	1	5	3.85	1.268	-1.239	0.512	0.846	0.992
Customer segment profitability analysis	19	1	5	3.84	1.463	-0.886	0.524	-0.642	1.014
Benchmarking	20	1	5	3.75	1.209	-0.857	0.512	-0.131	0.992
Target costing	19	1	5	3.68	1.376	-0.931	0.524	-0.417	1.014
Balanced scorecard	19	1	5	3.53	1.264	-0.435	0.524	-0.938	1.014
Value chain costing/analysis	19	1	5	3.32	1.250	-0.294	0.524	-1.261	1.014
Attribute costing	20	1	5	3.30	1.261	-0.459	0.512	-0.840	0.992
Lifetime customer profitability analysis	20	1	5	3.25	1.333	-0.213	0.512	-1.184	0.992
Brand valuation	19	1	5	3.21	1.548	-0.292	0.524	-1.479	1.014
Economic value added	16	1	5	3.13	1.204	-0.270	0.564	-0.342	1.091
Environmental management accounting	17	1	5	2.88	1.269	-0.169	0.550	-1.214	1.063
Life cycle costing	17	1	5	2.88	1.453	0.091	0.550	-1.263	1.063
Valuation of customers or customer groups as assets	18	1	5	2.83	1.383	0.033	0.536	-1.308	1.038
Intellectual capital accounting	16	1	5	2.31	1.448	0.729	0.564	-0.666	1.091
Average_Perception	**21**	**1.32**	**5.00**	**3.70**	**0.816**	**-1.254**	**0.501**	**2.540**	**0.972**

Table 49: Statistical information on responses to perceived benefits of SMA techniques

Twenty-three techniques are perceived to have benefits above the mid-point score, job costing ranked the highest, with nineteen (of twenty-one) respondents indicating the usefulness of the technique. The least useful technique is ICA with only three respondents indicating the usefulness of the technique. The mean perceived value of all twenty-five techniques is 3.70, almost a full point above the actual usage of 2.83 discussed earlier. From this it can be concluded that Group A respondents, the heads of finance, feel they could get additional benefits from using more SMA techniques on a more regular basis. We can also say, with ninety-five percent confidence, that the mean perceived value of using SMA for East Midlands based medium sized construction companies' lies in the range 3.35 and 4.10.

The comparison between the use and perceived benefit of each technique (as measured by their mean) is shown in Figure 46 below. This supports the findings of Guilding, Cravens and Tayles (2000), and Cravens and Guilding (2001) and is a very clear demonstration of the SMA paradox as described by Nixon and Burns (2012) who conclude that

> "The apparent low adoption of SMA techniques also seems inconsistent with business operating environments that demand more information, including management accounting." (Nixon and Burns, 2012, p.231).

However, they offer only tentative explanations of why this paradox exists, with surveys unable to offer a clear explanation and a lack of case-studies to examine the situation more deeply. Tentatively they suggest a lack of awareness of the SMA brand and lack of consensus on what SMA is, as possible reasons why the paradox exists. This research would certainly support their view that practitioners are unfamiliar with the term (see Appendix 10 below).

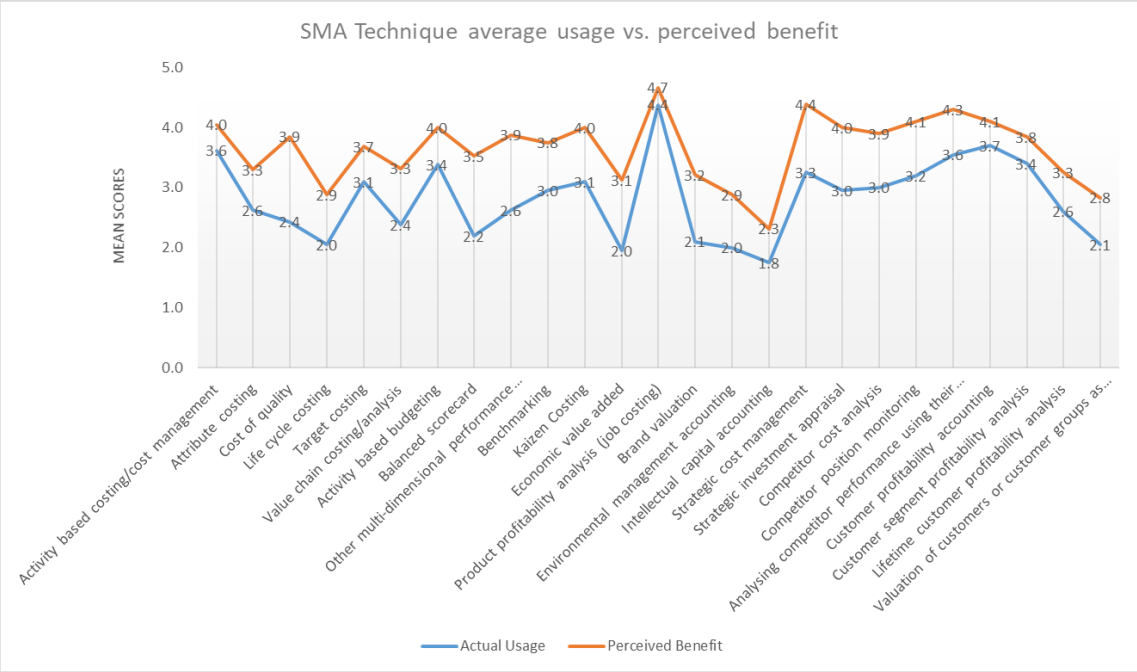

Figure 46: SMA Technique average usage vs. perceived benefit

Every technique shows a positive difference indicating that, not only do Group A respondents feel that using SMA more often would be beneficial but that every technique could be used more to the benefit of their business. The COQ shows the biggest difference (1.4) closely followed by the BSC and other multi-dimensional performance measurement (both 1.3). At the opposite end of the scale job costing, the most widely used technique, could still be used slightly more for the benefit of some businesses. Figure 47 below details the differences, in ascending order, for all twenty-five SMA techniques included in the survey.

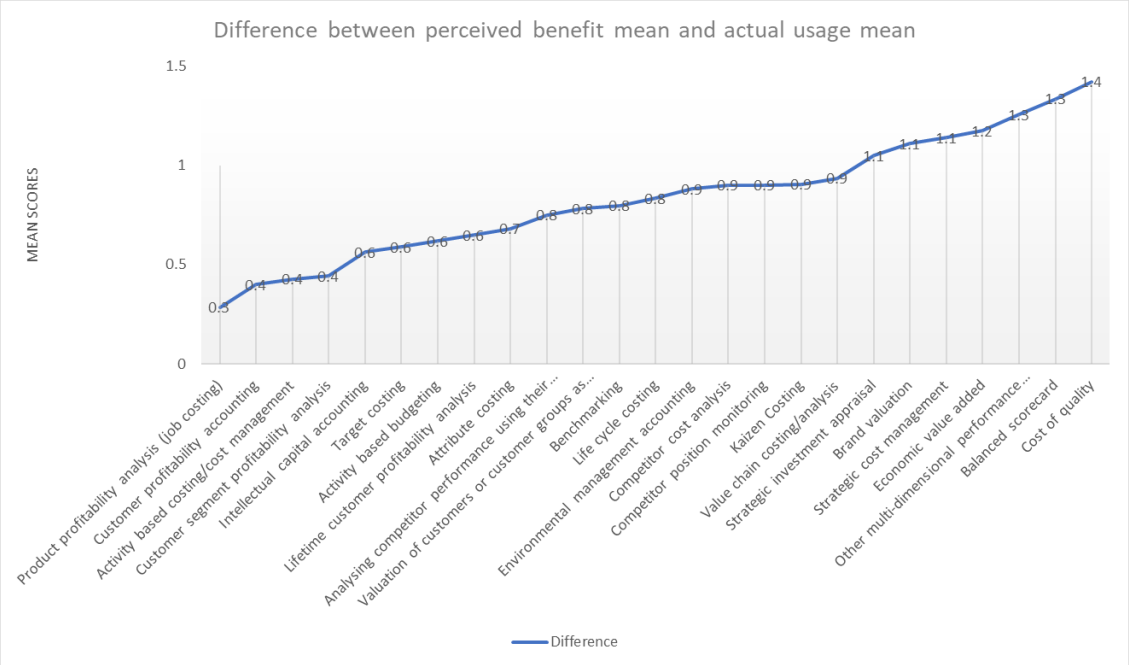

Figure 47: Difference between perceived benefit mean and actual usage mean

The semi-structured interviews included a question to try and understand why this paradox exists when it is clear that Group A respondents consider that using the techniques on a more regular basis would be beneficial. The response of the Operations Director of Company B was typical of the responses received:

> "A lot of these techniques when you look at them on their own individual merit they do have a benefit but in terms of available time and priorities I think that often, as much as they might have a benefit we are limited as to how much time we can spend on management accounting anyway. I mean it's only part of the role of, my role or a financial director's role in a company generally."

The FD of Company C said they are restricted by what their parent company allowed:

> "so much of what we do is governed by [our parent company]. If we were standalone, I think our views and activities would be different."

Whilst the newly installed FD of Company F, which was currently exhibiting profitability and cashflow problems, said that even basic accounting measures were not considered important by the previous management team. They commented:

> "[The business was] previously profit making and cash generative and therefore [there was] no particular focus, or requirement, or urgency to look at some of the basic accounting and measuring of the business."

The most common reason given for not using these techniques more was time; this appears to be a precious resource amongst the heads of finance. The effect of lack of time on the use of SMA is examined in more detail in section 9.4 above.

Appendix 10 Familiarity with SMA terminology

Previous studies have found that the term SMA is not well recognised outside of academia (for example (Langfield-Smith, 2008)). In fact Lord (1996) went as far as suggesting that "the widely touted 'strategic management accounting' is but a figment of academic imagination" (Lord, 1996, p.364). From the findings of this study it would be incorrect to agree with Lord, although to suggest that it is a widely used term by the business leaders interviewed, would also be an incorrect conclusion.

Interviewees familiar with the term fall into two distinct categories. Business leaders who have taken part in some recent executive training either an MBA or an Institute of Directors course, or accountants who had achieved their professional qualification in the last twenty years. In either case, whilst they are familiar with the term, it does not seem to be a part of their regular discourse, even though this was essentially the main topic of the research interview questions.

As found by Langfield Smith (2008) knowledge of the terminology of the BSC is high but in respect of some of the other techniques knowledge of what they are is low and in some cases non-existent. This supports the findings of Cinquini and Tenucci (2007, 2010) who concluded that unfamiliarity with the names of some of the techniques resulted in their survey data understating the use of some of the techniques. Several instances occur where the interviewee do not recognise the term when asked about it during an interview only to later acknowledge that they are in fact using the technique. As the QS from Company D put it

> "You will probably gather that we have done quite a lot of those but not necessarily under the same headings that you have got".

The consequence of this is that, despite sending out the glossary of terms to the group A respondents, there is a risk that the actual use of SMA recorded in the survey is understated.

Appendix 11 The Researcher's experience dataset

Prior to becoming a full-time academic in September 2016, I had worked in the construction sector as the FD of two medium sized, East Midlands based construction companies gaining over sixteen years' experience. Both companies were privately owned with the major shareholders involved in the day to day running of the business as CEO and MD respectively. In between these two roles I completed my MBA at Nottingham Trent University. As described in section 1.3.4 above this introduced me to the concept of SMA and some of the newer techniques associated with it. Furthermore, it made me much more aware of the SMP and emphasised to me the value that qualified accountants can add to that process. The following two paragraphs summarise my curriculum vitae for the two positions I held either side of completing my MBA.

Company T: January 1999 to September 2011 (12 years 9 months): FD with responsibility for the accounts department including management accounting, financial reporting and audit, payroll, sales ledger, credit control, purchase ledger and sub-contractor payments. Also, IT, insurances, bonding facilities, banking facilities, plant and fleet administration departments. I was also responsible for ensuring compliance with PAYE, VAT, CIS and Corporation Tax regulations but the task which I was involved in on a daily basis was to ensure a sufficient cashflow to fund both working capital and investment in non-current assets. During this time the company grew organically from having approximately 200 employees and an annual turnover of £10m to having over 300 employees and an annual turnover of £45m. In other words, it moved from being a large-medium sized company to a large company during the course of my employment. During this time the business increased the range of construction services it offered, eventually offering the services of a principle contractor as well as offering the specialist sub-contracting mechanical and electrical services which it had offered since inception. As a result, it grew from internally reporting profitability of three profit centres (divisions) to ten, this was a reflection of both the wider range of services offered and the expanded geographical regions in which those services were performed. From a management accounting perspective, the challenges faced by this growth and added complexity were significant; budgeting by division became a much more time-consuming process and the allocation of G&A overheads became much more involved.

The increase in scope of works to include principle contracting resulted in the recruitment of a new director with responsibility for this division and he wanted to introduce monthly profit forecasting, a process which was eventually adopted for all the other divisions. At the same time the role of the QSs became more influential within the business and my working arrangements with them had to evolve to accommodate the information they provided. This information was vital for me to prepare accurate and timely monthly management accounts in addition to preparing cashflow forecasts. In order to facilitate this planned growth one of my first actions was to research, justify the investment in, and implement a new integrated accounting system (Vixen from Vixensoft) incorporating a new job costing and purchase order system. Initially I was responsible for preparing the management accounts and associated management information but in 2005 a new management accounting role was created to take on those responsibilities. Management accounts were prepared, by division, to net profit, and these included a divisional JPA analysis, based on CPFs, which was presented to gross profit level.

Company A January 2013 to August 2016 (3 years 8 months): FD with a similar job description to the one above but within a much smaller organisation and with a smaller team. I had responsibility for the accounts department including management accounting, financial reporting and audit, payroll, sales ledger, credit control, purchase ledger and sub-contractor payments. Also, HR, IT, insurances and banking arrangements. I was also responsible for ensuring compliance with PAYE, VAT, CIS and Corporation Tax regulations. Monitoring cashflow was even more important within Company A than it had been at Company T. Company A had a fellow subsidiary, a plant hire company which utilised most of the free cashflow of the group to invest in non-current assets. During this time there was significant planned growth with annual turnover increasing from £6.7m to £16.9m and employee numbers increasing from 45 to 70. The company moved from being classified as small to the small-medium category. I was the first qualified accountant to be employed by company A in the forty-five years since it was formed and most of my time there was spent introducing new financial controls to ensure that financial transactions were properly recorded. This was despite a desire to implement some of the SMA techniques which I had been introduced to

during the course of my MBA. Improved management reporting including; more accurate JPA; divisional reporting to accommodate the new contract with Utility and monthly profit forecasting was driven by making better use of the existing integrated job costing software (Sage Construction) but also by investing in a new software package (Protean from Protean Software Ltd) to manage and report on the new contract with Utility which started in March 2015. BSC, COQ and better financial appraisal for investment decisions were all SMA techniques which I felt, given more time and resources, could have been implemented for the benefit of the business.

The following sections refer to my reflections on specific events during the above employments which provide additional data and triangulation of the other data gathered during the course of this study. All these reflections have been discussed with ex- colleagues in order to confirm the accuracy of my recollections.

A11.1 Role at Company T prior to MBA

Prior to undertaking the MBA, I was unaware of the concept of SMA or much of the terminology associated with it. I was aware of ABC, BSC and DCF but had never made any use of them within the business, considering them to be only relevant to companies much larger than Company T. In hindsight the use of JPA, using activities to allocate G&A overhead costs, and benchmarking by analysing our competitors' financial statements are examples of my use of SMA within the construction industry at that time. Colleagues at company T were also using SMA techniques such as competitor monitoring through tender feedback, cost of defects analysis by collecting the costs of post-completion defects works, reporting KPIs and pricing in the tender adjudication meetings. These techniques were used out of a need to make strategic decisions but operating in an environment of an emergent strategy driven by opportunistic tendering activity. Even the decision to start operating as a principle contractor, a part of the industry with which the business had no prior experience, was not a planned strategic decision. The decision was based on the availability of a highly respected and experienced individual who the CEO was able to convince to join the company, which at the time was operating mainly as a mechanical and electrical specialist sub-contractor.

A11.2 Role at Company A post MBA

My previous industry specific experience at Company T was a significant contributory factor in being offered a position at Company A as was, I later found out, my MBA qualification. The role appealed to me because it enabled me to become involved in the SMP which I helped to formalise. Together with the NED I ran the business's first strategic away day in March 2013 which help to crystallise and document the directors' long-term strategy for the business. Not only did I want to implement some of the SMA processes I had used at Company T, such as sophisticated overhead allocation, but I also wanted to introduce some of the SMA techniques that I was now aware of as a result of my MBA such as BSC, COQ and financial investment appraisal techniques. However, due to other priorities competing for my time, I never got around to implementing any of these three techniques. The other SMA techniques did not seem to have any relevance to Company A either because it was a construction company, for example attribute costing; kaizen costing or EMA or due to its size, for example ABC/ABB; EVA; brand valuation or ICA.

A11.3 Allocation of overhead at Company T

The increasingly complexity of Company T due to the growth in services offered required the creation of more and more divisions (profit centres) the net profitability of which was used to calculate staff bonus scheme payments. This required an increasing equitable and transparent allocation of G&A overheads as discussed in section 7.1.3 above. Initially this was based on turnover but as the number of divisions grew and the size of the G&A overhead increased, the allocation became increasingly based on consumption of the services provided by the overhead departments. G&A costs were allocated to cost centres rather than cost pools, but their allocation was based on cost drivers, such as the use of PCs to allocate the costs of the IT department and the number of vehicles being driven to allocate the costs of the fleet administration function. Whilst this could not be described as ABC it nevertheless had some of the hallmarks of an ABC system. Neither did it result in any form of ABCM which was unnecessary due to the relatively low level of G&A overhead, similarly the G&A budgets were incrementally based rather than using ABB.

A11.4 Forecasting at Company A

Based upon my experience at Company T I attempted to introduce 12 month rolling forecasts at Company A. Due to objections from the Commercial Director this was not successful, however we did compromise and it was agreed that we would track progress against our budgets with a profit forecast, updated monthly and prepared up to the end of our current financial year. This was completed to gross profit level by the Commercial Director and then to net profit level based on my forecast of G&A overheads. This was not a complicated or time-consuming task as it was based on existing CPFs prepared by the QSs. Whilst this did not give any visibility beyond the current financial year, the introduction of a bi-monthly strategy review meeting encouraged the directors to consider, without a detailed financial forecast, what might happen beyond the current financial year and to make longer-term plans accordingly. This allowed the annual budget setting process to be done sooner than before and was a much quicker process as plans were already being considered through the SMP.

A11.5 Tender adjudication process at Company A and Company T

I was never involved in tender adjudication meetings at either Company A or Company T. At Company A this was a scheduled weekly meeting at 10am every Tuesday to review progress on estimates and the mark-up on tenders to be submitted within the following week. It was attended by the Operations Director, Commercial Director, estimators and occasionally by the Contracts Manager who was planned to run the job. At Company T this was not a routine meeting, tenders were reviewed on an adhoc basis, but nevertheless there were still formal processes adhered to. Authority levels, based on estimated tender value, were delegated to heads of divisions but where these were exceeded divisional MDs and the CEO were involved in the pricing decision-making process. For tenders for strategically important customers the Director of Business Development would also attend.

A11.6 Bonus scheme at Company T and Company A

During my tenure at both Company T and Company A new bonus schemes were introduced for all monthly paid salaried staff. In both cases bonus schemes already existed for senior executives but were discretionary and amounts paid determined by

the CEO or MD with no documented scheme rules. Responsibility for designing the new scheme at Company T was delegated to a director who had studied the motivational effects of bonus schemes at an Institute of Directors conference. The scheme that was eventually approved by the board of directors was based on divisional net profitability and hence the need for a more accurate allocation of G&A overheads, as discussed in Appendix 11.3 above. Achievement of the 'bonus pot' was dependent on each division attaining its budgeted net profit and distributed to each member of staff in the division as a percentage of salary. However, an individual's share of the pot was increased or decreased depending on their performance, assessed on a mixture of five objective and subjective measures such as absenteeism and work ethic, relative to others in the division.

Based upon my experience at Company T I was instrumental in introducing a new bonus scheme at Company A. This was based on controllable profits, profits before allocation of Group company G&A overhead. Whilst Group G&A overheads were still allocated, they were not taken into account when calculating bonuses, this approach minimised the discussion on how they were to be apportioned. Unlike at Company T, payments to individual members of staff were not flexed in anyway, with everyone receiving the same percentage of salary when bonuses were paid. A staff appraisal system, which included the setting of individual objectives, was in place but these objectives were not factored into any bonus scheme payments. In my appraisal I was targeted with undertaking H&S site visit every quarter, the other directors had similar targets. These were reported on the monthly 'H&S dashboard' prepared by the SHEQ manager but despite regularly failing to achieve the targets no action was ever taken to ensure compliance. Several discussions took place about linking bonus payments to achievement of other objectives, including the site visits target, but the scheme was not changed before I left and continues to be operated in the same way. Personally, I felt that I would have found time to attend a site visit if my bonus payment depended on it. As it was, I never undertook a H&S site visit even though I recognised the strong message this would have made to our site-based staff, the reason the target was established in the first place.

A11.7 Tender feedback at Company A and Company T

I was never party to any specific tender feedback information, but I was aware of it as it was regularly discussed during board meetings. Feedback was received either in terms of the position of our tender relative to others or the absolute value of each tender submitted. Feedback was not received in all cases with feedback from public body clients often easier to obtain than from commercial organisations. In Company A this was provided, informally, by the Commercial Director who delegated the collection of feedback to the estimator responsible for the tender submission. In Company T this was much more formal with the Business Development Director taking responsibility for getting the information and reporting to the board as part of his monthly reporting. In either case this information was only ever used to inform future estimating and pricing decisions and was only ever used informally.

A11.8 Working with Quantity Surveyors

During my tenure at Company T and Company A I had to rely on information provided by colleagues, particularly QSs, more than at any other time in my career. The monthly management accounts including the JPA, the monthly profit forecasts, the annual financial statements and the daily cashflow forecasting were, at their very core, based upon the CVRs and CPFs provided by the QSs. I had no other choice, unless the contract had achieved practical completion, than to take this information at face value. For all intents and purposes these were 'black-boxes' which I was unable to look inside. Trial balance adjustments to actual invoiced sales (final account debtors) or to actual invoiced costs (work in progress or cost accruals) were necessary to report profits based on CVRs or CPFs. At times I suspected that the figures were being manipulated in order to deflect criticism, to manage expectations or to influence year-end bonus calculations. This left me feeling extremely vulnerable, especially at a financial year end when the trial balance adjustments were subject to audit. I felt unsure in the accuracy of the figures that I was reporting.

It can often take months, on occasions years, after the completion of a contract for final accounts to be agreed, first with the client and then with sub-contractors. Final account settlements can be long and protracted when the cost of contract variations need

agreeing between the client and the contractor. In some cases, agreement is only reached after arbitration or legal proceedings take place. Until the final accounts are agreed, on-going un-invoiced debtor and cost accruals will be required within the financial statements. This required me to have an on-going reliance on the CVRs reported by the commercial team, making the financial statements vulnerable to misstatement if the QSs had been incorrect in their assessment of the final account outcomes. This prolonged uncertainty created a tension and frustration between myself and the commercial team, I would apply pressure to get these issues resolved as quickly as possible with the commercial team resisting on the basis that they felt that pushing for a quick settlement would undermine their negotiating position.

Furthermore, the CPFs were fundamental sources of information to update my cashflow forecasts which were used on a daily basis to manage both short and long-term cashflow requirements. This was less of an issue at Company A where there were fewer contracts which were typically of a shorter duration than those at Company T. At Company A I was also able to spend more time with the Commercial Director which enabled me to better understand their assumptions in completing the CVRs and CPFs and thereby get greater reassurance of their validity. However, due to the size of Company T and the number of contracts running at any one time, such a level of scrutiny from myself was not possible.

A11.9 Role in the White Book process

The White Book was the name given to a process to identify cost savings initiated by a major customer, what I have called a 'strategic customer', of Company A, herein called Utility for reasons of anonymity. Following a protracted tendering process Company A and three other contractors had been appointed as preferred bidders to provide repair and maintenance services to Utility's underground network of wastewater and sewerage pipes. The contract was to last for five years starting in April 2015 (a period known as AMP6) with the possibility of it being extended for a further two AMP (asset maintenance plan) periods, a period of fifteen years in total. The five organisations (collectively referred to as the Alliance) were expected to work together to identify cost savings of fifteen percent over AMP6. Twelve individuals representing the Alliance developed the plan to deliver the cost savings. These individuals included two MDs, two

Operational Directors, Operational Managers, QSs and myself, as the sole accountant on the team, selected because of my MBA qualification. Utility facilitated the process and also provided some members of the team from their commercial department as well as seconding other specialists as they were required. The White Book, which was published in February 2015 identified cost savings of £13.6 million over a five year period, or 18.1% of existing levels of expenditure, exceeding the targeted cost savings of 15% and ensured that Company A and its three partners were formally awarded the contract which was signed in March 2015.

Although the White Book cost savings were itemised according to eight different cost saving initiatives, it could quite easily have been structured according to the SMA techniques employed to calculate their potential cost savings. Three SMA techniques were used; LCC, VCA and COQ, although if these terms had been used it is doubtful that anyone involved in the process, except me, would have recognised them. Prior to my involvement in this process I would have said that LCC or VCA where techniques that, whilst in theory had applications in the sector, were made irrelevant, due to the dominant combatant commercial practices that I had previously had experience of operating in the sector. Working in a commercial arrangement with information and profit-sharing agreements, enabled these two techniques to be used within the Alliance and also, because of the scale of the contract, allowed them to be extended beyond the Alliance partners to the wider supply chain. The 'zero-waste' (COQ) initiative, although driven by the Alliance, was not one which was dependent collaborative working, but used external benchmarking techniques to share best practice amongst the Alliance partners. The zero-waste initiative also required some initial investment which partners would not have been able to make without the security of a five-year contract during which they could recover their investment.

A11.10 New accounting software implementations

At both Company T and Company A I have been instrumental in identifying, justifying and implementing new accounting software packages both of which included an integrated cost accounting system (Drury, 2015). I would describe both of these as SIDs neither of which was supported by any sophisticated financial appraisal, just a cost of

investment and net annual increases in running costs, such as licences fees and support costs. We then debated the intangible benefits of these investments such as the value of more accurate and timely management information or the potential of lost opportunities if we did not make the investment.

At Company T, one of my first decisions was to implement Vixensoft which was a fully integrated system incorporating accounting modules, a job costing module and electronic purchase ordering system. This software required a complete overhaul of the MCS which took advantage of the new functionality incorporated in the new software. This software was still being used when I left the business in 2011, eleven years after it was first introduced. It had however significantly evolved during that time to incorporate the capture of data from jobsites, including daily electronic timesheet submissions from site-based operatives. Despite the increased functionality of this new software CVRs and CPFs were maintained outside of this system using spreadsheets. Furthermore, JPAs; rolling profit forecasts and cashflow forecasts were also spreadsheet based. This was because this software did not have the functionality or flexibility to manipulate this MAI in the format required by the business.

At company A I introduced new software to manage and account for the new contract with Utility. Due to the nature of this contract Company A was undertaking hundreds of individual sewer repair jobs per month each of which required its own individual job costing and other management information. Our existing software (Sage Construct) could not efficiently collect data at the level of detail required and therefore we decided to invest in software which could collect data directly from operatives on site using handheld technology. Due to the commercial arrangements in this contract CVRs or CPFs were not required, instead cost forecasts were based on the anticipated number of job completions each month. Also, as the contract was subject to an annual audit from Utility's commercial team to ensure the profit-sharing arrangements were being adhered to, the level of job-cost detail required was important. This cost data was also required to demonstrate that the White Book cost savings, referred to in section A11.9 above, were being achieved.