The Evolution of Culture-Climate Interplay in Temporary Multi-Organisations: The Case of Construction Alliancing Projects

Illona Clarissa Kusuma

The Bartlett School of Construction and Project Management

University College London

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I, Illona Clarissa Kusuma confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis

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Abstract

Organisational culture has been a long-standing debate in management research. However, in the field of construction project management, it is relatively under-explored. This is mainly due to the different organisational context of Temporary Multi-Organisations (TMOs). This research re-explores the notion of organisational culture in construction projects. Based on Darwin's theory of evolution this research goes back to the very beginning; illustrating the exact meaning and dynamics of organisational culture in a construction TMO's ecosystem.

This research view an organisation and its forming of culture(s) as part of an evolutionary process. Thus, a critical realist' view of causation is used as the foundation of the research design and methodology. Case study materials are provided from three Alliancing TMOs belonging to two major infrastructure clients in the UK. A designer culture model and the institutional theory are drawn upon to complement the basis of analysis for evolution. A qualitative research method is employed through semi-structured interviews and pre- and post-interview meetings. Other supporting documentations are also consulted.

Three propositions and a postulate are generated and examined against the empirical data. Findings suggest that (i) the TMOs' culture evolves through a set of recursive stages across the project lifecycle, (ii) the culture of the TMO undergoes several lifecycles during one lifespan of the project, and (iii) there are some evidence that culture at TMO level is learned, rationalised and routinised at corporate level. The postulate shows that it is plausible to predict the trajectory of how a TMO's culture will evolve across the project lifecycle given a set of organisational features.

In practice, findings suggest that hard artifacts alone are not able to sustain established culture throughout the project lifecycle. Awareness is needed to press the "refresh" button at times to maintain the desired culture and manage the evolution path.

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Glossary

AP – Alliance Protocol
CWS – Collaborative Working Strategy
Eco-evo-devo – ecology-evolution-development
HR Diagram – Evolutionary Curve Diagram
ICE – Integrated Contractor Engagement
LA – London Alliance
NA1 – Network Alliance 1
NA2 – Network Alliance 2
PAB – Project Alliance Board
PAS – Project Alliance Scheme
TMO – Temporary Multi-Organisation

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Part I

Introduction

Between Theory and Reality – Defining the Research Interest

"Traditional project management researchers become increasingly more interested in issues related to traditional management, organisation, and inter-firm cooperation. Another trend is that researchers in other disciplines show greater awareness of the importance of projects in understanding the functioning of markets and firms."
-- Söderlund (2004; p. 656)

Project management studies in academic research have evolved from its primary focus on the hard issues of tools and techniques to the emergence of soft issues and the broader combination between the two. There is also a growing attention towards the relationships between the strategic top management level and the operational project level – "one that is more engaged with the outside looking in: with projects and their management in their institutional context" (Morris, et al, 2011; p. 6). In this sense, the authors suggested that there is an increasing awareness towards the importance of linkages between firms and projects, "an appreciation of the role of governance and control to foster and assure effective use of resources within and across organisations", building competence and creating appropriate contexts for the project as well as "seeing projects as often complex organisations involving cross-firm relationships engaged in addressing uncertainty and novelty" (Morris et al , 2011; p. 6).

A bigger and more ambitious paradigm is needed covering not just the normative tools and techniques but beyond to include the softer side of issues surrounding the internal and external environments of the managerial context (between organisations and projects) such as "what characterized successful projects and what managing them successfully really entails" will lead to a "broader view of the theoretical underpinnings of the subject" (Morris et al , 2011; p. 2). Engwall (2003; p. 789) further emphasized this direction for project management research by highlighting the need to analyze project practices in terms of its history, organisational scope, and how it relates to long-term institutional context as well as "simultaneous activities in its environment". In other words, projects (its people, organisation, and activities) must be seen as embedded within its wider organizational, institutional and environmental contexts surrounded by time–spatial tensions with consequences arising from this dynamic interplay (cf.

Cherns and Bryant, 1984; Ibert, 2010; Engwall, 2003). In this thesis, such project organisations are termed as Temporary Multi-Organisations (TMOs) and serve as the main context of research.

The above "third wave" characteristics are believed to accumulate from and feed into one fundamental underlining issue relating to traditional management and organisational analysis on effectiveness – *culture*. The notion of culture have been regarded as a fundamental concept that cannot be separated from organisational theories as well as being an important criteria in measuring and achieving organisational effectiveness (e.g. Peters and Waterman, 1982; Denison and Mishra, 1995). This also holds true for the studies on construction project management (CPM). In this thesis, culture is defined as trusting the other party to come through with their part without watching them all the time, thus establishing a precept for actions, a scheme of expression, and a scheme of interpretation (adapted from Schuetz, 1944).

Although there already exist literatures studying culture in CPM, most focused on "what culture fits best" questions (e.g. Pant et al, 1994; Phua and Rowlinson, 2004; Chen and Partington, 2003; de Bony, 2010; Bredillet et al, 2010; Shore and Cross, 2005; Pheng and Leong, 2000; Winch et al, 1997), questions remain on *how* culture *evolves* over time. That is to say, culture as a process of selection as influenced by particular circumstances and context has yet to be underpinned; even more so in construction project management and across the project lifecycle. This is an important gap in research and applied practice that has led to barriers in the transferability of processes and knowledge.

It is also essential to pay extra attention to the term evolution used. In this study, evolution is perceived similarly with those studies of biology. The sole purpose in using the term is to acknowledge the third wave approach that incorporates the wider institutional environment in a way argued by March and Simon (1958) and Scott (2012) where to be effective, there needs to be a balance between the organisation's internal and external elements in which evolution addresses the processes by which "social structures are established, become stable, and undergo changes over time" (Op cit., p. 29). In other words, organisations must be able to adapt internally to conform to their external environments within which they are operating. Hence, it is defined here as *a lifecycle of internal metamorphosis in adaptation to the external ecosystem* as a response to *selection*, which is "the sum of the survival and fertility mechanisms that affect the reproductive success of genotypes [structures]" (Hall and Hallgrimsson,

2008; p. 3). In this sense, it is a progressive transformation developed from earlier forms due to arising internal and/or external factors in order to *maintain and foster* continuity. It is therefore believed that the term best illustrates the dynamic element of culture (especially across the project lifecycle).

In this research, the formation of an effective working culture will be looked at from the culture-climate interplay that surrounds the dynamics within the corporate-project relationships. What is referred to as climate is "the relative enduring quality of the total [organisational] environment [the ecology] that (a) is experienced by the occupants, (b) influences their behaviour, and (c) can be described in terms of the values [culture] of a particular set of characteristics (or attributes) of the environments" (Tagiuri and Litwin, 1968; p. 25). That is to say, an effective working culture embodies the values, beliefs, formal and informal rules and procedures as well as norms that *steer* individual behaviours. However, the formation and operation of said culture is influenced by differences of perceptions between parent organisation's and TMO's environment that forms the climate. These notions of evolution and culture-climate interplay is used here to clarify the conceptual stance adopted.

The key terms' defitions are summarized in Table 1 and its relationship is illustrated in Figure 1[1].

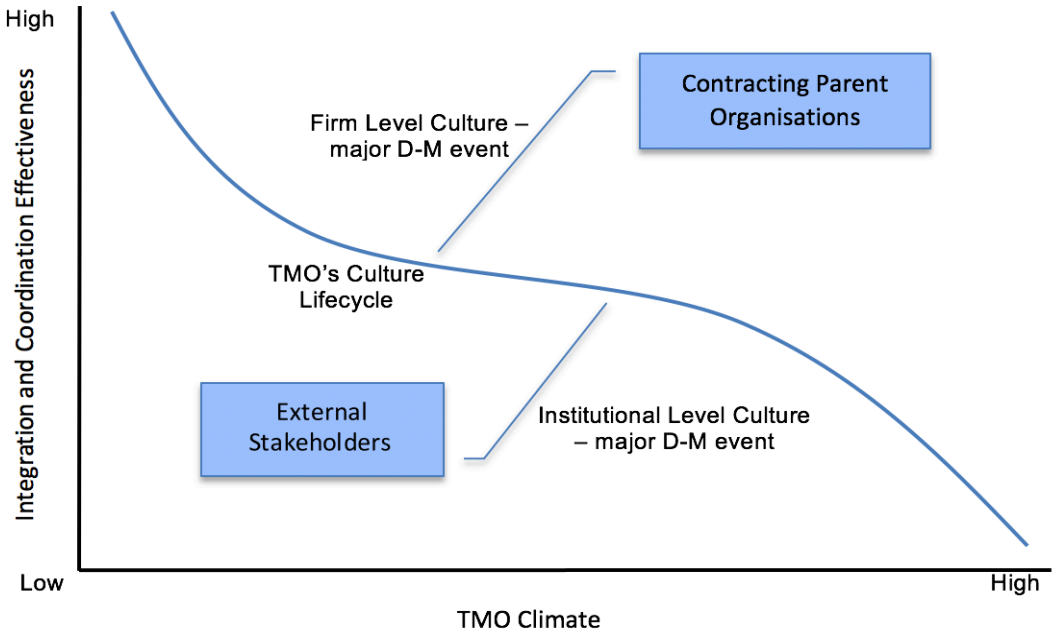


Figure 1 The Generic Compounds of a TMO's Culture Evolution Curve

[1] Figure 1, which is the simple version of the HR diagram, is further explained and illustrated in detail in Chapter 3.

Table 1 Summary of Key Terms' Definitions

Summary of Key Terms Definitions	
Culture	Trusting the other party to come through with their part without watching them all the time, thus establishing a precept for actions, a scheme of expression, and a scheme of interpretation (Adapted from Schuetz, 1944).
Climate	The relative enduring quality of the total [organisational] environment [the ecology] that (a) is experienced by the occupants, (b) influences their behaviour, and (c) can be described in terms of the values [culture] of a particular set of characteristics (or attributes) of the environments" (Tagiuri and Litwin 1968; p. 25).
Evolution	A lifecycle of internal metamorphosis in adaptation to the external ecosystem as a response to selection, which is "the sum of the survival and fertility mechanisms that affect the reproductive success of genotypes [structures]" (Hall and Hallgrimsson, 2008; p. 3).
TMO	Project-based organisations comprising of a variety of organisational forms that involve "the creation of temporary systems for the performance of project tasks" (Sydow et al, 2004; p. 1475; see also Cherns and Bryant, 1984; Lundin and Söderholm, 1995; DeFillippi, 2002; Whitley, 2006).

Research Scope and Objectives

Past Research Focus and Gaps

Although there are many discussions regarding the issue of culture, little had been done with the focus on construction project organisation (both firm and TMO levels) in particular as stated by Auch and Smyth (2010), Phua and Rowlinson (2003), and Ogbonna and Harris (1998; see also Walker, 2007). This is also evident in Turner, Pinto, and Bredillet's review (cited in Morris et al , 2011), where the authors exhibited a series of tabulated data surrounding the topics covered in project management research for the past three decades.

Further, from the three major academic project management research journals (IJPM, PMJ, and IEEE – TEM), only half a dozen articles are published surrounding the topics of culture since the emergence of the concept and its consequences. Most of these are in line with Winch et al's (1997) study in terms of approach and analysis – using static snapshot and quantitative data analysis focusing on Hofstede's individualism-collectivism dimensions (for example, Shore and Cross, 2005 and Pheng and Leong, 2000). Additionally, previous literatures on cross-cultural management in the construction industry address only the issues of *what happened* and *why it happened* questions within the individualism – collectivism and masculinity – femininity paradigm as opposed to the *how* it happened.

Work to date seems to have limited success in presenting a comprehensive, practical

and articulate picture to enlighten this issue at the project level (for example, Chang, 2010 and Chen and Partington, 2004). The discourses within these literatures are limited by what Bachrach and Baratz (1973; p. 11) referred to as “studying the issues rather than the values and biases that are built into the system”. The statement is backed by Cheung et al (2011p. 34; see also Andersen, 2003) where the authors also stated the “culture in construction project management has only been explored under specific context”. Whilst models may help at a general and abstract level, a practical or applied view remains lacking. In other words, there are significant limitations from the previous literature surrounding the timeliness aspect that is heavily embedded within the concept of culture.

In addition, the importance of acknowledging the complexity and temporary factor of the TMO remains underexplored. In this sense, concepts and contexts are either too broadly or too narrowly drawn in that aspects and features of culture are taken as given. Thus frequently disregarding the detail or bigger picture, overlooking, and/or just “brushing over” them. Furthermore, Cheung et al (2011) also mentioned the lack of a comprehensive cultural model for contracting organisations within the construction industry despite the significant number of discourses of the concept since its conceptualization in organisational theory.

Despite these observations, researchers have yet to present an articulate postulate to show *how* these cultural forces (the interplay between values, beliefs, norms, and informal rules and procedures embedded within the different levels of structure as mentioned above) work within the complex construction organisational context and the broader diversity of external settings. Frameworks are presented as listing and ranking the most valued artifacts of culture within organisations in a particular country overlooking the existence of the forces of “climate” (e.g. Cheung et al, 2011) and the dynamics and complexity that are believed to be the fundamental characteristics of culture as stated by Douglas (1999). In this thesis, the postulate is shown through the illustration in Figure 12 (Chapter 3) and the 4-Class System (Chapter 4).

Another gap in the literature is the fact that researchers tend to “merge” ownership, management, and operational levels. For example, where analysis tend to be discussed from the “individual project manager’s (PM’s) perspective” (cf. Engwall, 2003; p. 790; see also Frame, 2002), whilst during this era of globalization – and especially within project based firms – these organisational elements are separate with distinct groups of people with different motivation and goals (Simon, 1959 and 1979).

That is to say, in project-based firms, TMOs operate in a more dynamic and changing environment and therefore should be regarded differently in terms of social and usually locational context.

In sum, the overall research gaps concern the lack of knowledge about and are focusing on (cf. CIB W112, 2012; Fellows and Liu, 2013; Cicmil and Gaggiotti, 2014):

1. The search for a better understanding of Organisational Culture and its theoretical underpinnings in construction project management TMOs. This involves understanding the evolution process of culture and its mechanisms,
2. Challenges barriers and assumptions of cultural non-transferability,
3. Coordination and integration for seamless practice/research.

These gaps are also in line with Jaafari's (2003; p. 56) literature – *Project Management in the Age of Complexity and Change* – where the author stated:

> "As noted the normative approach cannot handle environmental complexity well … there is an acute need to develop the creative-reflective model … that enable management of projects in the age of complexity."

In which case here, this would be the creative-reflective model (Figure 1) of the evolution of culture at the construction project level across the project lifecycle, acknowledging the forces by which culture is shaped and developed as well as recognizing its relationships and interactions – the subtle and intricate ways (cf. Martin, 1995) – between and within the construction contracting organisations. In sum, this study distances itself in from the conventional cultural values research as appealed by Jackson and Aycan (2006) and Cicmil and Gaggiotti (2014).

As with other processes of evolution, there needs to be a trigger. Here, decision-making will be the point of reference to illustrate the cultural evolution in TMOs. There are several reasons to this approach. The first is due to the fact that decision-making is a fundamental outcome of any activities and/or individual behaviours within an organisation (cf. Simon, 1959 and Galbraith, 2011 (1952); p. 166) that is the reflection of the prevailing norms, values, and beliefs. This has been argued to influence the process of selection mentioned above. Secondly, to the extent of illustrating the behavioural orientation of organisational members, in line with Thompson and McEwen (1958; p. 31), "decision-making is potentially useful in analyzing organisational-environmental interaction with respect to goal setting". That is to say, changes in decision-making patterns and other social factors, especially in tense and critical points

of events are strong influencers for the future evolution: formation and renegotiation of culture. However, the fundamental reason is the two dimensions that are incorporated within the decision-making concept, that is, the quality and timeliness dimensions (Galbraith, 2011; 1952) that are very essential for this particular study in relation to the gaps mentioned above.

Therefore, with the emphasis on the *how* aspects in articulating the knowledge gaps mentioned, discourses will focus on the issues surrounding:

- Culture-climate interplay,
- Corporate-project dimension within one organisation,
- Points of events where different organisations in TMOs coalesce,
- Structuration within organizational processes as an evolving outcome stemming from key decisions and major decision-making events that feed back into cultural evolution.

In these ways, although there are other means of articulating the evolution of culture, decision-making is a dynamic and powerful point of reference that is researchable and tangible in the sense of identification.

Aims and Objectives

Whilst culture is important *for* management, it is often not taken seriously *by* management. Hence, given the importance of cross-cultural management and understanding above, as well as the extent/limitations of previous literatures, complexity of project organisations (both firm and TMO levels) and the dynamics of the decision-making event, three in-depth case studies were conducted. As stated in the previous subsection, the case studies chosen were TMOs that belong to a complex cultural ecosystem operating in a project Alliancing context.

In summary of the previous sections, this study aims to explore culture as a concept within the context of construction TMOs, its ecology, evolution, development and management across the project lifecycle (Figure 1). To do so, this study will be drawing upon literatures on organisation, management, and construction project management both from the general management theory of the firm as well as those specific to the construction project management perspectives. The purpose is to provide an articulated illustration of the theme – culture as well as Organisational Culture – exploring the mechanisms and the complexities; and hence interplay, as well as the theoretical underpinnings when brought upon the interface of the construction

contracting organisations and within the TMO throughout its lifecycle. Before continuing further, it is important to map the use of terms in parallel with the issues stated in the previous section as follows:

Table 2 General Discussion Terms and Measures

Term	Measure
Culture-Climate Interplay	This refers to the different levels of structure: 1. National (institutional/societal) 2. Organisational (firm) 3. Project (TMO and individuals that coalesce in the TMO) Dynamics of cultural forces exist across the three whereas climate is apparent in the last two.
Corporate-project dimension	This refers to the vertical hierarchy and horizontal functioning within one organisation within its wider institutional context(s).
Project lifecycle	This refers to the points of events where different organisational elements in the TMO coalesce.
Structuration after major decision-making event	This refers to the instances where established culture-climate interplay collides within the critical points of events across the project lifecycle. Structuration goes both ways: influenced by and influencing the interplay. Hence, acting as a trigger for evolution.

To emphasise, the scope of this study will be surrounding the coordination and complexity aspects of TMO culture as well as its parent organisations to recognize the culture-climate interplay between the two relative to its institutional context. The focus will be on how culture is perceived and interpreted as well as the forces by which it is shaped and developed at the different phases of the construction project lifecycle and within firms. Taking into account the decision-making event as a point of reference, this study aims to develop an instrument with predictive and transferable capability in addition to developing an illustration of the evolution of culture (how it works) during the whole project life and finally, towards a theoretical understanding in Organisational Culture in the construction project context. Hence, the discourses within this study will be beyond the individualism–collectivism and masculinity–femininity cultural values and other elements of Hofstede's overall theories in conjunction with other theories and models which tend to focus on describing the current culture rather than its dynamic development (introduced in later sections).

Rather than explaining what has been happening, which is the trend of previous cross-cultural management researches (for example, Winch et al, 1997), review and analysis will be approached using the "how" question through the interwoven network of issues – within which the concept of culture is heavily embedded such as organisational

structure, coordination and collaboration, judgments, knowledge sharing, and others – surrounding the mechanisms of evolution and the extent of integration between ecology-evolution-development across the project lifecycle. Furthermore, this study analysed how different cross-level values and beliefs affect the performance at a particular level (institutional/organisational/project teams-individuals) in which a diagram illustrating the interactions are presented. As pointed out by Söderlund (2004; pp. 187-188):

> "It would thus be advantageous to more clearly pinpoint and analyze why projects and project organisations differ… Several other questions that might be of interest to project research, such as industry and corporate issues (e.g. strategy, organisational structure, industry regulation and tradition), project issues (e.g. age, size, environmental uncertainty and complexity of various kinds). We thus suggest that project management must be understood as a situated practice where cultural, social and institutional traits are paramount."

To meet the objectives set, the following research questions are generated.

Research Questions

The main research questions and sub-research questions below are generated to assist as well as providing the scope and boundary for the study.

Primary Research Question:

"How does a TMO's Organisational Culture form, operate and evolve?"

In order to address this question in a project context two scales of examination are required – culture and climate – prompting the questions:

"How does the TMO Culture form, operate and evolve under the management and influence of the ecosystem, the contracting firms and within the temporary multi-organisational team?"

"How are both the Organisational Culture of the contracting firms and the TMO affecting and being affected by interplay of the relationships and interactions in decision-making at the project level and across the project lifecycle?"

And finally,

"To what extent can trajectories of evolution be predicted to increase the transferability of TMO culture and hence organisational process?"

To further distance this thesis to extant researches on culture in CPM, the following research setting is chosen.

Project Alliancing – The Research Setting

It has been stated that this research is concerned with the effectiveness of a construction organisation at the project level as a TMO. This is due to the (i) dynamic environment, (ii) multi-interface and (iii) the number of parent organisations involved to deliver a project in a TMO.

Throughout the years, as the nature of the construction industry evolves around its market, the way to do projects have also evolved. As stated by Winch (2014), projects are more and more recognised as a relationship-driven vehicle (as a TMO) rather than the traditional technical-driven vehicle. In this sense, for a TMO to be successful, the project management philosophy shifts from the traditional iron triangle to one that is focusing on governance, assurance and resources. Some level of integration is therefore crucial. From the organisational culture point of view, this means that there is the need to emphasise addressing the problems of coordination and collaboration as put forward by Merrow (2012).

The chosen context for the purposes of this research is Project Alliancing. This is due to:

1. The prerequisites of Project Alliancing that involves top management support, adequate resources and sustainable development (Yeung et al, 2007), and,
2. Cooperative culture as one of the key features for a successful arrangement (Lahdenperä, 2012).

As such, before going any further, it is essential to take some time and discuss the history and nature of Project Alliancing (or Alliancing in short) in construction TMOs; as well as the importance of understanding culture-climate interplay and its evolution in this environment.

The concept of Project Alliancing is first conceived the the British Petroleum to manage one of their oil excavation projects in the North Sea during turbulent market (Sakal, 2005). Sakal (2005) also mentioned that this type of project management is then adopted widely by the oil and gas industry in Australia before spreading to the Australian construction industry and finally re-introduced back to the UK construction industry. However, researchers have been arguing about the true nature of Project

Alliancing and what categorises it (e.g. Anvuur and Kumaraswamy, 2007; Lahdenperä, 2012; Davis and Love, 2011; Hauck et al, 2004; Yeung et al, 2007; Sakal, 2005). Due to this, some if not most researchers tend to equate Project Alliancing with that of Strategic Alliancing and Partnering, whilst in reality, these are three different types of collaborative arrangements (Lahdenperä, 2012; Hauck et al, 2004).

Thus from the above, to understand what the Project Alliancing context is, there is the need to distinguish the differences between Project Alliancing, Strategic Alliancing and Partnering. This is also to emphasise the importance of understanding culture-climate interplay and its evolution in this environment.

First of, a definition of terms. According to Yeung et al (2007), there are numerous definitions of Project Alliancing and the scope of Project Alliancing. That is to say, different projects have different types of Alliancing. However, in this research, Project Alliancing is defined as "the client and associated firms will join forces for a specific project, but will remain legally independent organisations. Ownership and management of the cooperating firms will not be fully integrated although the risk of the project is shared by all participants" (Gerybadze, 1995, cited in Yeung et al, 2007; p. 221). It is further noted by Hauck et al (2004) that the collaborative arrangements of a Project Alliancing do not extend beyond one specific project. As such, the intense integration between the alliance partners must be able to contribute to achieving the major goals and objectives of a particular project (Kwok and Hampson, 1996). This integration then must be realised in a relatively short period of time without prior exposure between the alliance partners.

On the contrary, a Strategic Alliance, that is usually discussed in parallel or as the same concept as Project Alliancing (e.g. Anvuur and Kumaraswamy, 2007), is an "interorganisational arrangement usually between two companies that extends beyond a specific project" (Hauck et al, 2004; p. 144). In this sense, the collaborative arrangements of a Strategic Alliance happen as the parent organisation level as opposed to the TMO level due to the aim for ongoing mutual beneficial business. Thus, this type of arrangement does not require intense and rapid integration between the Strategic Alliance partners.

Lastly, there is the collaborative arrangements in the form of Project Partnering (or Partnering in short). However, unlike Project Alliancing, Partnering is not a form of contract-based collaborative arrangement. Partnering is only a form of relationship

charter to complement the traditional construction contract arrangement in terms of guiding the relationship development among organisations in a single project application (Hauck et al, 2004; Lahdenperä, 2012).

Having distinguished the different concepts surrounding the Project Alliancing literature, it is now clear that although in theory each collaborative arrangement mentioned are to some extent similar, the execution characteristics and mechanisms are different at the TMO level. For example, according to Sakal (2005), Project Alliancing demands more commitments on collaboration, cooperation and best-for-project mind-set. Further, the author also emphasised the importance to recognise the dynamics of corporate-project relationship and interface in that it requires,

"tremendous buy-in at the outset from top management levels of each project participant in the cultural shift away from traditional risk-allocation and distrust, towards principles of this new relational contracting mechanism". (Sakal, 2005; p. 71)

Thus, TMOs that adopt Project Alliancing arrangements require "absolute dedication to a step change in behaviour between the project participants in order to be successful" (Op Cit, 2005; p. 74). That is to say, TMOs in the construction industry must be able to generate a cooperative and trustful climate in order to successfully achieve sustainable integration and for the successful implementation and delivery of the project.

In sum, the relation that ultimately renders Project Alliancing as the most suitable context for this research can be summarised with reference to Boddy et al (2000; p. 1008) and Davis and Love's (2011; p. 449) three factors any organisations should be aware of when attempting on a collaborative arrangement. These are:

1. The intra-organisational context and its affect on initiating behaviour in the corporate-project interface. This pertains to established organisational culture in the form of formal routines and histories at the parent organisation level that might hinder the integration, coordination and collaborative developments at the TMO level,
2. At the TMO level, individuals perceive and partially reconstruct the new project environment before adopting and accepting it as the formal organisational climate,
3. The development or a formal institution to provide support for sustainable integration, coordination and collaboration. Rowlinson et al (2006) stated the importance of the Project Alliance Board's role in maintaining the alliance culture throughout the course of the project lifecycle.

Having set the context of the research, the following significance and value for academic and practical purposes are discussed.

Significance and Value

Academic

In management research, the concept of culture has generally been considered at the firm and/or national level comparison. In construction the focus has generally been on the project. The academic significance of this study is to consider culture at three levels:

1. Institutional level – vertical and inter-organisational.
2. Organisational level – vertical and horizontal.
3. TMO project level (project as a collective team coming from different organisation) – mainly horizontal and both organisational and intra-organisational.

The analysis is filtered through two scales:

1. Top-down and bottom up relationships. That is, the culture-climate interplay within the corporate-project relationships,
2. Changing project environment. That is, managing relational interfaces between project functions and the extent of alignment in exchanges of values/beliefs in pursuit of project goals.

As the previous emphasis has been upon what culture and its configurations look like in static snapshots on the ground, this research focuses on *how* it is dynamically formed and mobilized between the three levels and at the two scales. In this sense, these levels provide an original contribution by extending previous work.

In the absence of a comprehensive cultural framework in construction project management the primary aim of this study is to provide and develop a reflective framework (beyond the interpretive listings and rankings of the most important culture artifacts and espoused values, norms, habits, traditions within the organisation) of the way culture is shaped and developed (its evolution). This includes identifying the implications from the dynamic corporate-project interface (interplay between the culture and climate) across the project lifecycle.

Firstly, this mapping between the levels of structure and the levels of cultural process are illustrated in Figure 5 and Figure 12 in Chapters 2 and 3. As such, incorporating the scales of analysis help address the ***how*** issues – which is a new and original

contribution of this thesis. Secondly, implications of the culture-climate interplay in the corporate-project interface is categorized to three selection mechanisms. These mechanisms (Tables 12, 13 and 14) illustrate in detail which factors could hinder or support the development and maintenance of a TMO's culture across the project lifecycle. Thus, giving clear guidance as to how a TMO's culture will evolve given a particular ecosystem.

Additionally, an articulate review and mapping between ecology-evolution-development of culture through the 4-class system presented in Chapter 4 is also expected to enable the identification of an optimum and dynamic image of coordination and integration processes that transcends across projects. In this sense, it could be further used to give a more "fitting" explanation of what the concept of culture really means in the construction project management context.

A spin-off contribution to the existing knowledge surrounding the topic area of structuration in decision-making events will be the dynamic look towards the integration of the image of the decision-making process between the strategic top management level and the operational project level across cultures. Further, this research presents another spin-off illustration on how culture fosters and facilitates knowledge sharing (types of action, routines and so on) as one of the basis for achieving coordination.

Relevance to Industry

As described within the previous sections, the practice of project management has moved toward a more soft skilled approach to complement the traditional hard skill approach. Winch 2010; p. 410; see also Morris, 1994) strongly argues "the core of project management approach is not the tools and techniques, but the establishment of organisational function concerned with the delivery of the systems to the client". In this sense, an articulated illustration (Figure 12 and Tables 12 and 13) in integrating the dynamic process of cultural formation and change or its ecology-evolution-development within the concept of culture as explained above is expected to enable a "quantum leap" in giving added value to the stakeholders through integrating the complex processes under one agreeable foundation of values as well as improving managerial awareness of the importance of understanding and managing culture in driving the development of project and organisational competitiveness. For example, this could be seen as going hand in hand in reinforcing process transferability, the development of robust conditions of trust and Relationally Integrated Value Networks (RIVANS), in which a more solid and strong evolution of the industry will follow

(Kumaraswamy and Rahman, 2006; Kumaraswamy et al, 2009; Kumaraswamy et al, 2010).

More appropriately, the significance to industry can be seen from the case studies chosen. The notion of Alliancing is fairly new to the UK construction industry. Thus, most practices still focus on the robustness of the Alliancing contract. However, it was found later on in this thesis that an Alliancing contract would not be robust enough to maintain an Alliancing culture without a robust planning and implementation of the behavioural aspect coming from the Alliance Protocol. Secondly, the HR diagram and the 4-Class System will give industry practitioners a more comprehensive illustration of a cultural evolution trajectory. This also allows for a careful planning and strategizing to anticipate cultural decay during the course of the project lifecycle. That is to say, we look at differences in cultural orientations not only as right and wrong, or coherence and incoherence but beyond those on how to make use of these indications before it actually happened. This is expected to enable the firms as well as the TMO itself to optimize and prepare the next step for the birth of the next culture as the environment shifts across the project lifecycle.

Lastly, is further developed, the HR diagram have the potential to measure the magnitude of influence from each parent organisation and external stakeholders toward the TMO culture's evolution path. Thus, providing an even more comprehensive practical understanding on how to manage and maintain a sustainable working culture at the TMO level.

Research Structure

This study aims to fill in the knowledge gap surrounding the concepts of culture in the construction project context by exploring the *how* question about the formation and evolution of Organisational Culture in a construction project TMO. This research adopts an *abductive-retrospective* philosophy for its research approach and theory building since its utilization concerns the interplay and mutual enrichment between the different levels of culture affecting the project TMO (cf. Shimoni and Bergmann, 2006) that is a relatively new perspective in the construction industry.

This research will be divided into four parts. The first part of the study provides the introduction. It covers the background and overview of the whole study as well as addressing the gaps, scope, objectives, and values that could be drawn upon at the end. The main and sub-research questions are stated within this part.

The next part of the study comprises of 4 chapters of theoretical background and literature review. Chapter 1 is introductory in nature to give an introduction as to the concepts of culture and decision-making event as trigger, probing the meaning and scoping the big issue as conceptual groundwork for subsequent chapters. Chapter 2 introduces the context of construction project organisations with emphasis on examining the structure and system as a whole. This will begin with an overview of the construction industry as comprising of a series of complex organisations that are interacting with each other. Pointing out the significant differences with those organisations of unitary nature. It focuses more on initial illustrations of the structure, interplay, and relationship between the construction contracting organisations and their institutional contexts. This is done to understand the degree of complexities imposed from cross-cultural (and climatic) differences in temporary organisations. The themes introduced within this part will be carried throughout the study.

Chapter 3 take up the themes in further details and extensively break them down through a series of literature reviews on the theoretical background as well as other discourses that have been carried out in the previous research – both in general management and in construction project management in particular. This will begin with the history and definitions of the concept of culture reviewed through a series of known cultural theories surrounding the topic area such as Hofstede's (1980) dimension of cultural differences, Schein's (1985) and Casey's Corporate Designer Culture (1996) model of Organisational Culture to name a few on top of the others in providing an illustration of the concept. Any other literature that is of relevance and falls within the scope (either incorporates or challenges these theories) will also be considered and included to enrich the discussions within the review of the literature. Given the structure of the construction industry's activities that involves many different organisations and individuals, a cross-level approach for the analysis will be used with the aim to better explain the relationships and impacts of cultural inconsistencies and values across levels (institutional–organisational–TMO) as pointed out by Kirkman et al (2006; pp. 308-309).

Chapter 4 refines the theories and concepts cited in the previous chapters and provides further explanation on decision-making events and structurations that follow as a trigger for the evolution of culture. An overview to illustrate the logic will be given through a discourse reviewing extant behavioural decision-making theories and the institutional theory and linking them back to the process of structuration. A synthesis

juxtaposing the research's theoretical standpoints and key perspectives are presented at the end of this chapter.

The third part will comprise of the empirical study where methodological choices, presentation, discussion, and analysis of the findings will be presented. This will be divided into 3 chapters starting with the research design and methodology in Chapter 5. The data presentation and analysis will be structured to go hand in hand and point by point, corresponding in parallel with the propositions and postulate claimed. A narration of a descriptive and abductive empirical study to justify and illustrate any propositions made within the previous part of the research (part II) through three construction project TMOs constitutes the next chapter – Chapter 6.

This abductive approach will also facilitate an evaluation relating the findings back to the literature review and reflect upon the validity of theories claimed, the need for new theories and/or amendments and what conceptual and theoretical contribution that may be brought upon from the analysis. This validation and generalisation will also be at the heart of Chapter 6. This chapter concludes with a presentation of the 4-Class system, that is, a comprehensive and articulate framework integrating ecology-evolution-development between the culture-climate interplay from the TMO's point of view that could help integrate the different cultural values into one positive and coherent force, with predictive capability as well as process transferability; hence leading to a more effective process and better TMO performance.

The last part (part IV) of this study will serve as the conclusion and summary of the discussions and analysis of the results and findings of the empirical study from previous part (part III). In addition to the contributions to knowledge section, recommendations and any limitations will be presented and acknowledge within this part also.

Having stated the research interest for this study, the primary problem owners of this study are the TMO and its Alliance protagonists as well as the construction contracting organisations that comprised the TMO. A secondary problem owner would be the external stakeholders and communities whether directly or indirectly affected by the project. An overview of the concepts (culture and decision-making) and context (construction project-based organisations and management) follows in the next part of this study.

Part II

Chapter 1

Linking Concepts to Context

Culture and decision-making are important concepts within organisational studies. The relationship between the two remains scarcely discussed. It presents a research gap, which it has been argued is worth exploring. Furthermore, the meanings of organisation, management, and construction project management in general have also been briefly addressed to highlight the significance of this study. From these three terms (organisation, management, and construction project management), there arise the fact that culture and decision-making operate at various different level; institutional – organisational – project teams (TMOs). As the TMO is focus of this research, both culture and decision-making are viewed as dynamic, operating from the viewpoints of the processes embedded in both the institutional and TMO levels. As such, it adopts a process view in a multi-organisational environment. This will be referred to as the TMO's cultural ecosystem. These different levels of structure are then believed to be in a state of constant interaction that mutually and iteratively affect one another. It is between and within these interplays that the study will be focusing upon. *Between* refers to the interplays between the different levels and *within* as in the interplays between the different units within a particular level (for example, between the strategic top management and functional level within a parent organisation).

In this second part of the research, introductions of each of the main theoretical concepts in the context of construction TMO will be presented. This is to initiate some thought-provoking underpinnings and intricacies of the concepts and context.

Why Culture?

"No one would question today that in some form or another, there are palpable phenomena in groups, organisations and industries that are best described as climate and/or culture"

-- Edgar Schein (cited in Ashkanasy et al, 2011; p. 4)

This quote provides an important reference point and is cited by others (e.g.

Ashkanasy et al, 2011). Culture has been regarded as both broad and complex, yet a critical organisational concept in construction (cf. Tijhuis and Fellows, 2011; Fellows and Liu, 2013). The concept is a ubiquitous part of organisational studies and encompasses shared values and beliefs as well as aligned behaviour and common action. Since the introduction of Geert Hofstede's (1980) seminal study surrounding the five dimensions of cultural differences, the Organisational Culture has been highlighted further and has been developed drawing upon anthropological and other views to something (for example, Douglas, 1999) that can help improve organisational and individual performance. Hence culture also serves as a fundamental factor and milestone to achieve effectiveness and coherence between the different business units *inter* and *intra* organisation(s).

One definition of culture in the organisational context is "the collective programming of the mind which distinguishes the members of one organisation from another" (Hofstede, 2003; p. 180) while according to Schein (2010; p. 13), the concept of culture at this level is used as the "espoused values and credo of an organisation". As we shall see in Chapter 3, there are hundreds other definitions of the term. Researchers have linked these cultural differences at the national level as one of the factors that affect – to some extent – those at the organisational level and further to the organisational effectiveness. In other words, the concept of culture has become a social paradigm that cannot be separated from any management and organisational analysis.

The concept is distinguished into four different categories or levels of culture that are inter-related to each other and is mapped in Table 2 below. The table is derived from Schein's (2010) model due to its simplicity as an introductory explanation to levels of culture in a given society. It closely aligns with the recent works of Fellows and Liu (2013) who generated a similar table on culture levels called "culture spectrum". They seconded Schein's notion that these levels are inter-related by stating that the boundaries are "fuzzy".

Table 3: The Categories of Culture. Adapted from Schein, 2010

Culture	Category	Scale
Macrocultures	Nations, ethnics, industry and market groups, occupations that exist globally	Institutional /societal
Organisational Cultures	Private, public, non-profit, government organisations	Organisational
Subcultures	Occupational groups (business units and functions) within the organisations	Project Team (TMO)
Microcultures	Microsystems within or outside organisations	Individual

According to these categories – within this study's context (construction project management) – it can be said that macrocultures are the ones surrounding the nation or industry (external society and institutions) in which the project TMO and the parent organisations operate. Organisational Culture is the culture adopted within each of the different contracting organisations that forms the project TMO. The subcultures are the culture(s) developed by the project TMOs and are interdependent with the parent organisations. Further, subcultures comprise of the differences in perceptions between the corporate project relationships. Lastly, microcultures are referred to as "task forces that cut across occupational groups" (Schein, 2010; p. 2) and can be referred to as small largely informal and/or task dependent groupings and individuals acting within the TMO levels.

From this, it can be said that subcultures and microcultures represent the climate within the culture-climate interplay. Given these different entities within culture and the definitions of culture given above that point to the need for a cultural unity, dysfunctional frictions and tensions are highly likely to emerge. However, when managed proactively, these frictions and tensions can be creative and constructive to the TMO's competitive advantage. The interplay between these different levels of cultural values and categories is illustrated in Edgar and Teicholz' (2001; p. 255) literature where the authors stated, "individuals must recognize that while they are acting to accomplish the mission of their business unit, they are also acting to accomplish the missions of other business units and the organisation as a whole" and

vice versa up the hierarchy (see also van Marrewijk, 2010)[2].

Understanding cross-cultural management concept as one of the factors of success – such as understanding and fostering cultural unity (or diversity) to improve performance and maintaining competitive advantage in the market (as suggested by French, 2007) – have been debated over the years. This is illustrated in the definition of culture as "a set of understandings or meanings shared by a group of people, where the meanings are largely tacit among members, clearly relevant to the particular group, and distinctive to the group" (Louis, 1980 cited in Linstead et al, 2009; Thompson, 2009; Liddle, 1996; Alisjahbana, 1966; Siehl and Martin, 1981). These meanings are then passed on to new group members.

Extending the above and in relation to Table 3 above, Liddle (1996; p. 143) stated, "in reality, this set of shared understandings or meanings are made up of many, often conflicting, patterns of values, beliefs, and customs that are forever changing in accordance with changes in both the internal and external environment". This is backed by Giddens (2001; p. 23) whereby the author stated, "Even within one society or community, values may be contradictory". As we shall see in the next chapters, this is very much apparent within the construction industry due to its nature and characteristics. Now, most researchers mainly linked cross-cultural differences at the national level (Hofstede's dimension of cultural differences) as one of the factors that affect organisational effectiveness. Additionally, Winch et al's (1997) study surrounding the Channel Tunnel project suggested, "The interactions of industry and Organisational Cultures with national cultures need to be determined and isolated". Walker further emphasized this particular problem by stating that "the work of firms in the construction industry and its professions present two types of management issue: the problem of managing firms and that of managing projects" (op cit., p. 7). In which case these two types of management issue are usually too narrowly drawn in previous literatures as stated in the previous chapter.

There have been a number of discourses surrounding the concept of culture where differing opinions of what culture really is and how it contributes to the effectiveness of organisational performances have been brought forward, notably Smircich (1983), Peters and Waterman (1982), Siehl and Martin (1981), and Louis (1980) in the general organisational context and Orr and Scott (2008), van Marrewijk (2007, 2010), van

[2] It is worth acknowledging that Kumaraswamy and Rahman (*eds.,* 2006) developed a crude version of this but it is believed that Schein's version suits the scope of this study better.

Marrewijk et al (2008), Auch and Smyth (2010), Tijhuis and Fellows (2011) and Fellows and Liu (2013) in the project context. Following Hofstede's study, several other researchers such as House et al (2004), Trompenaars (1993) and Schwartz (1994) have also introduced slightly improved theories in approaching these dimensions of culture. In addition to the national analysis, researchers have also analyzed culture at the detailed organisational level, for example, Schein (1985), Deal and Kennedy (1982), and Douglas (1999), which focuses on the exploration of the operational complexity within particular groups and organisations.

However, the focus of this research is on the relationships of cultural values interwoven within the TMO ecosystem. Hence, although different theories on culture will be acknowledged, detailed discussions in Chapter 3 will only be made to evaluate the extent of relevance of these theories in providing a starting point from which the evolution process and mechanism of culture can be illustrated. For example, Schein's three levels of culture acknowledge the reiteration process in the culture-climate interplay. Hence, the theory will be used to the extent of complementing any discussions that arise from the "various conventions, recipes, scenarios, principles of action, and habits of speech and gesture" (Sewell, 1992; p. 8) that make up the fundamental "tools" of thought in a given society that further influence the relational space within the project ecology. The concept of project ecology will be explained further in the next chapter.

Given the different categorization or levels of culture (Table 3), frictions and tensions are expected to emerge and hinder the TMO's ability to achieve effectiveness. Furthermore, different categorizations of these cultures from Schein's perspective are themselves further diversified by a mixture of behavioural perceptions becoming "bits of colored glass in a kaleidoscope" (Liddle, 1996; p. 143). This makes the set of prevailing understandings and meanings differ in each project. For example, Jaafari (2003; p. 51) put forward an accentuating view, stating:

> "In many countries of the world where the dominant view is that of strong cultural affiliation, there will be a predominance of Type 3 persons [fanatics, extremists], who not only resist change but may in fact mount a concerted battle against it … Thus, there may be inherent resistance to any project that threatens the traditional values of the affected communities or the power base of their leaders".

Hence, the different cultural values held between the various functions within the TMO can be equated as the bits of colored glass as Liddle put it, requiring constant integration (as well as re-integration) and coordination in developing maintaining a sustainable TMO culture. Another way of saying this is that these differences form

distinct cloisters (fragments) within the TMO, which is especially apparent and complex during the first “take off” and transition stages of the project lifecycle. However, this study will also argue that at the end of the lifecycle, established culture that evolved overtime at the TMO level will then serve as a climate that challenges an outdated culture (if any) at the organisational level into the one that fits the environment at the time to maintain competiveness; hence the terms evolution and dynamism.

This study conceptualizes cultural evolution as *a lifecycle of internal metamorphosis in adaptation to the external ecosystem* as a response to *selection*, which is “the sum of the survival and fertility mechanisms that affect the reproductive success of genotypes [structures]” (Hall and Hallgrimsson, 2008; p. 3). That is to say, TMOs are fertile and have internal survival mechanisms to survive in its given external project environment. This is viewed as a “complex interplay between two kinds of processes, interaction and replication [reproductive success of structures] (Hull, 1980; 1988), acting on two kinds of entities, ecological and genealogical [conservation and transferability of a bundle of processes] (Eldredge, 1985; 1989) at a variety of levels of organisation” (Baum and Singh, 1994; p. 4; see also Weeks and Galunic, 2003) with the aim to maintain competitiveness in an ever-changing environment. These processes and entities make up the evolution mechanism. How this came to relevance will be discussed further in the next chapters.

In addition to the problems stated above is the underestimation and misconception regarding the importance of understanding as existing in an ecosystem as one of the factors that influence effectiveness in the organisational context. For example, Liddle (1996; p. 66) stated that it is a common misconception within society that culture is “the sum of the peaks of the various regional fine arts traditions”. Drawing from the these, although it is commonly accepted that cultures change overtime (Clegg et al, 2008; p. 224), Liddle (1996; p. 65) argued that a vast geographical area and number of ethnic groups will create deeper variety of ideas that further sharpen the cultural dichotomy that leads to difficulties to predict how the TMO culture will evolve across the project lifecycle (particularly during the project initiation and definition phase).

Moreover, according to Alisjahbana (1966; p. 183) the degree of a cultural unity at one time or place “depends directly on the frequency and intensity of contacts between its members”. This also implies that strong governance and rigid hierarchy (power) within the corporate-project dimension are the underlying factor for cultural understanding. However, as suggested by Schattschneider (1960, cited in Bachrach and Baratz, 1973;

p. 8), “organisation has a bias in favor of the exploitation of some kinds of conflict and the suppression of others because organisation is the mobilization of bias”. In this sense, shared beliefs become espoused to various degrees, some being emphasised in strategy, reflected in organisational structure, tactics and norms to the extent that what is routed in reality becomes perceived to be sufficiently important that the perception is now out of proportion to the reality – a bias has crept in. Hence, given the different organisations involved within the ecosystem which forms the TMO, strong governance and rigid hierarchy tends to lead to a struggle for power (for influence and power among members, personal competition) and politics (bureaucracies).

From a previous construction-related study of two very culturally different countries – Indonesia and the UK (Kusuma, 2011) – there are findings that help inform and justify the problem cited. Firstly, the frictions and tensions from Table 1 above have been observed in the sense that the concept of culture (the prevailing values and beliefs) is perceived and interpreted differently between the two countries and that the concept of effectiveness is also measured differently (cf. Hofstede, 2003). The findings identified significant differences on the underlying forces in the development of a project culture between the two countries leading to differences on the severity and perceptions of the measurement of impacts to the effectiveness of management. Further analysis showed that the biggest impact culturally comes from the different basic assumptions and espoused values held individually between the project team members whereby extra efforts and attention must be focused. The shadowing of a rigidly imposed set of prevailing norms is therefore not recommended. The causality or *how* these arose was not addressed in that research.

However, the study did provide a springboard to support the identification of the knowledge gaps set out in this research around the complexity and temporary factors as well as the dynamism of culture. An articulate model of the evolution of culture that recognizes the dynamics of the project lifecycle and fitting the construction project management context is still to be produced. Hence, this research is built upon this analysis, using it as a springboard in achieving the research aims and objectives stated around the main issue of how Organisational Culture is formed and evolves within the TMO and construction domain.

Why Decision-Making?

“Indeed, only by myth-making, only by becoming ‘sub-creator’ and inventing stories, can man aspire to the state of perfection that he knew before the fall. Our myths may

be misguided, but they steer however shakily towards the true harbor, while materialistic 'progress' leads only to a yawning abyss."
-- J. R. R. Tolkien (1931, cited in Carpenter, 1977; p. 150)

This interesting quote sums up the arguments made thus far surrounding the need for an integrated soft system in parallel to support operations in the absence of an integrated hard system; the former being the key to achieving an effective functioning of the hard system (cf. Smyth, 2013; Smyth and Kusuma, 2013). This study has chosen the concept of decision-making and its structuration as a point of reference to illustrate the mechanism of selection within this myth-making activity.

It is important to note before going on further into the discussion, that the concept of decision-making and the structuration that comes after is used primarily in this research as a benchmark for identifying the start or end of a culture evolution cycle. It is argued in this research that an evolution of culture in a TMO can be observed after a major decision-making event that forced an established TMO culture to change and adapt. This is not to set aside the fact culture influences incremental day-to-day decision-making events within a TMO. However, since the focus of this research is to understand how a TMO culture evolves and to identify its mechanisms, discussions focusing on this incremental causal relationship between culture and decision-making process is irrelevant. Thus, the focus of discussion is on the notion of structuration (Giddens, 1981) and the structure-agency debate that exists within a decision-making event.

Structure implies a notion of "social whole which can be conceptualized as consisting of interdependent parts" (Baber, 1991; p. 225). According to Giddens' (1981; p. 27) theory of structuration, structure is both "the medium and outcome of the practices which constitute social systems". The author continued to state that structure has two main elements, which are rules and resources including norms that govern behavioural interactions. Rules being all the varieties of *"cultural schemas … that make up a given society's fundamental tools of thought … the various conventions, recipes, scenarios, principles of action"* (Sewell, 1992; pp. 7-8) and resources being both human and non-human being the *"manifestations and consequences of the enactment of cultural schemas"* (Sewell, 1992; p. 11). Both these rules and resources exist at various levels within a TMO's ecosystem and will have different logics and dynamics (Sewell, 1992; p. 16).

On the other side of the coin is the notion of agency. Agency is referred to by Giddens (1979; p. 55) as a "continuous flow of conduct". The agency theory implies to the relationship between the principal who delegates work and the agent who conducts the work on behalf of the principal (cf. Eisenhardt, 1989a), concerned in addressing the relational problem that can occur between the principal and the agent due to conflicts that arise from the differences in "desires or goals" with the aim to form collective projects (Sewell, 1992; p. 21). Sewell (1992; p. 20) further emphasized that:

> "Agency is formed by a specific range of cultural schemas … available in a person's particular social milieu. The specific forms that agency will take consequently vary enormously and are culturally and historically determined."

In other words, the actions of agents are the representation of the social structure – a particular set of social relations and particular culture in which individuals are born into (New, 1994; p. 188) which forms the individual's basic assumptions. Under Giddens' theory of duality, this then accumulates to represent the institutional level of culture. From this, it can be said that structures at the different levels within a TMO's cultural ecosystem frame the parameters of interpreting the implications of a major decision-making event.

For example, in the sense that the level of "discursive consciousness" under the description of the culture at an institutional level will be different (if not significantly different) to those at the organisational and further at the TMO level. Hence, this will put boundaries around perceptions of a decision event as individuals may "know little on the ramified consequences of the activities in which they engage" (Giddens, 1984; p. 26) when descriptions are different. Some will prove to be implicit and explicit constraints while others aid to sensible adaptation by framing the context.

From the above, it can be said that structuration in post decision-making event in this sense are merely the embedded results and consequences of past decisions and actions. These constraints are illustrated by Cohen et al (1976, cited in March , 1988; p. 296) as follows:

> "Although organisations can often be viewed conveniently as vehicles for solving well-defined problems or structures within which conflict is resolved through bargaining, they also provide sets of procedures through which participants arrive at an interpretation of what they are doing and what they have done while in the process of doing it."

In sum, the structure-agency debate emphasized the complexity and dynamics of culture-climate interplay as well as its implications in process transferability within a construction TMO well. Structuration refers to the "process of production and reproduction of social systems via the application of generative rules and resources"

(Poole et al, 1985; p. 76). To this extent, the theory is within the scope of this study to illustrate decision-making as a trigger to the evolution of culture across the project lifecycle. This will be unpacked further in the context of the construction industry and TMOs in Chapters 2 and 4.

Chapter 2

The Context of Project Complexity as Temporary Multi-Organisations and a Social Construct in the Construction Industry

Given the number of previous literature published under the theme culture – whether within the construction project management or the general organisational context – it is important to start off the literature with a review on the functions and operations of a complex project based organisations to further map the context of the study. As emphasized by Earley and Singh (1995; p. 338), "the key to conducting quality intercultural management research is to understand the contexts in which firms and individuals function and operate". This is essential to distinguish this research from previous research on culture, whilst highlighting the relationship between projects and their management from the outside looking in within their institutional context as well as emphasizing the relevance of the study itself.

Let us start with the nature of the construction industry. The construction industry is one of the largest and most important sectors in the economy (cf. Ive and Gruneberg, 2000). According to a report by UKCG (2009), the construction industry contributes around 10% of the total UK economy in 2008 and is a "driver of historical GDP growth". Further, the report (UKCG, 2009; p. 7) suggested the significance of the impact of construction in the following:

> "Construction is one of the best ways of stimulating economic activity – not just in the construction sector, but across the economy as a whole, including troubled manufacturing sectors. It also has one of the lowest levels of imports, so the stimulus spending stays within the national economy."

Winch (2010) backed this by emphasizing how failure to achieve efficient and effective construction cycle will lead to heavier long-term implications for other assets in the economy and for society to "create new value" (op cit., p. 31). However, the characteristics of the industry's activities are distinct in the sense that every project must be treated as separate with its own individual settings. In other words, "the timing and progress of work in the construction industry is dependent on climatic conditions" whereby "each construction project is discrete and temporary" (Ive and Gruneberg, 2000; pp. 149-150; cf. Rosenfeld et al, 1991). Furthermore, Jaafari (1984; p. 27) suggested that due to the significance of its contributions to national growth, it is then of equal importance to be able to identify these distinct project characteristics to

address performance and failure issues for the effective functioning of the project itself as well as of the broader economy.

It has been emphasized in the beginning that a TMO must not be seen as a unitary concept that is static and positivistic relative to its organisational and institutional contexts. Cherns and Bryant (1984; pp. 181-182; see also Goodman and Goodman, 1976) stressed the importance in seeing and referring to construction projects as:

> "An engagement over different points in time of several organisations … [whereby] the management of a construction project from inception to completion is a function of a *temporary multiorganisation* (TMO) comprising relevant parts of these component [parent] organisations … [and] is determined more by … their coordination than by the form of the contract."

From this, it can be said that the authors placed greater emphasis on effectiveness than efficiency. Having said this, Turner and Müller (2003; p. 7) define a project as:

> "A temporary organisation to which resources are assigned to undertake a unique, novel and transient endeavor managing the inherent uncertainty and need for integration in order to deliver beneficial objectives of change".

From these definitions, the authors suggested that as a TMO, a project is formed to reduce the implications of and manage change and uncertainty that are otherwise too difficult for the functional parent organisation; for example, to manage or keep up with unique current market demands. Hence, every project has the novelty characteristics depending on the time and space of its operation. As Söderlund et al (2008; p. 523) put it, "project is a process that is undergoing continuous development and change". The process of adapting to these changes and uncertainty whilst maintaining effective alignment is enormously complex, *encompassing myriad decisions and behaviours at several organisation levels* (Miles et al, 1978; p. 547). In the construction industry, a TMO comprises of actors from different business units and disciplines that are further attached to different parent organisations. In other words, at the construction project level, the TMO is formed through the different units of production of the parent organisations that have to come together and perform in a cohesive manner. These differentiated parts that form the TMO give rise to the notion of project complexity due to the degree of operational interdependencies and interaction between different organisational elements (cf. Baccarini, 1996). Thus, it is noteworthy to stress that this complexity further generates uncertainty and ambiguity. Therefore, there is the need to understand the way by which integration should be approached and managed to improve project management process.

From the discussions above, it can be seen that the construction industry and the structure of the organisations that operate within it are different to those of the

functionalists' and traditional view of the theory of the firm. Not only that this is due to the diverse nature of the internal and external environments surrounding these organisations but also due to the dynamic factors influencing the processes of the construction project lifecycle. From the brief description of the problems taken from Winch et al (1997) and Walker (2007) within the previous chapter, it can be seen that the differentiation of needs between the strategic management level and the operational project level leads to a significantly more complex organisational structure within the construction project management context. In this sense, it is essential then, before going straight into the review of the implications of the concepts and contexts introduced, that this study takes a step back to critically define the unique nature of project-based organisations within the construction industry. This will be done by firstly comparing the general traditional (unitary) and pluralist views of the organisation structure and processes (between M-form and P-form corporation) whilst incorporating theories on complex project-based organisation in construction before finally arriving to the specific TMO as a social construct as well as project ecology.

The purpose of this approach is to provide an understanding of the diversity and complexity of the internal and external factors influencing construction organisations at both the strategic and operational project level as well as its relationship in reference to the primary topic of this research: culture. In doing so, this chapter will also theoretically address the second and third research questions (How does the TMO culture form, operate and evolve? How is the culture affected by relationship and interaction dynamics across the project lifecycle?).

Construction Project-Based Organisation and Management – What Are They?

Researchers have argued that organisations move from the functional or traditional style of management to one that is project based as a strategy to adapt to the changing environment (cf. Firth and Krut, 1991; Turner and Keegan, 1999; Lundin and Söderholm, 1995; Hobday, 2000; DiVincenzo and Mascia, 2012; Sydow et al, 2004; Turner and Müller, 2003; Modig, 2007). Researchers also view project-based organisations as a variety of organisational forms that involve "the creation of temporary systems for the performance of project tasks" (Sydow et al, 2004; p. 1475; see also Cherns and Bryant, 1984; Lundin and Söderholm, 1995; DeFillippi, 2002; Whitley, 2006). To better understand the uniqueness of culture in complex project based organisations, let us turn our attention firstly, to what researchers conceive of by the concept of organisation and management itself.

Organisational studies have moved from the closed systems point of view on what an organisation is – that regards organisations as machine-like entities – to include open systems thinking. This includes the consideration of both internal and external environmental factors within which an organisation operates, be it economical or behavioural. As stated by Engwall (2003; p. 790) “organisational actions always take place within a societal web of structures, resources, values, and players” (see also, Blomquist and Packendorff, 1998). Rather than seeing an organisation as a machine that could be conveniently controlled, Handy (1999; p. 23) stated, “organisations are first and foremost fascinating collections of people … the challenge is to make them productive and useful communities”. In other words, organisations are institutions formed to achieve certain aims and objectives, which is done by combining the economic criteria with the behavioural criteria to provide the direction and control to achieve said aims and objectives as suggested by Burrell and Morgan (1979; p. 169). Furthermore, in reality, there are different processes and/or goals within an organisation that comes from various components, such as the actors.

The definitions of an organisation stated above led us to the concept of management. Wren (2005; p. 12) defined management as “the art of arranging physical and human resources towards purposeful ends”. According to Cleland and King (1983; see also Walker, 2007; p. 4) management – in the functional organisational context – is an operational concept that “identifies the [organisation] observable criteria of organized activity, objectives, relationships among resources, working through others, and decisions”. These two concepts are believed by the authors to be intrinsically interlinked with each other. Hence, the management of this organized activity then requires “an understanding of the context of the organisation, of its history, and of its purpose” (Handy, 1999; p. 23). As Weeks and Galunic (2003) argued that the culture of an organisation is a reflection of its history and purpose, in other words, effective management requires an understanding of the prevailing cultural values of the organisation, its norms, beliefs, and procedures. Putting it differently, before a domain can be properly managed, it must be rendered “knowable in a particular way” (Townley, 1998; p. 193) and to render them knowable is to understand the interplay between the different levels of social constructs and structures in the ecosystem, which are the manifestations of the culture-climate interactions overtime and objectivised or projected as knowledge.

In the specific construction project management context, Walker (2007; p. 5) defined the concept of management as:

> "The planning, co-ordination, and control of a project from conception to completion … in terms of utility, function, quality, time, and cost, and the establishment of relationships between resources, integrating, monitoring, and controlling the contributors to the project … and evaluating and selecting alternatives in pursuit of the client's satisfaction with the project outcome".

This is backed up by Morris (2011; cited in Morris et al , 2011; p. 15) for project management is viewed as a "social construct … where people are charged with spending significant resources, [hence] misapprehension can be serious". As opposed to the functional organisation, construction project-based organisations are viewed as the most complex organisational entity (Thompson, 1967). This is due to its temporary nature (Lundin and Soderholm, 1995) and that projects are generally conducted as "coalition of members drawn from different organisations" (Pryke and Smyth, 2006; Winch, 2010) with the aim to integrate different individuals and expertise across organisations into one coherent force in addressing the dynamics of management in a more adverse environment (Davies and Hobday, 2005). Given the numbers of the different organisational entities, cultural implications toward effectiveness at the project level will be more severe and complex. Hence, it can be said that the management of construction TMOs requires an understanding between the interactions surrounding relationships among actors (inter and intra organisational) and the structure of the contracting organisations within which preferences of power and politics are embedded at the different levels (strategic and operational project level) in relation to these internal and external environments (cf. Baccarini, 1996). In short, it requires an understanding of the evolution and integration of the different cultural forces affecting the TMO – vertically between the institutional/organisational/TMO-individuals and horizontally across the project lifecycle overtime.

From the above, it can be seen that project TMOs clearly exist as part of a multi-organisational ecosystem and are heavily influenced by the interaction of the socio-cultural systems within various levels of its institutional contexts in which they operate. Despite this, the management of projects tends to rely heavily on the *hard paradigm* such as to focus on technical precision, skills, and other quantitative measures (cf. Aritua, Smith, and Bower, 2009). However, the rigidity of hard paradigms limits flexibility and innovation (contingent and open systems thinking) needed in addressing uncertainty and it certainly is unable to overcome ambiguity. Furthermore, Sydow et al (2004; p. 1476) emphasized that there is a recurring set of dilemmas within the managerial practice of project-based organisations, that is:

> "Between the autonomy requirements of project participants and their embeddedness within organisational and inter-organisational settings that demand integration of project activities within organisation command and control routines and/or inter-organisational coordination efforts."

Based on these, researchers have argued that in an environment that borders on complexity and chaos, there is a need for a paradigm shift from the hard traditional management concept to a soft paradigm that is conceived within *the organisational, project organisation* [TMO]*, and individual cultural contexts* (Aritua, Smith, and Bower, 2009; p. 78; cf. Taxén and Lilliesköld, 2008).

Before delving deeper into the relationships of project complexities and culture, let us take another step back to discuss the functionalist organisation and its unitarian view that is often found imposed onto many TMO cultures and is often the cause of spectacular project failures in their diverse complex environment (cf. Jaafari, 2003; Loosemore, 1998); this contrasts to the pluralist view. There is a need to understand the complexity of interplay between the different levels of structure affecting the TMO in illustrating the evolution of culture across the project lifecycle. As emphasized by Berger and Luckmann (1966; p. 134):

> "To understand the state of socially constructed universe at any given time, or its change over time, one must understand the social organisation that permits the definers [individuals within the project organisation] to do their defining."

The Functionalist Organisation and Its Unitarian View – VS – The Complex Project Based Organisation and Its Pluralist View in Managing Construction Project Complexity

The M-Form Organisation

The functionalist organisation can be illustrated using Minztberg et al's (2003; p. 209) illustration on the *six basic parts of the organisation*. The authors see a functionalist organisation as rigidly structured, comprising of an operating core, a strategic apex, middle line management, technostructure, and support staff, all of which are wrap in a halo of ideology (see Figure 2 below). This ideology is the culture of the organisation encompassing the traditions, values, and beliefs. The functionalist organisation is further viewed as having unified and common culture where conflicts arising from differences in interests are rare. Therefore, coordination is structured in a hierarchical manner and can be achieved through the standardizations of values, beliefs, informal rules and procedures as well as norms, in other words, the standardization of culture. Firth and Krut (1991) suggested that this form of managerial approach is most appropriate and effective in a stable environment where "organisations value repeating skills, and emphasize cost reduction and large output" (see also Aritua, Smith, and

Bower, 2009). The functionalist organisation then reflects Söderlund and Tell's notion of the M-form organisation (cited in Morris et al , 2011)[3].

However, it has been strongly argued that, with reference to Hedlund (1994) and Prahalad and Hamel (1990), the M-form organisation that focuses strongly on formal organisational aspects such as division, permanent structures, top management, vertical integration, and hierarchy are less effective in utilizing its knowledge and core capabilities. Further, Clark and Wheelwright (1992; p. 9) emphasized that the process of integration for effective process is particularly challenging in organisations with strong functional groups. This study claims the reason behind this is the presence of cognitive as well as relational distance in interpreting culture between the top management policy maker point of view and what is actually perceived and happened at the lower hierarchy within the construct. This is also due to the fact that organisational effectiveness is usually achieved from dominant coalition rather than unitary command systems where different individuals hold different perceptions toward the prevailing values, reflecting a "divergent of interests" (Lampel, Shamsie, and Shapira, 2009; p. 843; see also van Marrewijk, 2010). These arguments point to the significant presence of organisational climate that is also influenced by experience and history of the perceivers (Chapman et al, 2008).

All in all, the functionalist approach views the whole TMO as part of one parent organisation. Whilst in reality, construction TMO consists of different parts coming from different organisations with different histories and social constructs *confounded by simultaneous learning of other actors and by errors in perceiving performance* (Levinthal, 1991; p. 143) where a single profession cannot possibly *codify* the whole field (Lundin and Söderholm, 1995; p. 444).

[3] It is worth acknowledging though, that Mintzberg's model is probably the most accommodating and flexible in his more organic model, which allows for primary and secondary forms in any one organisation and for different organisational types.

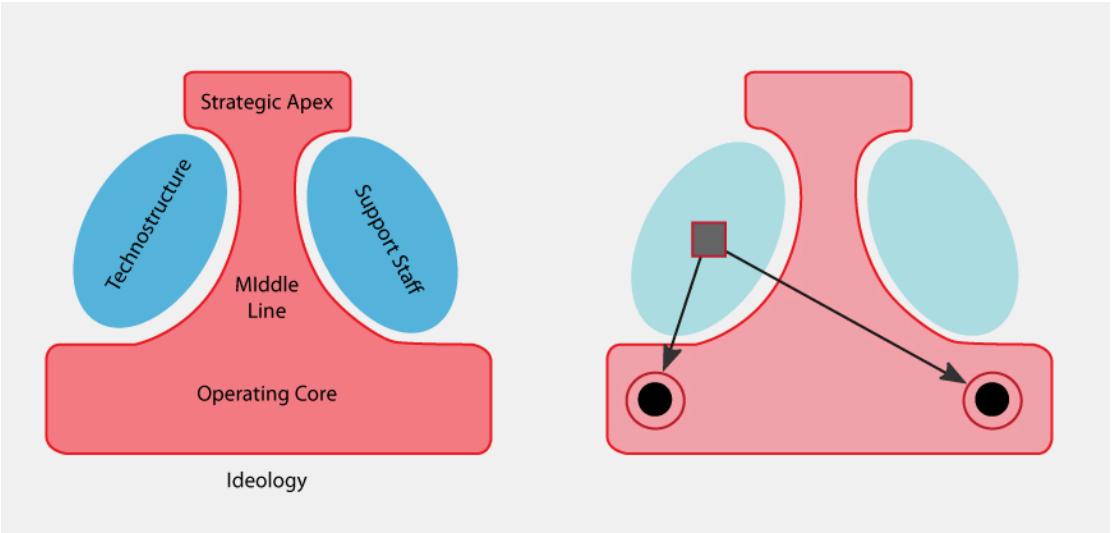


Figure 2: The Structure of the M-Form Organisation and Its Functional Standardisation of Work. Adapted from Mintzberg et al, 2003.

According to Burrell and Morgan (1979; p. 204), the *unitary view* of organisation is "epitomized in the classical theory of organisations which tends to view the organisation as a machine geared to the achievement of formal goals". It has been noted that most understandings in the functioning and management (structure and processes) of M-form organisations – even at the TMO project level – stem from Max Weber's theory of bureaucracy (for example, Burns and Stalker, 1961; Barnes, 1960; Hage, 1965; Thompson, 1965; Litwak, 1961). The theory places a strong emphasis upon the clear-cut hierarchy of authority in coordinating human activities where everything is imposed from the top down. Giddens (2001; p. 348) stated that according to Weber:

> "Bureaucracy is the only way of coping with the administrative requirements of a large scale social systems. As tasks become more complex, it is necessary for systems of control and management to be developed in order to handle them. Bureaucracy emerged as a rational and highly efficient response to those needs."

In this sense, a functionalist organisation in the Weberian view is regarded as "sophisticated" machine like entities focusing on the maximized combination of skills, accuracy, and speed. As we recall it, this is the primary view of managing construction projects – as mentioned in the earlier sections – to improve and promote maximum efficiency in fulfilling project requirements.

Indeed, bureaucracy in this sense denotes the participation of the lower chain of the hierarchy and emphasizes control from the top down where subordinates are obliged to obey explicitly. From this point of view, organisation is "independent of the personalities and psychological dispositions of individual members" (cf. Blau and Schoenherr, 1971) in which case, organisation are not people but a set of rules and procedures where

strong authoritarian culture is subject to legalism whereby the rules are served rather than the purposes for which the rules were put in place, which at the extreme leads to economic inefficiency and social abuse. This study begs to differ from this functionalist view of managing organisations especially within the complexity of a TMOs cultural ecosystem.

Illustration 1. Functionalist Organisational Culture in the Realm of Complexity

In managing a complex multi-cultural TMO, regardless of Weber's notion that bureaucracy is the best way for an organisation to control organisational activities and outcomes, overlooking the complexity of the construction TMO – brushing over the effectiveness factor – and adapting this functionalist approach will lead to internal failures. Baccarini (1996; p. 201) emphasized this by stating, "the application of conventional systems [functionalist view] developed for ordinary projects have been found to be inappropriate for complex projects". The most vivid example of bureaucratic failure – where functionalist approach is applied within the management of construction TMO as it usually is – can be illustrated using Loosemore's (1998) literature on *The Three Ironies of Crisis Management in Construction Projects*. The author stated that at the time where crisis occurs, stress is created by a sudden change in which the use of normal routine procedures is irrelevant and there is a need for a flexible approach supported by open communication. However, open communication is not part of a bureaucratic culture. Hence, rigid set of rules and procedures tend to be dysfunctional as differences in interpretations toward these formal guides produce more ambiguity and causes further differentiation (Blau, 1970). This then leads to a fragmented rather than collective project coalitions resulting, cumulatively in a worse situation that is usually called a "blame culture" that hinders effectiveness. Merton (1968; cited in Burrell and Morgan, 1979; p. 185) really emphasizes this in his argument:

> "Bureaucratic operations, with their emphasis upon method, prudence, discipline, and conformity, may have such as impact upon the bureaucrat that the adherence to rules and regulations, originally conceived as means to wider purposes, become ends in themselves. There thus occurs a displacement of goals – an instrumental value becomes a terminal value."

Winch (2010; p. 146) backed this by stating that conventional systems of control as means to manage moral hazards and opportunistic behaviours have the "tendency to generate vicious circles of adversarial behaviour [relations] between parties and over-engineering". In addition to the above, Buckley (1967; cited in Burrell and Morgan, 1979; p. 100) maintains that "mechanical and organic systems models are inadequate, since they are based upon an outdated view of science and do not

recognize the special qualities of socio-cultural systems" (see also Weeks and Galunic, 2003). Furthermore, Selznick (1966) emphasized the inability of the formal aspects of organisations in justifying the non-rational aspects or individual behaviours. The author further argues that the problem becomes that of "establishing how the organisation limits the cumulative and potentially destructive influence of the dysfunction" (cited in Burrell and Morgan, 1979; p. 187) vis-à-vis the institutionalized environment.

In sum, functionalist organisations tend not to rely on norms and informal routines even when they work perfectly well, preferring to formalize the routines so they can easily be monitored, managed and accounted for. This is the cultural embedded nature. This can be argued as enhancing integration but actually reduces it because it slows things up, increases costs and provides managers with opportunities for objections – hold up, principal-agent problems and others.

The P-Form Organisation

As opposed to the functionalist view, it is proposed by Baccarini (1996; p. 202) that TMOs are complex due to its structure consisting of a variety of *interrelated parts* and its operation is characterized in terms of *differentiation and interdependency* through the engagement of *several separate different organisations*. It is worth emphasizing once more that this complexity spans over several dimensions of project management process in terms of culture and climate manifested within different organisations, environments, systems, and decision-making events. In other words, with reference to Söderlund and Tell (2011; cited in Morris et al , 2011; p. 212), in addressing cross-cultural management issues, the P-form corporation must be viewed as part of its institutional context operating on several levels:

1. The institutional level (the permanent system/societal),
2. The organisational level (the permanent system/firm/corporation),
3. The project level (the temporary system/team-individual/organisation).

Hence, as opposed to the mechanistic and rigid approach of the functionalist view, this study believes that P-form approach present a dynamic and integrated view of the construction TMO as a whole in illustrating the evolutionary dynamics of both the TMO and the firm through the lens of the interaction of culture and climate at these different levels.

According to Söderlund and Tell, with reference to Davies and Frederiksen (2010; cited in Morris et al , 2011; p. 202), there are three different forms of project based organisations or firms. These are:

1. Single project organisations – megaprojects
2. Project-led organisations
3. Project-based firm – those often found in the construction industry.

The finite period of time of the TMO within the construction industry is temporary in nature of unique design and structure has been emphasized. Resources are configured accordingly both in explicit and implicit terms. Construction TMOs comprise of organisational actors who are *encouraged to show initiative and make contributions at all levels* (Firth and Krut, 1991; p. 438). These actors come from different business units and disciplines that are further attached to different parent organisations. In relation to the unitary view, literatures suggest that standardization of culture and hence rigidly imposed structure and processes, are nearly impossible due to environment volatility and change between each project in practice. This is illustrated in Ive and Gruneberg's (2000; pp. 149-150; see also Rosenfeld et al, 1991) statement that "the timing and progress of work in the construction industry is dependent on climatic conditions" whereby "each construction project is discrete and temporary". Hence, the characteristics of the industry's activities are distinct in the sense that every project must be treated as separate with its own individual settings, each having different boundaries in 'time' and 'space' (Ive and Gruneberg, 2000; p. 152; see also Dvir et al, 1998).

In other words, effectiveness of a managerial approach and team performance is strongly influenced by this unique characteristic between each project (cf. Baccarini, 1996) – that is, acknowledging the implications and interplay between the externalities of the project. In relation to the firm level scale, Söderlund and Tell characterize these as the task features of the P-form organisation with their *unique output, low procurement frequency, and difficulties to standardize process* (cited in Morris et al , 2011; p. 207-208).

The structure of a parent organisation within the construction industry is formed around project-based activity precisely because the entire firm is a project-based organisation (cf. Sydow et al, 2004). In other words, rather than seeing its structure as rigidly fixed (as illustrated in Figure 2 above), this research suggests that the structure is viewed

like a Russian *Matryoshka* doll (decreasing in size placed one inside the other – refer to Figure 3 below) with each part of the doll having different set of patterns.

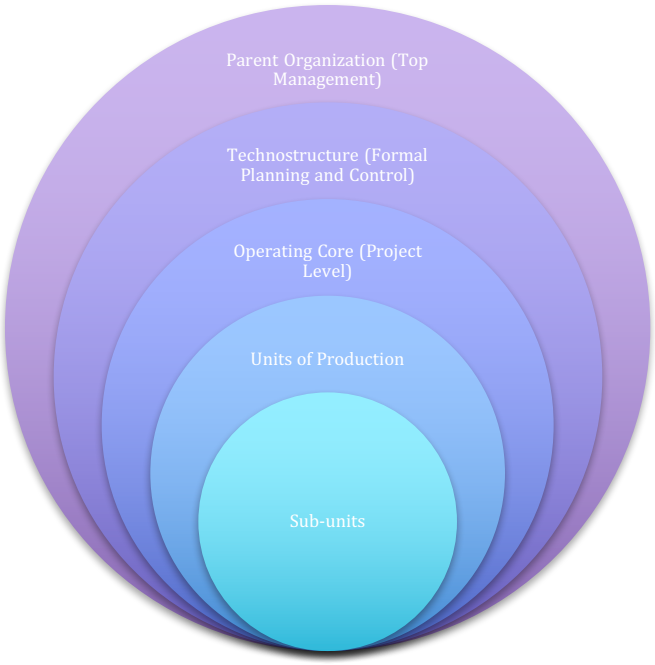


Figure 3: The Matryoshka Structure of the Complex Project-Based Organisations

This different set of patterns (presented as a gradient of different colors in Figure 3) is seen as the complexity comprising of different individual or occupational groups' perceptions in the different units within the organisation as well as other external institutional influences, which form the organisational climate. Just like the concept of the doll, these different patterns of the smaller parts are carved *according* to the one big "umbrella" theme, which has been referred to as culture within this study. It is worth highlighting the use of the word *according* here, as it will be argued shortly that this view of the project-based organisation will be able to facilitate flexibility as well as representing the distance between functions that is needed for an effective TMO.

Due to the characteristics of the construction TMO, this study argues that the TMO must be regarded as an evolving organisation capable of developing its own culture and structure – *flexibility* – proclaiming independence and cognitive cultural *distance* from its parent organisations to some extent in order to be able to find a coherent balance between the internal and external environments. Different parts of the operating core (and therefore, units of production and sub-units) must be able to be taken out of the parent organisational structure whilst still enabling top management supervision. In this sense, the proposed structure of the project-based organisation (as presented in Figure 3 above) facilitates the flexibility that is needed by the parent

organisational functions that are involved within the TMO. Recalling the doll illustration above, since each "pattern" of the parent organisation's elements are just carved *according* to the one big "umbrella" culture, it enables them to move around flexibly beyond the boundaries of the espoused values and credo of the parent organisation to acknowledge and absorb other cultural values imposed from the different levels of structure surrounding the external TMO ecosystem. In which case, this implies that the functionalist bureaucratic model is irrelevant since it does not optimize performance, especially for complex projects – as illustrated in Illustration box 1 above.

In summary, the above denotes the concepts of P-form organisation and TMOs within the construction project context is even more demanding in terms of complexity and flexibility for coordination through its distinguished activities surrounding the integration of system which creates a path, even pathological, dependencies for achieving performance effectiveness and competitiveness (cf. Söderlund, 2005). As stated, at the construction project level the TMO is formed through the different "smaller parts" of a parent organisation that have to come together and perform in a cohesive manner. As such, it can be seen that this is a complex transformation in the sense that (referring back to the Matryoshka doll illustration) the team must find a working culture that fits the unique project ecology between the various relational spaces in the TMO ecosystem[4] (see Figure 4 below).

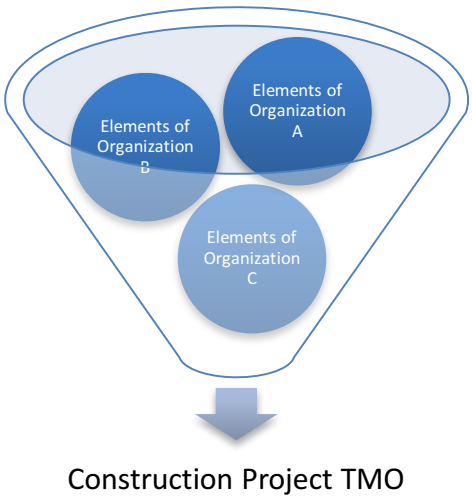


Figure 4: An Illustration of the TMO's Integration Process

[4] The concepts of Cultural Ecosystem and Project Ecology will be explained further in the next section.

Table 4: The dimensions of the P-form organisation and the differences in context with the M-form organization

Features	M-Form Organisation	P-Form Organisation
Problems	Routine. By routine this means that the problems of production are based upon a singular type of supply-demand interaction with a fixed target market and clear identification of product definition	Novel. Although some of the problems of the P-Form organisations can be classified as routine (adopted/inherited from one or other organisation, some induced by key decision-makers from past experience), problems during each execution phase have its own individual settings with new boundaries in time and space (new boundaries in the ecosystem as illustrated in Figure 5)
Processes	Routine. By routine this means that day-to-day strategic and production processes are highly based on the economies of repetition and economies of replication	Custom-conflated. Economies of repetition and economies of replication depend on the level of investments made. Processes occurring during the execution phase are custom – tailored to meet the fluctuating needs to complete each project relative to both the internalities and externalities of the project. Systems and procedures reinventions may occur at the program level where the same people are kept on board and the supply side has some role in standardization, for example in strategic partnering
Team	Homogeneous (Local). Members come from different subgroup, that is, different sub-cultures but within the same organisation	Heterogeneous (Multidisciplinary, Multinational, Multicultural). Organisation coalition members come from different occupational as well as cultural backgrounds
Structure	Fixed – High Inertia to Change. M-form organisational structures are designed to reap from the repetitive and replicated nature of day-to-day processes. It becomes so permanent overtime that change would be costly and chaotic due to the disturbed balance between established culture and climate	Transient – Temporary – Need for Integration. Organisational structures are contingent upon the culture-climate interplay with external environments as well as due to the fragmentation of perspectives, ambiguity, and uncertainty of the situation.

Lifetime	Supply – Demand. The lifetime is the lifecycles of a given product	Lifetime is the lifecycle of the process from inception to closure – that is, the project lifecycle. Subject to Urgency with Constraints to the Iron Triangle, as well as external market drivers and changes in government regulations during the lifecycle.
Competence	Stability – Control. Competence depends on the ability to control the market and achieve stability	Adaptation – Integration – Flexibility. Competence depends on the ability adapt to the environment's ecological settings, integration between different organisational elements, and flexibility of top management
Management	Centralized – Hierarchical – Closed System. Impacts from the external environmental settings (cultural or non-cultural) have less influence on the effectiveness of performance since decision criteria are clearly articulated	Decentralized – Coalition Driven – Open System. Management requires flexibility to allow for innovation and creativity in dealing with the contingent elements of the project externalities. In this context, management requires flexibility to allow for consideration and assimilation of the different levels of structure in engaging the culture-climate interplay
Environment	Stable. Few external environmental forces are changing (enacting within one or similar type of organisational ecology). There are less technological innovation factors and end products are usually heterogeneous enough to minimize the impact of competition	Diverse. Part of a wider institutional context operating on several different levels where different cultural perceptions are present simultaneously generating ambiguous climate attributes. In this context, environments are crowded by different government regulations, external community (public) pressure, and continually changing product preferences between projects
Conflict of Interest	Low. This is due to the singular type of supply-demand interaction and the homogeneous nature of the day-to-day processes	High. This is due to reciprocal interdependencies and the number of external stakeholders involved – be it directly or indirectly – across the project lifecycle. High variety of interest leads to uncertainty and ambiguity arising from the different culture-climate perception between inter and intra-organisational elements

Table 5: Measurements and Dimensions of TMO Complexity

Measurements	**Efficiency**	**Effectiveness**	**Effectiveness**
Dimensions	**Technological**	**Organisational (Internal)**	**Strategic (External-Contingent)**
Characteristics	Differentiation Diverse Number and types of technology involved in the process, varying between projects in content, management and contractual configuration, and interface in execution Number of Specialties Innovation Requirements Reciprocal Interdependency	Differentiation of Units and Specialization Open Systems – Complex Network of Contingent Elements Chaos Beyond Long-Term Contemplation Temporary – Has a Beginning and Ending. However, members of the coalition have homes to go to before and after the lifecycle period Decentralized Command Systems with Dominant Coalition Structure is contingent; dependent upon and explained by prevailing socio-cultural contexts Need Intensive Integration in terms of systems and procedures to Promote Collective Understanding and Effective Team Working Reciprocal Interdependency	Diversity of stakeholder influence as well as constraints (different stakeholder influence at different times within the project lifecycle) Variation of Socio-Cultural Contexts Affecting Operation International Stages with Geopolitical Interests. Especially within high visibility projects where many subjective functions and political critics are involved

		between the contracting organisations	

The bureaucratic model embedded within the functionalist approach is inappropriate within the P-form organisation since it does not optimize performance. Jaafari (2003) notes that the bureaucratic model of managing projects is a form of overcomplicating and/or oversimplifying approach vis-à-vis the degree of environmental complexity of a project. The author further suggested that bureaucracy is the approach favored by those who "resist change and despise environmental complexity intruding their routine decision-making and operational freedom" (Jaafari, 2003; p. 53). Although some hierarchical bureaucracy can be useful if it serves the intended purpose (for example to distinguish between roles), it often conjures up informal pecking order and demands beyond what is needed due to moralism, legalism, empire building, and fear of change. However, as have been argued above – and will be further developed later on – environmental complexity and change is at the heart of every project. Complexity creates ambiguity and uncertainty in identifying project objectives and goals (project reality) in major projects – through the differences in perceptions toward the different levels of prevailing culture – and heavily influences the structure of the TMO.

As organisations move from the traditional functionalist management to the project based approach in order to deal with environmental diversity that calls for differentiated and less centralized management approach. In this sense, bureaucracy's functionalist nature tends to be self-reinforcing and self-justifying – resulting in the organisation's mobilization of bias (cf. Schattschneider, 1960 cited in Bachrach and Baratz, 1973) whereby the problem for coordination and communication intensifies, becoming more complex (cf. Blau, 1970).

Rigidities of imposing cultural unity – the preference to formalize the routines to monitoring and accountability embedded within the set of rules and procedures – limits the degree of flexibility required to achieve effectiveness (cf. Burns and Stalker, 1961). It becomes difficult to address situations that require different approaches due to circumstances that are outside the boundary of the organisation's internal knowledge. One of the primary arguments here is that complexity requires an extra-integrated team working. This effective team working, that is a cohesive TMO, is dependent on *expecting* the other *party* to come through with their part *without* watching them all the time. To achieve this, there needs to be serious alignments of the different cultural values that are embedded within the different levels of socio-cultural systems to *divide things up in order to effectively conquer them as a whole*. In a nutshell, system complexity and interdependencies affect and is affected by decision problems

(Söderlund and Tell, 2011 cited in Morris et al , 2011; p. 212). Hence, this further relates to Giddens' (1981) theory of structuration presented in the previous chapter.

From the above, we have theoretically answered the second research question. Reviewing and justifying the need to view the construction TMO and project based firms as distinctly different is founded on their internal and external environment. Teams are complex and dynamic where the differences in interpretations of culture strongly influence the manifestation of structure and the objectivity of knowledge (interpretations) of the individuals concerned. Given its temporality, differentiation, and interdependence features, how then, can one articulately map and illustrate the evolution of culture as a fundamental process in the development of effective TMOs? For this, it is believed that embracing both contingency and institutional theories in the discussion is adequate as a mean of entry to systematically illustrate the *how* aspect of the research as explained within the previous sections. In practice, contingency theory challenges functions and hence functionalist theories. Contingency theory recognizes these unexpected aspects, the context in uncertain and complex environments, whether in (project) content or management internally.

According to Burrell and Morgan (1979; p. 176), the contingency theory postulates:

> "The effectiveness of the organisation in coping with the demands of its environment is contingent upon the elements of the various subsystems which comprise the organisation being designed in accordance with the demands of the environment (or, more accurately, sub-environments) with which they interact; this implies that the elements of different subsystems must be congruent in terms of the characteristics along each of the basic dimensions by which they are defined."

This view is backed by Lawrence and Lorsch (1967), where the authors suggested that coordination by means of standardization of cultural values manifested in organisational principles is inadequate. This is because particular organisational principles (which is termed culture, incorporating values, beliefs, formal and informal procedures and norms in this research) will only be appropriate in particular circumstances and within particular parts of the same organisation[5]. This statement acknowledges the interplay between the different levels of culture and hence, climate, that affect a TMO at a given time and space. Going further, while the contingency

[5] The environment as regarded in the contingency theory is regarded in this research as the relational space surrounding a TMO throughout its lifecycle. This includes the TMO social structure, environment and the relational space between the contracting organisations and the corporate-project relationships within the TMO. As such, it provides the initial starting point to map the Cultural Ecosystem of a Construction Project TMO presented in Figure 4 and the notion of the Project ecology and the need to integrate between Ecology, Evolution and Development (eco-evo-devo) of Culture in later Chapters.

theory recognizes the dynamics of external institutional challenges, it gives little guidance on the elements that make up the process of institutional construction, maintenance and change (Scott, 2012). In this sense, Scott's institutional theory is believed to better suit and complement the argument to be proposed of evolutionary dynamics of culture within the TMOs as well as the parent organisations. According to Scott (2008a; p. 673) institutional theory addresses,

> "The processes by which social structures—including both normative and behavioural elements—are established, become stable, and undergo change over time. It addresses the fundamental issues of social order and shared meaning. The normative elements include schemas, values, norms, and rules; the behavioural elements include activities, routines, interactions, and the use of resources."

Suddaby (2010; p. 14) further argued that the core of institutional theory is to "understand how organisational structures and processes acquire meaning and continuity beyond their technical goals" through positing three elements that comprised the pillars of institutions. These pillars are regulative, normative and cultural-cognitive elements that simultaneously constitute a project's global and institutional environments. Each environment is governed by "distinctive combinations of rules, norms and beliefs" (Scott, 2012; p. 33), that is the culture or cultural schemas of Giddens' theory of structuration. Thus, this brings us back to the notion of projects as complex social constructs, affected by their history and wider institutional context (Engwall, 2003), dwelling in their own dynamic worlds.

TMO as a Social Construct and The Concept of Project Ecology

The notions of organisation and management as well as construction project management have now been discussed. Further, we have emphasised the inadequacy of viewing complex projects in the traditional single project paradigm in coping with multiple organisational irrationalities vis-à-vis its external environment (cf. Grabher and Ibert in Morris et al , 2011). In this section, we shall move to illustrate the interplay of the micro and macro socio-cultural systems surrounding the TMO and their influence on the evolution of the TMO culture across the project lifecycle. We will end this subsection with an initial argument on the evolution of culture within the project lifecycle.

From the previous discussions, it can be concluded that construction is an industry that transcends definition by the market and extends beyond the confines of any regional or national market. Large-scale construction projects are viewed as "unique arenas in which highly complex, uncertain, and creative projects have to be realized" (Hartman, 1998; p. 81). In this arena, Clegg et al (2002) suggested that construction projects are

filled with multiple and conflicting modes of professional rationality that are *policed by a complex system of on-site surveillance, off site litigation, and arbitration*. Further yet, Schutz (1967) notes and as Weick (1969; p. 167) stated:

> "An organisation with multiplicity of actors, with multiplicity of interests, entails that a realistic grasp of the problematic meaning of that which is being projected must start from the actors' definitions of a project."

Generally, firms have been trying to overcome this differentiation through adapting the "think global, act local" approach (cf. Huemer and Östergen, 2000; see also Naisbitt, 1982) to allow for some flexibility in understanding and assimilating the "local buzz" (cf. Ibert, 2010). Although this heuristics approach can embrace contingencies in forming systems within a complex world, too much reliance can lead to an adverse culture of stereotyping behaviours and biases in decision-making repertoire (cf. Tversky and Kahneman, 1974; Bazerman and Moore, 2009).

Through briefly acknowledging contingency theory, it can be said that interaction of the elements between organisation and various levels of systems and sub-systems must be congruent in terms of characteristics in order for effectiveness to surface. Extending this, the formation and evolution of effective TMOs are influenced and dependent upon the interplay between the culture-climate within the relational space of the project ecology. This emphasis on cultural diversity within an organisation according to Casey (1996; p. 321) signifies the importance of "meshing the personal projects and ambitions of the individual actors involved in the project with those of the alliance" (see also Druskat and Wolff, 2001; Dulaimi and Hariz, 2011). In relation to the third research question, in mapping and understanding how this integration happens from the project inception to its closure – evolution – it is important to stress that though projects should be managed as independent from its parent organisations, the evolutionary dynamics of the TMOs are highly influenced by the cultural values embedded within the histories of these social constructs (Engwall, 2003; Weeks and Galunic, 2003).

As the TMO is regarded as a social construct, "defined by history, context, individual values and wider structural frameworks" (Cicmil et al, 2006; p. 676, see also Berger and Luckmann, 1966) comprising of the relationship between "cultural goals and the institutionalized means of achieving them" (Merton, 1968, cited in Burrell and Morgan, 1979; p. 91). As a complex society of its own, Jaafari (2003; p. 47) exhibited its characteristics as follows:

- **Open Systems:** Subject to instability and constant change.
- **Chaos:** "Describes behaviour that appears random but actually is produced by deterministic, nonlinear dynamical systems" (Chao and Moon, 2005; p. 1132).

Affected by uncertainties and thus defy traditional management approach of orderly planning and control.

- **Self-organisation:** Autonomous organic organisation units based on synergy flexibility and teamwork.
- **Interdependence:** Impossible to make any predictions on the basis of previous experience.

From these characteristics, construction project TMOs are executed within the boundaries of uncertainties and ambiguities that arise from the different perspectives toward the project (Lim and Mohamed, 1999). These then form the project ecology, which according to Grabher and Ibert (cited in Morris et al , 2011; p. 176) is:

> "A relational space, which affords the personal, organisational, and institutional resources for performing projects. This relational space encompasses social layers on multiple scales, from the micro level of interpersonal networks to the meso level of intra- and inter-organisational collaboration to the macro level of wider institutional settings."

Grabher and Ibert's theory on project ecology is reflected in Lim and Mohamed's (1999) examination of the macro and micro viewpoints of project success. The authors suggested that the macro viewpoint (culture) "takes care of the question *does the original concept tick?*" and the micro (climate) concerns "the construction parties" (Lim and Mohamed, 1999; p. 247). In other words, this relational space is where the vertical and horizontal interplay takes place.

Taking into account the arguments so far, it can be concluded that the achievement of a project's success can be argued from the integration between the culture (macro) – climate (micro) to overcome uncertainty and ambiguity between the different levels. As argued, an articulate model to show how the relationship of different cultural levels work as well as its flow within the complex construction organisational context and as an ecosystem has yet to be articulated. However, from the above discussions, this study is able to present an illustration as can be seen below (Figure 5).

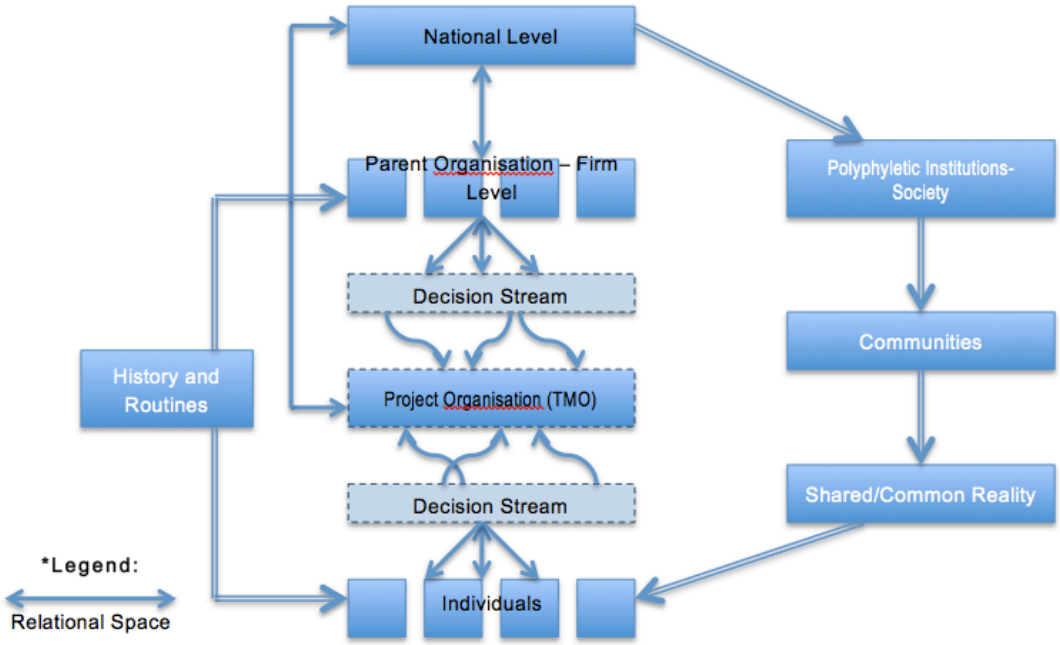


Figure 5: The Hierarchy of Cultural Ecosystem of the Construction TMO – The interconnectedness of elements with Each Other and Their Wider Contexts. Adapted from Kusuma, 2014.

The concept of project ecology is considered new in the project management context (cf. Morris et al , 2011), although the concept was first introduced in the work of Hannan and Freeman (1977) and is considered a fundamental aspect to explain the evolutionary dynamics of an organisation by heavily incorporating an open systems point of view. Baum and Singh (1994; p. 5) cited the idea of organisational ecology according to Hannan and Freeman (1977, 1989) as:

> "Organisational ecology seeks to understand the mutual interactions within and among the populations and communities comprising organisational ecosystems and the mechanisms and processes underling their growth, regulation, and decline … the emerging ecological view is that organisational evolution can best be studied by examining how social and environmental conditions and interactions within and among populations influence the rates at which new organisations and new organisational forms are created, the rates at which existing organisations and organisational forms die out, and the rates at which organisations change forms."

In this sense, the concept of ecology is very useful to acknowledge, explain, and describe the process of evolution (the evolution of culture of the TMO as well as the firm) by way of systematically mapping and illustrating *what* happens to different kinds of entities and *how* it happens overtime (cf. Baum and Singh, 1994).

In terms of *what* happens, both organisational and project ecology encompasses some heavy elements of history that is embedded within the process by which new organisational forms are created and introduces an element of path dependency (cf.

Eisenhardt and Martin, 2000) so that history helps shapes the evolution through the path set. In this case, the new organisational form is the construction TMO. With this in mind, in terms of *how* it happens, TMOs as opposed to having no history and no future due to its temporality and one-off ventures (cf. Lundin and Söderholm, 1995), *borrow* the histories – the repetitive operating routines, procedures, and rationalizations – of the parent organisations as means of *providing the first stepping-stones of knowledge* and *the first steps of action* towards developing its own. Putting it another way, organisational histories are deeply reflected in the organisational processes (one of which includes the decision-making events). It both produces and is a product of culture and overtime it becomes part of the organisational custom, habit, and traditions. In an environment full of uncertainty and ambiguity, these fallback notions to known routines provide a "comforting – if false – sense of continuity and stability" (Schoenberger, 1997; p. 132).

As suggested by Cherns and Bryant (1984; p. 180) the progress of a construction project "cannot be adequately explained without a reference to the past" (see also Engwall, 2003). These past, the histories, are brought upon mainly from the firm level through the taken for granted cultural values that are already understood (as well as imposed) by the individuals and embedded in the formal routines and procedures. In this sense, projects are not drawn on a 'blank canvas' – where the canvas is the project externalities – as it is often approached and perceived. Rather, projects must be seen as operating on a canvas that has been previously drawn where the TMO is seen as an object to be added and hence must fit into the overall picture. Further, Berger and Luckmann (1966) put it that histories are produced through the manifestation of human activities and as such, as a socially constructed universe, these histories are continuously *realigned* across the project lifecycle.

Thus, the apprehension of reality shifts from *autonomous creation of meaning* by isolated firms to the project team *taking over the world in which others already live* (Berger and Luckmann, 1966; p. 150), mediating a *common reality, but from considerably different perspectives* (Berger and Luckmann, 1966; p. 187). Or, figuratively speaking, imagine the puzzle *connect the dots* – where the dots represent the established cultural values in the ecology – but without the numbers to act as guidance to associate or make sense of the different cultures in creating the intended picture. In this sense, the forces of climate then take over through the process of quantifying and associating the different cultural values. Hence, interpretations will be different between the parent organisation and the different elements involved within the

TMO depending on the extent of interplay within the ecosystem as illustrated in Figure 5 above.

These differences in interpretation – these fragmented perspectives – can be traced back to something called *cultural efficacy*, whereby, to the degree that culture is followed by success (success being winning the tender for example), it is a "besetting fault … that they become fossilized in their moment of glory" (Keegan, 1993; p. 31), trapped in their own perfectly isolated little world. For example, although the emphasis on project management have shifted towards a more front-end relationship management approach (through the introduction of KAM and RM) to better leverage on value, traditional *arm's length* methods focusing on transactional aspects still dominates leading to disjointed systems across functions and service incoherence (cf. Cova and Salle, 2007; Crespin-Mazet and Ghauri, 2007; Smyth, 2015).

Moving on, as the TMO – as a social construct – becomes more of a totality, the reification of the mind will become greater also (Adorno, 1967 cited in Connerton , 1978; p. 276). It becomes a fallacy in interpretation between the abstraction of functional rules and the reality of the current project situation. Decision-making events coming from the firm-level functionalist system can no longer grasp and visualize the situation at the TMO's project-level interface; thus, disturbing the culture equilibrium within the TMO. To borrow Lorenzer's (1970, cited in Connerton , 1978; p. 148) notion:

> "The situation grasped by an act of reflection is replaced by the uncomprehended scene – the internal … pattern of a relationship to the outside world stimulated by instinctual responses and directed schematically."

Put simply, it has been cited that the TMO operates in diverse environments. Hence, as the environment shifts during the lifecycle, these fallback strategies to the rigid and functionalist culture lead to stereotyped behaviours that resist change. However, as cultural patterns are context embedded, these stereotypical acts of reflection will be unable to fully grasp the current reality and knowledge that is mainly based on interpretations of the relative enduring quality of the existing culture-climate interplay within the ecosystem. Hence, the TMO's culture moves to the second and third stages of the systematic evolution until finally, it reaches the final stage where it begins to detach itself from the prevailing cultural values of its respective parent organisations. For example, the difference between *before* (the plan) and *after* (the actuality) of the project where planned action "more or less crashes as soon as the action starts" (cf. Gustafsson, 2002; p. 3) due to circumstances and context of the present.

From the temporal perspective and given the mixtures of culture-climate interplay in the ecosystem (as illustrated in Figure 5), the organisationally effective or 'successful' TMO will be forced to adapt in conformance to the changing environment where forces of *climate* (at the TMO's project level) prompt and enact the process of quantifying and challenging the *history* (the firm level). Hence, these initial fragmented cultures – these "complicated and highly contested" historical processes (Schoenberger, 1997; p. 120) – will be challenged, associated with one another, and gradually fade away, finally, replaced by a new integrated form of culture resulting from this evolutionary process that represents the big picture; one that is independent from its initial form but is effective in promoting coordination and unity. A common example of this can be illustrated through vertical integration and horizontal functioning during procurement and business development where changes in external market drivers force the shift from transactional-methodical systems (reactive) to relational-normative (proactive) approaches.

From the above, the first proposition of this research is generated as:

Proposition 1: *the TMO's culture evolves through a set of recursive stages during the project lifecycle as follows:*

1. Firm level cultural values are most apparent and heavily imposed at the front end and during the commencement of the execution stage of the project lifecycle.
2. However, the project team will soon realize that the mixture of values from other institutional contexts poses more pressure for integration of coordination.
3. Hence, beginning to challenge the different prevailing cultural values in search for a working project culture.
4. In doing so, the project team begins to distance and potentially detach itself from the prevailing cultural values of its respective parent organisations, towards evolving into a new form of organisation with its own working culture fitting its current institutional context.
5. Across the project lifecycle, due to the nature of culture, this newly formed working culture will become more and more solidified as customs, habits and traditions (norms) emerge and are cycled back to inform decisions of the TMO where the evolution cycle loops back from stage 2 again and again until the TMO is terminated at the end of the project or (re)formed for the next projects. The informing of decisions may give way to a more automatic process due to the new norms and thus become stereotypical and form part of the mobilization of bias.

From the above, there are two other propositions that can be generated. First off, due to the diverse environment within the ecosystem, the interplay between culture and climate that exists within the relational spaces pose pressure and influence process transferability for effective performance within the TMO at different stages of the lifecycle and in different forms of situations[6]. Hence, it can be further proposed that:

[6] This will be explained further in the next Chapter.

Proposition 2: *across the project lifecycle, the culture of the TMO itself can only work throughout several different cyclical stages depending on the types of interplay at that given situation. In other words, the culture of the TMO can undergo several lifecycles of adaptation during one lifespan of the project or at some stage the mobilization of bias may cause rigidities that can act as a barrier to adaptation and reduce organisational effectiveness of the TMO*.

Taking it further, Lundin and Söderholm (1995; p. 442; see also Cherns and Bryant, 1984) suggested that the TMO members, as part of their respective parent organisations, have *homes before, during and, after* the project lifecycle. *Climatic* change at the project level will influence the creation of subsequent Organisational Culture of the parent organisation (firm-level), becoming part of the creation of the next firm-level history, which may be affected by each project team in the TMO, whether it is reformed, continued or disbanded. Hence, it can be proposed that:

Proposition 3: *culture is brought upon to the firm level through this dynamic evolutionary process of change that is rationalized and routinized; becoming part of the next taken for granted reality of the construction firm level organisational conducts*.

These initial theories, how it really works and how firms can best optimize the process, will be explained further through detailed analysis, literature review of the introduced concepts, and empirical study in the subsequent chapters. (See Figure 6 below)

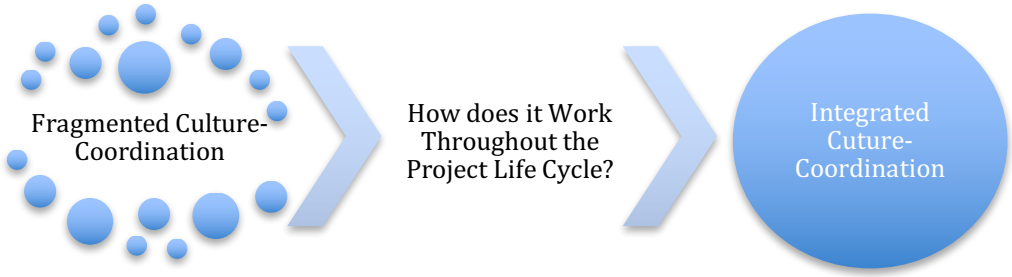


Figure 6 How does the Evolution of Culture Works in Practice?

In essence, this study argues that by unpacking and systematically utilizing patterns surrounding the ecological, developmental, and evolutionary formations of the TMO's culture will facilitate the transferability of a bundle of organisational processes between projects. Hence, in mapping the evolution of culture across the project lifecycle, we need to understand the extent to which culture-climate interplay – as illustrated in Figure 5 – surrounding the TMO's working environment influence and is influenced by decision mechanisms and processes in major decision-making events.

It is believed that culture (and hence, climate also) influence organisational routines and the way things are perceived and expected to run within organisations and other institutional contexts (and vice versa). The forces of culture manifest in different interwoven ecosystem of organisational as well as institutional issues and generate different implications toward the evolution of the culture of the TMO. Hence, the next chapter will be dedicated to reviewing the concept of culture in the established context to further map and illustrate how it evolves across the project lifecycle and what underpins this evolution, that is the mechanisms of evolution.

In sum, the theories and reviews conducted in this Chapter are as presented in Figure 7.

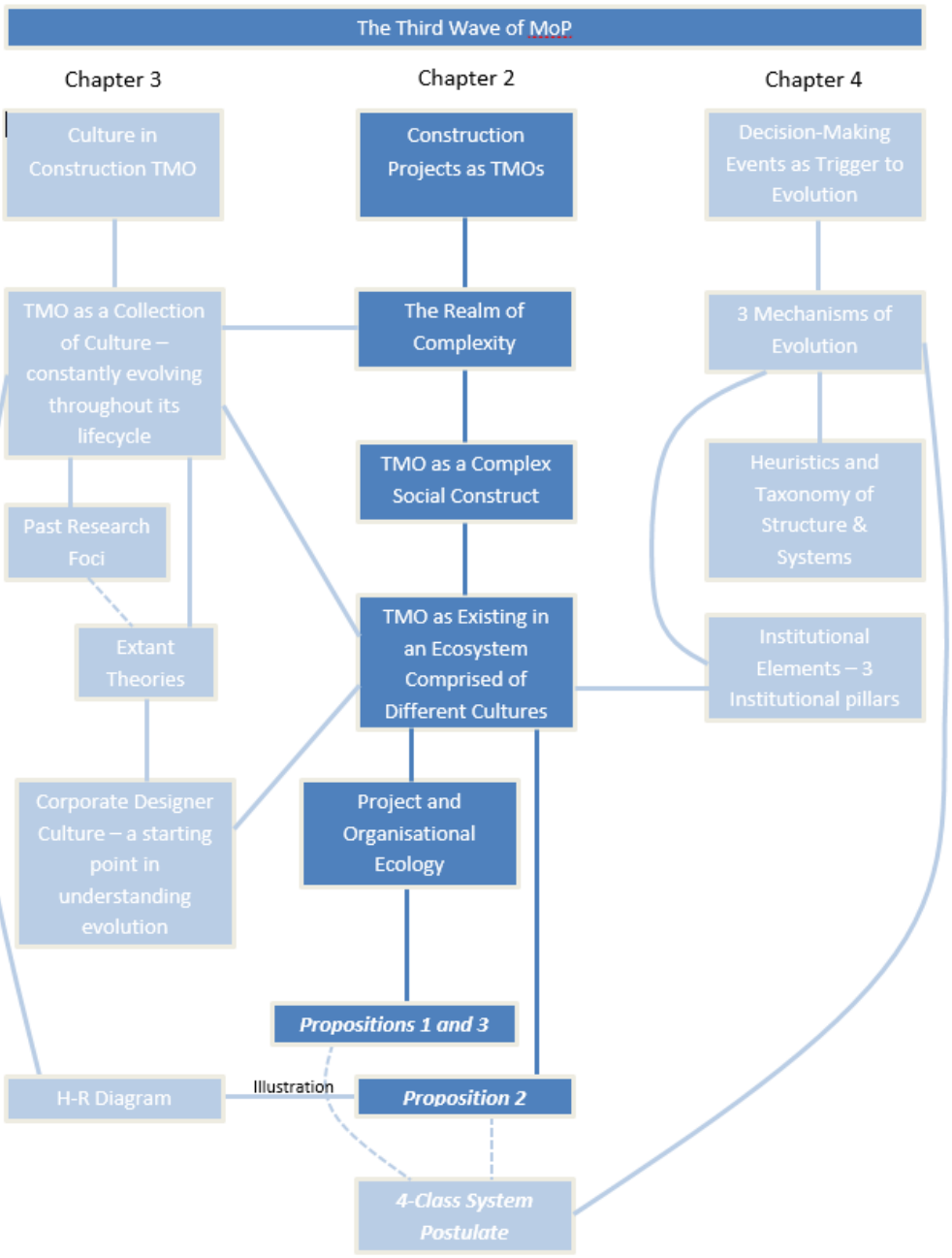


Figure 7 Chapter 2 Theory Relationship Diagram

Chapter 3

The Concept of Culture in Construction Contracting Organisations and Project TMOs – The Search for a Theoretical Starting Point

It has been noted that project-based organisations and TMOs have become increasingly popular as means of coordinating the execution of organisational tasks in a highly diverse ever-changing environment. This is due to its ability to integrate different functions from different organisations allowing for optimized management that reflects the various demands of the different project environments. However, despite their apparent success and popularity, many of these established TMOs end up in failures, especially surrounding the major projects in construction (cf. Morris and Hough, 1987; Loosemore, 1998; Flyvberg, 2003; van Marrewijk and Veenswijk, 2006; Orr and Scott, 2008; van Marrewijk et al, 2008).

Many researchers have then sought to identify the critical success factors affecting projects in construction (for example, Morris and Hough, 1987; Pinto and Prescott, 1990; Winch, 1998; Chan, Scott, and Chan, 2004). These research studies have focused on the functional project management processes emphasizing the efficiency of internal aspects as the underlying factor for achieving project success (cf. Shenhar et al., 1997; Frame, 2002) such as scheduling, budgeting, contracts, risk, technological interdependencies. Yet, it has also been emphasized that the construction project organisation as a TMO should be regarded as a social construct with levels and layers and as such, it should be seen as a "system of inter [and intra] relationships which connects individuals together" (Giddens, 2001; p. 22). As a part of a wider ecosystem, the TMO's success and even long-term survival and competitiveness are contingent on the actors' understandings of it. In this sense, the critical success factors of a project move toward a more external aspect of the organisational environment, in which cultural differences have become more and more significant as a factor to influence the success of a project.

Of course, one may argue that the implications of cultural differences in construction projects may not be as blatant and easily identified in which consequences are plain and direct as other issues. Some have even argued that standardized processes are the ultimate key to project success (cf. Milosevic and Patanakul, 2005) due to its

repetitive efficiency. However, the authors later stated that it is *wrong* to assume that higher levels of standardization of project management process will "automatically lead to increased project success" (op cit., p. 191). In which case, it is argued, this is due to the fact that the implications of culture manifests through the interplay illustrated in Figure 5 where many interwoven issues pose problems of complexity, uncertainty, and ambiguity influencing the ability to facilitate transferability of a bundle of processes. In other words, "old moulds" of interpretations are less able to facilitate effective structuration across the project lifecycle where standardization can only occur to some extent.

With this in mind, this chapter will further address the complex and dynamic nature of the concept of culture and its ecosystem identified in the previous Chapter 2. The discussion will be presented in the form of a review on extant research on culture in construction project management and the theoretical frameworks that follow. In doing so, this study will further address the second and third research questions theoretically in detail.

Culture as an Organisational Theory in the Project Management Context

"As a species, we are constantly balanced on a knife-edge, prone to parochial disputes and unable to harness our powerful curiosity and boundless ingenuity"

--Professor Brian Cox

This interesting quote, taken from the BBC's *Wonders of the Universe* programme (2011), has its roots from the natural sciences. Yet it fits perfectly with the complexity and intricacies that culture brings, be it between individuals in their daily interactions or within organisational conducts and project environments, as is our case here. As a social construct, the TMO, its management and commitment are constantly operating in the balance (or contingent upon) of its cultural ecosystem. Walker (2007) sees the problem in construction projects as hanging between the management of firms and the project itself. In relation to the arguments in Chapter 2, it can be seen how a strong functionalist culture eventually leads to parochial disputes between the TMO members. Further, we have emphasized how behaviours and habits at these different levels of structure within the ecosystem are bounded and grounded in culture. That is, in the prevailing values, beliefs, norms, formal and informal rules and procedures as well as objects and symbols.

It is mentioned in the first sections of this study that the concept of culture is an important part of the theory of the firm. It has also been mentioned that culture manifests in different types of organisational issues that are previously imposed from its wider institutional contexts and is adapted as the *approved* code of conduct. Hence, culture is a fundamental influence to the effectiveness of organisational performance in order to finally reach a state of efficiency. However, it has also been widely known that the meaning and approach to the concept itself as an ontology and/or epistemology is still widely debatable and somewhat confusing and ambiguous with various models and theories on measuring and managing cross-cultural differences in various different organisational and institutional contexts. Primarily, this is due to the common underestimation and misconception regarding the importance of understanding the dynamics[7] and particularly the different levels of culture as factors that influence effectiveness in the organisational and project context.

Martin (2002) sees this diversity of understanding of the concept as arising from disagreements on what to study when studying culture between researchers. Further, the author stated, the fact that researchers' "definitions of culture do not always agree with how they operationalize the concept" leads to further disagreements in illustrating what have been learned about the concept so far (op cit., p. 91). For example, Liddle (1996; p. 66) stated that it is a common misconception within society that national culture is "the sum of the peaks of the various regional fine arts traditions". In addition to this, Giddens (2001; p. 22) identified and backed Liddle's notion of the misconception by stating that in daily conversation the word culture is often seen or regarded as the equivalent of the "higher things of the mind – art, literature, music, and painting". However, Giddens went on to state that in the organisational and sociological terms (the scope where this study is placed), culture refers to "the ways of life of the members of a society, or groups within a society" (op cit., p. 22). This suggests that the definitions of the concept of culture are highly dependent upon the process, state, and context of the people defining it. Putting it in the context of this study, it is argued that the complexity, implications, and influences of culture are highly dependent upon the "*relative enduring quality of the total [organisational] environment that (a) is experienced by the occupants, (b) influences their behaviour, and (c) can be described in terms of the values of a particular set of characteristics (or attributes) of the environment*" to use Tagiuri and Litwin's (1968; p. 25; see also Denison, 1996)

[7] Note that Fabianski (2014) has looked at the dynamics using a different cultural lens and method, but not really at different environmental/operational levels.

definition of climate. This interplay between culture and climate is presented in Figure 5.

We have illustrated the dynamics and complexity of the TMO from a cultural perspective in the previous chapter. What is left is to further delineate the concept of culture itself and its implications surrounding the interplay within the given boundaries, highlighting the *how* aspect. Hence, it is essential to continue the chapter with a general review on how culture became important in organisational studies. In other words, the view and approach to culture as ontology and epistemology. Here, we shall also look at past research within the general management as well as construction project management literature that focuses on the relationship between culture and performance to further highlight the complexity embedded within the concept.

Defining Culture in Construction Project Management

Culture is dynamic. It revolves largely incrementally and more often than not is distinguished largely between the implication of eastern and western conceptions in most project management literatures (cf. Pant et al., 1996; Chen and Partington, 2004; Phua and Rowlinson, 2003; Chang, 2010; Bredillet et al., 2011). From the previous two chapters, we have established that culture is not universal. There is no universality in the way to apply and manage culture such as there is universality in the laws of physics for example[8]. This study has emphasized that what applies in one context does not always hold when brought upon another. It will be argued that this is the reason why the culture literature in project management stream has not been very successful in addressing and presenting a theoretical understanding regarding the matter due to analyzing particular projects. However we shall discuss this further in the next section. Let us first focus our attention to the ontological aspects – that is, the form and nature, the set of terms – of the concept itself.

To begin with, the multiversity of culture can be explained by French (2007; p. 20), where the author suggested that there are 5 major cultural layers, which are:

- Global layer which defines behaviours
- National layer which defines attitudes
- Regional layer which defines beliefs (within an ethnic group)
- Community layer which defines values (within an organisation, group, or team)

[8] Universality here refer to previous research, which regard culture as static rather than dynamic. Thus, as argued in the beginning, rather than coming up with another static cultural model, it is more fruitful for practice to be able to predict the trajectory of how culture may evolve given a particular context.

- Personal layer which defines taken for granted assumptions

Each of these layers affects one another in which Schein (1985) distinguished as macro cultures, Organisational Cultures, sub-cultures, and micro-cultures (as introduced in Chapter 1). Further, French argued that culture, at any one layer or level, is complex and multifaceted relative to a "range of institutional or society-wide factors" (op cit., p. 19).

Although the concept of culture as an organisational theory had only been widely recognized after Hofstede's study in the 1980s, it has previously been long known through – amongst others – the study of Alfred Schuetz (1944) in his work, *The Stranger: An Essay in Social Psychology*. Indeed, culture as a normative theory has been widely used in the studies of sociology and anthropology as an explanatory variable of human behaviour in relation to their differing types of society (cf. Giddens, 1981; Jaeger and Selznick, 1964). The study of Schuetz (1944; pp. 499-500) can be referred to as the root where other definitions of national culture and Organisational Culture stem from when the author stated:

> "The cultural pattern peculiar to a social group … determines the strata of relevance for their 'thinking as usual' in standardized situations and the degree of knowledge required for handling the tested 'recipes' involved … [whereby] the knowledge … is not homogeneous; it is (1) incoherent, (2) only partially clear, and (3) not at all free from contradictions".

Now, Schuetz's view on the concept suggests that culture is absorbed and learned more than inherited or just simply passed on – a key difference in social evolution compared to biological evolution. In this sense, culture should be seen as the relational interplay between the knower and the stranger about how we came to understand how things come into being rather than accepting culture as it is. Putting it in our context, the ecology of the TMO is "stratified in different layers of relevance, each of them requiring a different degree of knowledge" (Schuetz, 1944; p. 500). Recalling the discussions in Chapter 1, it was mentioned that throughout the past decades – especially during the boom of cultural studies in the 1980s, there have been dozens of definitions of what culture in the organisational management context should be or is (cf. Alvesson, 2002; Martin, 2002).

According to Kroeber and Kluckhohn (1952), there are about 164 definitions of culture. In Chapter 1, we have stated some definitions of what culture is perceived to be by scholars in organisational studies. To recall, in the general management stream, between the relationship of culture at the national level and performance, the studies of culture was dominated by the work of Hofstede where the author defined culture as a

"collective mental programming: it is that part of our conditioning that we share with other members of our nation, region or group but not with members of other nations, regions or groups" (op cit., 1983; p. 42; see also Walker, 2007; p. 144). Within the relationship of culture at the organisational level and performance, the studies of culture stem mainly from the works of Ouchi (1981), Smircich (1983), and Peters and Waterman (1982). As stated, there are many definitions of Organisational Culture. Kunda's (1992) definition is one example that best sums them up. The author defines Organisational Culture as "the shared rules governing cognitive and affective aspects of membership in an organisation, and the means whereby they are shaped and expressed" (op cit., p. 8).

Smircich (1983) argued that culture, which is conceived at the organisational level as shared key values and beliefs – "a system of common symbols and meanings" (Alvesson, 2002; p. 3) – fulfills several important functions. Namely, culture conveys a sense of identity for members within a team and/or organisation (Deal and Kennedy, 1982; Peters and Waterman, 1982), facilitating the generation of commitment to something larger than self (Schall, 1981; Siehl and Martin, 1981; Peters and Waterman, 1982). It enhances the stability of the social system and will lead to common roles being accepted between the team members to improve performance effectiveness (Louis, 1980). Lastly, Louis stated that culture serves as a sense-making device that can guide and shape behaviour (1980; see also Siehl and Martin, 1981; Davis, 1984). Drawing from the above, it can be said that the concept of culture is generally defined by researchers as the norms and values that is tacitly accepted and leads to the collective behaviour and a sense of identity amongst and/or between individuals within a team, organisation, and/or community from which the foundation of the team, organisation, or community is established (Louis, 1980; Thompson, 2009; Liddle, 1996; Alisjahbana, 1966; Siehl and Martin, 1981; Sathe, 1985; Schein, 1985).

In the project management stream, researchers (cf. Kendra and Taplin, 2004; Du Plessis and Hoole, 2006) tend to regard culture as "the way we do things around here", which is broadly summarized from Deal and Kennedy's (1982) *the rites and rituals of corporate life*. However, this definition seems a little bit crude and general for something that is rich and complex. Du Plessis and Hoole (2006; p. 42) then elaborated the definition as:

- The way = refers to the project process (how)
- We = refer to the people in the project, i.e. project team and stakeholders (who and for whom)
- Do things = refer to the Project Management methodology (what)

- Around here = refers to the project environment (where)

There are two things that can be drawn from this elaborated definition of culture in the project context. Firstly, by referring to the people, the definition – again – acknowledges the project as a social construct that has direct relationship and interdependence with the external environment. Hence, project is part of a wider ecosystem as opposed to existing in isolation. Secondly however, the culture within the relational space of the project's ecosystem, although acknowledged, is not seen by the authors as something that has fundamental historical elements prior from its coming into being. In this sense, whilst having highlighted the elements of project management culture – such as flexibility, open systems, open communication and so on – the authors failed to illustrate the dynamic process of the evolution of culture for the TMO. In other words, how it works across the project lifecycle.

From the succinct description of the various definitions of culture, this study believes that the definition of the concept of culture in the project management context (especially in construction) should go beyond the term *shared*. For reasons that have been put forward in Chapter 2, the word tends to lead the project-based organisations toward the positivist-based management. Hence, inherent with Schutz (1944; p. 501), to establish an effective project culture can be defined as:

> "[Establishing] a knowledge of trustworthy *recipes* for interpreting the social worlds and for handling things and men in order to obtain the best results in every situation with a minimum of effort by avoiding undesirable consequences … as a precept for actions and thus serves as a scheme of expression … [and] as a scheme of interpretation."

Putting this another way, the study defines a coherent culture in projects as a medium *to establish knowledge of consistent recipes within the project coalition for the other party to come through with their part without watching them all the time, thus establishing a precept for actions, a scheme of expression, and a scheme of interpretation*. This study's view and approach to the concept concerns and addresses how the different institutional levels of culture are assimilated, becoming the accepted Organisational Culture and further involved and influenced by decision-making event and its structuration both at the organisational and TMO levels.

In a more familiar "organisational" explanation, and in relation to the quote at the beginning of this chapter, Hofstede (1980, cited in Pant et al., 1996; pp. 53-54) stated:

> "We are all culturally conditioned. We see the world in the way we have learnt to see it. Only to a limited extent can we, in our thinking, step out of the boundaries imposed by our cultural conditioning. This applies to the author of a theory as much as it does to the ordinary citizen: theories reflect the cultural environment in which they were written."

Taking the last sentence into our established context in Chapter 2, any formal rules and procedures during the initiation and planning stages of the project lifecycle are written and formulated either consciously or subconsciously in conformance to the prevailing culture imposed from the wider institutional context. However, as the context shifts from one project stage to another, it is then up to the organisational actors within the project team (within the TMO) to interpret the relative enduring quality of the culture surrounding the project's environment where the forces of climate begin to take place. In this sense, the systematic steps of the evolution of culture of the TMO proposed above are theoretically supported.

Before moving on with the review of literatures in the project management stream, let us begin with a brief overview surrounding the general management literature.

Earlier studies and reviews in the general management stream (cf. Child and Kieser, 1979; Denison and Mishra, 1995; Deal and Kennedy, 1982; Peters and Waterman, 1982; Ouchi, 1981; Scholz, 1987; Kotter and Heskett, 1992) have established that there is a positive correlation between strong cultures and effectiveness of organisational performance. Schein (2010; p. 57) supported this statement by agreeing that the identification and management of culture is essential to minimize destructive conflicts. Deal and Kennedy (1982; p. 15) stated, "organisations that have cultivated their identities have values and beliefs to pass along, stories to tell, and heroes whom managers and workers can emulate" govern and motivate behaviours. Further, Brown (1995; p. 197) suggested that cultural artifact "provides a framework for ideas that enables individuals to comprehend their environment and the place of their organisation within it".

Alvesson (2002; p. 53) suggested that most cultural literature links the effectiveness of organisations with strong culture. However, others (Deal and Kennedy, 1982; Peters and Waterman, 1982; Walker, 2007; p. 145) have also pointed out that strong culture can turn into an "authoritarian system that is subject to abuse". This is due to the fact that the perception of the relationship between culture and effectiveness is comparable to a double-edged sword in which culture influences effectiveness or vice versa. Hence, it can be said that although culture can be linked to better performance, the idea of one best culture is simplistic and misleading. In relation to the construction project management context, given the characteristics of the TMO, it is best summed up by Schuetz (1944; p. 505) where the author suggested "cultural patterns provides by its recipes typical solutions for typical problems available for typical actors". This

points to a contingent approach, in which case, culture cannot be mimetic and standardization can only occur to some extent. Further, we have also established through the discussions within Chapter 2 that a strong and rigid culture can act as a counterforce to flexibility and autonomy required to deal with project externalities. Baligh (1994; see also Auch and Smyth, 2010) summarizes the above by stating that to achieve organisational effectiveness there needs to be a fit between the internal and external culture. In a construction TMO, it can be said that there needs to be a fit in the balance between the interplay of cultures in the ecosystem.

Theories of Culture and Project Effectiveness: Evidence from Past Researches

It has been cited that although there are many discussions regarding the theme culture, little had been done with the focus on construction project-based organisation in particular as stated by Auch and Smyth (2010), Phua and Rowlinson (2003), and Ogbonna and Harris (1998; see also Walker, 2007). This is also evident in Turner, Pinto, and Bredillet's review (cited in Morris et al , 2011), *The Evolution of Project Management Research*. Nonetheless, the importance of culture in the project context has long been recognized. It is evident, that culture is not homogeneous but heterogeneous both within a particular country and an organisation (cf. Auch and Smyth, 2010; Hofstede, 1980; Au, 1999). Auch and Smyth (2010) argue that this is particularly apparent within a project-based organisation due to the interaction between the levels of structure in the ecosystem; that is, between the individuals and the team, between the team and the organisation, and between the organisation and the institutional cultures (cf. Auch and Smyth, 2010).

The most practical metaphor to illustrate the significance of culture may be one that is suggested by Gray and Larson (2003). The authors (op cit., p. 77) stated:

> "The relationship between Organisational Culture and project management is that of a riverboat trip. Culture is the river and the project is the boat. Organizing and completing projects within an organisation in which the culture is conducive is like paddling downstream: much less effort is required."

As we have seen in previous discussions, the above is easier said than done. As cited above, many researchers have been trying to identify and minimize the impact of cultural differences in project environment (cf. Phua and Rowlinson, 2003; Hofstede, 1983; Chen and Partington, 2004). Others, (for example Auch and Smyth, 2010; Kendra and Taplin, 2004; Du Plessis and Hoole, 2006) have established cultural heterogeneity within project firms and tried to identify some cultural elements of project-based organisations in the form of a framework. In this section, we shall seek to

address the current state of cultural research in project management with particular attention to construction.

As cited, there is a broad range of cultural theories and models that have been developed and introduced in the past several decades, to name a few the infamous Hofstede's dimension of cultural differences (1980), Schein's three layers model of Organisational Culture (1985), Deal and Kennedy's four models of Organisational Culture (1982), Trompenaars' seven dimensions of culture (1993), Schwartz's dimensions between contractual and relationship culture (1994), Casey's designer culture (1996), Douglas' grid group model of Organisational Culture (1999) and the GLOBE project (House et al, 2004).

It has been shown that previous research tends to adopt Hofstede's and Deal and Kennedy's theory in their analysis. In this sense, a review surrounding past researches will bring us to the next area of complexity, which is the inherent research methodologies adapted in describing the implications of culture to project performance in construction. These methodologies are believed to have framed the results, in the sense that they limit the chance of presenting a generalizable conclusion in illustrating the *how* aspect of cultural research by focusing on *what* and *why* questions. Further, the narrow choice of cultural theories as the basis of the studies leads to a somewhat cyclical arguments on the issue itself. Hence, in this section we shall cover literature in topic areas related to:

1. The focus of the studies;
2. Major achievements in research surrounding culture and projects in construction;
3. Remaining work yet to be done.

Given the above, it is cited that research incorporating cultural theories in the project management stream can be divided into two categories. The first category are those trying to identify and objectify the impact of cultural differences in project environment – taking a static snapshot approach focusing on results. The second category – taking a more dynamic approach focusing on process – are those that prove the cultural heterogeneity within project firms and tried to identify some cultural elements of project firms in the form of a framework. Hence, in exploring the strengths and weaknesses of the theoretical backgrounds, the literatures will be grouped as such.[9] Further, the

[9] Only frameworks that have been used and cited in previous Construction Project Management researches is reviewed in this research to further illustrate limitations of extant researches and the

subsequent discussions will show how previous research tends to approach the issue on integration and coordination through identifying causal relationships in similarities and differences between cultures based on established frameworks.

Category 1

National Culture and Projects – Hofstede's Dimensions of Cultural Differences

Starting from the general management literature from where the framework initially stems, Hofstede's work on culture is by far the most widely recognized and accepted as the basis theorem from which others stem, such as Trompenaar's and Schwarts dimensions and the GLOBE project. Management researchers (cf. Kirkman et al, 2006) stated that Hofstede's framework has had far greater impact, not to mention also more widely cited compared to others, while others (Trompenaars, 1993; see also Kirkman et al, 2006; p. 285) gave credit to the framework "for opening management's eyes to the importance of the cross-cultural management subject".

The factors that define a nation's culture are captured in Hofstede's dimensions of cultural differences (1980). There are 5 dimensions within the framework, which differs between each country. These are:

- Power distance → responsibility vs. discipline
- Structured/unstructured situations → innovation vs. precision
- Individualism/collectivism → self actualization vs. group performance
- Masculinity/femininity → strong control vs. relationship with others
- Long-term/short-term orientation preferences → differences in conceptions between eastern and western thinking.

need to present an integrated view on ecology-evolution-development (eco-evo-devo) of a TMO Culture.

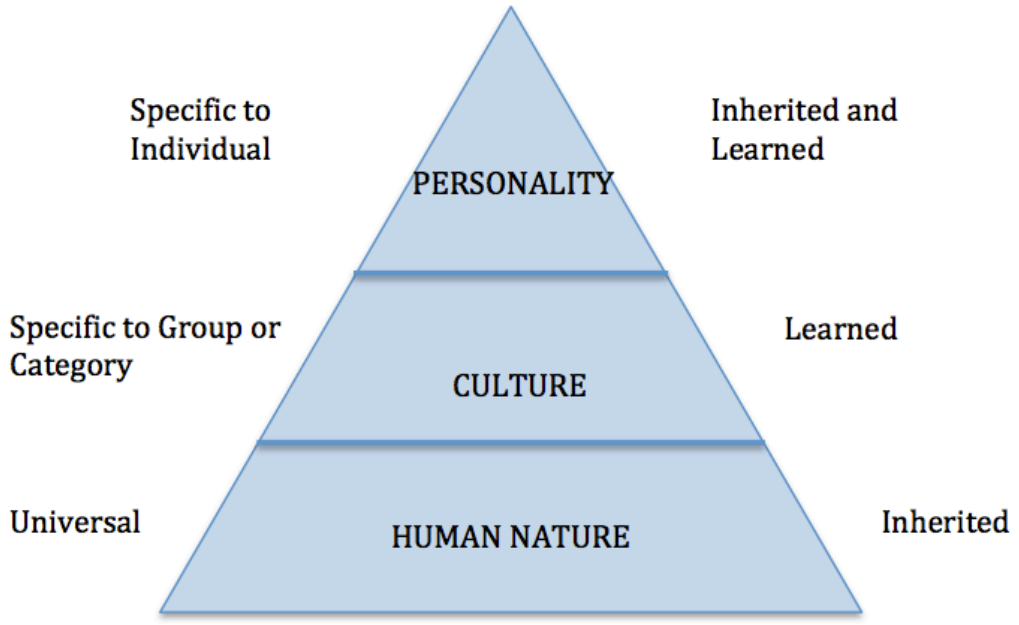


Figure 8: Three levels of uniqueness in Human Mental Programming. Adapted from Hofstede, 1991.

According to Hofstede (1991; p. 6), culture is a part of a human mental programming that has three levels of uniqueness within it (Figure 8). He went on to argue that culture is always a collective phenomenon that is *learned* as "it derives from one's social environment" and is "the collective programming of the mind which distinguishes the members of one group or category of people from another (Hofstede, 1991; p. 5). However, contrary to the assertions of Douglas (1999) where any cultural values held by an individual are a representation of the regional culture (or social-institutional environment), Hofstede went on to state that the basic assumptions of an individual are unshakeable lest there will not be a cross-cultural management issue.

The framework above conceives culture in terms of managerial orientations (in which this study perceives to have come from individual's interpretation and experience towards the espoused values later on and manifested as climate) within a particular geographical location based on one multinational company by which the samples are then regarded as the representation of the nation's cultural preferences as a whole. However, Thompson (2009; p. 260) argued and pointed out that culture is not strictly geographical in the sense "it does not pertain to just nations and countries", but also, as stated above, the norms and values shared by particular groups and/or organisations. In other words, when applied for analysis at the organisational or project level – which it usually is – Hofstede's framework may present an inconsistency in its interpretation. This is backed by McSweeney (2002; see also Phua and Rowlinson,

2003; van Marrewijk, 2010) where the author argued that it is likely that aside from the national cultural values, due to the different multiple cultures that often exist within and between the organisation's units, an organisation may reflect a different set of cultural values (sub-cultures). To further explore the strengths and weaknesses of Hofstede's cultural dimensions, let us turn our attention to Hofstede-inspired research surrounding projects in construction.

In the construction literature there are quite a number of studies that cite and apply Hofstede's dimensions (national culture) as an independent variable for the basis of their analysis. Most of these literatures are comparative studies between two or more nations, focused on explaining the causal implications coming from the different preferences between the dimensions (cf. Pant et al, 1996; Winch et al, 1997; Chen and Partington, 2004; Pheng and Leong, 2000).

First off, in conjunction with his massive empirical study, Hofstede (1983) had used his infamous and initial 4 dimensions of culture (and later a 5th dimension) to illustrate the impact of differences in national culture for project management based on the argument that project management assumes a "village market model of organisations" (op cit., p. 47). The focus of his study is that of linking the preference of national cultural index with the challenges for international project management. However, the concept of project management was not examined in depth. As we know it, this particular type of study does not present much help in generalizing a conclusion on how to best manage, integrate, as well as to understand different cultural interplays in the construction project context. Kirkman et al (2006; p. 286) with reference to Sivakumar and Nakata (2001) attributed this setback on the framework's inability to "capture the malleability of culture over time and ignoring within country heterogeneity". Hence, ignoring everything else but the "culture level comparisons" (Smith, 2002; p. 123).

Another trend in the approach of project management integration incorporating Hofstede's framework is the distinction between eastern and western perceptions of cultural orientation in which cooperation and coordination is brought upon the individual level of analysis with the focus on the power distance and individualism-collectivism dimensions. Examples of this type of study are Pant et al, (1996), Phua and Rowlinson (2003), Chen and Partington, (2004), and de Bony (2010). These studies focus on the comparison between differences in national culture with the ability to nurture

cooperative behaviour and appropriate transferability of organisational structure in the integration of project management process.

Table 6: Summary Review of Precious Hofstede-related research in Construction Project Management Context

Authors	Theoretical Paradigms	Focus of Study	Key Finding(s)	Research Design
Pant et al (1996)	Hofstede's Power Distance (PDI) Dimension – adapted to represent bureaucratic orientation	Comparison on work orientation between Eastern (Nepalese as a developing country) and Western (US as a developed) managers. Examining the degree to which western organisational structure are accepted and effective against Nepalese culture	Integration of organisational and management model by means of direct transfer in problematical due to differences in the bureaucratic orientation between the national cultures	Static – Quantitative, Statistical analysis of data
Pheng and Yuquan (2002)	Hofstede's 4 Dimensions of Culture	Comparison on similarities – differences between two countries, Singapore and China focusing on demographic factors	Supportive interpretation of the frameworks on the consequences from Hofstede's initial study	Static – Quantitative, Statistical analysis of data
Phua and Rowlinson (2003)	Hofstede's Individualism – Collectivism (IDV) Dimension	Construction procurement systems. The impact of individualism – collectivism orientation to cooperative behaviour of project participants	The national collectivist culture poses negative effects of non-cooperation and tend to heighten inter-organisational discrimination	Static – Theoretically-based research with no empirical investigation
Chen and Partington (2003)	Hofstede's 5 Dimensions of Culture with some adaptation of Trompenaar's and Schwartz model. However, focus is mainly upon Hofstede's IDV dimension	Interpretive comparison in understanding the different ways in which relationships are conceived between eastern (Chinese) and western (UK) project managers	Interpretive support for Hofstede's national culture predictions on workplace relationships and behaviours	Static – Qualitative, Phenomenography
De Bony (2010)	Hofstede's Individualism – Collecitivism (IDV)	Project Management integration between 2 western countries	The national orientation towards individualism and collectivism are key factors in	Static – Theoretically oriented with qualitative – inductive research

	Dimension with some adaptation of Douglas' model	(Netherlands and France). Focus on relation between practice with the national context	the appropriation of project management	
Bredillet et al (2010)	Hofstede's 5 Dimensions of Culture	The implications of national culture on the disparity in Project Management deployment and development between 74 countries	Differences in implication correlations between national culture and project management depends upon low GDP/Capita and high GDP/Capita of the country	Static – Quantitative, Statistical analysis of data with controlled variable (GDP/Capita)
Pheng and Leong (2000)	Hofstede's 5 Dimensions of Culture modified and translated with emphasis to Chinese style of Management	Examining the implications of cross-cultural management on project management and dispute resolutions in China	National culture orientations are hard to change. Understanding local cultural orientations by foreign organisations is crucial for communications in managing projects	Static – qualitative – narrative, single case study snapshot analysis of past calendar events
Winch et al (1997)	Hofstede's 5 Dimensions of Culture	Exploring the predicted implications and consequences of cultural values instrument taken from Hofstede's framework between two western countries (UK and France) working in the same TMO	Cultural dimensions predicted by Hofstede do not reflect in the behaviours of the project team members. In fact, the opposite happened	Static – theoretical based research with single empirical case study

From the summary table (Table 6), this research concurs that the state of most of these Hofstede-inspired studies fall within Kirkman et al's (2006; p. 313) critique that they are "fragmented, redundant, and overly reliant on certain levels of analysis and direction of effects". That is, true or false, coherence or incoherence, consequence or lameness, and substantiality or emptiness, regardless of which, the same question – how to manage cross-cultural differences – still remains; it is just the research approach and selected nation that is different. The emphasis of this adaptation and application of the framework is illustrated in Winch et al's (1997) study on the case of the Channel Tunnel Project. The authors found that the cultural dimensions predicted by Hofstede do not reflect in the behaviours of the project team members, in fact, the opposite happened. This can be argued from the fact that as environmental forces surrounding the project environment change, the values reflected in the dimensions would also change because the "sense" (the climate perceived and experienced by the members) around the working environment, that is, the meaning attached to the culture will be different. In which case, integration based on these dimensions is shallow and lacking the rigor needed to overcome project complexity whose cultural values span across different levels within its ecosystem.

Looking from the individual-level cultural construct, Chao and Moon (2005) denotes that culture at any given time is a collection of a "unique collage of multiple cultural identities [that] yields a complex picture" (op cit., p. 1128; see also a simpler argument posed by Kumaraswamy and Rahman, 2006). The authors went on to argue that these *cultural mosaics* are shaped and influenced by a combination of an individual's demographic, geographic, and associative aspects within the ecosystem.

In relation to the firm-level cultural construct, it is stated that the TMO is a complex system having to perform in a *localized* ecology. Recalling the proposed systematic stages of the evolution of culture in Chapter 2, reification will become greater due to the interplay between these different aspects yielding chaotic and complex behaviour (cf. Wolfram, 2002). As a result, regardless of its ability to provide a guidance to map different cultural orientations between countries, Hofstede's ready-made dimensions cannot fully deal with the social dynamics that occur between the relational space of the firm and individuals converging around the TMO. Therefore, while preserving the notion of culture, the dimension, which focuses on the national level, "demolishes its present manifestations as mere commodities and means of brutalization" (Adorno, 1967 cited in Connerton , 1978; p. 268) while blindfolding a more "polymorphous approach to knowledge production" (Jack and Westwood, 2006; p. 495; Ailon, 2008; p.

901). All in all, it can be concluded that Hofstede's dimensions contribute the most in static snapshot research analysis such as shown in Bredillet et al's (2010) study. It cannot provide a dynamic explanation – the interplay across levels – on how culture integrates and evolves within the TMO. Hence, to further this cultural discourse and to find a theoretical starting point by which the evolution of culture can be explained, one must look beyond these states of objectified differences to the substance, that is, to the process of becoming in its relation to the established ecosystem.

Category 2

Douglas' Grid Group Model

The Douglas grid group model recognizes four types of cultures that are identified as attitudes and values that justify the organisation, each emanating from a specific form of the organisation. Rooted in anthropology, Douglas' ethnographic model addresses the issue of culture within an organisation in relation to its external regional as well as institutional cultural orientation (cf. Mamadouh, 1999; Tansey, 2004). In this sense, the model asserts, "Organisational Culture is influenced by regional social preferences that can be internalized as organisational norms" (Auch and Smyth, 2010; p. 444; see also Handy, 1999). For example, the hierarchical type of Organisational Culture, with its ranked levels and symmetrical branching, depends on the adoption of hierarchical values and the expression of matching judgments (Douglas, 1999; p. 411). Thompson et al (1990) enriched the theory through three assumptions namely all organisations comprise of all four cultures, each cultural bias is defined relative to each other, and the four culture types stand in contested ranking (cf. Fabianski, 2015. Although all four cultures are present, recent studies (e.g. Smyth and Kusuma, 2013 and Smyth, 2013) found that only one or two cultures are recognized and dominant amongst different organisational functions.

Douglas (1978) argued that all cultures could always be identified according to two basic dimensions of sociality – grid (structure) and group (incorporation) – that represents the levels of autonomy and compliance within a given social structure (cf. Fabianski, 2015). Hence, the typology is parsimonious and thus based on a cultural bias – the steady preference for one or another set of institutional forms and consequently, and the commitment to the kinds of knowledge and action that go with it. In this sense, the model argues that every cultural conflict is about the types of organisation – the different interpretations towards product, process, and purpose (cf. Turner, 1999; see also Ruuska et al, 2009). Putting it another way, the model is in line with Cohen (1976; p. 63) who stated, *a man can know that his thinking is subject to*

bias, can experience bias and acquiesce in it, and one source of bias can be his social position. For this reason, the model assumes that there are only four stable organisational forms namely, hierarchical, egalitarian enclave, isolated fatalism, and competitive individuals (cf. Douglas, 1978). All others are considered to be transitional in form (Figure 9).

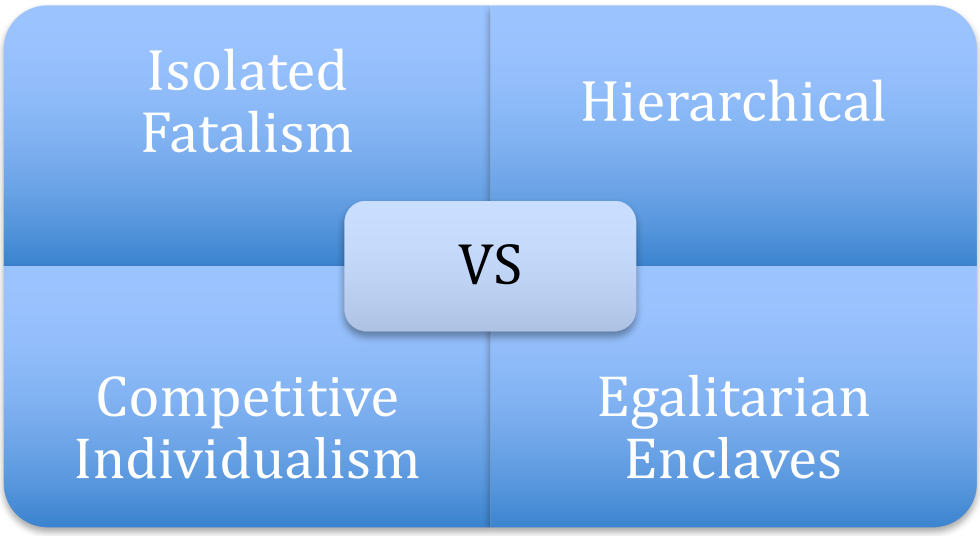


Figure 9: The Grid-Group Model of Culture. Adapted from Douglas, 1999

Mamadouh (1999; p. 397) argued that cultural biases and social relations functionally reinforce each other in a way that rationality in behaviours within social relations is justified by the expectations held by the cultural bias. Linking this back to Simon's (1955) theory of rational choice, rationality is plural and symbiotic to the social representations of reality. Hence, rationality is in itself a *convention* in which it creates strong organizing principles "to make sense of and legitimize a worldview" (Cabantous et al, 2008; p. 407). This is what Douglas (1978) meant by *institutions* and *institutional constraints* – as self-defined and self-reinforced – in supplying "the metaphors and analogies of which mental models are constructed" (Tansey, 2004; p. 19) and from which cultural biases are formed. In this sense, as opposed to Hofstede's ready-made framework of recorded culture, Douglas' model acknowledges that culture is indeed context embedded and is influenced by climate interplay where biases are actively interpreted, challenged, accepted, and recreated (Rayner, 1992; p. 90). An example of the application of the grid-group model in construction project management arises in the work of Auch and Smyth (2010) in demonstrating the presence of a heterogeneous culture in the same organisation operating from various regions within a country (the UK). Citing Auch and Smyth (2010; p. 47):

> "The dynamic nature of the model facilitates the analysis of how culture evolves as a result of primary and secondary socialization, hence the interaction between regional (geographical) [and in our case institutional-societal-network] and organisational (office)

> culture. It also aids examination as to how culture and norms are negotiated within each setting."

However, this advantageous point of the grid-group model also has limitations. Firstly, the theory does not emphasize the distinction between culture and sub-culture. This is evident when the author (Douglas, 1999; p. 412) stated:

> "Whether the bias of opinions and preferences that belong in one corner or another of the diagram should be called culture or a sub-culture or a cultural type is of no importance. It is usually simpler to talk of cultures, and to assume that at any one time a given culture is part of a regime comprising all four cultures standing in contested ranking in relation to one another."

There are some complications attached to this flexible approach to the model. To begin with, the notion *contested* means that in assessing one cultural bias it must be placed in relation to the other three. Tansey (2004; p. 25) pointed that in this sense the typology "is a static device, not a causal model designed to illustrated change" and hence is primarily of heuristic value; placing its focus on the present rather than the past (Douglas, 1987), in which primary and secondary socialization must be separately defined. Ostrander (1982) further noted that technically, the model as a typology is incapable of capturing and distinguishing the social systems across levels. Thus the dynamism the grid-group model claims to capture is a function of the model categories rather than the processes over time or at best allude to the processes in functionalist terms.

As Douglas herself affirmed, the explanation for this space – what we call *the relational space*, the project ecology – "was left to history, personality, and happenstance" (Douglas, 1999; p. 412). In this sense, the model is indeed parsimonious and too simplistic to capture the richness and complexity of the situation surrounding the TMO's ecosystem e.g. in providing illustrative examples to how the process of selection happens and how social structures defines itself as an outcome of evolution.

Schein's 3 Layers of Culture

A great deal of the culture literature both in the general management and project management streams treat the concept as comprising identical phenomena between the three levels of structure in the ecosystem. However, from the discussions surrounding Category 1 literature above, it has been seen that this kind of stereotyping leads to rather superficial explanation and analysis of culture. Hofstede (2003; p. 181) further noted that:

> "These rather superficial manifestations of culture are sometimes mistaken for all there is; the deeper, underlying level of values, which moreover determine the meaning for people of their practices, is overlooked".

With that in mind, Clegg et al (2008; p. 224) stated, “There often is not a singular Organisational Culture and [they] are often not easily amenable to being managed”. This is caused by the different norms held by different people and cultural clashes in day-to-day activities that are often an issue given the vast number of different “roles played in each by the manifestations of culture” (Hofstede, 2003; p. 181) in a country. Indeed, this is reflected in Chapter 1 Table 3.

Schein’s (1985) model reflects the definition above by dividing the Organisational Culture into three levels going deeper from the observable to what is hidden beneath the obvious (Figure 10).

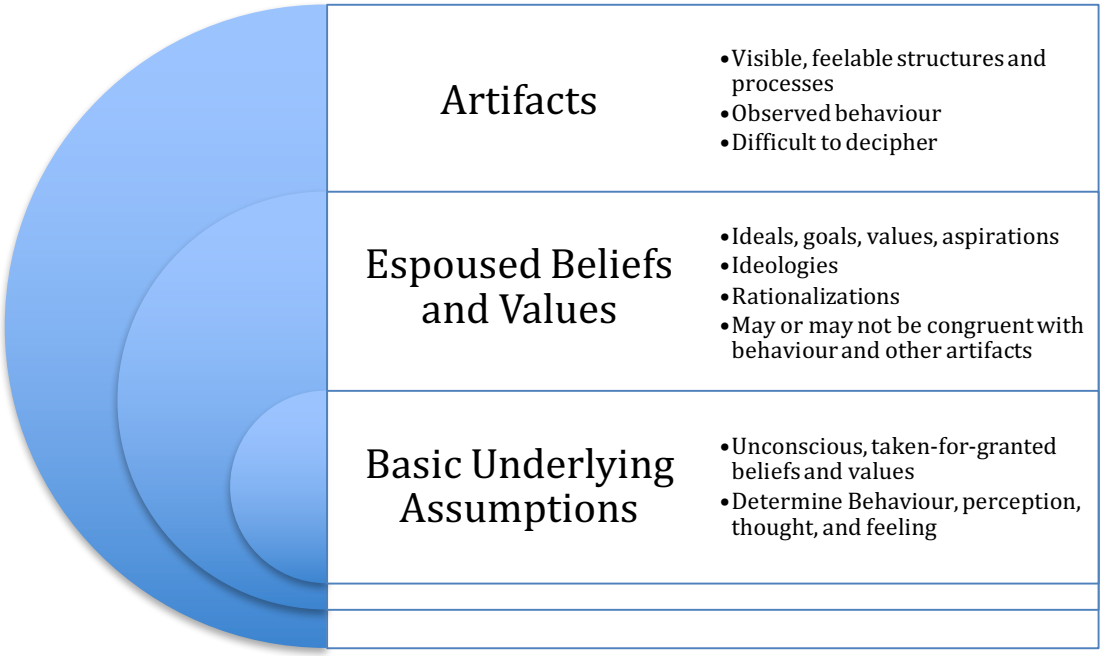


Figure 10: The Three Levels of Culture. Adapted from Schein, 2010

Within the framework, Schein recognizes the different elements and categories of culture and how each of these elements influences and interacts with each other. Schein (1985) argued that the culture of an organisation could be seen from the various visible aspects of the organisation such as structure, systems, written procedures and manuals, spatial distributions, and many other physical aspects as well as individual espoused values and beliefs. Furthermore, the author argued that a sub-culture within an organisation is the “reflection of the common experiences of given levels within a hierarchy” (Schein, 2010; p. 56). In this sense, Schein’s view in the categorization of culture, recognizes (whether intentionally or not) the principles of organisational climate put forward by Tagiuri and Litwin (1968) and Ashkanasy et al (2011).

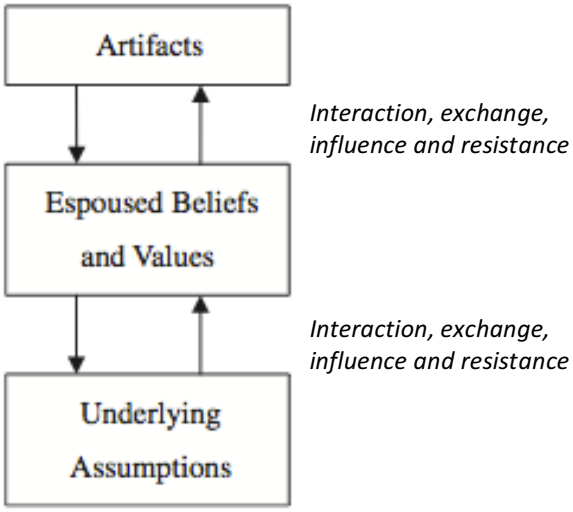


Figure 11: Interplay Between the 3 Levels of Culture. Adapted from Schein, 1985.

According to Schein's three-level hierarchy of the flow of culture within an organisation, resistance to change due to the differences between the different elements could and will result in a "hung up" situation that will hinder effectiveness. In this sense, this framework allows for deeper understanding of the principles of cultural efficacy.

The primary argument of Schein's framework or when using Schein's framework is that firstly, it emphasizes on the culture's implications from the organisation or group leader's point of view(s), that is, culture is brought upon mainly by the top management that is accepted collectively throughout the organisation/team. In this sense, every form of culture developed originates from someone who imposed their strong will that prevails among others. In other words, Schein advocates that leadership and culture are two sides of the same coin (Cheung et al, 2011; p. 34; see also Dyer, 1985; Gordon and DiTomasso, 1992). Hence, the framework assumes that every cultural misfit must or most likely come from a perceived crisis that calls into question the leaderships' attitudes and practices, "accompanied by a breakdown of pattern maintenance symbols, beliefs, and structures" (Dyer, cited in Kilmann et al *,* 1985; p. 212).

The second relates more to the methodological approach. To begin with, Schein asserts that the *clues* to the culture of an organisation can be observed from the most superficial level – the artifacts – "the visible behavioral manifestations of the underlying concepts" (Schein, cited in Kilmann et al *,* 1985; p. 21). The author went on to argue

that once the *what* issue is identified, researchers can then ask the *why* questions to strengthen the credibility of said artifacts. These then make up the first two layers of the cultural framework presented (artifacts and espoused values). However, the third layer – the learned underlying assumptions – is arguably the most significant point in answering the *how* questions that are brushed over by most researchers, in this case, as was presented by Cheung et al's (2011). According to Schein (cited in Kilmann et al *,* 1985; pp. 22-23) these "learned underlying assumptions", in the success in solving collective organisational problems, are the driving forces behind "some world view, some cognitive map, [and] some hypotheses about reality". This resonates with this study's definition of culture based on Schuetz's ideas earlier.

Going back to Cheung et al's (2011) study, the relationship between culture and organisational effectiveness is presented by the authors in the form of quantitative rankings of a selection of artifacts in terms of their importance or significance through a considerably small sample number that are justified by a considerably lesser number of interviews. It is also worth emphasizing that the authors' aim was also confined within the similarities-differences paradigm, in line with the Hofstede inspired research previously mentioned. Hence, although the article identified the elements or preconditions for a conducive culture, it still is unsuccessful in addressing the *how* question, hence failing to identify the preconditions (the warning signs) for cultural failures. Further, this study argues that although the authors were aiming to produce a better definition of Organisational Culture in the construction project management context, they returned to the term "shared" in the end, brushing over the dynamics interplay between the different levels of structures yet again.

In sum, although the framework provides a good conceptual starting point – a baseline – for understanding culture, it lacks the ability in providing guidance to help decipher and overcome any complexity surrounding the corporate-project dimension in construction that is "overlaid with other constructs which make it difficult to determine what is culture and what is due to more superficial, but nonetheless important, socio-psychological factors" (Tijhuis and Fellows, 2012; p. 15) emanating from Chao and Moon's (2005) cultural mosaic theory. Hence, whilst acknowledging the advantages of the framework, this study will not be using it as a theoretical baseline.

As such, in the search for a fitting theoretical baseline to match the arguments of evolution, ecology, and ecosystem put forward in Chapter 2, this study will turn to Catherine Casey's corporate designer culture with its team-based approach and focus

on the crisis of the social sphere that provides "the semblance of solidarity and cohesion" (Casey, 1996; p. 333) of the TMO as a social construct.

Casey's Designer Culture

When taken at face value, the corporate designer culture may reflect the way culture is constructed, simulated, and imposed within M-form organisations. Going deeper to the conceptual basis however, it represents a richer and more fitting baseline and interpretation of culture within the construction project management context focusing on the forms of cohesion and social solidarity between the different levels of structure (Casey, 1996; p. 318). Adapting Clegg et al's interpretation to a project situation, this research argues that the core of the concept of corporate designer culture has the following characteristics (Op cit., 2002; p. 324):

- The individual enthusiasm manifesting values of dedication, loyalty, commitment, and passion for the project, seen in correct language forms and appropriate interpersonal interactions. In other words, it seeks to counter the "attractions of rampant individualism and narcissistic consumption" (Casey, 1996; p. 331) in retaining the integrative form of the TMO.
- Strong customer focus – where employees and other significant stakeholders in the projects are considered end-users and not just clients or customers.
- Organisational and project discourses are based on the façade concerning forms of solidarity and social and structural cohesion of the team.
- There will be public display to ensure the culture is communicated throughout the different levels of structure.

From the above, the corporate designer culture has two distinct conceptions that are in line with this research's context. Firstly, Casey's corporate designer culture illustrates the "corporate struggle against a fear of post-industrial anomie, and towards a revived industrial integration" (Op cit., 1996; p. 334). Putting it in our context, the theory represents the struggles between the construction contracting organisations in overcoming the anomie – the lack of the usual standardized social day-to-day routines – that occur at the project interface (within the TMO as an integrated project organisation).

The emphasis on the theoretical conception is an effort against Weber's notion of the functionalist organisation to "harness generalist with spirit" to establish the "knowledge and emotional commitment to production" (Casey, 1996; p. 334). Secondly, it has been stated that this research focuses on the attention towards the relationships between the corporate-project dimensions across organisations involved in the ecosystem – "one that is more engaged with the outside looking in: with projects and their management in their institutional context" in line with Morris et al (2011; p. 6). Looking at the first point made, the corporate designer culture has the same perspective in

addressing the interplay of the different level of structures in the ecosystem. A further key concept is its focus towards meeting client and customers requirements as more than functionally integrated but beyond to be relationally integrated during the project delivery. Replacing the functional with relational integration within the TMO shifts the primary focus towards team and knowledge rather than class and self-identifications. Casey (1996; p. 328) argued that:

> "The breaking down of traditional occupational and professional boundaries effects the dissolution of the bonds of social cohesion that their statuses and collegiality provided … ostensibly, it appears that this enables the natural creation of multifaceted teams in which people share knowledge, skills and resources and work cooperatively in the manufacture of their products."

In other words, the functional integration within the TMO – the extent to which integration and coordination is usually attempted within any construction projects – that is contractually committed leads to the illusion of an automatically created effective and multifaceted teams. However, often in reality the breaking down of traditional and professional boundaries amplifies the organisational hierarchy where people are fragmented within different silos. In which case, sharing of knowledge is demarcated, being at "loggerheads with each other" (Clegg et al, 2002; p. 331).

From the above, the conceptual baseline of the corporate designer culture brings us back to the problem of the theoretical underpinnings of culture in the construction project management context. It provides a deeper and more detailed justification to the proposed definition of culture – stated in the previous sub-section – as a baseline to embark upon in line with Schuetz (1944; p. 501):

> "[Establishing] a knowledge of trustworthy *recipes* for interpreting the social worlds and for handling things and men in order to obtain the best results in every situation with a minimum of effort by avoiding undesirable consequences … as a precept for actions and thus serves as a scheme of expression … [and] as a scheme of interpretation."

In other words, this research embarks upon the theoretical underpinning where a coherent culture in projects is defined as *trusting the other party to come through with their part without watching them all the time, thus establishing a precept for actions, a scheme of expression, and a scheme of interpretation*.

A Creative-Reflective Model to Illustrate Cultural Evolution in the TMO

The Hertzsprung-Russell Metaphor – Illustrating the Propositions

From the previous sections above we have seen the two main categories of the culture literature surrounding the management of projects. To briefly recall, the first deals with interpretive comparisons and cultural fit, what Kirkman et al (2006) stated as affirming

right or wrong, similarities and differences, coherence or incoherence, consequences of different types of cultural orientations that are heavily inspired by the work of Hofstede. The second deals with identifying cultural elements, artifacts, and heterogeneity. However, this study believes that from what have been seen, there still remains the initial question. That is, what are cross-cultural differences, how do they come into being (manifest), and how to manage them to ensure the effective continuity, in this case, integrating eco-evo-devo – the seamless continuity of the TMO across the project lifecycle in relation to the respective parent organisations within the different ecosystems? Van Marrewijk (2007) went further to suggest that it is hard to measure or reflect upon the culture of the TMO as it goes along the lifecycle, that is, to measure its health and reflect upon any dysfunctional elements. This research argues that this limits the generalization of any frameworks presented so far to reflect the complexity and interrelatedness of the situation. Recalling Propositions 1 and 2, this is due to the fact that at any one given time during the project lifecycle, there will be different type of cultural interplay that is "active" and imposing their values on and trying to influence the TMO. In this sense, prevous research has "identified" yet brushed over the interplay between the different levels of culture as illustrated in Figure 5 and thus from where and how the TMO's culture manifests.

With these arguments in mind, this research believes that to be able to better illustrate the propositions made – to underpin and establish a comprehensive illustration of culture in the *third wave* research context of project management, the study needs to look beyond these ready-made theories and frameworks.

Now, we have established the relationship and interplay in which culture-climate could manifest in a TMO's ecosystem (see Figure 5). Hence, to enable this integrated logic on the construction of cultural evolution to manage and optimize the TMO's culture, we turn to and adapt the *basic principles* of the Hertzsprung-Russell diagram (1912) in conjunction with the principles established in Figure 5. The justification and reasoning are presented next.

Let us begin with a brief history. Two astronomers, Ejnar Hertzsrpung and Henry Norris Russell invented the Hertzsprung-Russell diagram in the year 1912. The diagram articulately maps the lifecycle of stars – for example the sun – throughout the universe based on their luminosity, which is the brightness of the stars, and their surface temperature. The brightness and surface temperature are influenced by the structure of the stars' core elements that changes incrementally as they go through the lifecycle.

It was explained and illustrated in propositions 1 and 2, and in Figure 5 that:

1. A TMO's culture has an ecosystem and its evolution and development are affected by the relational ecology that exists in the ecosystem, and,
2. A TMO's culture evolve through a set of recursive stages and across the project lifecycle, the culture of the TMO itself can only work throughout several different cyclical stages depending on the types of interplay at that given situation.

These types of interplay, involves the dynamics between the corporate-project relationships within the TMO at a given time in it project lifecycle. Translating this into our context, it can be said that the brightness – the TMO's level of integration and coordination – and the surface temperature – the intensity of organisational climate produced from the culture interplay – are influenced by the structure of the TMO's core elements that changes incrementally through the 5 systematic stages proposed. Further, the analogy can be seen from its use of the term *variable stars*. These stars are those belonging to specific *globular clusters* – a collection of stars formed through galactic interactions (Ashman and Zepf, 1992) – which translated into the project ecology in our context.

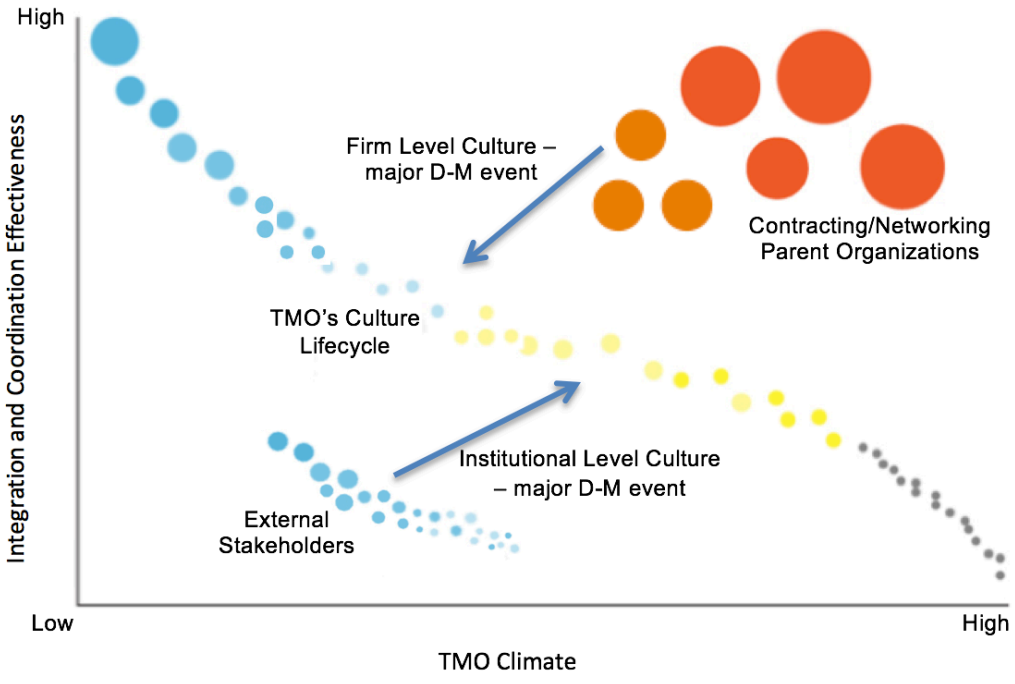


Figure 12: The Evolutionary Path of Culture in a Construction TMO - A Conceptual Illustration. Adapted from Kaler 2006.

Continuing, a variable star has a known luminosity although the apparent magnitude pulsates over periods of time and is used as a standard measurement for establishing

galactic distances (Freedman et al, 2001; Majaess et al, 2009). In our context this is translated to represent the corporate-project dimension amongst the contracting organisations (clients-architects-contractors for example) to measure/indicate the cultural distance(s) between systems environment in the wider institutional context of the project ecology. In other words, where a firm has a known Organisational Culture, the influence (apparent magnitude) imposed to the TMO pulsates over different stages of the project lifecycle and this apparent Organisational Culture can be used to measure the cultural distance between the vertical hierarchy and horizontal functioning of the firm relative to the current project ecology. Positioned at the upper right corner of the diagram, they reflect steps 1 and 2 of the proposed 5 systematic steps of the TMO's culture evolution. The pulsation of luminosity magnitude and the high surface temperatures represent the highly contested histories (see Schoenberger, 1997).

High level of effectiveness in integration and coordination reflects the ability to execute standardized processes during project start-ups but that is as far effectiveness goes when brought upon the interface of the TMO with different *globular clusters* (project ecology). Further there are the sub-type stars, which have fainter luminosity (represented by the lighter coloured bubbles – inflicting fewer cultural implications to the TMO) and is better as a standard measurement for nearer objects (Bono, 2003) in the local group of a galaxy (Clementini et al, 2001). In this sense, it can be said that this sub-type of stars represent contracting organisations with shorter periods of involvement within the TMO across the project lifecycle for example, sub-contractors and suppliers.

The lower left area represents stars that have the longest cooling periods in the history of the galaxy, in which case none has reached the end of their lifecycle (Kaler, 2006). The adaptation of this last variable star represents the external stakeholders such as the external community, statutory bodies, and governmental organisations and policies that pose national (institutional/societal) level cultural influences (the outermost layer of the established culture-climate scale). These are therefore the predisposed externalities influencing the TMO's cultural evolution, as argued earlier through the illustration of traditional *arm's length* methods on transactional aspects, this level of culture is the most enduring and hence imposes the most basic cultural perceptions.

These variables are always present in any type of project ecology. In other words, these are the organisations and institutions that are always present, posing different

types of cultural implications (and constraints) of different manifestations and magnitudes to the TMO during the project lifecycle.

Further reforms must be made for the concept to work in the construction project management context. Firstly, stars die out as their surface temperature decreases. However, to make this work in our context, we need to go back to Tagiuri and Litwin's (1968) definition of organisational climate. The authors denote that what is referred to as climate is "the relative enduring quality of the total [organisational] environment [the ecology] that (a) is experienced by the occupants, (b) influences their behaviour, and (c) can be described in terms of the values [culture] of a particular set of characteristics (or attributes) of the environments" (op cit, 1968; p. 25). Hence, the surface temperature that resides in the x-axis of the diagram works in reverse from low to high or cool to hot in concordance with the ambient colour. In other words, when the surface temperature goes up, the climate becomes hotter with many or increasing tensions, conflicts, and differentiation of cultural values. That is, the cultural values between the TMO and the parent organisations relative to their external environment (ecology). In this sense, we just need to flip both the y- and x-axis of the diagram so that it starts from 0. Therefore, the explanations and reasoning of the remaining variables are as follows:

> **Y Axis =** the level of effectiveness of the TMO's integration and coordination processes.
> **Reasoning:** Stefan-Boltzmann's law (circa, 1879-1884) denotes that star luminosity – its brightness – depends on two things, the surface area of the star in relation to its surface temperature. Hence, putting this into our context, the terminology is translated as follows: *the brightness of the star* in the main sequence is the level of effectiveness of the TMO's integration and coordination processes. This depends upon two things; the first is the *surface area* of the TMO, which is translated to the number of the construction contracting organisations that make up the TMO. Or, put another way, the size of the TMO and the number of the stakeholders (internal) involved (cf. van Marrewijk, 2010).
>
> The second dependent variable, which is also the variable for the x-axis, the *surface temperature*, is the climate resulting from the interplay of culture between the levels of structure illustrated in Figure 5. We have argued that at any one given moment during the project lifecycle, there will be different types of cultural interplay that is active and imposing its values to the TMO, affecting its integration and coordination effectiveness. This manifests through the heuristics held towards the historical and environmental challenges inform and influence rationality, judgments and their interpretations within a

particular relational space and by the taxonomy of both structural and functional constraints. In other words, the coordination process is the measure of the state of eco-evo-devo integration, in which the experience and outcome of every decision-making event informs (and re-informs) and defines (and re-defines) the ecological space that sparks evolution.

X Axis = the climate produced from the culture-climate interplay at the TMO level that is active at a given moment during the lifecycle.
Reasoning: the *hotter* the climate, the higher the pressure from the externalities whereby the reification of the mind will become greater. Recalling the 5th step of the 5 systematic steps of culture evolution proposed, decisions coming from the stereotyped culture or based on stereotypical culture (whether from the firm-level at the start up phase or from the TMO's culture itself later on) of the functionalist system can no longer grasp and visualize the situation at the TMO's project level interface. Hence, as the climate becomes *hotter* the level of integration and coordination effectiveness will also decrease due to various conflicts and incongruences that arise. This is indicative to the emergence of any dysfunctional elements. We will explore these dysfunctional elements through the three processes of selection or selection criteria that underline cultural evolution further in the empirical chapter.

Main sequence = the main sequence line represents the TMO's culture lifecycle.
Reasoning: This reflects the congruence or *compatibility* of current adopted customs, norms, and traditions, relative to the current state of the interplay within the project ecosystem.

From the above, it can be said that the HR diagram has 1 function; to illustrate the relationship – the interplay – between the different concepts used, that is, how it affects the evolution of the TMO's culture. So it integrates the relationship between ecology (the relational space), evolution, and development of culture within the project's ecosystem over the lifecycle. The diagram recognizes, represents, and includes the different levels of culture-climate interplay simultaneously into one coherent and normative typology to help reflect the TMO's cultural standings relative to its wider institutional context between the culture-climate scales. In other words, the diagram captures the complexity across levels within the ecosystem in illustrating the cyclical pattern of the TMO's evolution of culture relative to its wider institutional context. In line with Hannan and Freeman's (1989) concept, it maps what happens and how it happens between the different entities overtime. In this sense, we look at differences in cultural orientations not only as right and wrong, or coherence and incoherence but beyond those (as appealed by Jackson and Aycan, 2006) on how to make use of

propensities and predictions. That is, before a culture is nearing the end of its lifecycle, hence providing a more optimized and effective continuity of the TMO's performance as a whole across the project lifecycle, from inception to closure.

In further operationalizing the metaphor – in integrating eco-evo-devo to explore the how aspect within this interplay, a 4-class system (cf. Stone and Hall, 2006) – form, congruence, function, and development – is postulated to mobilize the empirical. This study postulates that with these 4 combinations of circumstances, it is possible to potentially predict the propensity of things happening, that is to potentially hypothesize the sort of trajectories of the construction TMO's cultural evolution rising from a set of culture-climate combinations within a given ecosystem; hence, increasing process transferability and effectiveness. This is covered in the next Chapter.

In sum, the theories and reviews conducted in this Chapter are as presented in Figure 13.

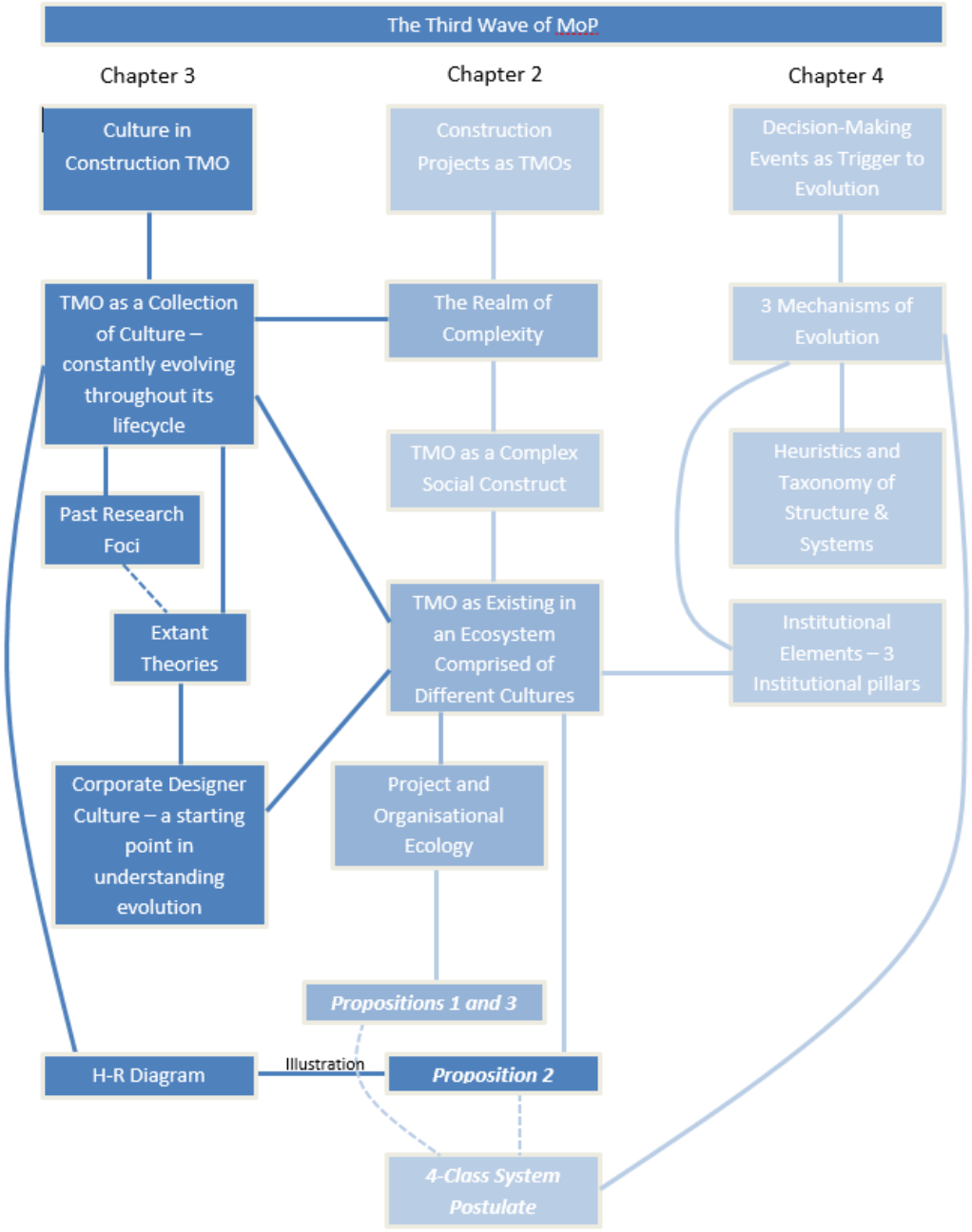


Figure 13 Chapter 3 Theory Relationship Diagram

Chapter 4

The Evolution of Culture – Mechanism, Trigger and the 4-Class System

As have been argued, in the absence of robustly integrated hard systems for projects, an emphasis upon achieving an integrated soft system has been seen to be necessary (e.g. Miller and Lessard, 2000; Gray and Larson, 2003) of which culture forms part, covering both the formal and informal organisational functions (Smyth and Kusuma, 2013).

To be effective in this context, there needs to be a balance between the organisation's internal and external elements. This balance is achieved here as part of evolution, in which evolution addresses the processes by which "social structures are established, become stable, and undergo changes over time" (Scott, 2012; p. 29). In other words, organisations must be able to adapt internally to conform to their external environments within which they are operating. That is to say, there must exist an *evolution – a lifecycle of internal metamorphosis in adaptation to the external ecosystem* as a response to *selection*, which is "the sum of the survival and fertility mechanisms that affect the reproductive success of genotypes [structures]" (Hall and Hallgrimsson, 2008; p. 3). In this sense, it is a progressive transformation developed from earlier forms due to arising internal and/or external factors in order to *maintain and foster* continuity.

Given the complex research setting, before designing the methodology and methods, it is essential to unpack and articulate what constitutes the mechanism and trigger for the evolution of culture in a construction TMO. For this purpose, juxtaposition and development of the propositions and postulates made will be presented within this chapter.

To begin with, in empirically addressing (i.e. operationalizing) the evolution of culture (firstly at the TMO's level and secondly at the firm level), there are – amongst others – three factors that will be considered as constituting the evolution mechanism (cf. Hall and Halgrimsson, 2008; pp. 631-632 – with changes in rationalization). These are:

1. **The structure of populations** → in other words, the structure of the socio-cultural systems that exist in the project ecology, hence, influencing the norms and values and their interpretations within a particular relational space. It has

been argued in Chapter 1 that this is the basis for the process of structuration in which culture influence processes and vice versa. The greater the size and variability in the structure, the more rapid and vigorous the selection becomes.

2. **Adaptive and developmental constraints** → at the corporate-project interface, the constraints are argued to come from the external institutional and internal firm levels culture that limit the extent to which the TMO's structure and functions are able to flexibly develop and consequently what the TMO is able to achieve in delivering the project. In other words, these constraints pose selection in that evolution of the TMO's culture can only advance along a certain path.
3. **Intensity of variability at different ecosystems** → the TMO's culture ecosystem is illustrated in Figure 4, depicting the ecological spaces between institutions and organisations constituting the TMO. The historical and environmental contingencies in these ecological spaces of a TMO make it so that there will be more than one cultural evolution within the TMO for each project lifecycle. That is to say, each changes along the project lifecycle informs (and re-informs) the TMO's heuristics and therefore define (and re-define) the TMO climate in the ecological space and act as the *stimuli* for adaptation. This is further illustrated in Figure 12 in Chapter 3, where different historical and environmental contingencies come from the corporate-project interface(s).

From the three mechanisms of evolution or selection criteria above that underline cultural evolution, it can be said that the *constitutive* complexity (cf. Mitchell, 2003) of the TMO – as a temporary organisation comprised of numerous different parts – at the start or the beginning of the project lifecycle will become an *evolved* complexity (cf. Mitchell, 2003) at the end or completion of the project. That is to say, organisational form at the end is the resultant divergence of adaptive challenges that occurred along the project lifecycle. As can be seen, these three criteria carry in their very essence the notion and the need to integrate between eco-evo-devo (1, 2, 3 respectively above). Hence, they bring us to our next challenge to operationalize the ability to signpost – to predict (in a project-based firm and TMO contexts) the propensities and trajectories of said evolutionary path as part of the study's empirical objectives. Keeping in mind that the ultimate aim is to – at the very end – really underpin the concept of culture in the construction project management context and also to increase the transferability of processes for better project outcomes.

As mentioned, any or every processes of evolution must have a trigger – a stimuli for transformation and adaptation. In this study, we have chosen major decision-making

events that occur as part of critical organisational conduct to be that trigger. The form of trigger exists in 2 different elements in the process of decision-making events. Firstly, the heuristics held towards the historical and environmental challenges, inform and influence rationality, judgments and their interpretations within a particular relational space; and secondly, by the taxonomy of both structural and functional constraints. In other words, the process in making sense of a decision-making event is the measure of the state of eco-evo-devo integration. That is to say, the experience and outcome of every decision-making event informs (and re-informs) and defines (and re-defines) the ecological space that sparks evolution. The extent to which this helps propensities and predictions will be articulated and discussed further in the next section.

Benchmarking the Evolution of Culture – Structuration in Decision-Making Events, Processes and Outcomes

As stated, processes and outcomes of a major decision-making events are cast off as the points of reference – the trigger and stimuli for cultural evolution between the construction corporate-project interfaces. The underlining idea for this has just been argued as consisting of 2 different elements of a decision-making event. The role of decision events as stimuli is due to its symbiotic relationship and relative weights that are attached to the prevailing norms and values embedded within the organisational routines and social constructs (cf. Royer and Langley, 2008). Royer and Langley further argue that processes preceding a decision event are always torn between the choice to firstly focus on establishing common goals or to firstly focus on establishing common means to pursue and maintain fit with the uncertainties surrounding an organisation's ecosystem. These two pathological paths in approaching decision problems then create, as they develop, a "non-linear, dynamic, and partly endogenous process of change" (op cit, p. 266) to said routines and social constructs, that is the evolution of culture. Before moving on with the argument, let us first turn our attention to some of the extant decision theories.

In Chapter 1, it is scoped that processes and outcomes of a major decision-making events are at the heart of organisational activities. The brief review from extant literatures as argued in the first chapter suggests that during the early years of its conceptual development, decision-making was heavily embedded with the normative and prescriptive notion of economics, organisational strategy formulation and the rationality of its processes focusing on probability aspects between the alternatives provided (e.g. Raiffa, 1968). The focus of this so-called decision analysis was of

course, in maximizing the input-output ratio through highly structured and straightforward processes (cf. Keeney, 1982) to help overcome uncertainty surrounding the environment. As time progressed, there emerged researchers that argued about the concept of decision-making within the hermeneutical tradition that encouraged a definition of the term from the social point of view. This raised a second stream of study in organisational decision-making focusing on the behavioural and adaptive aspects of the process (cf. Cabantous et al, 2008). It is surrounding these behavioural and adaptive aspects of decision-making event that this study is concerned.

The behavioural and adaptive stream of decision-making has several theories attached to it that falls within our culture and its evolution context. These are Simon's (1955) behavioural model of rational choice, Vroom and Yetton's (1973) contingency model, March's (1962) political model, Tversky and Kahneman's (1974) heuristics, Giddens' (1984) structuration and Sir Geoffrey Vickers' (1965) judgment theory. Given that processes and outcomes of major decision-making events are treated to the extent of *signposting the sparks of cultural evolution at the corporate-project interface*, it is believed that a little extra depth of evaluation of the concept picking up from Chapter 1 is sufficient to operationalize and juxtapose the hypothesis and postulates made thus far.

From the decision-making point of view, this study started off by arguing that every decision must be accompanied by a myth-making activity – however leading or misleading – to aspire to a state of perfection for its outcomes. It has been cited that this study defines decision-making as *a conscious process of making choices between one or more alternatives with the intention of moving toward some desired state of affairs* (Bratton et al, 2007; p. 523). From this definition, it can be seen that there are some heavy probabilistic decision analysis elements surrounding the prescriptive and "judgment under uncertainty" view of the concept. However, this study believes that it is essential for us to start from their positivist point of view to captivate the fundamental decision situations where successes and failures to converge between decision routines and processes occur (cf. Langley, 1995).

The importance to understand both uncertainties and complexities aspects that surround the construction TMO have been articulately defined in Chapter 2 through seeing it as a social construct dwelling in a particular ecosystem structure and organisational ecology. The characteristics of the TMO's ecosystem have been argued to border on open systems, chaos, self-organisation and interdependence (Jaafari,

2003). In this sense, uncertainty and complexity come from the fact that instability and constant change defies traditional management approach of orderly planning and control based on history and previous experiences alone. Hence, previous experiences are hardly able to mold and produce the same outcome from one point of event to another. As decision situations change, so too must the structuration mechanism to maintain fit between internal and external organisational environments[10].

There are three main areas of focus in behavioural decision theory – judgment, choice and decision (cf. Shapira , 2008) wrapped around the notions of rationality and heuristics. According to Raiffa (1968) decision-making under uncertain situations has 6 requirements. These are (op. cit., p. ix),

1. The number of viable options available to gather information, experimentation, and action,
2. The number of possible events occurring,
3. Chronological arrangement of the information and choices,
4. Opting between the possible consequences of each optional alternatives,
5. Judgment on that chances that any particular uncertain event will occur.

In moving from 1 to 5, Raiffa stated that the process would be consistent and dependent to i) one's basic preferences and ii) one's basic judgment about the events (op. cit., p. xxiii; see also Thaler, 2000). Ideally, it can be seen from the author's statements that the decision process and mechanism will always be consistent to and dependent upon a) the prevailing cultural values currently held by the decision maker, b) the prevailing cultural values embedded to the current situation, and c) the climate of interpretation that generates the knowledge of understanding in weighing the process and mechanism.

Raiffa's notion on analysis of decisions under uncertainty is modeled upon the primitive terms and definitions of Simon's (1955) behavioural model of rational choice and Tversky and Kahneman's (1974) heuristics and judgment under uncertainty. Rooted in economics, Simon's behavioural model of rational choice denotes that rationality does not perform the hard work of observing how people behave in reality but only pays emphasis in how people *ought to behave* (op cit, 1959; p. 254), in which the authors stated (op cit, 1955; pp. 100-101),

> "The 'flavour' of various models of rational choice stems primarily from the specific kinds of assumptions that are introduced as to the 'givens' or constraints within which

[10] From this, how the ecology is perceived and whether or not the current experiences (towards the current established culture) still fits can therefore be tracked from the changes that happened to the structuration mechanism at the time. In this sense, it is thus possible to predict the trajectory of culture evolution using the eco-evo-devo concept. This will be explained further in the later sections.

> rational adaptation must take place… the selection of particular constraint and the rejection of others for incorporation in the model of rational behaviour involves implicit assumptions as to what variables the rational organism 'controls' – and hence can 'optimise' as a means of rational adaptation – and what variables it must take as fixed."

From the above, normative rational behaviours in guiding decisions are assumed to happen in a prescriptive state of equilibrium where the economic actor – to use Simon's term – live in an objective environment. The prevailing organisational norms and informal rules and procedures as well as beliefs (i.e. the social construct) that guide behaviours as well as interpretations and perceptions, by which alternatives of decisions are evaluated and based upon during the process preceding a decision-making event are overruled by the economic rationality. Although Simon (1959) considers that the equilibrium of an organism's adaptive rationality to be dependent upon the diversity of the environment, the challenge in converging between decision routines and processes can be tackled through normative applications, binary choices and probabilistic preferences of the perfectly adapting organism to achieve its goals. Shapira (, 2008) cite this approach on the concept as lacking to take into account the history dependent and the organisationally embedded element of decision-making. Therefore, Simon's emphasis on the studies of biases and errors in choice bring us to the concept of heuristics as put forward by Tversky and Kahneman (1974).

Analysis of decisions under uncertainty as stated, relies on the rationality of the economic man that is bounded by the psychological limits. It has been argued that the difficulties for bounded rationality arise from the beliefs in expressing subjective assessments. Putting it within this study's context, judgments for rationality toward a decision process and mechanism are evoked by a climate of affective interpretations and perceptions toward the established higher-level culture and norms, in which decision situations are evaluated and based upon. Kahneman and Tversky (1983; and Tversky and Kahneman, 1986) claimed that contrary to the static view of the rational choice, variability in preferences (cultural orientations) frames multiple perceptions (climate) toward a decision problem. At the basis of this culture-climate interplay is an expression termed as *heuristics* or the rules of thumb that help simplify judgmental operations in the complex world (cf. Tversky and Kahneman, 1974). Payne (1976; p. 367) further claim that,

> "Heuristics used by decision-makers [individuals] may systemically relate to certain characteristics of the decision situation."

From the above quote, Kahneman and Tversky (1983) broadened the discourse on rationality by claiming that *a mismatch between decision values and experience values*

will give rise to further uncertainty and complexity to decision problems, process, and the mechanism that go with it (op. cit., p. 350). In a dynamic and turbulent organisational ecosystem, there is the need to maintain coherent understanding to define and ensure the forward continuation of the same event (cf. Maitlis, 2005). Weick (1993) termed this activity as *sense-making* where "reality is an ongoing accomplishment that emerges from efforts to create order and make retrospective sense" of the climate (op. cit, p. 635). Tversky and Kahneman (1974; see also Beamish and Biggart, 2012) argued that in the pursuit to create order, people rely on a set of *heuristics* principles. Having said that, Tversky and Kahneman (1974) identified a number of heuristics principles that decision-makers and decision-making bodies rely upon to reduce task complexity, that is, to simplify decision-making. These are *availability* heuristics, *representative* heuristics and *confirmation* heuristics, amongst others such as *congruence* heuristics (Baron et al., 1988), *positive hypothesis testing* (Klayman and Ha, 1987), *prototype* heuristics (Kahneman, 2003), *social* heuristics (Beamish and Biggart, 2012) and others. For the purposes of this study, we shall adhere to the first three types and social heuristics.

The concept of heuristics holds the same principles and is therefore analogous to this study's illustration of "connect the dots" puzzle mentioned towards the end of Chapter 2. It is – to use Kahneman's (2003) words – "a potent determinant" of the perceived picture in which the dots resemble and are interpreted and therefore is a heavy element that generates climate. We have argued that a project's ecosystem is analogous to a drawn canvas in which the construction TMO is an added element that must fit the drawing that already exists. Therefore, an interpretation and perception that relies on only a scramble of scattered dots to make sense of the distance cue between what has already been established and those to be added depends heavily on the circumstances of the current relational space within the ecology that generates bias for rationality. This is the first fundamental element or decision-making event as a trigger for cultural evolution within the construction TMO.

Illustration 2. Heuristics as a Form of Trigger – Its influence on Climate, Sense-making and Judgment on Post-Decision Events

The works of Tversky and Kahneman's heuristics are based on Simon's (1955, 1979) conception on the psychology of bounded rationality. As we recall it, rationality in decision process in this sense refers to the accurate assessments of values and preferences that are logically expected to lead to the most optimal result (cf. Bazerman and Moore, 2009). Tversky and Kahneman further argued that 2 types of

cognitive functioning influence heuristics in complex world, *i) the notion that thought differs in accessibility* where some things come to mind more easily than others and *ii) the distinction between deliberate and intuitive thought processes* (Kahneman, 2003; p. 697). Since heuristics are brought about as a sense-making device to simplify the complex world, reliance on heuristics creates further complexity and biases through an overestimation or underestimation of the decision-making repertoire (cf. Kahneman and Frederick, 2002; Kahneman, 2003; Bazerman and Moore, 2009). This study has cited in Chapter 1 that over-reliance on, for example, hindsight of knowledge, conjunctive events and anchoring emanating from the confirmation heuristics (cf. Bazerman and Moore, 2009; p. 41) lead to an efficacy in perception, in which what is sufficiently important is now out of proportion to the reality; This limits "the scope of the actual decision-making to safe issues by *manipulating* the dominant community values, myths, and political institutions and procedures" (Bachrach and Baratz, 1973; p. 18). In other words, biases emanating from the application of heuristics lead to the wrong interpretation of the selective conditions (the selection process) as composed by the TMO's ecosystem and ecological space.

Putting the *non-decision-making* argument aside and going back to heuristics in post-decision events as the *stimuli for cultural evolution*, this can be seen from Kahneman and Frederick (2002; p. 49) stated,

> "From its earliest days, the heuristics and biases program was guided by the idea that intuitive judgments occupy a position – perhaps corresponding to evolutionary history – between the automatic parallel operations of perception and the controlled serial operations of reasoning. The boundary between perception and judgment is fuzzy and permeable… however, the representations on which intuitive judgments operate retain some features of precepts: they are concrete and specific, and they carry causal propensities and an affective charge."

In a more social approach, Beamish and Biggart (2012; p. 60) define heuristics as,

> "Pragmatic cultural-cognitive and normative models that resolve practical problems at the nexus of institutional logics such as investment and project success, on the one hand, and individuals' current and future viability as participants in an active and ongoing [TMO ecosystem]."

From this, it can be seen that heuristics as a sense-making device and as a precept of judgment that reflect conventionalized conducts (cf. Beamish and Biggart, 2012) are molded through an established knowledge of understanding towards history and are re-informed and re-defined by any adaptive and developmental constraint that changes the direction and intensity of variability in each decision point of events.

How then, does heuristics that lead to judgmental and sense-making biases "fit in" in juxtaposing decision-making events as the trigger for cultural evolution? For this, one should turn to decision theories under the organisational stream and the theory of structuration – the second trigger element.

According to Vickers' (1965) view,

> "Every decision-making body is to be regarded as a regulator of the dynamic system of which it forms part [.] But its scope of regulation and hence the meaning of that term is much more complex than at the simpler levels at which our concepts of regulators and regulations are commonly formed."

What is simple when looked at from one perspective – such as strongly claimed by the notion of rationality – becomes more complex once others are involved due to differences in perspectives toward the matter. The dynamic mixture of the ecosystem maintains a complex pattern of relationships in each ecological space in accordance to its own established standards or "within the limits that have somehow come to be set as governing relations" (Vickers, 1965; p. 41) – cultural values and norms orientations – as a result of these selections.

Cabantous et al (, 2008) stated that the organisational stream of decision theories departs from its point of rejection towards the rational choice principles as put forward by Simon (1955, 1979). The organisational perspective of decision-making challenges the fact in seeing the decision-maker as the centre unit of analysis. In this sense, in line with the third wave approach in the management of projects, the organisational perspective takes into account the fact that rationality is context embedded and therefore, can be contested in an arena filled with multiple and conflicting modes of professional rationality that are *policed by a complex system of on-site surveillance, off site litigation, and arbitration* (cf. Clegg et al, 2002). March (1962; see also Cyert and March, 1963; March and Olsen, 1976) claims that these conflicting modes of professional rationality are due to the political systems embedded within the institution.

The process of selection for cultural evolution embedded within this perspective can be further seen from Vroom and Yetton's (1973) contingency model of leader behaviour in decision-making. Putting the leadership factor aside, the essence of this approach denotes that decision processes are based on "a diagnosis of situational demands" (Vroom and Jago, 1978; p. 151), that is to say; decision processes should be a "function of the situation" (Margerison and Glube, 1979; p. 47). Vroom and Yetton conceptualized that the approach to decision processes – what constitute a decision mechanism – depends on two sets of factors. The first is the taxonomy, which is the

extent of flexibility in participation given the structural constraints and the second, the situational variables or rules that influence the effectiveness in applying the decision process. In other words, the model emphasized that every successful decision outcomes depends on the exogenous social interactions and the influences that go with it to account for the achievement of rationality (cf. Vroom and Jago, 1974, 1978; Tjosvold et al, 1986). In other words, decision processes are described as an activity to set and regulate norms (Vickers, 1965; p. 45) to integrate reality judgment with value judgment rather than pursuit to achieve a threshold of elusive goals coveted by chaotic processes (Elbanna, 2006). Vidaillet (2008; p. 423) seconds Vickers' argument by stating that decision are "seen as plausible stories collectively generated by the members of the organisation to account for past and present events, serve to make sense". Hence, we shall revise our initial static definition of decision-making from Bratton et al's (2007) into one posed by Orton (2000; p. 231) as follows,

> "[A decision is] the presentation of a package of deliberate initiatives that will change formal relationships among organisational components … Emergent enactments are transformed by organisational members into deliberate decisions … [where] organisational members cobble together sensible arguments to support the decision they are announcing."

In so far as seeing organisations – and especially construction TMOs here – as open systems and social constructs, it can be seen that processes following a major decision events are part of an appreciative system (cf. Checkland 2005; Vickers, 1959, 1965; Checkland and Casar, 1986) to maintain a cultural mechanism in evaluating desired relationships (Checkland, 2005; p. 287). In line with Giddens' (1984) theory of structuration, Checkland (2005; p. 288; as part of the author's conversations with the late Sir Geoffrey Vickers, 1972) stated,

> "[The] action will both affect the current world and condition future experience in it, modifying over time our in-built readinesses [culture embedded in histories and routines] to see certain features of our perceived situations as significant and to neglect (or not see) other features … [this] represents a continuous cycle of thought and action 'carved out by our interests, structured by our expectations and evaluated by our standards of judgment'."

In this sense, rationality in decisions are seen as a convention of a social achievement produced by a social construction process through manipulating the structure of the socio-cultural systems that exists in the project ecology. That is to say, through manipulating the taxonomy of both structural and functional constraints that limit the extent to which the TMO's structure and functions are able to flexibly develop and consequently what the TMO is able to achieve in delivering the project. Hence, this constitutes our second trigger element.

Illustration 3. The Organisational Perspective as a Form of Trigger – Taxonomy of Structure and Systems

The heavy element of structure in the organisational perspective consists of *rules and resources* including norms that govern behavioural interactions. Rules being all the varieties of *"cultural schemas … that make up a given society's fundamental tools of thought … the various conventions, recipes, scenarios, principles of action"* (Sewell, 1992; pp. 7-8) and resources being both human and non-human being the *"manifestations and consequences of the enactment of cultural schemas"* (Sewell, 1992; p. 11). Both these rules and resources exist at various levels within structure and will have different logics and dynamics (Sewell, 1992; p. 16). Some will prove to be implicit and explicit constraints while others aid to sensible decision-making by framing the context.

Vidaillet (2008) summarized the reasoning behind the arguments of both rational and organisational perspective of decision-making cited as follows (op cit, p. 419),

1. Different decision-making processes lead to different decision,
2. Different decisions lead to different actions,
3. Different actions lead to different consequences [and hence re-defining the present heuristic moldings of experience – culture].

The author further argued that while decision mechanisms can create "an illusion of order about the past" (op cit, p. 424), they are the sources of equivocality within the established structure of socio-cultural systems for the present due to "the existence of multiple and conflicting interpretations about an organisation [current] situation" (Trevino et al, 1990; p. 74) as the ecosystem and relational ecology shift.

From the above, it can be said that structures in this sense are merely the embedded results and consequences of past decisions and actions in which the resultant effects are amplified as culture. These constraints are illustrated by Cohen et al (1976, cited in March , 1988; p. 296) as follows:

> Although organisations can often be viewed conveniently as vehicles for solving well-defined problems or structures within which conflict is resolved through bargaining, they also provide sets of procedures through which participants arrive at an interpretation of what they are doing and what they have done while in the process of doing it.

Therefore, it can be affirmed that processes following each major point of decision-making events across the project lifecycle "punctuates and modify the network of issues" (Vidaillet , 2008; p. 431; see also Langley et al, 1995) that pervade the entire ecological structure of the TMO – hence, forcing it to re-define its culture.

In line with Ursacki-Bryant et al (2008), the above denotes that, the static prescriptive view on decision processes put forward by Raiffa (1968; as well as Simon, 1955 and Tversky and Kahneman, 1974) are too rigid and idealistic. Rather decision processes under uncertainty have a complex pathological and dynamic characteristic summed up to four key elements of decision processes. These are (op cit, p. 181):

1. Degree of centralization,
2. Legitimacy and trust,
3. Diversity of information sources used,
4. Speed in reaching conclusion and taking actions.

From the four key elements above, post-decision processes can be argued as pathological to the societal and institutional capacity of an organisation. Coupled with an organisation's ultimate requirement for survival and continuity, there must be a fit between the decision process (that ultimately lead to the decision event), the scope and scale (the ecosystem) of both intra- and inter-organisational environments and the so-called contingency elements that provide the structure and principles in governing the relationships and behaviours as well as providing the function in describing and interpreting a situation. In other words, every attribute – every cultural attribute – that are attached to both an organisation as well as its ecosystem determines, according to Ursacki-Bryant et al (2008), the extent of midway disruptions, the climate in which decision problems are constructed (i.e. the social construction of reality and rationality) and the choice of decision processes required in order to deal with them.

Now, this study has, as its first proposition that the TMO's culture evolves through 5 systematic steps throughout the whole project life. As we recall it, these are:

1. Firm level cultural values are most apparent and heavily imposed during the take off stages of the project lifecycle.
2. However, the project team will soon realize that the mixture of values from other institutional contexts poses more pressure for integration of coordination.
3. Hence, beginning to challenge the different prevailing cultural values in search for a working project culture.
4. In doing so, the project team begins to detach itself from the prevailing cultural values of its respective parent organisations, towards evolving into a new form of organisation with its own working culture fitting its current institutional context.
5. Across the project lifecycle, due to the nature of culture, this newly formed working culture will become more and more solidified as a custom, habits and traditions in which it will cycle back to stereotyped decisions of the TMO where the evolution cycle loops back from stage 2 again and again until the TMO is terminated at the end of the project or (re)formed for the next projects.

In this sense, it is clear that the ecosystem, in which the TMO operates, provides the experiences and histories that mold sense-making processes within the organisational ecologies in defining decision problems. When new changes in direction and intensity in variability occur, this affects the structure of population where the "old mold" of the

relational ecological space must be redefined to adapt to any new developmental constraints. In other words, where new mechanisms in a decision process is required to define and ensure the forward continuation of the same event – in this case the continuation of one project life – this is the benchmark where stimuli of adaptation surfaces and consequently, sparks the evolution of culture. As emphasized strongly by Kahneman and Tversky (1983; p. 350; see also Vickers, 1965; Checkland and Casar, 1986; Tversky and Kahneman, 1986),

> "Violations of invariance [diversity in organisational ecosystem and ecology] further complicate the relation between decision values [affected by current environmental contingencies] and experience values [based on history] … [hence] the evaluation outcomes in the context of decisions not only anticipates experience but also molds it."

The following sub-section will be dedicated to unpack this logical construction of cultural evolution mechanisms in the attempt to systematically utilize patterns surrounding the ecological, developmental and evolutionary information to increase transferability of both culture and process between projects (i.e. to address the second objective: *to challenge barriers and assumptions of non-transferability* and to provide a conceptual template for the last sub-research question: *to what extent can trajectories of evolution be predicted to increase transferability of Organisational Culture and hence organisational process?*).

Unpacking the Mechanisms for Evolution: Institutional Elements and the 4-Class System

In Chapter 3, reviews of extant cultural models have led this study to believe that Casey's model of culture will be used as a starting point of reference to illustrate a dynamic view on the TMO's cultural evolution within the third wave's institutional context. In moving away from the conventional values research, this study argues that stand-alone ready-made cultural models are parsimonious and too simplistic to capture the richness and complexity of the situation surrounding the TMO's ecosystem; i.e. in integrating eco-evo-devo, providing illustrative examples to how the mechanisms work and how social structures (as perceived within Scott's institution theory) defines itself as an outcome of evolution. However, further justifications must be articulated in order to make sense of this logic.

In the previous section we have articulated the juxtaposition of the *process of selection* and the role of decision-making as *trigger*. Earlier, this study has also as its postulate, that in operationalizing the HR diagram (Figure 12), integrating eco-evo-devo to explore the how aspect within this interplay and the evolutionary process of culture can

be mapped systematically through the *4-class* categorization – *form, congruence, function and development* (Stone and Hall, 2006). Where and how then, do the selected three culture models fit within this postulation? This section will deal with this task.

Having articulated the concept of evolution in the previous section and before going straight into defining the 4-class, a revisit to previous arguments and justifications on the remaining two concepts – ecology and development – is essential. As have been highlighted, this study argues that currently, too few cultural systems are understood comprehensively from the ecological, developmental and evolutionary perspective. Usually taken for granted, cultural interplay within the construction TMO has been broken down and illustrated in Figure 4. We like to call this, *the logical construction of the TMO's cultural ecosystem*. Further, this study has also argued very early on, the problem with culture is, it is only apparent or starts giving out problems in different levels of the TMO's relational spaces. As we know it, the notion of relational space in construction project management context is termed by Grabher and Ibert as the *project ecology*. In which Hannan and Freeman defined (in pursuit of better *fit* of wordings) as,

> "[The] social and environmental conditions and interactions within and among populations influence the rates at which new organisations and new organisational forms are created, the rates at which existing organisations and organisational forms die out, and the rates at which organisations change forms" (1977, cited in Baum and Singh, 1994; p. 5).

As stated, Brooks and McLennan (1991) have developed a 4-class system classification to integrate "the causal and reciprocal interrelations between development and evolution at multiple scales and multiple levels of analysis" (Müller , 2007; p. 504). Further, Stone and Hall (2006; p. 25) stated, "ecology and evolution have been flirting for a long time" and integrating ecology would be beneficial because then evolutionary relationships between structures/systems as cultural schemas (Sewell, 1992) "could be considered more-completely as modification over time that is wrought by environmental effects" on developmental progress (Stone and Hall, 2006; p. 25). In other words, the 4-class system aims at explaining as well as mapping how development [of culture within organisations] itself evolves and how the control of developmental processes is mutually effected by the culture surrounding the internal, external, and institutional systems embedded within the ecosystem of contracting organisations, imposed upon and inherited within the TMO. As a systematic comparative method in the study of evolution, in the field of social sciences Winterhalder and Smith (1992; p. 8) stated that the theory directs a researcher's attention to "the role and characterization of the environment". In this sense, eco-evo-

devo combination focuses its attention to predict the diversity and flexibility of behaviours in complex systems that are contingent upon localized and often changing environments as argued within Scott's (2012) institutions-based approach to the study of organisations.

As stated in Chapter 2, the institutions-based approach focuses on the notion of *the three pillars* of analytical constructs, "intended to identify underlying ingredients in institutional systems" (Scott, 2012; p. 29). These are namely, regulative, normative and cultural-cognitive elements argued to be contributing to the construction, maintenance and change of a system. Scott (2008b; pp. 50-62) described the explanation of each pillar elements as follows,

- **The regulative element** deals with rule-setting and arenas of control based on compliance to established system regulations,
- **The normative element** deals with the importance of prescriptive, evaluative and situational obligations that predominate an organisation,
- **The cultural-cognitive element** points to the centrality of cultural schemas as symbolic aspects within organisational structures that constitute the basis construction of reality (Berger and Luckmann, 1967). To avoid confusion, herein this pillar will be referred to as cognitive.

Although Scott (2012) argued that these three pillars represent their own distinguished empirical elements, in that each works in different ways, this study believes that the three *corresponds* to the three processes of selection as explained in the previous section. In other words, this study argues that within the concept of cultural evolution, the essences of the three pillars can be incorporated into Brooks and McLennan's 4-class system to form an integrated approach to our evolutionary, ecological and developmental study of culture in construction project management. Thus, the three pillars of the institutional theory come in as an auxiliary complementary concept in the quest to unpack the mechanism of the TMO's cultural evolution.

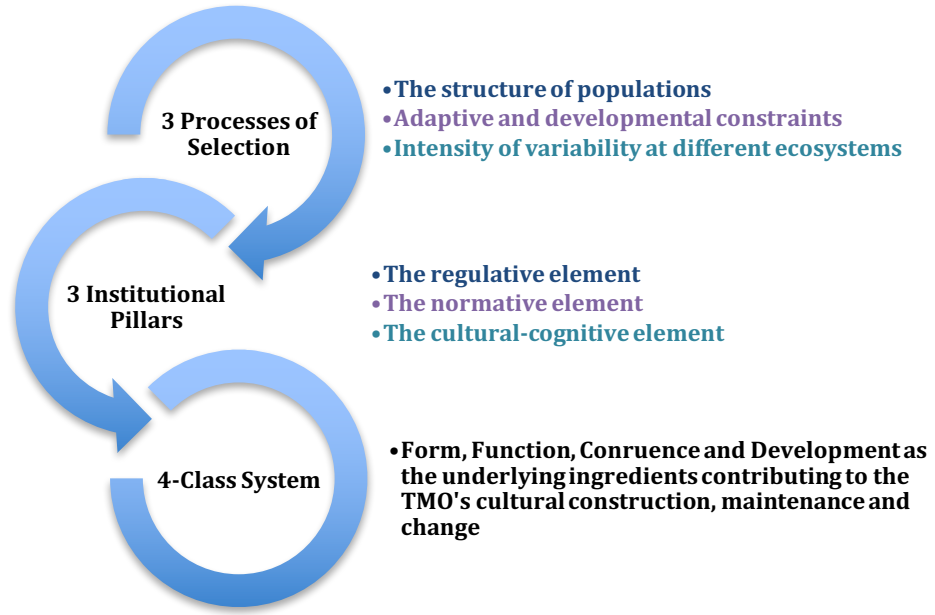


Figure 14: Elements of Institutional Constraints and How they Materialise. Adapted from Kusuma, 2014

This pluralistic approach affords more thorough comprehension concerning how cultural features are affected by environments, effected in development, and transformed during evolution than do more conventional cultural values approaches. The reasoning for a fit in this theoretical juxtaposition is illustrated in the figure 14. The 4-class system is at the heart of this study's postulate. The postulate states:

> *The evolutionary process and features of culture can be mapped systematically through a 4-class combination of features: form, congruence, function and development. This gives 16 possible trajectories and categories of potential cultural evolution paths to increase an organisation's functional transferability. This combination constituting the 4 classes encompasses the aforementioned interplay between the three levels of cultural hierarchy, thereby, facilitating the aforementioned conceptual Organisational Culture synthesis among ecology, development and evolution within the construction TMO.*

The 4-class rationale (Brooks and McLennan, 1991) arose from Stone and Hall (2006) who applied biological terminology, which requires redefining for operationalization into our context. The 4-class system is comprised of three binary supercategorical features, *form, congruence and function* with two conformant developmental modes, *comparable* and *non-comparable*. Each feature has different traits, which are observable properties exhibited by organisations at any level from microscopic to macroscopic. In this sense, traits represent the different levels of culture exhibited from the macro institutional level to the meso corporate-project interface and the micro individual level. The theoretical fit for the operationalization of the three cultural models will also be addressed in the following paragraphs, starting with the supercategories.

Form

According to Bock and van Wahlert (1965; pp. 272-273) a form can be defined as "the class of predicates of material composition and the arrangement, shape or appearance of these materials". In other words, feature form is equivalent to what Giddens (1984) and Sewell (1992) term as the structure of an organisation, which may be described through size, shape, position, typology and others. Together with Weeks and Galunic (2003), these authors agree that the structure of an organisation is a representation of its cultural schema, that is, an organisation is an accumulation of culture(s). Since any compositions within this feature should "not mention any reference to the normal environment of the [organisation]" (Bock and van Wahlert, 1965; p. 273), the target population for measurement will be the units of production of the parent organisation(s) embedded within the TMO throughout the project delivery. The emphasis therefore, is on the exhibition of histories inherited and structural similarities or dissimilarities to the current megaproject's cultural environment (e.g. as illustrated in the works of Casey, 1996 and Clegg et al, 2002).

Congruence

Feature congruence deals with descriptions of an organisation's cultural orientations within an evolutionary context, which are defined on the basis of comparative analyses between the three cultural levels. These taxa comprise of a reference group; the out-group and the in-group. Relating these back to Scott's institutional theory, as units of production from the parent organisation moves into the TMO, its cultural orientation becomes part of the in-group cognitive element. The congruence in the TMO's cultural state is measured through synapomorphic regulative elements coming from the parent organisation(s) that has become the out-group. Thus, synapomorphy – a common cultural trait shared within the corporate-project interface – of the TMO's cultural characters are classified as either shared *(homologous)* among the corporate-project interface (between out-group and in-group) or as unique *(homoplastic)* to the in-group TMO itself. The reference group then comprised of any cultural orientation at the national/institutional level, that is what Scott (2008b) termed as the normative elements predominating value-laden realms within the relational spaces of the project ecology.

In sum, congruence involves topographic, structural and compositional similarity that concerns the evolutionary relationships of cultures between form, development and position. Putting it another way, any changes in the relational ecological space will induce the TMO (and consequently the parent organisation's unit of productions

forming the TMO) of a preexisting historical background to develop differently structurally and behaviourally overtime. Thus changing the relative relationship and association between the different socio-cultural systems within the TMO and hence ultimately the frequency of hereditary elements from the respective parent organisations.

Function

According to Stone and Hall (2006; p. 30),

> "The association between function and environment can provide information that is useful for inferring developmental modes, and thereby, categorization. Feature function may be described in accordance with the term 'aptive' [adaptive], which refers to the advantages that are conferred to [organisations] possessing particular features – literally, 'fitting' them for particular conditions."

Although this study are not orientated towards the resource-based view of an organisation, the essence of the argument still stands. As stated in the previous section, in empirically addressing (i.e. operationalizing) the evolution of culture (firstly at the TMO's level and secondly at the firm level), three factors will be considered as constituting the mechanism of selection. These are:

1. The structure of populations
2. Adaptive and developmental constraints
3. Intensity of variability at different ecosystems

Within these processes of selection, three institutional pillars – regulative, normative and cognitive – affect functional adaptability through associations with the external institutional environments both from which these feature functions originated and are currently situated. For example, similar organisational forms that persist in dissimilar environments may be interpreted as a result of strong cultural constraint if the congruence trait that defines the organisational cultural state is homologous.

Feature function adaptability is measured through a 'before-and-after' cultural-cognitive fit enacted through heuristics and organisational sense making posed as climate during major decision events. Thus, as opposed to structure, feature function is a representation of existing organisational processes and routines that is embedded in behaviours, values, identities and core purpose culture-coordination elements.

Development

The previous three supercategories elaborated juxtapositions for the operationalization of theoretical fit. However, each operationalization is a static stand-alone empirical mobilization. A dynamic view that is needed to underpin the evolution of culture in construction project management is embedded in this feature, development. Development and evolution have parallel meanings. To avoid confusion, differentiation between the two concepts could be analogously compared to the meanings of the words discovery and invention. Thus, evolution is the long-term transformation in the form of major changes within an organisation whereas development is equivalent to incremental changes within a given period of time. In other words, cultural evolution is the difference in the TMO's cultural state before and after the project, which has undergone incremental developmental transformations during the lifecycle of the project.

In this sense, feature development incorporates more continuity, in which if combined with the previous three supercategories, provides a mean for analyzing and systematically categorizing the evolutionary trajectory(s) of the TMO's culture as well as the propensities for any conformational and non-conformational features within the resultant culture as the product of evolution. Another way of putting it, feature development as conformational or non-conformational provides a means for analyzing the evolutionary trajectory of the cognitive element in response to the other two (regulative and normative) as the institutional pillars contributing to the TMO's construction, maintenance and change of culture. Qualitatively, development with its dynamic trait will be approached through participant observations and filtered through a phenomenographic analytical method to take into account the bottom-up (climate) side of the argument.

To sum up the arguments within the section, let us recall Stone and Hall's (2006) abstraction of the three supercategories and developmental modes and their roles in integrating ecology evolution and development. The authors (op cit, 2006; p. 25) stated,

> "Form is central to development and evolution but peripheral to ecology. Congruence is applied at different hierarchical [cultural] levels … [and] function is central to ecology but peripheral to development."

Having unpacked the theoretical explanation for our postulate, the discourses in this Chapter are illustrated in Figure 15.

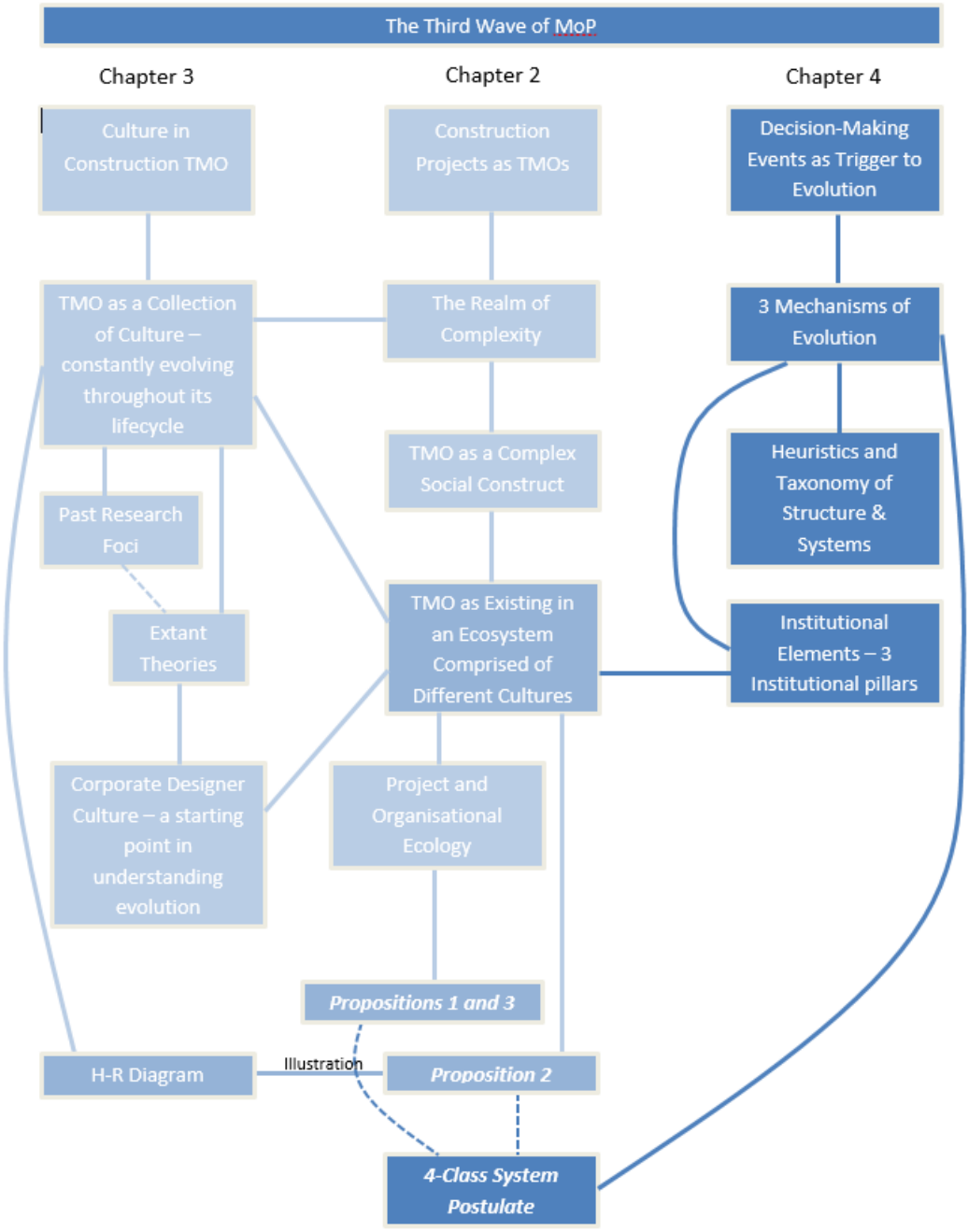


Figure 15: Chapter 4 Theory Relationship Diagram

Synthesis

This section synthesizes and refines the theoretical perspectives as well as the context of analysis that has risen thus far. The key perspectives are culture in the third wave of MoP, cultural integration/coordination, evolution and mechanism, and lastly, construction project as TMO, with major decision-making events as the trigger to the evolution of culture.

For the first perspective, it has been stated that the third wave of MoP (Morris et al , 2011; Morris and Geraldi, 2011) views:

- Projects as complex organisations involving cross-firm relationships – social constructs exhibiting open systems, chaos, self-organisation and interdependence (Hobday, 2000; Davies and Hobday, 2005; Jaafari, 2003),
- Projects as temporary multi-organisations (Cherns and Bryant, 1984; Söderlund, 2004; Sydow et al 2004),
- Project practices embedded in history, organisational scope and long-term institutional contexts (Engwall, 2003;Weeks and Galunic, 2003; Cicmil et al, 2006),
- Normative approach cannot handle environmental complexity well – to enable management of projects in the age of complexity (Miller and Lessard, 2000; Jaafari, 2003; Milosevic and Patanakul, 2005).

This first perspective then leads this research to a different lens in viewing culture in a project business. Instead of viewing culture as a static measuring concept to identify differences between organisation, this research views culture as an ongoing process constantly (re)structured by organisational actors (Weeks and Galunic, 2003; Baum and Singh, 1994) with respect to their external ecosystem. The diversity in viewing culture as part of an ecosystem manifests in two different types of challenges. These are the dynamics between the corporate-project relationship and the changing project environment(s). This then leads to the second perspective.

The second perspective concerns the notion of culture as a primary factor affecting the degree of integration and coordination in construction project TMOs (Berggren et al, 2001). In construction projects, it was stated that knowing-doing gaps are dominated by cause-effect analysis with the focus on cost/risk or cost/benefit analysis of economic efficiency (cf. Stinchcombe and Heimer 1985; Flyvberg et al 2003; Flyvberg 2005; Miller and Lessard 2000; Olds 2001). Building on this, it is then essential to encourage a move beyond the bane of contractual (or hard systems) efficiency in guiding governance and relationships within a construction TMO; whereas soft system issues such as understanding and managing cultural integration is also of importance.

The third perspective digs deeper into the notion of cultural integration. There has just recently been a call to address the “how” rather than the “what” in studying culture (Cicmil and Gaggiotti, 2014). In order to be able to provide solutions beyond the conventional recommendations by extant culture researchers in the construction industry, this research aims for to address this call. As stated in Chapter 3, the issue in

culture research in the construction industry is that recommendations are too prescriptive that it could not transcend across context. This research believes that this is due to not starting from tackling the root of cultural studies – understanding that culture exists in an ecosystem where each organisational and institutional element are inter-connected. In other words, the focus is to understand how components of cultural values and biases are built into the TMO system. This research then attempts to articulate this.

From the above, it is then proposed that in one lifecycle of a project TMO, an established culture can only survive for so long, before the adverse environments surrounding the TMO forces it to "morph (whether or not significantly)" and be "re-constructed". Thus, understanding this evolutionary process of culture in construction project TMOs and its process mechanism is seen as a basic necessity. Three propositions and a postulate have been generated to help structure this research.

Finally, the notion of construction projects as a form of Temporary Multi-Organisation is the fourth perspective (Hobday, 2000; Davies and Hobday, 2005; Lundin and Söderholm, 1995; Cherns and Bryant, 1984; Engwall, 2003). By taking the process perspective in viewing culture, its evolution and mechanisms, diversity and complexity in a TMO environment poses four different challenges. These are: identity and core purpose, values, behaviours and formal mechanisms. As such, the evolution of culture is seen from the dynamics, ecology and development complexity within the TMO context (cf. Kusuma, 2014).

A major decision-making event is believed to be one of the primary triggers of cultural evolution. As such, this research's the unit of analysis (that constitutes the actors within a TMO experiencing this event), is studied utilising the four theoretical perspectives summarised and synthesised above. Drawing from these, this research's theoretical standpoints are:

- An evolutionary view of culture in projects as TMOs (Hobday, 2000; Davies and Hobday, 2005; Davies and Frederiksen, 2010; Engwall, 2003; Weeks and Galunic, 2003; Baum and Singh, 1994); this incorporates Casey's Corporate Designer culture (1996),
- The process of structuration and institutional theory (Giddens, 2001; Sewell, 1992; Scott, 2012),
- Evolution and evolutionary mechanisms (Hall and Hallgrimsson, 2008).

As such, it can be said that the four theoretical perspectives build on:

- Starting point for cultural discourses: Casey's Designer culture (1996) because of its recognition of the term climate and culture-climate interplay.
- Starting point for discourses on cultural evolution and mechanisms: (1) selection theory (the mechanisms of evolution) → where this includes the discussions on structuration and (re)structuration as an evolving outsome stemming from key decisions and major decision-making events, sense-making and decision-making theories and (2) Scott's Institution Theory (the 3 pillars of institution). This includes discussions on cultural schema and cultural distance.

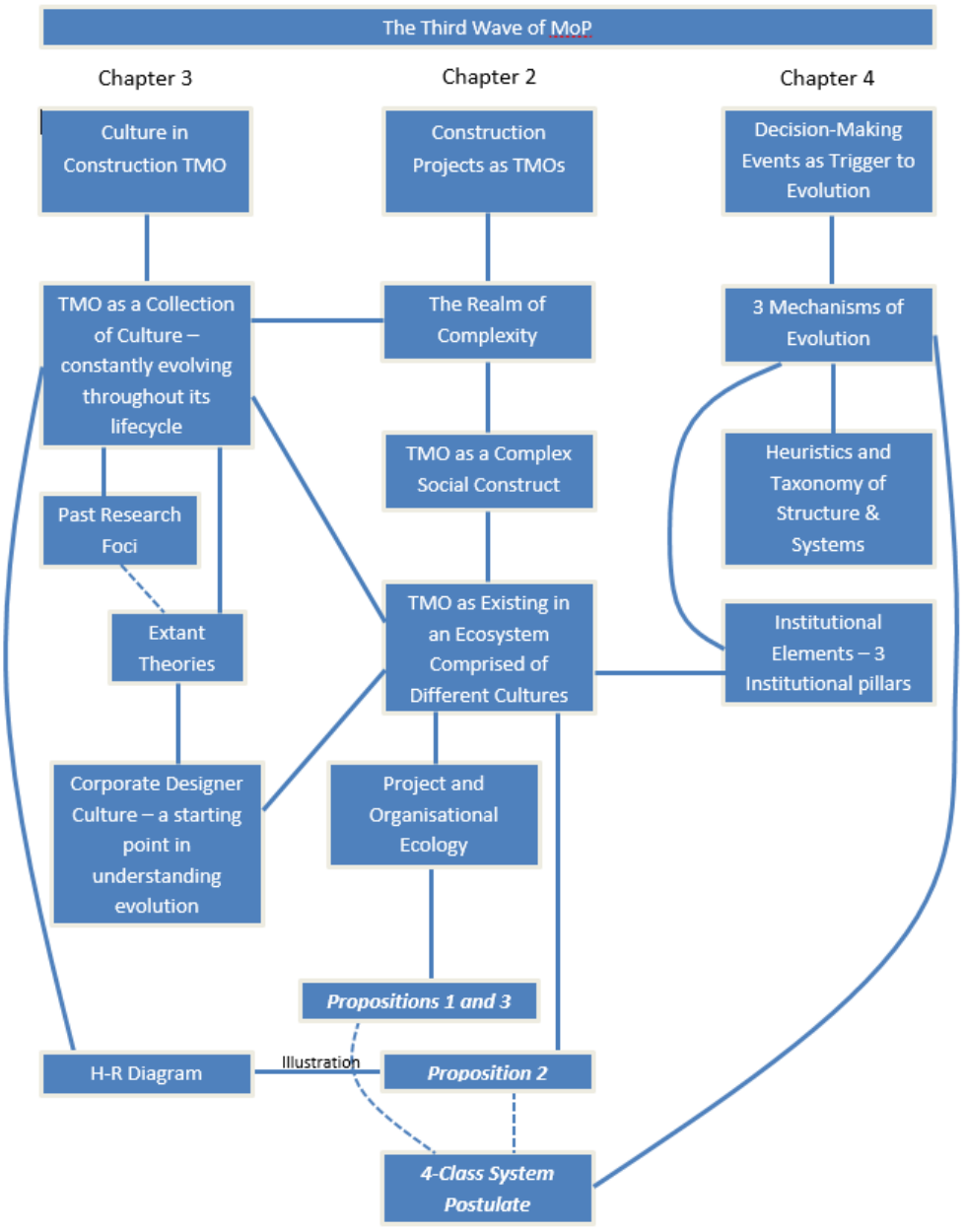


Figure 16: Synthesis of Theories

Having refined and juxtaposed the theoretical standpoints in this chapter, the next chapters will address the empirical part of this research.

Chapter 5

Research Methodology and Methods

The aim of this Chapter is to present the reasoning for our research methodology and methods. This begins with a brief summary of the research gaps and interests. Second, the research approach, studies and studied industries are presented. This is followed by a description of the research process and the methods of data collection that has been employed and a review of the data analysis. A reflection on the research quality and validity ends the Chapter.

Summary of Research Gaps and Interests

To relate this back to the research gaps identified in Part I, this study claims that at present, it would seem that the field of cultural research in CPM is more focused on specific themes and conventional values frameworks rather than theory development. Walker (2007), Auch and Smyth (2010) and Cheung et al (2011) highlighted the above and argued the need for a comprehensive understanding of the concept of culture and its multidimensional levels. In other words, the field (culture and projects) overall, lacks empirically grounded understandings that are capable in addressing and proving the relatedness between cultural levels and their interplay in TMO settings.

From the discourses in the previous three chapters, it can be seen that studies concerning construction projects can be approached through two different ways. The first is studying the project plan that is, the story of the planned as an intentional rational system (Gustafsson, 2002). This revolves mainly on the critical paths in the series of events focusing on the project aspects considered necessary to achieve the ultimate delivery goal. As we know it, studies using this methodological approach are those captured in Morris and Hough (1987) and Flyvberg (2003). In the culture and projects theme, studies reflecting this approach are Pant et al (1996), Winch et al (1997), Pheng and Leong (2000), Pheng and Yuquan (2002), de Bony (2010), Bredillet et al (2011), that attempt to prescribe with the intention to minimize emergent risks through increasing the amount of comprehensive information to reduce uncertainty within the project plan. The second approach, involves studying projects in retrospective lenses after the project ended. The second approach mainly focuses on the fit between what was planned and what had actually happened. Different but equally clear, rational and causal perspectives form the central reminiscent backbone to this explanatory storytelling method. Gustafsson (2002; p. 1) stated,

> "When travelling backwards on this causal rail, which is the rational connection of the logically necessary steps, the end result is often more or less visible in certain events at the very outset of the project and the end result thus being visible more or less through the whole project. However, it can be questioned what the plan or the history really tells about the actual project and what actually happened."

Extant literatures within the culture and projects theme that fall within this approach are those captured within most of the Hofstede inspired studies. Clegg et al (2002), van Marrewijk et al (2008) and van Marrewijk (2010) provide some examples. However, Gustafsson (2002) further argued that the question remains to be addressed between what the plans or the history tells about the actual project and about what actually happened. Now, there is emerging research within the culture and projects literature that address the issue using this *middle* methodological approach namely van Marrewijk (2007) and Smits (2013). Within these studies, the main empirical methods applied is longitudinal ethnography in which data analyzes are mainly done through a normal narrative description of what happened on the ground compared to what extant theories have established. In other words, these studies, at their first point of entry to the field aim to observe the social construction of reality to report findings and generate conclusions. The resultant conclusion this study would argue, especially with the emphasis on culture and construction projects, is that they may have touched upon the question how culture impacts behaviours in project environments, yet the findings presented are unable to yield a meaningful conclusion as to how studying and understanding culture in various project contexts help the transferability of organisational functions and prediction (or forecasting the trajectory of development some would argue) to and between projects.

In this research, the research approach is more inclined towards the second one. Due to time constraints and the nature of the research questions that this research has aimed at adopting an *abductive-retrospective* philosophy – rather than inductive as adopted by previous studies – in theory building as the appropriate methodological starting point (e.g. Dubois and Gadde, 2002). The reasoning is described in the following sections.

Research Approach

Qualitative Research

Empirical procedures in the study of social science are largely divided into two over-arching categories. These are the intensive (qualitative) and extensive (quantitative) approaches (Danermark et al, 2002). A quantitative study is usually designed around a "logical positivist metatheoretical foundations" (Op Cit; p. 154), that is everything

stands in unitary positions. However, it is has been stated quite rigorously in Chapters 2 and 3 that this study regards the construction TMO as unique, complex and must be viewed as part of its institutional context. Further, it has also been argued that culture as a concept is multi-layered and hence, must also be viewed in terms of its ecology, evolution and development (eco-evo-devo) in the open system environment. Thus, it is determined that an intensive, qualitative approach (Denzin and Lincoln, 2000) is more appropriate. Because a qualitative study follows a hermeneutic process, it emphasizes interpretation and understanding. That is to say, (i) interpretation depends on the researcher's previous experiences, theories and frames of reference used, and (ii) constantly involved in the interplay between the parts and the whole (Danermark et al, 2002). Thus, it would be logical to continue with some explanation of this research's ontological and epistemological standings.

Ontology and Epistemology – A Process Research[11]

According to Fellows and Liu (2013), in studying culture, it is essential to firstly explain the author's philosophical position, that is, the ontology and epistemology of the research. The starting point of this research is the aim to increase knowledge on (i) how Culture is adopted and evolved in a construction project TMOs and (ii) how it can be congenially described and generalized across context. This view recognizes the interplay between Culture-Climate, Corporate-Project relationships and structuration after a major decision-making event, and how these dynamics changes the Organisational Culture of a TMO throughout one project lifecycle. Thus, it can be said that in essence, this study follows the principles of studying 'Organisational Change' as stated by Van de Ven and Poole (2005).

According to Van de Ven and Poole (2005) there are two different ontological starting points in how a researcher should study organisational change. These are: (i) organisations as consisting of things or (ii) organisations as consisting of processes (Op Cit; p. 1377). Following this, the authors also claimed that there are different epistemological approaches that follow regarding variance or process methods for conducting the research. However, let us start with justifying our ontological position first.

Tsoukas and Chia (2002) as well as Rescher (1996) stated that, viewing organisations as consisting of things regards that the identity and substance of such things does not change – only their relation to their external environments changes. Now, we have

[11] Here, Organisation and TMO is regarded as the same thing for simplicity.

stated that this research views organisations as a collection of cultural schemas (Weeks and Galunic, 2003) and that TMOs as a representation of histories and routines from the parent organisations (Engwall, 2003). If we regard the cultural schemas as the "things", in other words, it can be said that organisations as consisting of things regards that the meaning and the construction of an Organisational Culture does not change; which is not the case since this will undermine the existence of a culture-climate interplay, corporate-project relationships and so on. By focusing on evolution and cultural evolution, this research is therefore not privileging stability or routine. Instead, it acknowledges the need on internal/external balance and hence acknowledging the need for internal changes – evolution as an ongoing process rather than stability. Thus, we shall adopt the second view, that is, "everything in nature is a matter of process, of activity, of change" (Rescher, 1996; p. 10)[12]. In other words, following this view, this research re-affirms its point that an organisation is a reification of its processes, routines and history (Engwall, 2003; Weeks and Galunic, 2003), which are continuously maintained and (re)constructed (Berger and Luckmann, 1966; see also Giddens, 2001 on Structuration) in an ecosystem that that are continuously breaking down the organisation and its boundaries (Van de Ven and Poole, 2005).

To sum up, firstly, this research sees an organisation as a social structure consisting of different cultural schemas. However, since the popular belief is that culture is something that is usually taken-for-granted, therefore combined with this research's theoretical standings (from Chapters 2 and 3) that:

1. Culture exists in an ecosystemic nature,
2. Culture evolves according to perceptions and current organisational climates and structuration from decision-making events,
3. Cultural differences occur within the boundaries of the relational ecology, and,
4. A TMO is a collection of different organisational processes.

Then, we must view our ontological standing that Cultural stability and changes – its evolution and what triggers it – in a TMO are judged with comparison to its external environment.

Process Epistemology

In Chapter 2, it was stated that, by saying cultural evolution, this research means to understand the processes by which "social structures are established, become stable, and undergo changes over time" (Scott, 2012; p. 29). It is further asserted that organisations must be able to adapt internally to conform to their external environments

[12] This is captured in our definition of Culture and Cultural Evolution.

within which they are operating. Thus, with reference to Poole et al (2000), this research views its epistemology of evolution (or in simple terms, change) as a narrative describing a sequence of events on how these unfold. As such, the meaning of evolution in this research takes an event-driven approach associated with a process theory (Van de Ven and Poole, 2005, Poole et al, 2000; Tsoukas, 2005). Thus, it addresses the "Temporal sequence of events that unfolds in an institutional environment" (Van de Ven and Poole, 2005; p. 1381). Further, a process epistemology is concerned with understanding how things evolve over time and why (Van de Ven and Huber, 1990; see also, Langley, 1999). As was explained in Chapter 4, the "events" chosen in this study in the major, routine-changing decision-making events that occur in one project lifecycle. Following that, the temporal sequence is depicted in Figure 12 in Chapter 3 and is also part of our findings in Chapter 6.

To sum up, this research's process epistemology helps articulate the research design and case study selection as a starting point undertaken to understand the dynamics of a TMO Culture's eco-evo-devo, and the mechanisms affecting its evolutionary path.

Having described the ontological and epistemological stand points, this research will now move on to detail the research process undergone.

The Research Process

This section will detail the research process undergone in achieving the current state of the research. The research process can be divided into two steps. The first one is a short narrative of the author's first attempts in identifying the relevant case studies, which has shaped the development of the interview questions[13]. The second one details the three case studies studied.

The Initial Attempts

The initial concept to guide the research process and in the selection of case studies is the notion of complexity and major decision-making event that can alter the current institutionalized norms. As such, the author started by approaching and researching current megaprojects (non-industrial) that are available both inside and outside the UK. 3 megaprojects instantly came to the fore (2 within the UK and 1 abroad), all of which carried forward the "Learning Legacy" initiatives from the London 2012 Olympics.

[13] For complete interview questions see Appendix 1.

However, the author later found that there were several insufficient issues surrounding these case studies, which rendered them less relevant in helping to fulfill this research's aims. These are:

1. A megaproject of an international scale is considered a single project firm, which is governed by its own routines, has its own upper management echelon and lives in its own world per se. It was found during the initial access negotiation that established organisational routines, norms and values are "guarded" in such a close knit way that it resembles in this sense a closed system environment in the end[14].
2. Continuity of personnel across serial megaprojects are a stable factor as strong if not stronger than the organisational aspect of project based firms – in this sense and open yet linear informal system.
3. Due to its size and prestige, although it is said that Organisational Culture is built bottom-up and nurtured top-down, perceptions of middle-lower management of "how things are and supposed to be done" are stronger. Thus, this reduces resistance and dynamics throughout the organisations that delivers its projects through TMOs.
4. There is too much of a gap between the vision of top management echelon and middle-lower management that the disparities are large, making negotiations for meaningful research access difficult. For example, top management referred the author to middle-lower management representative(s). However, the concept of culture is perceived as irrelevant at project level (rather than at corporate level). Thus, due to concerns of commitments and meeting timescales, the author decided to rethink the empirical focus.

There were further related difficulties, namely, much power play surrounding the extent of the totality of research being conducted, granting access to politically "sensitive data", governmental issues surrounding the "fate" of one of the projects eligibility to go forward, and geographical distance of one of the case studies and language barriers.

Given the issues above, the author then decided to re-frame the selection and negotiation approach, as well as reframing the interview questions. Firstly, the case study proposals were restructured to emphasise more on the notion of coordination and collaboration (Berggren et al, 2002), as such, the word culture is 'disguised' as or reflected in processes, philosophies, value and norms for coordination and

[14] Although in theory a megaproject should be a P-Form organisation operating in an open system as well (Söderlund and Tell, 2011). But the practitioners approached were not too "open-minded" about this.

collaboration. Negotiations stressed the importance of such cultural changes with regards to the recent publication of BS11000 collaborative frameworks in the UK and the new NEC3 forms of contract that also emphasized collaborative behaviours (albeit still contractually bounded). Interview questions were re-worded to ease participant understandings of the meaning of the questions. So, academic 'jargon' was significantly redacted.

A penultimate result of this initial empirical attempt at negotiating case study access is a theoretical synthesis paper published by the author in a peer-reviewed journal[15].

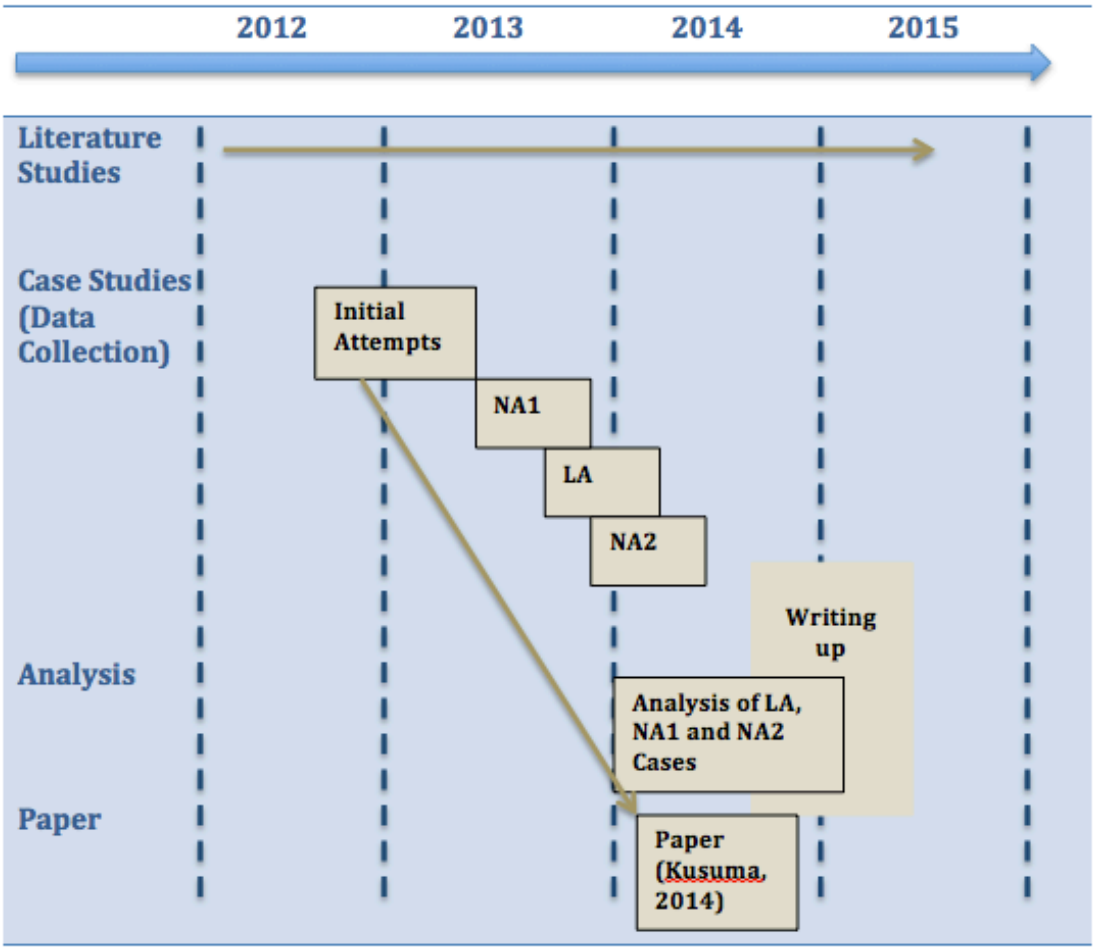


Figure 17: The Research Process

Case Studies – Selection and the Critical Realism Approach

According to Yin (1984) a case study is used in a qualitative analysis to produce in-depth research that compares and contrasts either similar or contrary predicted results. Yin (1984) also stated that there is no fixed recipe that exists for a case study research.

[15] See Kusuma, 2014. Attached as Appendix 2.

However, Welch et al (2010; see also Eisenhardt, 1989) claimed that case study is the constructing typology of theoretical foundations; that is to say, for theory-building. With reference to Welch et al (2010), the case studies in this research are regarded as "Contextualised Explanations" (Op Cit, p. 747), where the existence of reality is independent of human perceptions, that comprehension of what is happening is subjective and where social phenomena are dependent upon the meaning we attach to them (see also Bhaskar, 1998; Collier, 1994).

Case studies often use different methods of analysis and summary to draw meaning. From the initial attempts, in order to study Culture as an integrated eco-evo-devo mechanism, this research has found that there are two aspects that need to be considered. The first one is related to the theoretical standpoints of the research, and the second one, the critical realist view of causation (Bhaskar and Danermark, 2006; Sayer, 2000; Danermark et al, 2002; Archer et al, 1998).

Theoretical Stand Point

From the theoretical review, it can be summarized that, putting it in methodological context:

$$\int TMO'sEco - Evo - Devo = \frac{Institutional\ Theory + Organisational\ Culture}{Major\ Decision - Making\ events}$$

The equation above depicts, in context, how this research views cultural evolution. As such, the main point to focus on is major decision-making events, and how these change the current organisational climate of a TMO and restructure the cultural construction of reality within the TMO by its members. The changes can be 'shocks to the system' or more usually incremental changes, both of which are accommodated in evolutional theory and reflected in evolutionary management and economic theories to varying degrees. They are equally applicable here.

From this, it is clear that any case study selected must have undergone changes to its routines, structure and so on, whether or not such changes are imposed from above (Corporate level) or due to pressing institutional demands (external environments). These changes are commonplace in projects. Thus, searching for the case studies involves looking for projects that indeed incorporate and/or apply adapted and new if not innovative approaches to its day-to-day functional routines; and where these changes can be felt and (re)structured by agents (TMO members – interviewees). Thus, the units of analysis are the ecological dynamics produced by decision events

and the *relevant agents* experiencing the events (regardless of the parent organisation affiliation).

Critical Realism

The concept of Critical Realism is closely related to the characteristics of a process research. Both incorporate causation and causal explanation, abduction and retroduction in designing the case studies.

Let us start by recalling briefly that in addition to understanding how culture in a construction TMO evolves, this research also aims to unpack the mechanism of such cultural evolution, and ultimately, predict the trajectory of a cultural evolutionary path and challenge the barrier of cultural non-transferability between projects or a programme of projects; which has been theorized in 3 propositions and 1 postulate in Chapters 3 and 4. As stated, a TMO's culture must then evolve under what is termed a laminated or open systems, such is how it is in the construction industry.

From the above, critical realism is relevant as it indicates the focus towards relationships between the concepts formed and the real world. Thus, the case studies are observed as real domains, where generative mechanisms are to be found (Danermark et al, 2002; p. 21). Further, this justification is seconded by Sayer (1992) where the author stated that, it is important that an intensive, qualitative case study be adopted, incorporating in-depth study of "individual agents in their causal contexts" (Op Cit, p. 243). Thus, this research's case studies are designed to illustrate the dynamics between structure-mechanism-condition-effect/event (see Figure 18 below).

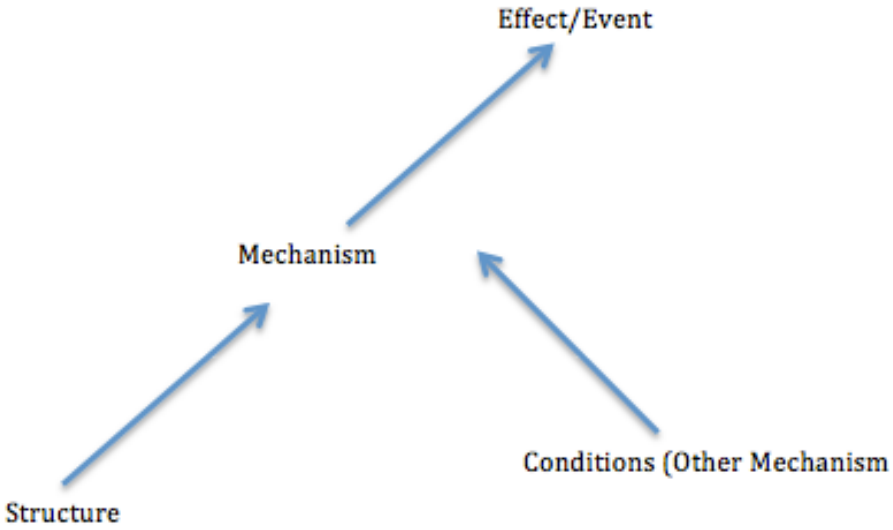


Figure 18: The Critical Realist View of Causation. Adapted from Sayer, 2000.

Due to the time constraints and timing factors[16], a multiple case study approach is undertaken (Leonard-Barton, 1990), again, with the intention to compare and contrast any similarities and/or dissimilarities in results; and to provide richness in data. As a necessarily laminated or open system, more than one mechanism, types of context and characteristics effect are all essential in understanding the phenomena discussed (Bhaskar and Danermark, 2006). Thus, a project that is delivered as a TMO, having complex internal contractual arrangements and complex external institutional demands ultimately guide the case study selection. Hence, it is not only the size of the project, or the value in (£), but the inter-relatedness of the TMO itself to its wider institutional context is the main factor. The main idea is that the multiplicity and complexity deriving from level, context and scale each result in the constitution of the TMO's social construction of reality and hence Culture. In this research, the case studies are all Project Alliancing in nature. Where collaboration goes beyond what is stated within the contract, and where behavioural changes go beyond the traditional adversarial nature common in the construction industry.

It must also be noted that, through critical realism and process research, events and chronologies are the focus. This is to make sure that the analysis produces a case study and not a case history in the end (Pettigrew, 2001).

[16] The point where the author conducts the research in each case study with respect to where the TMO is currently within the project lifecycle.

Table 7: Methodological Summary

Methodological Aspect	LA Case	NA2 Case	NA1 Case
Context	Rail Infrastructure – Station Capacity Upgrade	Rail Infrastructure – Line Track Upgrade	Rail Infrastructure – Line Capacity Upgrade
Unit of Analysis	The TMO Design/ Commissioning Function	The TMO Operations Function	The TMO Operations Function
Stage of Project	Initial Project Phase after the contract have been awarded – going into detailed design, where new major Tier 2 organisation start to have more influence in the project	Execution stage – a few months after the Alliancing structure have been introduced, where Alliancing-based coordination structure had been solidly established	Closure – Handover stage, typically the end phase, when Alliance members were about to disperse
Actors Interviewed	Client and Tier 1 Main Contractor and 1 other external observant	Client and Tier 1 Main Contractor	Client and Tier 1 Main Contractor
Data Collection Methods	Case Study Semi-structured face-to-face interviews. This is supplemented with process descriptions, TMO boundary drawings and relevant documentations	Case Study Semi-structured face-to-face interviews. This is supplemented with process descriptions, TMO boundary drawings and relevant documentations	Case Study Semi-structured face-to-face interviews. This is supplemented with process descriptions, TMO boundary drawings and relevant documentations
Methods of Analysis	Content analysis of interviews and categorization of main concepts and cross case analysis as per the RRREIC frame of reference, discussions with fellow researchers	Content analysis of interviews and categorization of main concepts and cross case analysis as per the RRREIC frame of reference, discussions with fellow researchers	Content analysis of interviews and categorization of main concepts and cross case analysis as per the RRREIC frame of reference, discussions with fellow researchers

Table 8: Summary of Case Study Characteristic

Characteristic	LA Case	NA1 Case	NA2 Case
Project Size	Large – under £1 billion	Medium – one of a number of projects in a £9 billion Control Period Enhancement Programme	Medium – one of a number of projects in a £9 billion Control Period Enhancement Programme
Duration of Project	8 Years	3 Years	3 Years
Lifecycle Complexity	Complex delivery interface, non-routine site, non-routine conditions, non-repeat project	Complex delivery interface, non-routine site, non-routine conditions, non-repeat project	Complex delivery interface, non-routine site, non-routine conditions, non-repeat project
Customer	End-user with varying experiences	End-user with varying experiences	End-user with varying experiences
Supply-Chain	More than 3 Tiers – some have worked together in previous projects	More than 3 Tiers – some have worked together in previous projects	More Than 3 Tiers – Tier 1 Main Contractor have a long standing experience in working with the Client
Other Stakeholders	Authorities are known, classification and regulations are somewhat new with more emphasis on health and safety and sustainability	Authorities are known, classification and regulations are somewhat new	Authorities are known, classification and regulations are somewhat new with emphasis on improving health and safety practices

The 3 Case Studies – Characteristics and Summary

There are 3 project case studies employed in this research – LA, NA1 and NA2. The 3 cases come from the rail infrastructure industry, drawn from 2 major parent companies (Clients) operating within the industry. There are several reasons for this. The first reason is the pragmatism for access and the fact that both parent companies are the ones initiating the Alliancing Scheme from top-down and is the major decision-making event that acted as the trigger for the project TMO's culture evolution. Secondly, the projects are complex and large, where the Alliancing Scheme is adopted within, and transferred between the parent companies' project pipelines. Thus, there is a long duration that is sufficient for articulation (abductively and reductively) across the lifecycles and at particular stages when the study is undertaken. Thirdly, there it is a current area of focus in construction work for its large market.

Although operating within the same industry, the Client organisations adopted different evolutionary mechanisms in order to cope with the changing external environments and institutional demands. The methodological and characteristics summaries from the 3 cases are tabulated in Table 7 and Table 8 respectively.

Methods of Data Collection

The nature of the research guides the kind of methods employed. In this section, the research instruments used for data collection are presented. These include semi-structured interviews, meetings and some observation and consultation of documentations provided and other materials. The methodological reasoning follows that of a qualitative process research and critical realism philosophy.

Interviews

In this study, a semi-structured interview method is the primary instrument for data collection. To begin with, from the point of view of a qualitative research, interviews as an essential tool for data collection in case study research are well established (Yin, 1984). From the critical realist viewpoint , explaining causal mechanism "lies rather in understanding the constituent nature of objects: in other words, what objects are capable of doing" (Welch et al, 2010; p. 748). Thus, the primary source for understanding causal explanations is not through collecting observations (ethnography) but through "digging beyond the realm of the observable to understand the necessity inherent in object" (Welch et al, 2010; p. 748; see also Collier, 1994). As such, although extant research on Culture opts more to conducting in-depth

observation with the aim to gather rich data and rich-text narration, this research has opted to conduct in-depth semi-structured interviews.

Semi-structured interviews, that are reasonably open ended, are preferred rather than highly structured interviews and questions in this research. This is due to the fact that the aim of the interviews was to provide contextualized explanation, to evaluate and identify mechanisms for understanding cultural evolution and its trajectory. That is to say, pre-determined questions guided the interview exercises in which the depth and nature of responses from the interviewees were gauged. Thus, appropriate follow up questions could be undertaken to achieve the interview agenda's topic of interests. As a semi-structured interview, conversations were not the only source of data gathered. Each interviewee was asked to draw their TMO boundaries, to help the author understand the each interviewee's perception of the Alliancing concept, which organisation(s) is the main protagoniss and what kind of collaborative norms have been established. In this sense, the author always started with how the interviewees' think of how things work (causality), then the following pre-determined questions were conducted in context based on this. This form of conducting interviews also gives the flexibility to the interviewees to bring in important discussion points that may or may not have been overlooked by the author.

Further, because a semi-structured interview's agenda set is not too rigid, depending on the level and role of the interviewee, it is possible to discuss respondent specific items regarding the project, how things were, how things are, difficulties in transitions, comparison to previous experiences, expectations, future and immediate action plans and so on. Misunderstandings and misleading conclusions are avoided by way of immediate clarification questions when the author doubts the real meaning of a response. A cross (but confidential of course) interviewee evaluations of such doubtful response are also undertaken – either to clarify or consolidate the data. This discussion-like interview process then allowed the author the possibility to achieve more valuable and unique information than initially expected.

In order to ensure that comprehensive and realistic view of what was happening on the ground, the interview questions were first shown to 1 or 2 senior project members (usually the author's primary contact) during the negotiation of the research. Another reason is to ensure that the other interview participants will understand the wordings or the questions and so will generate appropriate responses to the topic of interests. The author's contact and the Alliance Project Directors of each case study helped choose

and identify the potential respondents. Then, these potential respondents were approached by email individually. Depending on the level and job role, each interview lasted from 1 hour to 3 hours. Interview transcripts were in the form of notes, drawings and recordings (recordings excluded sensitive materials as agreed with the contacts and as part of ethics – this is part of the limitations of conducting an interview). Accuracy is therefore ensured through follow up meetings where findings are presented and feedback was given. The senior Alliancing Managers also gave updated information relevant to the research over the period of the research.

Interviews conducted were all face-to-face due to consideration and importance of body language and atmosphere that can only be felt through being physically there. The author conducted all of these interviews personally. The numbers of interviews differ from each case (a total of 32 interviews). Although the cases chosen all embody Project Alliancing – the same project structure, leadership structure and so on – the LA case is the only one to employ double-posting or 'man-marking' for each job role. For example, one position will be filled with 2 personnel – 1 from the Client and 1 from the Tier 1 Main Contractor Organisations; hence the difference in numbers. However, the levels and positions are all the same between cases. This is depicted in Figure 19 and Table 7.

Structure of Interview Questions

It is found during the initial negotiation stages of the case studies that the Client Organisation is the main driver of Cultural shift, be it in the form of introducing new routines, processes and/or behaviours; That is, from the context of a traditional adversarial cultures to that of Alliancing. Due of the nature of cultural shifts, culture shocks are found to be experienced by everyone at the TMO level (this is also apparent in extant research mentioned in Chapter 3), be they from the Client Organisation or the Tier 1 Main Contractor and so on. Hence, it is insignificant to distinguish between which interviewees come from which parent organisation. The focus is to understand the experienced evolution process.

Since the aim of this research is to understand how this process of cultural shift evolves within a construction project TMO, drawing the interview questions focused on understanding how introducing cultural shifts is formed, accepted and developed by the *Client Organisation* – as the main driver of such shifts in behaviours – and

implemented across its project TMOs. Thus, the questions take on a multilevel approach to cover the dynamics of:

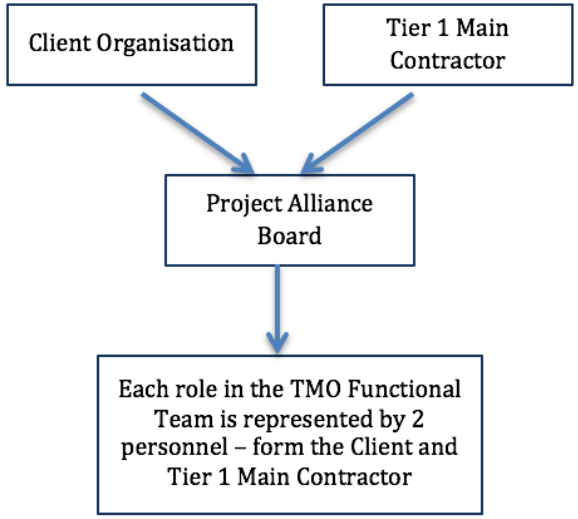
1. The long-term vision and purpose of the cultural shift at the parent organisation level,
2. The relational interface between the corporate-project relationship – how they are built and maintained and,
3. Perceptions of individuals involved at TMO level.

Coordination and collaboration challenges in terms of trying to integrate the diversity of cultural and behavioural norms within the TMO are drawn out in four different elements spread throughout the questions. These are:

1. Identity and Core Purpose – who we are and what we stand for,
2. Values – espoused beliefs, perceptions and judgments made,
3. Behaviours – relational attitudes and actions in evidence through observed norms and informal routines, and,
4. Formal mechanisms – TMO organisational structure and routines.

The identification of these challenges then led the author to illustrate the mechanisms of cultural evolution and the nature of the TMO cultural trajectory in the context of the 4-Class System postulate – as is shown in Chapter 6.

LA

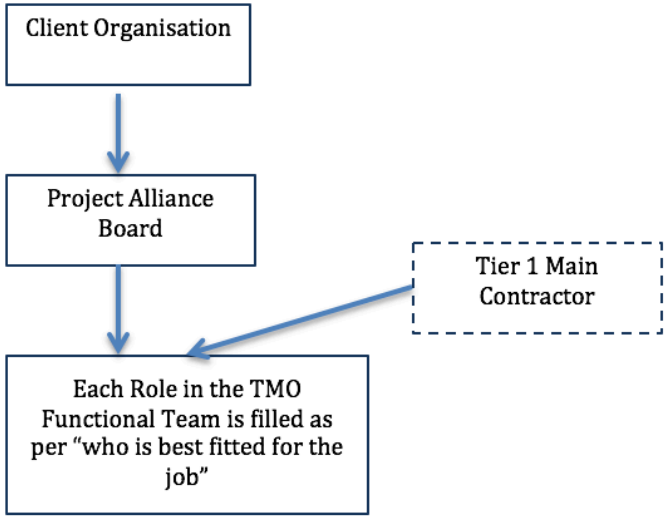


Interviewee Roles:

– Parent Organisation Representative x 2
– Project Manager x 2
– Project Director
– Delivery Manager
– Senior Sponsor
– Consents PM
– Safety Manager x 2
– Engineering Manager x 2
Total = 18

– Commercial Manager x 2
– Project Controls Manager x 2
– Independent Chairman
– Independent Observant

NA1 and NA2



Interviewee Roles:

– PAB Director x 2
– Director of Collaborative Working x 2
– Alliance Commercial Manager x 1
– Alliance Engineering Manager x 2
– Alliance Delivery Manager x 2
– Alliance Controls Manager x 2
– Alliance Scheme Project Manager x 1
– Alliance Director x 2
– Alliance Services Manager x 1
Total = 15 (7 NA1, 8 NA2)

Figure 19: Summary of the Interviews

Meetings and Observation

In each of the case studies, an initial negotiation was attempted commencing with an email to approach the contact – a Senior Alliancing Manager. This was followed by face-to-face meetings at the project premises. During this second meeting, the research proposal was discussed in detail. The discussions were conducted with an open mind from both the author's and the Senior Managers' point of views. This is done with the aim to achieve an optimal research agenda, of which results can be helpful to be implemented by the practitioners but also fulfills the author's original research intentions. During the second meetings, the pre-determined interview questions were discussed. The Senior Alliance Managers then helped the author to "re-word" the academic terms and 'jargon' into industry language and applied terms to ensure the true meaning of the questions will be easy to grasp and understood by the practitioners in the specific context – concepts were therefore made culturally appropriate.

A closure meeting was conducted with the same Senior Alliance Managers for each case study after the period of the research had finished. The author provided a summary report for each project, detailing the findings and some practical recommendations. These are then discussed – again openly – to generate constructive feedback and to encourage more theoretical-centric debate that could not be done during the interviews with other interview participants. Thus, this helped the author to clear up any misunderstandings and clarify some grey areas. During this closure meetings, the author also observed and listened to shared experiences, stories and other related issues pertinent to the original research agenda. After the meetings, any significant observations made were recorded in minutes by the author. Because this research is abductive-retrospective in nature, constant dialogue was only maintained during the research period and not after the closure meeting. While some might argue that this is a limitation, a multiple-conjunctural view (Ragin, 2000) was developed to illustrate the desired result under the critical realism philosophy.

Observations in this research were taken at face value. It is not the in-depth observation as put forward under the term ethnography. That is to say, during the period of the research, the time spent for interviewing the interview participants and meetings, it exposed the author – to some extent – to the day-to-day atmosphere within the project premises. This gave the author enough flavour of the working climate to add some supporting data to the findings. This subsidiary observation exercise is also recorded as note form. For example, the positions of furniture, how personnel

mingled during lunch break[17], the way organisation and division of departments and so on.

Documentation and Other Materials

In addition to the interviews, meetings and observations, other materials such as the Alliance Protocol, Collaborative Working Strategies, Approach to Procurement and its structure – anything that increases knowledge concerning the cultural and behavioural shifts within the project functions, routines and processes were studied. The documentations are all project specific and they were used to support the formulation of interview questions and in producing the summary reports as well as for reference purposes in articulating the findings in the next chapter of this research.

Data Analysis Approach

According to Van de Ven and Poole (2005) a process research may include (i) a description of how an event leads to or influences another event and (ii) an explication of the overall pattern that generates series of events or cycles (Op Cit. p. 1384). It was stated in the earlier subsections that this research uses abduction and retroduction as part of its methodological approach, where proposed models of cultural evolution are tested through the case studies. Since abduction and retroduction is also part of critical realism, the data analysis in this research follows the basic analysis of explanation of phenomena in critical realism. The concept of the "RRREIC" schema is referred to (Bhaskar et al, 2010; p. 4; see also Danermark et al, 2002; p. 109), and is part of the data triangulation effort.

In accordance to Bhaskar et al (2010), "RRREIC" stands for: *Resolution, Redescription, Retroduction, Elimination, Identification and Iterative Correction of earlier findings (if any)*. Referring to this, for the data analysis the following steps were applied:

1. Resolution. As a first step, resolution attempts to separate the complex and/or composite events observed and re-evaluate them as an analytical resolution. That is to say, the analysis begins to distinguish the various components, aspects and dimensions, and categorise them into a raw initial illustration of what happened. It involves explaining the concrete. It is here that a multiple conjectural view (Welch et al, 2010) is adopted. Thus, the first step of the analysis chapter is to outline and elaborate the complex and/or composite events the author intends to study. As accounted by Danermark et al (2002; p.

[17] In one of the case studies, the project members invited the author to have lunch together.

109), an important part of this step is the interpretation of how the interviewees described their responses regarding an event in question. This is reflected in the first section of the chapter where findings from the case studies are presented as raw accounts of what had been observed and gathered from the research.

2. Redescription. Theoretical redescription involves abduction. Here, the different components or aspects that were hypothesized as propositions in the conceptual frameworks and theories about structures are re-described. The conceptual propositions are then re-interpreted and contextualized, compared between the three case studies and finally integrated with one another. The integration is part of the next step. This second step is reflected in the explanation and justification of Proposition 2 and the HR diagrams.
3. Retroduction. According to Danermark et al (2002) the process of Redescription and Retroduction are closely linked. Retroduction is the step where questions like how is ABC possible and what are the causal mechanisms are answered. It is about discovering "the nature of the relatively enduring generative mechanisms at work" (Bhaskar et al, 2010; p. 6). This is reflected in Table 12 presented in Chapter 6. Further, as different theoretical interpretations and abstractions are part of this step, Table 13 in Chapter 6 is also generated to give a more lifecycle-orientated perspective of the findings. As such, alternative competing antecedents of illustrated mechanisms are eliminated.
4. Identification. Bhaskar et al (2010) stated that identification focuses on the causally effective or generative antecedents. For this point, the analysis moved to focusing on the Postulate, that is, the identification of the type of features that constitutes the 4-Class System. In other words, the identification step draws the analysis back to the open-systemic phenomenon to establish the "characteristic multiplicity of causes, a fortiori mechanisms" (Bhaskar et al, 2010; p. 6) and integrate them in the form of the 4-class system as a potential theorization of the established cultural evolution mechanisms.

Since the study is retrospective, iterative corrections come from peer discussions and reflective comments from the practitioners during the interviews with fellow researchers; and hence, only somewhat theoretical rather than following the most recent developments from studied projects after the period of research. This is acknowledged as part of the limitation.

Research Quality

It is of importance to ensure the quality of a research to present a logical set of statements. The first thing to look for is a sound methodology to show how well the methods have been applied to suit the research design and how applicable the result it. For the latter, a common way to reinforce the research quality in empirical research is to touch upon the notions of validity and reliability (Yin, 1984). This is presented as follows.

Validity

According to Yin (1984), validity can be categorized into construct (establishing suitable measures for data collection), internal (establishing a robust and efficient causal mechanism for data analysis) and external validity that concerns generalization of the findings beyond the current research scope.

To ensure construct validity beyond a traditional qualitative case approach and in the use of critical realism, multiple data sources and triangulation have been applied. This aids reflection for the four stages set out below. With the process research and critical realism philosophies adopted, internal and external generalization depends on versatility of the findings, that is, “the degree to which it can encompass a broad domain of developmental patterns without modification of essential characters” (Poole et al, 2000; p. 43). To justify these, the context of the case studies selected have been limited to those shifting from traditional management of projects to that of Project Alliancing, structured as TMOs and conditioned by a dynamic and complex cultural Ecosystem within the UK. Thus, versatility of findings is ensured applying Poole et al’s (2000) suggestion.

Reliability

Reliability concerns with the notion of how well the study can be repeated, which is essential for the overall research process. That is to say, another person should be able to achieve similar results and conclusions when conducting another research whilst following the same research process stated in this research. Following Yin (1984), this can be ensured by documenting the methodology thoroughly. As such, this research’s reliability has been ensured by the systematic description of the research steps. Interviews have been recorded and noted and the meetings and observations have been documented in minutes. Further, summary reports of findings were also discussed with practitioners so as to generate useful and refined feedback. However, Culture as the main theme is heavily context-dependent, as such, margins of variance

in the findings of repeated studies must be taken into account. This should not be taken as a limitation per se, but as an opportunity to broaden and reinforce the postulated essence of the current research.

Summary

In this Chapter, the research methodology and methods adopted in this research has been presented. First, the ontological and epistemological standings of the research were explained. This was then followed by a description of the research process and the process for case study selection. The methods of data collection and analysis followed. Finally, a reflection of the overall research quality was presented.

Chapter 6

Case Studies Findings, Analysis and Discussion

This Chapter will present, analyse and discuss the findings, in relation to the theories, propositions and postulate presented in Chapters 3 and 4. As stated in the Methodology Chapter, in accordance with the RRREIC structure, the Case Studies represents the first R (resolution) and will be presented in a headed narrative style, incorporating any "raw" findings and initial analysis of what has been observed and found on the ground within each projects. A discussion section, which has as its purpose to link back the "raw" findings and initial analysis to the theories and literature reviews. The discussion section will be structured in accordance with the propositions and postulates.

Case Studies Narratives, Findings and Initial Analysis

In this research, three complex and/or major infrastructure projects operating under an Alliancing banner in the UK were observed as case studies. These projects fall under the category of TMOs as discussed in Chapter 3 and are disguised as LA, NA1 and NA2. Further, it is essential to again point out the key decision event that happened across the three projects that ultimately serve as the trigger to culture evolution, that is, the top-down introduction or shift to the alliancing scheme.

In presenting the case studies, findings and analysis are intermittent and will be structured as follows:

1. Short background of project – how the TMO is first formed,
2. What the headline drivers found that initiated cultural shifts, and,
3. What the enabling and supporting factors found, that could impact the development of each case's cultural evolution as a TMO.

In other words, taking into account the culture-climate interplay and corporate-project dimensions into the narratives, the case study findings are structured to highlight (a) what factors underpinned the success of the project TMOs in initiating their Alliancing strategies and (b) key factors from which initiated success of the Alliancing strategies are maintained and further developed during the next stages of the projects. As such, giving focus in particular to the impact of corporate-project relationships and the relationships between organisations within the TMO ecosystem it provides the basis to

illustrate what supported or constrained the process of cultural evolution. This provides the first step towards satisfying the main aim of this research[18].

LA Case

The LA Alliance project (referred to as LA subsequently) is a major rail station refurbishment project in London. Its project boundaries include a multi-tiered supply chain comprised and co-located as a TMO for the duration of the project starting from the post-bid stage.

During the study, detailed analysis of the interviews identified 3 headline drivers and 4 enabling and supporting factors that initiated and curved LA's path of cultural evolution (see Figure 20 below). The headline drivers are the factors or point of events that first generated the cultural evolution to Alliancing. These evidences are gathered through interviews with the senior TMO members. The enabling and supporting factors are the cultural artifacts needed to adapt to the evolution and are evidenced mainly from interviews with the various TMO departments.

Figure 20: Overall Framework for LA Case Study

[18] Tackling the enigma of cultural studies, this thesis tried to integrate between cultural Dynamics, Ecology and Development to underpin how culture evolves overtime within Alliance project TMOs.

The picture of delivering major infrastructure projects in the UK construction industry is usually painted with traditional adversarial behaviours. Interface management between levels of corporate HQs and the project is often weak. These have further been characterized by cost and time overruns as well as legal settlements (key examples being the Channel Tunnel and Wembly Stadium).

Beginning with the Heathrow T5 and the Olympic Park, Alliancing and Partnering approach to project management has been a testament to collaboration with a remarkably low level of disputes. The LA similarly shifted to this 'soft' management approach to managing projects. It did so by moving the starting point of collaborative working very early in the project front-end. Let us begin the narrative analysis according to the illustrated framework.

Headline Drivers

1. **Shift in project management philosophy, particularly pertaining to the iron triangle (time-cost-quality).**

The LA project posed two main challenges. The first was the crucial importance of completing construction in a tight, well-defined context and timescale (e.g. congestion relief, step-free access). The second was the interface with a wide range of stakeholders that had legitimate influence over parts of the project.

> *"We are changing the way we do procurement to a target cost contract with a base case scenario to be developed hand-in-hand with the Contractor. We push forward this process [towards] the front-end. Instead of focusing on time cost quality, I changed those criteria to requirements, risk opportunities profile and cost benefits ratio." [Project Manager 1 whilst showing the researcher their project proposal slides]*

Against this backdrop, the Alliancing initiative was first glimpsed through the implementation of the Integrated Contractor Engagement (ICE).

> *Parent Organisation Representative 1 also said, "ICE came out of a necessity we have – we had to do something different, but it didn't come out of super duper brain. It just came along that way. Commercial tension could still ruin this, especially when the contractor starts having problem in this area".*

In theory, Alliancing is defined as providing better value for money and improved project outcomes through a more integrated approach between the Client-Contractor contractual engagements. Through ICE, early dialogue with bidders was initiated and the Client acknowledges the cost of this dialogue. Thus, requirement statements and

bid evaluation against the business output could be more rigorously assessed at the front-end.

The focus of the traditional and narrow iron triangle (time-cost-quality) criteria was shifted to a focus on project requirements, a broad and inclusive risk/opportunities profile and benefits ratio. Thus, throughout the ICE process, the management processes were characterised by collective sharing of risks, avoidance of a blame culture and unanimity of decision-making.

> *"The Alliancing Contract provides transactional efficiency. Transactional is a given, but efficiency is added and developed. We have best man for the job and double job roles." [Project Manager 1]*

Project Manager 1 also saw the double roles as "leader" and "sub-roles", seeing each Project Department as sub-TMOs. Further, he thought that KPIs (from the traditional iron-triangle) drive the wrong behaviours.

> *"The Alliance is like a male-female relationship, like a marriage". "Engagements are done through R+R forms. But I understand that the soft issues are still a blur right now and we need help." [Project Director and Project Manager 2]*

As the project moved to detailed design stages (which is now) the LA is formally formed as an integrated team based on selecting the best person for each position. Thus far, the 'hard' organisational structure and governance mechanisms are put in place as carried forward from the success of the ICE process. However, integrated 'hard' management systems should always be accompanied with the establishment of a 'soft' management system to be able to perform effectively and cascaded down the project hierarchy. This has yet to be done.

> *"It's right because it's right in the Alliance". "G4 is already efficient but need to disseminate to operations". "The question is, are they producing enough? How to make them aware of the AP [Alliance Protocol] explicitly?" [Project Manager 1]*

The Project Director also stated, *"Designers are like circle people and Engineers are like square people and you try to mash them together. Validating log works for designers are hard, they are not in the mindset yet".*

In sum, the first headline driver pertains to the autonomous structuration of the TMO's organizational structure that is moving away from the corporate HQ form. However, apart from the changes made in the basic project management philosophies, are otherwise largely informal and highly flexible in form. Thus, this headline driver

conforms to the works of Engwall (2003) and provides the initial pointers towards the first proposition, where the TMO starts to distance itself from the Corporate HQs in order to adapt to its current project ecology.

2. Explicit specification of a series of targets and principles around the base case scenario to be developed.

While traditional commercial elements such as costs and profit margins are still present as part of main organisational/corporate objectives, the Client had a number of additional objectives that had to be met to achieve broader social and economic impact. Series of target and principles around requirements to be achieved are identified in the base case scenario. The base case scenario here is an item that is part of their ICE procurement scheme. Instead of giving blind design specifications for tender, the Client Organisation gave the Tier 1 Contractors (Tier 1 from here on) invited for tender a base case scenario of what kind of a "product" they want. The base case scenario is then developed together by both the Contractors and their chosen designers with the guidance of the Client through the ICE before tender. It covers:

- Innovative solutions on design and accessibility,
- Added values and benefits to include service experience on top of traditional value of money from the product,
- QHSE (quality, health, safety and environment)
- Asset sustainability,
- Legacy to replicate ICE as a standard procurement process for the Client.

"We have a corporate baseline as the base for [Alliancing] behavioural evolution. This includes the process and requirement for rigor." [Project Manager 1]

How is this rigour achieved? This could be pursued in a number of ways from a strategy top down to a detailed behavioural programme. Management claimed to facilitate a rigorous process through structuring the project and additional management support and processes.

"It is not an ordinary project for us. But we are 100% supportive. [ICE impact] Just building the relationship for successful delivery of the project. We minimize resource changes and this pushes forward the getting to know each other process. [LA] is my baby, this is the biggest project we have in the whole world. I am confident about the way management are going forward in structuring the Alliance [at the project level]." [Parent Organisation Representative 2]

However, such themes are not 'codified' or written down as part of the Client's strategy at the time of the ICE. What was crucial was that the Client's senior management still needed convincing that the ICE and its collaborative Alliancing approach is not just a window dressing.[19] The success is deemed as important as traditional construction targets.

> *"We haven't really distributed the AP yet. But it's a case of agreement. The AP is the bubble supporting the agreements. The contract tells the obligations. But behaviours and moulded by the 8 AP objectives". [Project Director and G4 sentiments]*

Thus, cultural behaviour is seen as goal driven. Yet there was not always certainty about how this worked on the ground, what worked and what did not.

> *"People are confusing role and status with real personal skills and expertise." [Project Manager 2]*

> *"We only need vision and mission statements. We don't need to make pens or mugs [to produce Alliance-supportive artifacts], we don't have the budget for it and I don't think we need it. We have an award-winning Programme Director so we will be fine." [Project Director. Sentiment shared amongst most G4s and other LA interviewees].*

The above sentiment suggests not having essential Alliance transfer ready yet and sees the ICE as "enough" and is the source of dispute later on with Designers. As part of a Client-led Alliancing programme, detailed overarching objectives and principles, which the Alliance team will be committed to achieve at least in principle, should be well-developed before the start of LA formation. This will then allow principles of AP to be cascaded down through the ICE bid process to the Tier 2 Subcontractors simultaneously – allowing them to buy into the Alliancing mindset sooner. This will be explained further in the 'enabling' and supporting factors section.

Apart from the 'hard' base case scenario provided, Parent Organisation Representative 1 agrees that an accompanying 'soft' base case AP strategy is necessary. In this sense, while the targets and principles were non-negotiable, it will be up to each Tier 1 bidder to promote the Alliancing mindset to their preferred Subcontractors in their own way – cutting the overall introduction and orientation times.

[19] In theory, high level of resources, input and support from corporate HQ is crucially needed to maintain project integration. Thus, in LA's case, ensuring that the Alliance can work as consistently as possible throughout the rest of the project lifecycle is crucial. Particular point should be noted to establish a base case AP as the beacon to show the kinds of behaviours required for new Tier 2 organisations joining the Alliance at each stage of the project.

The second headline driver further reinforces the reason behind the TMO's autonomous structuration. It shows instances where the newly introduced alliancing mindset is starting to take a more tangible shape. However, there can also be seen some instances where cultural efficacy (Keegan, 1993; Bazerman and Moore, 2009) is starting to arise. This can be seen from the quotes, which cites over-reliance and hindsight of knowledge, conjunctive events and anchoring emanating from the confirmation heuristics. In this sense, the management scope in pursuing the actual rigour is limited to safe issues by *manipulating* the dominant community values, myths, and political institutions and procedures" (Bachrach and Baratz, 1973; p. 18). This sparks of cultural efficacy are discussed further in the next headline driver.

3. Early contractor engagement, philosophy and the practice of allowing Tier 1 contractors to work with familiar Tier 2 partners during procurement.

The implementation of the ICE process reflected a broad project management philosophy from the Client's side. The Client exercised a thoughtful use of 'loose-tight' management.

> *"There should be leadership on the project [operations/deliverables] and the programme [business]. But it's early days. That's why many people think there's a light touch. But as long as things are going right. Otherwise this might change." [Parent Organisation Representative 1]*

> *"We write management plans, the R+R form, articulation of government law and so on. It's two people coming together to write a plan." [Project manager 1]*

This means that some aspects were tightly controlled so as to achieve highly consistent results, whereas other aspects were loosely managed, which gave room for flexibility and change (e.g. moving the dialogue phase to the front-end whilst at the same time being well structured and protected). In other words, there were some management and cultural decoupling from the corporate HQs by regarding the TMO as independent for that moment, in order to have the social space to induce the desired Alliancing culture.

> *"[LA] is seen as an island inside HQs". [Project Manager 2]*

So far, tightly controlled aspects include the orthodox ITT/ target cost contract, requirement statement, principles and targets relating to health and safety as well as the kind of behaviours required to underpin the Alliance culture.

This tightness made sense because of the need for project-wide consistency on formal processes and structures and partly to reinforce and emphasize the importance of

adhering to the contractual framework. However, little evidence was found that the expected behaviours and culture are well-captured, documented as part of the project artifacts and fully understood. This is believed to have led to LA's inability to quickly gain control and nurture the desired culture when new members of the Alliance join the team after the ICE process has been concluded.

Loosely controlled aspect can be seen from how Tier 1 contractors would implement and innovate the principles of the base case scenario in developing the desired solution.

> *"There is less hierarchy in the corporate-project interface. HQ has a light touch. However, most project functions are still inherited from [HQ] and this is the frustration at the project level." [Project Manager 2]*

Theoretically, the rationale behind this loose control is that each contractor already had their way of doing things in engaging their preferred Tier 2s. Thus, it is better to provide an objective and challenge the contractors to find their own route to achieving it. If given the appropriate AP to guide desired behaviour at this point, the lengthy procurement process will greatly reduce misalignments and misunderstandings with the Tier 2 subcontractors subsequently as common grounds are established explicitly early on. This way, when the bid stage is over, the LA can "hit the ground running" having provided time for proper evaluation of the overarching principles and targets of the AP – cutting the overall introduction and orientation timing for new project members.

However, it was mentioned by Project Manager 1 that,"*[During the period of study] we haven't really distributed the AP yet. But it's a case of agreement. The AP is the bubble supporting the agreements. The contract tells the obligations. But behaviours and moulded by the 8 AP objectives"*. This proves that not having essential Alliance transfer ready yet and seeing the ICE as "enough" is the source of dispute later on with URS designers.

In sum, it was stated in Chapter 4 that post-decision processes can be argued as pathological to societal and institutional capacity of an organization (Ursacki-Bryant et al, 2008). Thus, there must be a congruence between the decision event (the shift to alliancing scheme), the scope and scale of both intra- and inter-organisational ecologies and the so called contingency element that provide the structure and principles in governing the relationships and behaviours as well as providing the

function in describing and interpreting the post-decision situation. However, it is illustrated in this third headline driver that the congruence is falling apart due to neglected maintenance efforts by the G4 team to maintain the TMO's cultural fit with its current project environment. This bring us to the following sub-section to highlight the enabling and supporting factors that affect the eco-evo-devo in the TMO's culture as the project transition to another stage in its lifecycle.

Enabling and Supporting Factors

The research analysis suggests that there are four key enablers that can affect LA's cultural evolution path. Mainly, the enabling and supporting factors deal with the key areas that can affect the project ecology and hence, influence the incremental development of the TMO's culture evolution. These are:

1. Rigorous management processes in the form of supportive 'hard' contractual arrangement that is 'laid over' by a 'soft' AP to guide behaviour,
2. Current cultural integration,
3. The active leadership of the G4,
4. Strong emphasis placed on personal and organisational (HQ) development.

The LA is run as a Temporary Multi-Organisation (TMO). As such, it is a transitory organisation where lead times for getting things up and running are short. Thus, the G4 was set up to act as leader, bridging the gap between high level management goals with the operational project goals.

> *"The [LA] Board is seen as a Corporate Protection. The role of the G4 is to be effective in technically managing the project. Getting the basic things set up."*
> *[Project Manager 1 and agreed by the other G4 interviewees]*

In other words, this involves action and structuring to bridge the corporate-project misalignments that are often the source of disputes and conflicts.

Interviewees of the operational team found it difficult to draw a clear picture of what the role of G4 is in promoting the Alliance and hence, AP. Some understood that G4 provides leadership on how Alliancing collaboration should work and what kind of behaviour is needed. Few argued that the leadership is visible and tangible enough to be felt whilst most others argued that they are confused about the purpose of this arrangement. One of the Board members also showed some degree of skepticism on the extent of effectiveness of the current Alliancing structure – whether or not it could

maintain the positive atmosphere once the project goes into construction. These are reflected in the following quotes.

> *Safety Managers both think that LA is "still typical construction perspective". Both also think "It's cultural since it's a [foreign] company – [foreign] Directors with [local] Managers. Have to re-educate to [local] Culture. This is more like a joint venture. We talk about the Alliance objectives but the we walk away and forget it".*

> *Commercial Manager 1 also agrees, stating, "it's more of a genuine D&B project. There is a hint that this is less straight forward and from a commercial point of view, this is a challenge."*

There is a general belief between the interviewees on the need to set aside HQ culture and establish the Alliance central core cultural system/team with a third person consulting point of view – to make things tangible. This is a major challenge since no one is currently monitoring according to a number of interviewees at this level. The G4 however, believes that this is already been tackled through having the independent chairman. So, there is a de-synced view here.

As stated, four key enabling and supporting factors were found and will be explained in the next section. Each factor heading tries to capture the corporate-project relationships and/or the G4-project relationships in highlighting the reasons behind the de-sync view and their influence to LA's cultural evolution path.

1. Rigorous management processes in the form of supportive 'hard' contractual arrangement that is 'laid over' by a 'soft' AP to guide behaviour.

As found in the previous sections, the success of the ICE was directly related to three headline drivers. These drivers thus resulted in a number of 'hard' management processes being set up and carried forward to the current project stage (design stage). These were:

- Up-front planning process
  A comprehensive base case scenario provided a comprehensive baseline, which defined scope, specifications and initial budget across the entire programme. It provided a valuable tool for tracking progress and changes.

- Project monitoring process
  Each project department is required to provide detailed information on progress, budget position, and future programme on a timely basis. The R+R forms were

being distributed to each department. The reason for doing this was said to be, "to loosely control progress as each department [e.g. design, health and safety, engineering] is encouraged to develop their own way of doing things" [Project Manager 2]. From this, it can be said that this forms the basis of G4 to review the project through an 'assurance' role.

- Problem resolution and change management process
  Having had the chance to get to know each other during the bid process (through ICE), one third of the interviewees mentioned that enough time had been spent to identify, explore and evaluate problems and options to reach common ground. This grounded the assumption that behavioural mindsets and formal work ethos had been established between the LA members and the Tier 2 Subs. Two of the interviewees mentioned that there is no need to explicitly state or codify such expected values since it is already embedded as institutionalized knowledge project-wide.

However, the findings from the above points and the interviewees suggested otherwise. There are two reasons for this that mainly comes from the difference in the interplay of perceptions between the believed culture and the real experienced climate:

1. Rigorous up-front planning coupled with rigorous monitoring (setting the hard systems) resulted in G4 and the Board being seen as isolated from the management team. Most management team interviewees agreed that things feel too task orientated, robotic and hierarchical in terms of control mechanisms. Some stated that dynamics at the senior level is 'magic' though it is not the same with the management team and especially with the Tier 2. Further, interviewees from the management team are unaware of the 'Steering Group's' purpose as a collaborative forum being run by G4. Thus, there is the need to align the use of 'management language' and 'operational and technical language' to overcome this barrier.

   In sum, most interviewees at this level agreed that the ICE and the Alliance idea are sitting more with the upper echelon managers. Some quotations revealed: "We need an Alliance Charter and Alliance identity". "Not just a charter on the wall but included in the KPI". "People don't know the core beliefs of the Alliance at this stage".

2. Behavioural mindsets and formal work ethos, i.e. the values underlying the AP must be explicitly communicated in a tangible manner. This is due to:
    - Though the Client and Tier 1 contractor may have lived and breathed those through the ICE process, new members will not have known what was going on or is expected. Project Controls Manager 2 said, *"level of engagement is to the extent of fulfilling contractual obligation rather than behavioural. Everybody's just concentrating on work scope whilst managing the contract."*
    - Different Tier 2 Subs will come and go as the project moves from one stage to another. To achieve sustainable Alliancing, Tier 2 Subs must be able to buy into the Alliancing mindset in a short time. Although they are co-located and had been together during the ICE process, some of the interviewees agree with the Consent Manager who stated, *"for people who just joined now, communication is a big issue although physically people from [Client] and [Tier 1] are sat together."*

The above findings lead to the need for a soft mechanism as a mean of control to complement the hard mechanisms, in the form of integration and interface management processes. From the above points, it can be seen that more needs to be done (apart from leadership efforts and supportive contractual arrangement) on developing the dynamics of the inter-personal relationships within LA firstly and Tier 2 Subs secondly. Arguably, this is the key effort that will determine the level of awareness and solidity by which the AP in pursued and executed. This brings us to the next point.

2. Current cultural integration.

According to Schein (1985), Culture and Organisational Culture encompass widely held assumptions, which drive people's behaviours in the form of:

- Basic assumptions → what people believe about how things work.
- Values and beliefs → what is deemed to be important, usually stemming from individual skills and expertise and corporate (HQ) allegiance,
- Norms and artifacts → formal rules and procedures indicating accepted ways of behaving.

However, according to Casey (1996) evolving culture needs to be nurtured and managed for its healthy maintenance across the project lifecycle.

Currently, it was found that there are three important aspects that render LA's Culture to be a bit sporadic at the operational project level. This sporadic culture is the result of how the Alliancing mindset is perceived at first by the LA project members during the ICE process, hence, is the initial sparks of evolution[20]. The three aspects are:

- There are currently two different basic assumptions going on within LA. **The first group**, consist of people who were involved in the ICE process. Their basic assumption is that LA and the AP are fully functional with just the leadership of the G4. As such, new members automatically understand the purpose and principals of the Alliance. For example, it is a general agreement amongst half of the interviewees that psychologically, *"people are distant from the Alliance and more attached towards the parent HQs"*. Engineering Manager 1 however, stated that this is of no concern at all because people will *"catch up out of their own common sense"*. He also believes that permeables (expected implicit knowledge, behaviour and understanding that comes with experience) can be done just by having a good leader, e.g. leading the theory. He also argues that an infrastructure of cultural schema that has already existed in the industry and institutionalized artifact is enough and brands are not needed to guide new Alliance members. For him, ICE already gives a sense of ownership and adoption because he had been involved in the process from the beginning.

  The second group, consist of people who just joined LA after the ICE was concluded. Their basic assumption is that LA is just another conventional project with conventional management process and control. The Alliance climate is not at all visible and people do not understand its purpose, principals and mechanisms. This is further influenced by the established 'hard' mechanisms. Engineering Manager 2, backed by 7 other interviewees stated, *"Identity and a sense of belonging is individually driven and not established formally. There's the morning breakfast meetings but that's all. It needs re-energising*." Commercial Manager 2 also backed this by stating, *" If you're not involved from the beginning, it's hard to get people up to speed with the [AP]. I know there's a Steering Group, but not more than that."* Interviewees agree that things are mostly driven out of the Project Manager 1 and Project Director's Leadership. *"They put initial measures and then back to procedures."*

[20] In LA's case, this is the primary initial sparks of cultural evolutionary decline. This will be presented in more detail in the Discussion section later on.

- Currently, values and beliefs generally stem from institutionalized technical skills and expertise. According to the Consents Project Manager, most interviewees in the operational team (but one) expressed that they still identify themselves to respective corporate HQs. There is the need to promote the feeling of unity to emphasize ownership and adoption. For example, promoting the feeling that 'this is the best thing that is happening in the construction industry for years', 'proud to be part of LA', and so on.

- Currently, formal rules and procedures are established in the form of formal managerial processes and ICT systems for project monitoring. In fact, 7 of the interviewees agree, *"There is a [Tier 1 Contractor] programme that are stored in [Client] management database – monitored into the [Client] planning system directly"* and that *"[Client] has sets of robust rules that govern how we do things around here."*

  As stated earlier, this resulted in perceptions that everything is quite rigid and robotic. This is due to the low levels of awareness perceived by members from the second group of people. Thus, feelings of inclusion and collaboration did not penetrate as deep as intended by the LA's senior team, i.e. G4. For example, most interviewees are unaware of the Steering Group (apart from health and safety) as a forum to maintain and sustain the Alliance's collaborative mindsets.

These can be presented as Figure 21 below:

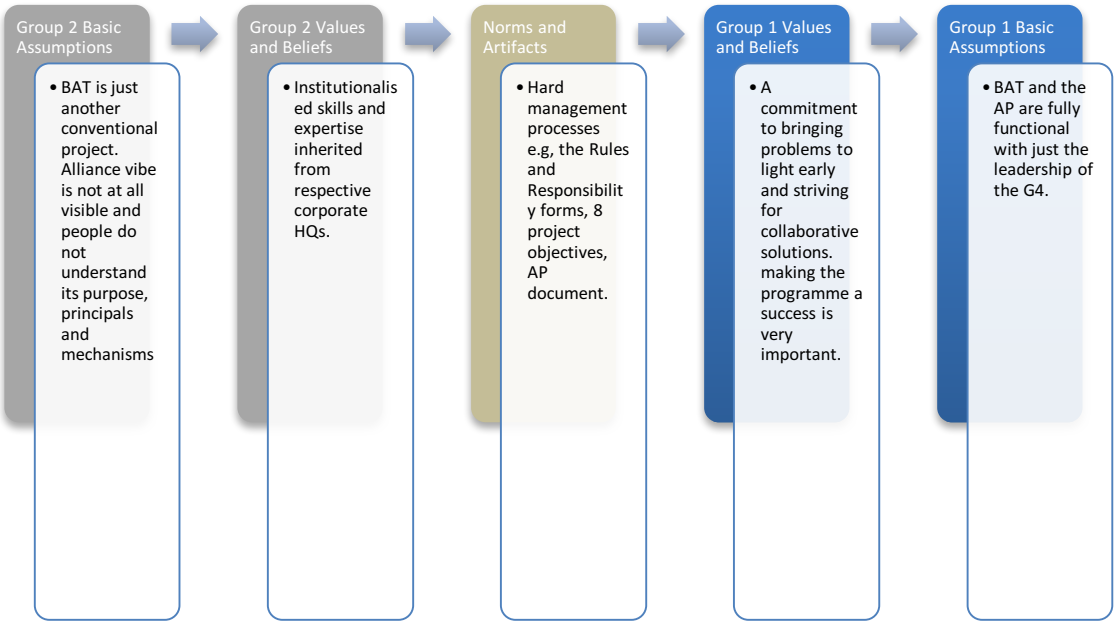


Figure 21: In-Group (Group 1) and Out-Group (Group 2) Comparison of Cultural Integration in LA

Whilst it is clear that things must be done, senior management cannot simply impose Culture and Organisational Culture. They develop in response to a number of 'hard' processes. Although senior managers' actions and pronouncements (leadership) are important, developing a desired culture is also influenced heavily by tangible 'soft' factors. These are the artifacts overlaying the 'hard' mechanisms and guide behaviour. This is well summed up by Engineering Manager 2's statement, which is backed by all but one interviewee in the operational team. The statement is as follows:

> *"I've been on 2 other Alliances before, where the aim is to get everyone comfortable. But this project hasn't got the adverse factor yet as a reason to make Alliance compelling. So I don't understand the talk about Alliance. Also, there is no Alliance agreement or protocols yet, just the contract and that's it. It's just a commitment to collaborate. Compared to a non-[LA] project, the G4 is not mature yet now. The 8 objectives are just a piece of paper. Not a game changer."*

> *"An Alliance should be chilled out, not bothering with micro level of detail. This project is 'wallowing' with details and this is not what an Alliance is all about – worrying too much on what or how things cascade up the pyramid."*

> *"The Alliance Board should be weary that people are pushing things up the stairs that doesn't need to be. [Designers] are already more collaborative that the average of the market. Primary issue is the lack of experience in programme management that's complex. It's the corporate (LA's) leadership that's not yet supportive].*

> *"The programme is something more impressive than it is".*

"The operations guys are still trying to establish and understand their deliverables."

The words *"very early days"* and *"still in honeymoon period really"* seem to resonate with every interviewee. The requirements for a mindset change in leadership and management to fully meet greater performance challenge will be discussed further in the next section.

According to Casey (1996), artifacts are the tangible elements of Culture. It serves as the first and foremost beacon for members to identify themselves with an organisation (in this case, LA and extending to Principal Tier 2s). It is the first stepping-stone to unanimity of decision-making, integrated project organisations and shared understanding of goals, which LA currently lacks in several places. Cultural artifacts are currently produced in the form of the 8 objectives, the AP documentation and the branding of company logos. However, according to Clegg et al (2002), in the effort to manage the incremental changes in a TMO's cultural evolution path, there are other artifacts that should be put in place to promote ownership and adoption. These are:

- A brand or branding that represents LA as a whole (to include other members within the supply-chain especially principal Tier 2s),
- Codifying relationship management against the principles of BS11000, which structures the right things to do in developing inter-personal relationships. This is not to insist that effort to gain BS11000 certification is needed as its principles are based on day-to-day collaborative frameworks. However, such codes should be tangible enough to challenge taken-for-granted thinking and behaviour, and on occasions point out the *"elephant in the room"* and not just a *"ribbon"* – declaring and internalising the formal rhetoric of the Alliance principles.
- Primary essence taken from the AP as slogans, mottos or banners to promote a fundamental belief that 'failure is not an option', 'the success of the programme is very important'.
- Lastly, co-location, which is already in place.

Perhaps the main aim to highlight in implementing the bullet points is the highly desired collaborative culture that is extended across the entire LA hierarchy, transcending and bridging the differences in values exchanges between high managerial strategies and the operational deliverables. In other words, to ensure that – in terms of cultural values – corporate-project congruence are flexibly aligned across the project lifecycle to allow each TMO function to adapt to the current project environment.

The influence coming from senior managers' actions and pronouncements (leadership) are highlighted in the following section.

3. The active leadership of G4.

From previous sections, it is clear that G4 is appointed to act as overall programme manager. As such, its role should be broader than a conventional programme manager. However, interviewees from the second group found it very difficult to differentiate this broader role of G4 that includes promoting and circulating the Alliance's values, beliefs and norms. This suggests a lack of understanding that the Organisational Culture in a TMO is not singular but is influenced by the corporate-project relationship and the current state of project ecology between organisations in the ecosystem and therefore, needs constants maintenance across the project lifecycle.

A number of the interviewees went as far stating, *"the G4 should just get on with it, it's taking too long", "They put the initial measures and then back to procedures"* and *"other Alliancing programmes were executed in a more dynamic and proactive manner"* in terms of leadership and promoting identity and unity. There appears to be a lack of understanding that a step change in goals and performance requires an embedded step change or shift in the management mindset too. The current position appears to be impatient with rhetoric rather than understanding the necessary changes that alter behaviour, especially subsequent decision-making and its processes that can feed back to influence cultural evolution.

Though it is understood that G4 should evolve over time, to provide specific and effective capability to the LA, it should aim to evolve under a certain path to influence cultural evolution. These are (the ones in **bold** are indicative of goals not yet emphasized currently):

- Embedding the rhetoric as a change of mindset,
- Specifying detailed project management processes,
- Providing project assurance,
- **Promoting clear LA identity and unity – emphasizing internal communication to aid awareness,**

- **Providing problem solving expertise and pro-active management of skills requirements at the operational level,**
- **Managing the change process,**
- **Managing the interfaces within LA and between LA and principal Tier 2 Subcontractors.**

Causality is seen as linear, short term and at worse mechanistic. A more nuanced approach stretching beyond the short term and multi-layered on the ground is needed for management to shape or develop the culture as intended. It should be noted that implementing such goals would only yield maximum benefit with the pro-active support from the Board. As mentioned in the headline drivers section, there was some skepticism coming from both Parent Organisation Representatives even though most of the effort to develop the Culture had been top down. The most apparent was the extent to which the current AP format will be sustainable for the rest of the project.

4. Strong emphasis placed on personal and organisational (HQ) development.

One of the Alliancing incentives for the management team interviewees is the opportunity for personal development. Some cited a higher form of goal to include capturing lessons learned and transferring them to the corporate (HQs) levels. To break things down a little:

- The health and safety effect
  The department has the most exposure to G4's support and hence, understanding the LA main Alliance principles best. According to both Safety Managers, there are efforts present to develop an innovative approach to health and safety that moves away from the traditional paperwork culture.

- A future knowledge capture and standardization
  According to the Consents Project Manager, there are efforts present from the non-technical departments to try and capture lessons learned from the current Alliancing scheme. There is enthusiasm to codify the processes and mechanisms that happened and will develop as *"An Idiot's Guide to Project Alliancing in Rail Infrastructure"*. An appropriate support and challenges set by the G4 could increase the benefit of its realizing such exercise. It will provide in the long-term, a generic strategy for programme development, engagement and

procurement and delivery management (engineering and construction). Further, if successfully achieved, it will mitigate re-inventing the wheel for future projects and strengthens collaborative credentials.

- Skills requirements and the Commercial effect
  Commercial Managers 1 and 2 agreed that proactively getting the *"right person in the right position", "[having an] outstanding commercial contract with the principal designer", "Commercial tension could still ruin this, especially when the contractor starts having problem in this area"* and *"ICE sets project interest to be bigger than commercial interests, but there's really little things that's bigger than that"* were cited on many occasions and resonates with every interviewee. However, it became clear that some do not feel as if they are getting the right form of support or even freedom in executing their roles. For most, there is little distinction in doing things in an Alliancing context or not.

  It became clear that most in the operational team, who are intended by the G4 to focus more on managerial aspects, translate organizational culture into the technical stream of thinking. This technical belief mainly came from individual expertise and previous experiences. Most interviewees are more concerned about getting the numbers *"correct"* and proved to be the gap between senior management intents and operational procedures. It is a general belief that this should be made clear that such responsibilities are meant to be shared under the AP. The visibility of Steering Groups, beyond the breakfast forums should be emphasized to discuss how LA and its Culture are meant to be developed and to seek consensus around issues and solutions.

In sum, it can be drawn from the above initial analysis that there is no guarantee that specifying rigorous processes, setting overall targets and principles and adopting what appears to be a well considered management philosophy will achieve the Alliance's goals. Certain 'enabling' factors are also a key influence to ensure that desired cultural evolution paths and outcomes are achieved. Inducing and aligning the appropriate culture promote and maintain the Alliancing and collaborative atmosphere throughout the rest of the remaining project lifecycle.

Table 9 sums up the key quotes from the LA case study. How this relates to the TMO's culture eco-evo-devo will be discussed in more detail later on in Tables 12 and 13.

Table 9 LA Case Table of Evidence

LA Case – Table of Evidence	
Roles in influencing the culture-climate interplay	**Quotes** depicting the dynamics in the form, function, congruence and development of culture-climate interplay
Corporate Representatives **The interviewees in this sub-heading represent the top-down view in the culture-climate interplay.*	• It is not an ordinary project for us. But we are 100% supportive". [Corporate Respresentative 2]. "However, fixed standard procedures must not be changed too much". ICE impact: Just building the relationship for successful delivery of the project. "We minimize resource changes and this pushes forward the getting to know each other process". "LA is my baby, this is the biggest project we have in the whole world. We took a lot of risks". [he is confident about the way the management are going forward in structuring the Alliance at the project level]. • Corporate Representative 2 also believes that co-location will mitigate any difficulties. [However, there is no evidence that he is on site frequently to make that judgement]. He is not in a position to lose money on a project this size. "We are working towards a target profit". • Corporate Representative 1 said that "ICE came out of a necessity we have – we had to do something different, but it didn't come out of super duper brain". "It just came along that way". "Commercial tension could still ruin this, especially when the contractor starts having problem in this area". • Corporate Representative 1 also thinks the Alliance is to overlay the contract. There should be leadership on the project (operations/deliverables) and the programme (business). "But it's early days. That's why many people think there's a light touch". "But as long as things are going right". "Otherwise this might change". [Suggests strong parent company leadership still].
G4 (Alliance Board) **The interviewees in the sub-heading represent views in how the culture-climate interplay are managed and translated top-down as well as bottom-up to achieve a "healthy" level in the TMO.*	• The Bank Board is seen as a "Corporate Protection" just like [the Client]'s assurance role. • The role of the G4 is to be effective in technically managing the project – getting the basic things set up. Agreement is up to the Evaluation Steering Group. • We write management plans, the R+R form, articulation of government law, etc. it's two people coming together to write a plan. • URS hasn't got a QMS yet so they can't be included in the Alliance. They don't have the ticket yet. "we're struggling to get the basic contract right with them" [LU Project Manager]. [But this is like a paradox, because how can URS have the same Alliancing mindset if they are not allowed in without a ticket]. • The Project Director has been working for [The Client] for 30 years. LA has an "outstanding commercial contract with the principal designer". Designers are like circle people and engineers are like square people and you try to mash them together. "…validating log works for designers are hard, they are not in the mindset yet". • We have a corporate baseline as the base for [Alliancing] behavioural evolution. This includes the process and

	requirement for rigour. [Corporate here means the commercial element]. • HQ has a light touch, hence autonomy is present, "there is less hierarchy in the corporate-project interface". "it is a natural fit for the contract". • LA is "seen as an island inside HQs". However, most project functions are still inherited from Madrid, and this is the frustration at the project level. • The Alliancing contract provides transactional efficiency. "Transactional is a given". "…efficiency is to be added and developed – best man for the job and double job roles". • "The Alliance is like a male-female relationship, like a marriage". "Engagements are done through R+R forms. But I understand that the soft issues are still a blur right now and we need help"[Project Director and Project Manager 1]. • Project Manager 2 said, "It's right because it's right in the Alliance". "G4 is already efficient but need to disseminate to operations". "The question is, are they producing enough? How to make them aware of the AP explicitly? • "We only need vision and mission statements. We don't need to make pens or mugs [to produce Alliance-supportive artifacts], we don't have the budget for it and I don't think we need it". "We have an award-winning Programme Director so we will be fine". [All G4s and other LU interviewees]. Project Manager 1 is the only one recognizing the importance of having new Alliance-based artifacts. • "We haven't really distributed the AP yet. But it's a case of agreement. The AP is the bubble supporting the agreements. The contract tells the obligations. But behaviours and moulded by the 8 AP objectives". [Suggests not having essential Alliance transfer ready yet and sees the ICE as "enough" and is the source of dispute later on with URS designers]. • "People are confusing role and status with real personal skills and expertise". [Project Manager 1]. • LA "kinda forged its own way ahead". "AP sets out how we're going to behave collaboratively". • "The Alliance doesn't necessarily develop their own governance process. That's why we actually have 2 of each role". "But we have our contract and this is why [the transfer to Alliancing] is organic". [They see the double roles as "leader" and "sub-roles", seeing each Project Department as little TMOs. Project Manager 1 also thinks that KPIs drive the wrong behaviours.
Rest of Project **The interviewees in this sub-heading represent the bottom-up view in the culture-climate interplay. That is to say, how the changes and contingencies along the project lifecycle informs (and re-informs) the TMO's heuristics and therefore define (and re-define) the TMO*	• Safety Managers think that LA is "still typical construction perspective". Both Safety rep thinks "it's cultural since it's a Spanish company – Spanish Directors with English Managers". [Have to re-educate to English Culture". "This is more like a joint venture". "We talk about the Alliance objectives but the we walk away and forget it". LU Commercial manager also agrees stating, "it's more of a genuine D&B project. There is a hint that this is less straight forward and from a commercial point of view, this is a challenge". • Most interviewees at this level agreed that the ICE and the Alliance idea are sitting more with the upper echelon

climate and act as the stimuli for adaptation.	managers. “We need an Alliance Charter and Alliance identity”. “ Not just a charter on the wall but included in the KPI”. “People don’t know the core beliefs of the Alliance at this stage”. • Overall, LA has the same structure with [NA2]. But there’s a feed-forward – feed-backward process they’re trying to do to influence the parent HQs. • There is a general belief between the interviewees on the need to set aside HQ culture and establish the Alliance central core cultural system/team with a third person consulting point of view – to make things tangible. This is a major challenge since no one is currently monitoring according to a number of interviewees at this level. The G4 however, believes that this is already been tackled through having the independent chairman. So, there is a de-synced view here. • It is agreed that “level of engagement is to the extent of fulfilling contractual obligation rather than behavioural”. Project Controls Manager 1 stated, “Everybody’s just concentrating on work scope whilst managing the contract”. • Biggest motivation influence is employment status, who pays you, etc, because psychologically, “people are distant from the Alliance and more attached towards the parent HQs”. One of the interviewees however, stated that this is of no concern at all because people will “catch up out of their own common sense”. Project Controls Manager 2 stated, “ICE sets project interest to be bigger than commercial interests, but there’s really little things that’s bigger than that”. • Although they are co-located and had been together during the ICE process, some of the interviewees stated that “for people who just joined now, communication is a big issue although physically people from [The Client] and [Tier 1] are sat together”. [So, the ICE didn’t have that much impact in changing culture-wise]. • “Identity and a sense belonging is individually driven and not established formally”. “There is the morning breakfast briefs but that’s all”. “it needs re-energising”. “You try to be flexible, but there are traditional contractual boundaries”. [Some believe this is due to the “size” of [Tier 1]. It’s been there for 150 years. It’s hard to change the mindset and standard procedures”]. Consent Manager also agrees that sometimes, traces of routines and procedures from [The Client] HQ pose problems with Tier 2. No top-bottom support/guidance from [The Client]. • Interviewees also agreed that things are mostly driven out of the Alliance Project Manager 1 and the Project Director’s leadership. “They put the initial measures and then back to procedures”. • Safety Manager 1 stated that the strategy team needs more “primary” representation from [the Designers] as they are seen as a key part of the Alliance in this stage. [This confirmed theory on changing players needs change of culture across the project lifecycle]. • Project Controls Manager 2 stated, “There is a [Tier 1] programme that are stored in LU management system/database – monitored into [the Client] planning system directly”. This is backed up by Engineering Manager 2 stating, “[the Client] has sets of robust rules that govern how we do things around here”.

	• Engineering Manager 2 also said, “I’ve been on 2 other Alliances before, where the aim is to get everyone comfortable. But this project hasn’t got the adverse factor yet as a reason to make Alliance compelling. So I don’t understand the talk about Alliance. Also, there is no Alliance agreement or protocols yet, just the contract and that’s it. It’s just a commitment to collaborate. Compared to a non-LA project, the G4 is not mature yet now. The 8 objectives are just a piece of paper. Not a game changer”. “An Alliance should be chilled out, not bothering with micro level of detail. This project is “wallowing” with details and this is not what an Alliance is all about – worrying too much on what or how things cascade up the pyramid. Or as others say, “the Alliance Board should be weary that people are pushing things up the stairs that doesn’t need to be”. [He also thinks that URS is more collaborative that the average of the market. Primary issue is the lack of experience in programme management that’s complex. It’s the corporate (LA’s) leadership that’s not yet supportive]. • “The programme is something more impressive than it is”. • Making individual contribution or creativity is the general motivation for the interviewees. Not the whole programme schedule, etc. • Engineering Manager 1 sees the CDT as the embodiment of the integrated team itself. He said that for the LU guys, they see the Alliance as a working programme because they are the ones driving it. He also believes that permeables can be done just by having a good leader, e.g. leading the theory. He also argues that an infrastructure of cultural schema that’s already existed in the industry and institutionalized artifact is enough and brands are not needed to guide new Alliance members. For him, ICE already gives a sense of ownership and adoption. • Most interviewees agreed that the LA is “still in honeymoon period really”. Most are not up to speed with the steering group and what it’s for. The Consent Manager said that most members understand the Steering Group to be the Programme Board for the project. And the Steering Group is very isolated from the rest of the project. However, it was stated by the Project Manager 2 that the Steering Group is in fact the G4. This is why everybody seems to be going back and basing everything around the contract. “The Operations guys are still trying to establish and understand their deliverables”. • There is a concern that with Alliancing, they are not currently where they should be cash flow wise. This suggests skeptical behaviour towards the transfer and can be a barrier. • The words “very early days” seem to resonate through every interviewee. • Consent Manager and Senior Sponsor said that it is a “real struggle to change the corporate mindset from Project[→]HQ[→]Future Project”. • Only 6 of the overall interviewees are actually able to identify themselves with LA and not at the corporate level. • Regarding the AP, it is a general agreement amongst the Project Level interviewees that LA “Need a good backbone of documents and learning from other [Alliancing] projects], strong visual leadership and clear messages”. “Core

	message of why we're doing the project". • Similar with the other two case studies, BS11000 is just a "ribbon". • The Senior Sponsor reflected the G4's concern on "disconnection" amongst the engineering-design function, "in terms of communication they're not good" i.e. not communicating within their own. "Ultimately, it's what the business says and standard corporate governance". • It is of strong general agreement as well that there is little indication of proper governance structure to guide the Alliance transfer, to guide behavioural/cultural development "other than the contract". "There's a wrong perception that these things can be built slowly. Right now the G4 is sitting in a corner. Get on with it". "The 8 objectives are not too visible as a behavoural [soft] overlay to complement the contract". • Commercial Manager 2 acknowledged, "if you're not involved from the beginning, it's hard to get people up to speed with the AP". "I know there's a Steering Group, but not more than that". • Project Controls Manager 2 also stated that "sometimes it's hard to know the limit". "ICE is hard to understand because it's the first time and we come from outside [Spanish]". "If things go bad, it would more on mis-performance on someone's side rather than due to mistrust". • "It's hard for the Corporate HQs to change, but within LA itself, it's happening".

Overall, the LA case illustrates the culture evolutionary curve at the beginning of the project lifecycle. Namely, the inception, bid and detailed design stages. The headline drivers act as the trigger of the TMO's culture evolution whilst the enabling and supporting factors act as the elements to influence the evolution trajectory. In sum, both elements feed back into the three factors constituting the evolution mechanism. In relation to the proposition and postulate, it can be seen that the LA case provides some initial indicators to Proposition 1 that a TMO's culture does indeed evolve through a set of recursive stages. Here, it was illustrated from the headline drivers that, after the introduction for a shift towards an alliancing scheme, LA's culture undergone development from stages 2 to 4 in accordance to Proposition 1[21].

The subsequent analysis surrounding the enabling and supporting factors have found that changes in resources and interplay between organisations in the ecosystem across the stages in the project lifecycle have also influenced the way the established culture is perceived. As stated in Chapter 4, different organisations come and go throughout the project lifecycle; this denotes the importance to pay attention on the dynamic intensity between the corporate-project relationships at a particular lifecycle

[21] The Propositions will be discussed in further detail in the Discussion section.

stage to manage the culture evolution path. Thus, in the context of eco-evo-devo, in the LA case, it is found that the effectiveness of the corporate-project relationships within the current project ecology affects the incremental development of the TMO's culture which in turn, feeds back to mould the culture evolution trajectory for the next lifecycle stage.

NA1 and NA2 Case Studies

NA1 and NA2 are project TMOs from the same client organisation. Contrary to the LA's TMO Alliancing culture development, NA1 and NA2 is imposed from above through a formal introduction of a Collaborative Working Strategy (CWS)[22]. The development and evolution of these two projects follow each other in the sense that in implementation, NA1 is an initial beta Alliancing TMO and NA2 is a more strategically advanced Alliancing TMO. The aim is for the Client organisation's management team to be able to replicate the "Perfect Alliance" for the next projects in the programme pipeline and standardize lessons learned. At a first glance, the cases of NA1 and NA2 mimic the claim made earlier in this research. That is, to find a means to help bridge the traditional notion that culture is non-transferable. Thus, to emphasise once more, coupled with the LA case study, this research aims to provide the solution for the missing links that were observed from these case studies.

Similar to the LA case, during the duration of the study, detailed analysis of the interviews identified 3 headline drivers and 3 enabling and supporting factors that initiated and curved NA1 and NA2's path of cultural evolution (see Figure below). The headline drivers are the factors or point of events that first generated the cultural evolution to Alliancing. These evidences are gathered mostly through interviews with the senior TMO members. The enabling and supporting factors are the cultural artifacts needed to adapt to the evolution and are evidenced mainly from interviews with the various TMO departments.

[22] However, it is essential to point out that there was also quite a lot of top-down influence in the LA case albeit not in the form of a formal introduction, but in the form of trying to impose established culture to new project members. Thus, there is a corroboration of top—down drives across cases in this matter.

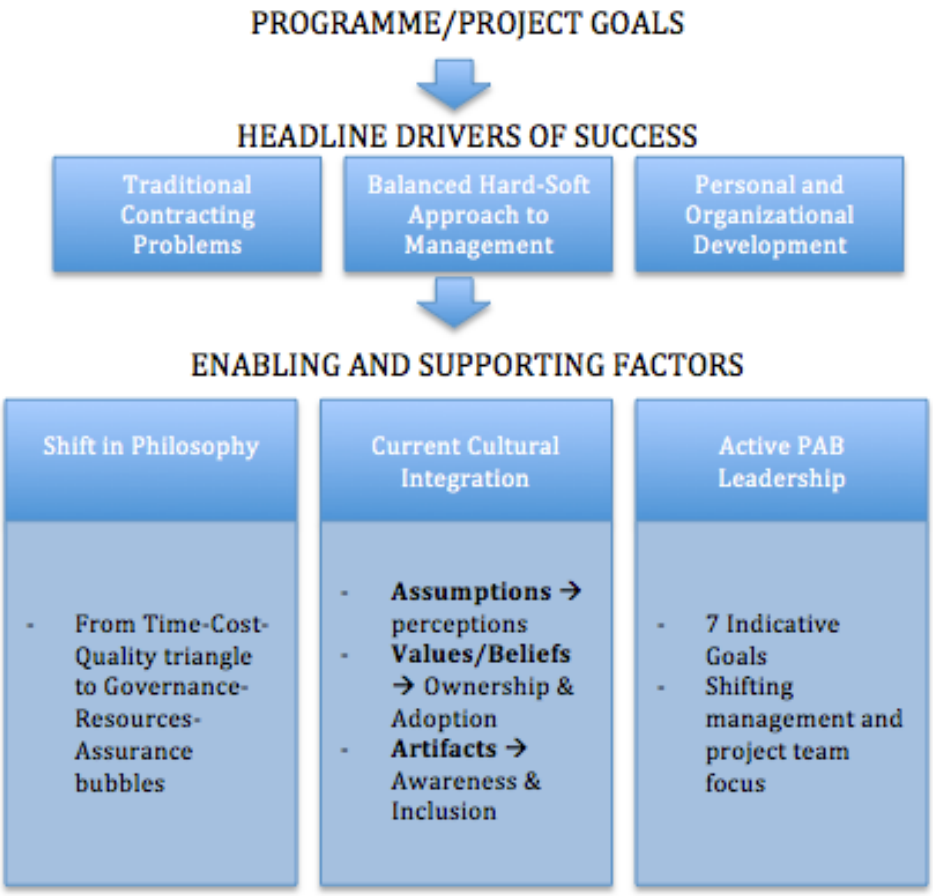


Figure 22: Overall Framework for NA1 and NA2 Case Studies

As stated, the cases of NA1 and NA2 are the opposite of LA. Thus, it is just as expected that some of the headline drivers and enabling factors mirror that of LA. Further, although the factor headings are similar, the elaboration behind it between LA, NA1 and NA2 differs. Thus, giving a richer set of combined data and analysis at the end.

The findings from both NA1 and NA2 will be presented separately. There may be some repetition between the cases. This is due to the fact that they share the same Client Organisation that initiate the major decision-making event (i.e. the shift to Alliancing). However, some differences in perception, reception and motivation can be seen also.

NA1
Headline Drivers

1. **Problems around the specification of a series of targets and principles around the traditional lump sum contract.**

The scope of NA1 involved complex project requirements that demands very robust, even idealized flawless execution. There were primarily two main challenges. The first is the crucial importance of completing construction in a tight, well-defined context and timescale (e.g. congestion relief). The second is the interface with a wide range of stakeholders that had legitimate influence over parts of the project.

"There are challenges legally coming from the form of the contract." [PAB Director]

Traditional commercial elements such as costs and profit margins were significantly to the fore and amplified by the initial contractual approach and the appointment of the equally traditional Tier 1 main contractors. This leads to conflicting objectives and barriers being present. For example, there are *"rebuilding the railway", and "third party trying to hold on to their businesses [objectives], [and] we couldn't quite incorporate collaboration from them fully"* [NA1 Alliance Director]. Thus, creating an adversarial and distrustful project environment.

Similar to LA, in a rail infrastructure project, NA1's client had a number of additional objectives that had to be met to fulfill broader social and economic targets. To recall, these are:

- Innovative solutions on design and accessibility,
- Added values and benefits to include service experience on top of traditional value of money from the product,
- QHSE (quality, health, safety and environment)
- Asset sustainability,
- Legacy to replicate the Project Alliancing Scheme (PAS) as a standard project delivery process (for the Client part).

Against this backdrop, and as part of the Client's new vision towards developing a more collaborative working environment, the Director of Collaborative Working and the PAB director decided to introduce the concept of Alliancing into NA1.[23] The Alliancing initiative was first glimpsed through the implementation of the Collaborative Working strategy (CWS) by the Client organization during the execution stage of the project.

[23] The problems around the specification of a series of targets and principles around the traditional lump sum contract has been long-standing in the industry sector studied and has been a problem faced by the Client overtime resulting in traditional blame cultures and disputes. Coupled with the traditional contractual issues arising specifically from NA1, the Client felt that NA1 is the appropriate project as a first beta project to try and introduce the collaborative schemes in the form of project Alliancing.

However, Alliancing themes are not yet 'codified' or written down as part of the Client's strategy at the time of procurement.

> "*The formal development of the Alliance came late. The actual formal agreement [structure] came late.*" [Alliance Delivery Manager] The Alliance Delivery Manager sees this as a "problem from a commercial point of view", as it is very important to map behavioural differences between people. The NR12 Alliance agreement underlies the project organization chart. Further the Alliance Director stated that at this time, "*there is only a pseudo-Alliance called the IBC*".

However, there were some implications cited from this move. What was crucial was that the Tier 1 Main Contractor's senior management still needed convincing that the Client's CWS and its PAS approach is not just a window dressing – i.e. there were significant 'Culture Shocks' present. When teased further about the culture shocks issue, most of the interviewees in NA1 (apart from the Alliance Director and Alliance Delivery Manager) agreed that Senior people with more experience and more exposure toward the PAB are less cynical towards the Alliancing transfer.

Success is deemed as important as traditional construction targets. As part of a Client-led Alliancing programme, detailed overarching objectives and principles, which the Alliance teams will be committed to achieve (at least in principle), should be well-developed as part of the procurement strategy. This will allow principles of the CWS to be cascaded down through the bid process to the Supply Chain simultaneously – reducing the consequences of 'Culture Shock'. This will be explained further in the 'enabling' and supporting factors section.

In sum, this first headline driver pertains to the traditional organisational perspective consisting of traditional rules and resources including norms that govern behavioural interactions. As stated in Chapter 4, this is the second form of trigger for the evolution of culture in a TMO in this context. Rules and resources exist at various levels within structure and will have different logics and dynamics (Sewell, 1992; p. 16). Some will prove to be implicit and explicit constraints while others aid to sensible decision-making by framing the context. However, it is illustrated here that in traditional project management exercise within NA1, decision mechanisms are hierarchical. It can create "an illusion of order about the past" (Vidaillet, 2008, p. 424), which are the sources of equivocality within the established structure of socio-cultural systems for the present due to "the existence of multiple and conflicting interpretations about [the TMO's current] situation" (Trevino et al, 1990; p. 74) as the ecosystem and relational ecology shift.

This leads to the second headline driver.

2. **Shift in management processes in the form of supportive 'hard' contractual arrangement that is 'laid over' by a 'soft' Alliance Protocol to guide behaviour.**

The familiar large construction programme challenges the maximization of constant delivery efficiency. Due to the conflicting objectives mentioned in the previous section, there existed a mutual motivation between the Alliance protagonists to minimize inevitable problems coming from:

- Interest misalignment between Client/Stakeholders and Design, between Design and Construction,
- Changes caused by inevitable revisions to requirements, construction problems and external third party factors,
- Contractors failing to do what they said they would do – conflict of interests between departments within the TMO.

Thus, the senior management teams took the initiative to restructure NA1 project organisations to reduce HQ controls and the commercial effect. The focus of the traditional iron triangle (time-cost-quality) criteria was shifted to a focus on project requirements, risk/opportunities profile and benefits ratio characterised by collective sharing of risks, no blame culture and unanimity of decision-making.

> *"[NA1] is devised around the BS11000 relationship management framework. Structure and functional relationships are mirrored between [the Client Organisation and NA1] I order to balance business-project goals. Change the layout of the office and this changes a lot of how people think, their thought process, how they shape decision problems through change of communication style."* [NA1 Alliance Director]

Similar with the problem cited in the LA case, there is a lack of awareness amongst the alliance's managerial echelon that the TMO's re-structuration on post-decision processes are pathological to societal and institutional capacity of the Client organisation that initiated them (Ursacki-Bryant et al, 2008). Thus, the emphasis for a fit between the corporate-project ecology in facilitating the structure and principles in governing the relationships and behaviours at the TMO level is corroborated in this headline driver. This is further illustrated in the following quote.

When asked about how they went about this, the Alliance Director further stated, *"There wasn't time to fight all the battles to mould people. To induce collaboration in the Alliance, you decide what works and doesn't work. For example, we try to adopt contractor practices, which is not easy because NR has big and widespread bureaucracy beyond ticking the boxes exercise."*

3. Strong emphasis placed on personal and organisational (HQ) development.

This is more of a circumstantial driver. Some of the Alliancing incentives for the interviewees are geared towards the opportunity for personal development (this mainly came from interviewees with engineering related roles). Others cited a higher form of goal to include capturing lessons learned and transferring them to the corporate (HQs) levels (this mainly came from interviewees with management related roles). However, these sentiments are more visible around the NA2 members as opposed to NA1 members.

In the case of NA1, this particular driver came from the Alliance Delivery Manager wanting to "learn more about Alliancing" and to "please the Client". Organisationally, the motivational driver is similar to LA's Tier 1 main contractor. That is, being exposed to the latest developments in the industry and appeal to the Client more. Further this is reflected in the Alliance Director's position, exposure and close relationship to the PAB, PAB Director and the Director of Collaborative Working. Thus there is a personal level motivation to see this through successfully. It is also stated by one of the interviewees (and later seconded by other engineering-based interviewees when asked) that "peer-pressure" and "personal recognition" is the primary motivation in buying into the Alliance mindset.

Although circumstantial, this third driver act as a conjunctive factor that helped reinforce the trigger for a cultural shift to alliancing. This came in the form of "punctuating and modifying individual perspective on the network of issues" (Vidaillet , 2008; p. 431; see also Langley et al, 1995) that pervade the entire ecological structure of the TMO – hence, forcing it to re-define its culture. This bring us to the following sub-section to highlight the enabling and supporting factors that affect the eco-evo-devo in the TMO's culture as the project transition to another stage in its lifecycle.

Enabling and Supporting Factors

Similar with the LA case, mainly, the enabling and supporting factors deal with the key areas that can affect the project ecology and hence, influence the incremental

development of the TMO's culture evolution. The research analysis suggests that there are 3 key enablers:

1. Shift in project management philosophy, particularly pertaining to the iron triangle (time-cost-quality) and early contractor engagement.
2. Supportive and aligned project-wide culture,
3. The active leadership of the Project Alliance Board (PAB).

Again, similar to LA, both NA1 was run as a TMO. To begin with, interviewees from NA1 found it difficult to draw a clear picture of what the role of PAB (NA1 members found it difficult to draw a clear picture between an Alliance and normal projects) is in promoting the Alliance and hence, CWS. Some understood that PAB provides leadership on how Alliancing collaboration should work and what kind of behaviour is needed. Few argued that the leadership is visible and tangible enough to be felt whilst most others argued that they sometimes felt abandoned with this arrangement. One of the senior management interviewee also showed some degree of concern on the extent of effectiveness of the current CWS and PAS structures – whether or not it could maintain its momentum for the long-term.

There are several reasons that were found and will be explained in the next section.

1. Shift in project management philosophy, particularly pertaining to the iron triangle (time-cost-quality) and early contractor engagement.

The starting point for the shift towards becoming a PAS for NA1 is said to be more of a pilot collaborative working project to assess the feasibility of introducing the concepts of Collaboration and Alliancing. As stated in the first headline driver, tensions coming from the commercial effects were the major driver that sparks NR's initial efforts to shift into PAS and developing the CWS.

However, the importance to firstly introduce a shift in the Client Organisation's programme management philosophy at corporate level was not given adequate attention. This is crucial as part of a basis to relay leadership messages and support from corporate to project level as one of the foundations for a robust corporate-project relationship in the case of influencing cultural evolution path.

It was mentioned by most interviewees that the contractual focus of the traditional iron triangle (time-cost-quality management) criteria was shifted to a focus on project

requirements, risk/opportunities profile and benefits ratio characterized by collective sharing of risks, no blame culture and unanimity of decision-making. The Alliance Director sees this as reflected in the way that *"there is a 50-50 role division between personnel from the Client and Tier 1"*, while the more engineering-based interviewees see NA1 as "*the commercial contract of collaboration".*

However, it was found that at the time of the study, this shift in project management philosophy from the traditional, tangible and technical time-cost-quality (TCQ) to a more BS11000-collaboration based on soft issues is not communicated and managed properly. For example, it was agreed between interviewees that personality always meddles and there are some opportunistic behaviours still present. The Alliance Engineering Manager and Alliance Scheme Project Manager both believed that BS11000 is just about "*gathering evidence because we're already doing it, like, show us how you sit down, what your alliance leadership look like*".

Further, the Alliance Engineering Manager and Alliance Scheme Project Manager do not like the given project mission and goals for an Alliancing. As far as they are concerned, it was little more than re-emphasising the TCQ triangle and Health and Safety issues in a collaborative manner. "*Alliance is the front-face and the fact that we work well together under one flag*" [Alliance Engineering Manager]. For one, it is "*much more personal, like a family, going the extra mile*"; and for others, it is much more professional, "*a business jargon to make people work more collaboratively and less commercially minded*". This suggests that contrary to the LA case, there was not any apparent effort made by the PAB and the Director of Collaborative Working to realize the necessity to also shift the underlying management philosophy to accommodate and sustain Headline Driver 2.

This leads to the conclusion that without proper communication and constant management (nurturing), formal project documentations do not automatically guarantee acceptance of the newly established culture. Behavioural mindsets and formal work ethos, that is, the values underlying PAS must be constantly nurtured in a tangible manner. This is due to different Supply Chain components that come and go as the project moves from one stage to another; or in NA1's case, the project members whose routines are affected by the shift as well. To achieve sustainable Alliancing, Supply Chain organisations must be able to buy into the Alliancing mindset in a short time. Thus, it is only appropriate if the traditional cost-time-quality triangle were

changed to reflect governance, assurance and resources management (cf. Winch, 2014) (See figure 23).

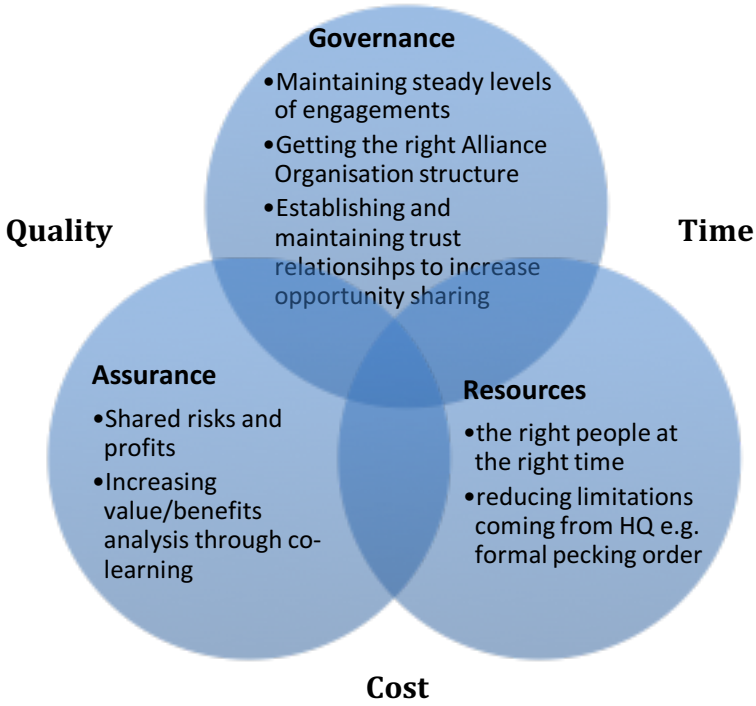


Figure 23: Bumper Bubbles of Project Management Philosophy (Winch, 2014)

Further, a thoughtful use of 'loose-tight' management can be implemented. This means that some aspects were tightly controlled so as to achieve highly consistent results, whereas other aspects were loosely managed, which gave room for flexibility and change (e.g. moving the dialogue phase with Designers and Tier 1 Main Contractors to the front-end whilst at the same time formal processes are being well structured and protected). In this sense, where loose-tight management is achieved or successfully implemented, it would help "flatten" out the TMO culture's evolutionary curve in the HR diagram[24]. It will also further reduce the potential of short evolution cycles due to cultural efficacy.

It was further mentioned that the shift from traditional contracting to PAS had caused:

1. 'Culture Shocks' for project members in particular and,
2. Difficulties to cope with new process mechanisms and controls for the corporate HQs.

[24] The evolutionary curve in the HR diagram will be further discussed in the discussion section under Proposition 2.

Theoretically, the rationale behind loose-tight management is that each contractor already had their way of doing things in engaging their preferred Supply Chains. Thus, better to provide an objective and challenge the contractors to find their own route to achieving it. Early dialogue from loose-tight management can also serve as initial stepping stones for the Alliance protagonists to get to know each other early on from the project front-end. Thus, will reduce complacency throughout.

These findings lead to the need for a soft mechanism as a mean of control to complement the hard mechanisms, in the form of integration and interface management processes. More effort needs to be done by the PAB Director and the Director of Collaborative Working (as the bridge between the corporate project interface) on developing the consistent dynamics of the inter-personal corporate-project relationships.

In sum, firstly, it can be seen that this point pertains to the re-structuring of the TMO's organizational structure and the restructuration of the TMO members' perception of the introduced alliancing cultural schema. However, due to lack of penetrative action to influence culture at the TMO level, there are still obvious division of identity amongst the members. Arguably, this is the key effort that will determine the level of awareness and solidity by which the CWS and PAS is pursued and executed. This brings us to the next point.

2. Current Cultural Integration.

It was stated that formal 'hard' organisational arrangements can only go so far in driving efficiency and effectiveness of desired outcomes. In theory, they must be accompanied by a supportive 'soft' managerial element, i.e. Culture. The prevailing external culture and Organisational Culture are crucial for driving the 'open and collaborative' behaviours that underpin success. When teased with a question about this, both the PAB Director and the Director of Collaborative Working agreed. The same sentiment is shared with the Alliance Director.

It was found that there are two important aspects in NA1 that may impact the transferability of a perfect sustainable alliancing culture for future projects. These are:

- From what has been gathered, the basic assumption of interviewees in NA1 is that NA1 is just another conventional project with conventional management

process and control. The Alliance twist was seen through the BS11000 accreditation. The Alliance climate is less visible and people do not understand its purpose, principals and mechanisms in detail. There were low levels of awareness perceived by members from this group of people. Thus, feelings of inclusion and collaboration do not penetrate as deep as intended by The Client's senior management team. This is reflected in the following quotes:

> "*Things are inherited from respected parent company. Certain things are done the client's way and others that aren't are done the Tier 1's way*." This is the extent of Alliancing according to the Alliance Scheme Project Manager. "*The Alliance is a name and a flag. [The Client] is very overpowering as a partner*" [Alliance Scheme Project Manager]. According to the Alliance Delivery Manager, this is a lot more freedom to define organizational structure within NA1 – "*marrying [The Client's] and [Tier 1's] standard procedures with the best of each*". [So the development has a base rather than starting from scratch].
>
> According to the Alliance Controls Manager, the Alliance's focus is mainly on delivery, "*A bit of every man for himself. Who could be best placed to do xyz*". "*Colocation + branding is the [NA1] Alliance*", "*not stripped down and built up as [NA1] people*". [So, in a sense, the FACET5 behavioural workshop at the start is less significant]
>
> The Alliance Engineering Manager said, "*NA1 have massively tried to blur those roles to build up the Alliance culture. The Alliance practice is still very much fragmented but not facing the organizational boundaries*".

- Currently, values and beliefs generally stem from institutionalized technical skills and expertise. Most interviewees in the NA1 team expressed that they still identify themselves to respective corporate HQs. Tensions of power play were also present in NA1 due to the nature of its change process. There is the need to promote the feeling of unity to emphasize ownership and adoption. The Alliance Engineering Manager stated that, "*There is no point in having certain measures enforced from above*".

Further, four of the interviewees agree that there should be a more ICE type (like the one done in the LA case) of exercise within NA1, creating new roles, not just "sticking" things together. An Alliance Controls Manager said, "*People still answer the phone as [The Client] or [Tier 1]*". Further, the Alliance Scheme Project Manager agreed that, "*it's good to have a fixed process but need to adapt if looking for long-term assurance*". The division in terms of individual identification emphasise the extent of PAB's efforts in managing the cultural shift to alliancing. Therefore, it can be said that NA1's TMO culture is a real-life

> manifestation of what Bachrach and Baratz refer to as *manipulating* the dominant community values, myths, and political institutions and procedures" (Op Cit, 1973; p. 18) to fit the TMO's circumstances at the time.

To recite once more, whilst it is clear that things must be done, senior management cannot simply impose Culture and Organisational Culture. They develop in response to a number of formal 'hard' processes. Although senior managers' actions and pronouncements (leadership) are important, developing a desired culture is also influenced heavily by tangible 'soft' factors. These are the artifacts overlaying the 'hard' mechanisms and guide behaviour.

Cultural Artifacts in this sense must not be mistaken for branding, alliance protocols, slogans, banners and mottos that were put in place during NA1's change process. Cultural artifacts here must be developed from top-bottom as part of detailed PAS planning to relay the desired codes-of-conduct and setting the boundaries to which Alliance identities are allowed to change at the project level (Casey, 1996; Clegg et al, 2002). The inclusion of BS11000 standard as part of the Client's CWS alone is not enough. Most if not all interviewees saw BS11000 as having little impact in helping to relay collaboration messages. BS11000 was thus perceived as only a default tool, but not encouraging people towards an Alliancing mindset. More needs to be done in this respect. For example, shifting core programme goals to focus on governance, assurance and resources (Figure 23) allows flexibility and freedom for projects to be innovative whilst not forgetting the Client's goals as a business. Hence, corporate attachment acts as guiding principles in approaching autonomous Alliance management. This is what it meant by the need to have a high level of inter-dependency management or interface management to ensure behavioural understanding.

The requirements for a mindset change in providing Cultural Artifacts support in leadership and management to fully meet greater performance challenge will be discussed further in the next section.

3. The active leadership of the Project Alliance Board (PAB).

From previous sections, it is clear that PAB is appointed to act as 'middle persons' in bridging the corporate-project gap.

> "*The Alliance Board brings together the project and us [The Client HQ]. we rule the Alliance[s], making sure things are driven for the best of the Alliance [s]. we don't deal with the day-to-days of the Alliance though. [The Client] set up something called the Alliance Authority – it involves independent assurance, so we talk to the Alliance[s] in an independent way, for example, trying to limit change [deviate from the contract, cost, risks, etc].*" [PAB Director]

As such, its role should be broader than a conventional Programme Director. To start with, interviewees from NA1 found it is very difficult to differentiate this broader role of PAB that includes promoting and circulating the Alliance's values, beliefs and norms. It is said it is "hard to grasp for engineering". Arguably, this is due to the starting point chosen to start the PAS. Further it was also mentioned by four of the interviewees that there is rare inspection or site visits by the PAB Director.

A number of the interviewees from NA1 went as far as stating, "*I wasn't here at the start so I don't know as much, it's no different than a normal project*" (e.g. Alliance Controls Manager) in terms of leadership and promoting identity and unity. There appears to be a lack of understanding that a step change in goals and performance require an embedded step change or shift in the management mindset too. The current position appears to be impatient with rhetoric rather than understanding the necessary changes that alter behaviour, especially with subsequent decision-making.

From this last point, the significance of paying attention to the current state of the project ecology between the parent organisations in the ecosystem is emphasized. As the project goes, PAB should also evolve over time to provide specific and effective capability to projects and to maintain healthy corporate-project relationship. With the current state of project ecology between the contracting organisations it should be noted that implementing goals would only yield maximum benefit with the pro-active support from corporate senior management. As mentioned in the headline drivers' section, there was and still is some skepticism coming from members in the CWS board. The most apparent, is the extent to which the current CWS and PAS format will be sustainable for the rest of the project. However, the Alliance Engineering Manager did say, "*the word Alliance is a motivating incentive to reach common understanding and to change to be more lenient towards personal or professional mindset*" [to be more adaptable to the current TMO mindset requirements].

Table 10 sums up the key quotes from the NA1 case study. How this relates to the TMO's culture eco-evo-devo will be discussed in more detail later on in Tables 12 and 13.

Table 10 NA1 Case Table of Evidence

NA1 Case – Table of Evidence	
Roles in influencing the culture-climate interplay	**Quotes** depicting the dynamics in the form, function, congruence and development of culture-climate interplay
Alliance Board **The interviewees in this sub-heading represent the top-down view in the culture-climate interplay.*	• People's thought process are important. It's the balance between social interaction and emotional energy. • It is important to understand audit and compliance to home process. • The Alliance Board brings together the project and us [[the Client] HQ]. We rule the Alliance[s], making sure things are driven for the best of the Alliance[s]. We don't deal with the day-to-days of the Alliance though. • [the Client] set up something called the Alliance Authority – it involves independent assurance, so we talk to the Alliance[s] in an independent way, for example, trying to limit change [deviate from the contract, cost, risks, etc]. • Alliancing for us adds value for money. However, there are challenges legally coming from the form of contract. • We try to build an Alliance identity, create a brand to tie people [create artifacts]. One of the ways we do this is to take teams away and do workshop[s]. • We also created a Collaborative Working Strategy to guide this process. • We identify [maintain] the level of engagement through a number of techniques, such as through questionnaire. • [NA1] is a pilot study that we did to test our new Collaborative Working Strategy [CWS] as part of our [new] long-term procurement strategy. We want to capture any lessons learned from this project and see if it's feasible enough to be applied [lessons learned to be transferred] to other projects. • We are confident with our approach to Alliancing. You can see that compared to the Alliancing that other company is currently doing [referring to the LA case Alliancing], our Alliancing is more properly structured. We understand the importance of BS11000 and have incorporated this in our documentation [referring to the CWS document]. • I [PAB Director] control the Alliance Board, "I know every detail of it" [with the supervision of the Director of Collaborative Working].
Alliance Director **The interviewee in the sub-heading represents views in how the culture-climate interplay are managed and translated top-down as well as bottom-up to achieve a "healthy" level in the TMO.*	• [NA1] is devised around BS11000 Relationship Management Framework. • To induce collaboration in the Alliance, you decide what works and doesn't work. For example, we try to adopt contractor practices, which is not easy because [the Client] has big and widespread bureaucracy beyond ticking the boxes exercise. • There wasn't time to fight all the battles to mold people. [The climate to feedback these changes in culture to the [the Client] level is little. Bigger projects have better chance on doing this. Also, bigger projects can gain more autonomy. • Everyone has their own unique role. It is an open plan office to encourage conversation. We encourage less talk about home practice and more to [NA1] branding.

	• If the Alliance is ideal, ideally you don't really answer to the mothership. [Things of concern to achieve the ideal Alliance are only individual expertise, roles and past experiences]. • At [NA1]'s time, PAB is not yet set up properly. There is a pseudo-Alliance called the IBC. • Where people live is very important to collaboration for the Alliance. Being an away project, it is easier to keep people interested • Change layout of the office and this changes a lot of how people think, their thought process, how they shape decision problems through change of communication style. • Structure and functional relationships are mirrored between [the Client] and [NA1] in order to balance business-project goals. • Culture is also molded from in-depth selection through FACET5 (behavioural workshops). • Similar with [NA2], 3rd party supply chain is a barrier to Alliancing. They couldn't quite incorporate collaboration from them fully. • Also similar with [NA2], there is a 50-50 role division between [the Client] and [Tier 1] in [NA1].

Rest of Project
 	
**The interviewees in this sub-heading represent the bottom-up view in the culture-climate interplay. That is to say, how the changes and contingencies along the project lifecycle informs (and re-informs) the TMO's heuristics and therefore define (and re-define) the TMO climate and act as the stimuli for adaptation.*
	• Things are inherited from respected parent company. Certain things are done [the Client]'s way and others that aren't, are done the [Tier 1]'s way. This is the extent of Alliancing according to the Scheme Project Manager. The Alliance is a name and a flag. [The Client] is very overpowering as a partner. According to the H rep, this is a lot more freedom to define organizational structure within [NA1] – marrying [the Client] and H standard procedures with the best of each. [So the development has a base rather than starting from scratch].
	  ○ According to the Alliance Controls Manager, the Alliance's focus is mainly on delivery, "A bit of every man for himself. Who could be best placed to do xyz". Colocation + branding is the [NA1] Alliance, "not stripped down and built up as [NA1] people". [So, in a sense, the FACET5 behavioural workshop at the start is less significant]".
	  ○ The Project Engineer said [NA1] have massively tried to blur those roles to built up the Alliance culture. The Alliance practice is still very much fragmented but not facing the organizational boundaries.
	• Similar with [NA2], it is hard for engineering to grasp the Alliancing purpose. Little changes of perception happen.
	• Also similar with [NA2], there are more trust elements and more empowered to do things than in [the Client] HQ. But [the Client] is the polite nonetheless.
	• Parents' cultures are still there, because for some, the transfer to Alliancing is a complete culture shock.
	• NA1 is less adversarial than [Tier 1] in addressing the transfer to Alliancing.
	• Similar with [NA2], there is rare inspection or site visit.
	• Personality always meddles and there are some opportunistic behaviours.
	• People do what they individually needs for their head offices. If the best for the Alliance is different from [the Client], you

	have to seriously think. Do well by not doing things wrong. • BS11000 is just about gathering evidence because we're already doing it. E.g. "show us how you sit down", "what your Alliance leadership look like". • Senior people with more experience are less cynical towards the Alliancing transfer. • Project engineer and Scheme Project manager don't like project mission and goals for an Alliancing. It's always about TCQ triangle and Health and Safety and as far as they are concerned, it is business as usual. "Alliance is the front-face and the fact that we work well together under one flag". • According to the Alliance Delivery Manager [NA1] looks like this: o [The Client] ——[Tier 1]---[the Client]'s Alliance Partner • The formal development of the Alliance came late. The actual formal agreement [structure] came late. H rep sees this as a "problem from a commercial point of view", as it is very important to map behavioural differences between people. The NR12 Alliance agreement underlies the project organization chart. • Technical critical events don't usually challenges current Alliance values. • According to the Alliance Delivery Manager Alliance Leadership team: o Senior (lenient) ←----------→ Junior (rigid, more hands on people) o However, the Project Engineer said that the word Alliance is a motivating incentive to reach common understanding and to change to be more lenient towards personal or professional mindset. • There are different definitions of Alliancing between the interviewees. For one, it is "much more personal, like a family, going the extra mile" and for others, it is more professional, "a business jargon to make people work more collaboratively and less commercially minded". Nonetheless, there are still blurred understanding about the boundaries of the term Alliance and what id the difference with normal collaboration practice from the [the Client] side. • It is nature ("from the parent mindset") vs nurture ("we get on well, etc") mindsets mainly. • The more junior interviewees see [NA1] as "the commercial contract of collaboration. People still answer the phone as [[the Client]] or [[Tier 1]]". • Anything can change under stress [where "close calls" happen]. • Most interviewees agree that there should be a more ICE type of exercise within [NA1], creating new roles, not just "sticking" things together. It's good to have a fixed process but need to adapt if looking for long-term assurance. The Project Engineer concurs to this, by saying that "there is not point in having certain measures enforced from above". • Peer-pressure and personal recognition is the primary motivation in buying into the Alliance mindset. [The climate of the Alliance is not a major influence on how the Alliance's culture is formed. This is due to the fact that expertise and roles are still the main base for perception and judgments in decision processes].

Overall, the NA1 case illustrates the culture evolutionary curve at the end of the project lifecycle. Namely, the end of construction to closure stages. The headline drivers act as the trigger of the TMO's culture evolution whilst the enabling and supporting factors act as the elements to influence the evolution trajectory. In sum, both elements feed back into the three factors constituting the evolution mechanism. In relation to the proposition and postulate, it can be seen that the NA1 case provides some corroborating indicators (on top of the LA case) to Proposition 1 that a TMO's culture does indeed evolve through a set of recursive stages. Here, it was illustrated from the headline drivers that, after the introduction for a shift towards an alliancing scheme, NA1's culture undergone development from stages 2 to 4 in accordance to Proposition 1[25]. However, it must be acknowledged that the evolution path is not as momentous as that of LA. This is due to the nature of how the PAS was introduced midway and the fact that NA1 is treated as a pilot project.

The subsequent analysis surrounding the enabling and supporting factors have found that a formal shift in the traditional project management philosophy is central in influencing the way the established alliancing culture is perceived. In NA1's case, dynamics surrounding the hindsight of knowledge and anchoring that emanates from the existing heuristics are of particular importance and must be rigourously noted. Again, the importance to pay attention on the dynamic intensity between the corporate-project relationships at a particular lifecycle stage to manage the culture evolution path is emphasised.

In the context of eco-evo-devo, in the NA1 case, it is found that the basic understanding of the alliancing philosophy affects the incremental development of the TMO's culture in terms of promoting ownership, adoption and integration. However, due to NA1's place, which is at the end of the evolutionary curve, the cultural efficacy that comes after the introduction of the PAS is due to the closure of the project. There are no strong evidence to suggest that the alliancing mindset introduced is retained and/or will be replicated by any of the TMO members interviewed apart from the informal lessons learned captured by the PAB.

[25] The Propositions will be discussed in further detail in the Discussion section.

NA2
Headline Drivers

1. **Problems around the specification of a series of targets and principles around the traditional lump sum contract.**

Similar with NA1, the scope of NA2 involved complex project requirements that demands very robust, even idealized flawless execution. There were primarily two main challenges. The first is the crucial importance of completing construction in a tight, well-defined context and timescale (e.g. congestion relief – increasing capacity). The second is the interface with a wide range of stakeholders that had legitimate influence over parts of the project.

Traditional commercial elements such as costs and profit margins were significantly to the fore and amplified by the initial contractual approach and the appointment of the equally traditional main contractors. This leads to conflicting objectives and barriers being present, that is. "rebuilding the railway", and "third party trying to hold on to their businesses". Thus, this creates an adversarial and distrustful project environment.

> "*Our current barrier is the third party. They are not into Alliancing mindset – trying to hold on to their businesses. So, lot of differences in goals. There are [also] problems/de-sync from top-bottom in terms of practical perception.*" [NA2 Alliance Director]

This is especially more significant in NA2 compared to NA1. NA2's Tier 1 main contractor is well-known in the industry to be a very traditional and/or adversarial main contractor. The Alliance Director at the time stated that traditional lump sum contract was proven to be too adversarial for the project in that every problem faced became a dispute about profit fairly quickly in the transition stages between design and construction. NA2 needed something else to increase the Client–Tier 1 glue for coordination and collaboration.

> *"[NA2] got accredited in BS11000 and transferred to Alliancing in Summer 2012 just after the contract [lump sum] has been awarded. There were lots to learns in the transfer – lots of culture shock. The contract always dominates the landscapes of a working environment*." [NA2 Alliance Director]

Similar to LA, in a rail infrastructure project, the client had a number of additional objectives that had to be met to fulfill broader social and economic targets. To recall, these are:

- Innovative solutions on design and accessibility,

- Added values and benefits to include service experience on top of traditional value of money from the product,
- QHSE (quality, health, safety and environment)
- Asset sustainability,
- Legacy to replicate PAS as a standard project delivery process (for the Client part).

Against this backdrop, the Director of Collaborative Working stated that the Alliancing initiative, which was first glimpsed through the implementation of the CWS by the Client organisation in NA1, is then improved and applied to NA2. As is the case with NA1, Alliancing themes are not yet 'codified' or written down as part of the Client's strategy at the time of procurement. However, both the Director of Collaborative Working and the PAB Director agreed that they are more prepared in terms of introducing an Alliance Protocol more thoroughly.

What was crucial was that the Tier 1 main contractors' senior management still needed convincing that the Client's CWS and its PAS approach is not just a window dressing – i.e. there were significant 'Culture Shocks' present.

> "*People we deal with from [Tier 1] have never been in an Alliancing before. So it's a complete culture change from [Tier 1's] HQs/ they drain and sack the Alliance for info, but [NA2] is trying to reduce duplication*." [NA2 Alliance Director]

The Alliance Director also stated, "*personally, I think Alliancing is a Relationships' Contract, and the mechanics of the contract is very important*". Similar with the arguments put forward in NA1, success is deemed as important as traditional construction targets. As part of a Client-led Alliancing programme, detailed overarching objectives and principles, which the Alliance teams will be committed to achieve (at least in principle), should be well-developed as part of the procurement strategy. This will allow principles of the CWS to be cascaded down through the bid process to the Supply Chain simultaneously – reducing the consequences of 'Culture Shock'. This will be explained further in the 'enabling' and supporting factors section.

In sum, this particular headline driver pertains to two things. The first is the need for re-structuration of the TMO members' perception in terms of existing hindsight of knowledge and anchoring emanating from the confirmation of existing heuristics that comes from different Corporate HQs. That is to say, in trying to overcome the conflicting objectives between the different parties. The second pertains to the

taxonomy of structure and systems inherited from respective Corporate HQs. Similar with NA1, decision mechanisms are hierarchical particularly those coming from the Tier 1. It creates "an illusion of order about the past" (Vidaillet, 2008, p. 424). As stated, it is the source of equivocality within the established structure of socio-cultural systems for the present due to "the existence of multiple and conflicting interpretations about [the TMO's current] situation" (Trevino et al, 1990; p. 74) as the ecosystem and relational ecology shift towards the execution stage.

The second headline driver then follows this sparks for culture evolution.

2. Shift in management processes in the form of supportive 'hard' contractual arrangement that is 'laid over' by a 'soft' Alliance Protocol to guide behaviour.

The familiar large construction programme challenges the maximization of constant delivery efficiency. Due to the conflicting objectives mentioned in the previous section, there existed a mutual motivation between the Alliance protagonists to minimize inevitable problems coming from:

- Interest misalignment between Client/Stakeholders and Design, between Design and Construction,
- Changes caused by inevitable revisions to requirements, construction problems and external third party factors,
- Designers failing to do what they said they would do.

The motivation to minimize said problems is reflected in the following quote.

> *"[The Client] provides 100% assurance in the project while delivery is conducted 90% by our main contractor [Tier 1, the project's Alliance partner].*" [NA2 Alliance Director]

Thus, the senior management teams took the initiative to restructure NA2's project organisation to reduce HQ controls and the commercial effect. The focus of the traditional iron triangle (time-cost-quality) criteria was shifted to a focus on project requirements, risk/opportunities profile and benefits ratio characterised by collective sharing of risks, no blame culture, unanimity of decision-making.

> "*The relationship within the project is like this:*
> *[Tier 1] representative----→[PAB]←----[The Client] representative (Alliance Director + independent rep from [The Client] headquarters). We do build up our own [organizational] structure, or at least try to. We think about what [Tier 1]*

needs and designed the organization based on the role even if it may be different from the HQ. but the dynamics are pretty much similar, like a linked-pin organization, like a family in a family." [NA2 Alliance Director]

Further in NA2, it was somewhat fortunate that the Alliance Delivery Manager had some motivation with working in a collaborative environment before. This made the transitions smoother and in terms of convincing or motivate the Tier 1 HQ to agree and buy into the Alliancing mindset faster. Also, the Alliance Services Manager stated that, "*a lot of people in the office are ex-[Tier 1] or contractor [freelancer], so they know each other already before the [Alliancing] switch*." Due to this, contrary to the NA1 case, post-decision processes are tackled in a more sophisticated way in that the fit between the decision event, the scope and scale of both intra- and inter-organisational environments and the so-called contingency elements are facilitated by the Corporate HQs in a more tangible manner. It therefore, involved formal structuring and priciples in governing the relationships and behaviours. Interplay within the corporate-project ecology are also formally acknowledged.

3. Strong emphasis placed on personal and organisational (HQ) development.

This is more of a circumstantial driver. Some of the Alliancing incentives for the interviewees arise from the opportunity for personal development. Others cited a higher form of goal to include capturing lessons learned and transferring them to the corporate (HQs) levels. However, these sentiments are more visible around the NA2 members as opposed to NA1 members. To break things down a little:

- A future knowledge capture and standardization
  There are efforts present from the non-technical departments (in NA2) to try and capture lessons learned from the current Alliancing scheme. There is enthusiasm to codify the processes and mechanisms that happened and market them internally at corporate level. This can be seen from the Alliance Delivery Manager's enthusiasms who emphasized that he personally saw to it that the brandings and artifacts of the NA2 Alliance are also "habituated to sell safety and quality messages", challenging the Tier 1 HQ's bureaucracy. In the end, it was found that NA2 became such a sensation at the Tier 1 HQ and was marketed internally to change the corporate level culture. Codifying the processes and mechanisms aims to provide in the long-term, a generic strategy for programme development, engagement and procurement and delivery management (engineering and construction). If successfully achieved, it will

mitigate “re-inventing the wheel” for future projects and strengthens collaborative credentials.

- Skills requirements, employment status and the commercial effect

  Pro-actively getting the ‘right person in the right position’ was cited in many occasions and resonates with every interviewee in NA2. Members were given appropriate training and rigorous workshops throughout the change process. These can be seen from the following quotes:

  > “*We did a lot of culture workshops [behavioural workshop] … series of sessions [discussions] with different departments to negotiate the best systems for NA2, depending on who you’re dealing with and at times you need to threaten a bit. There are KRAs [Key Results Areas] agreed between NA2 protagonists and talks about behaviours, comparing traditional and Alliance behaviours. Initially, staffs are quick to recognizing authority. In this way, they adapt very quickly to the new F2A design. The main underlying rule is, ‘for the interest of the Alliance’ and everything will follow through*.” [NA2 Alliance Director]

  > “*My motivation is to get continuity of job, track record because I am a contractor [freelancer]. To retain position, you have to adapt. Adapting to the new way of adapting. Gaining extra personal skills*.” [Alliance Engineering Manager] and this is seconded by the Alliance Services Manager.

  > “Everyone not fit for the environment was removed – unlocking other potentials.” [Alliance Delivery Manager]

  It was further found that those who could not adapt to the new Alliancing Protocol were replaced. Most interviewees cited that being a ‘contractor’ [freelancing] as opposed to permanent staff makes it easier to make the switch to an Alliancing mindset’. Further, it was the common view between interviewees that when the commercial manager comes not from the client organisation, integration can be achieved more easily as there will be more trust present initially.

  The second somewhat controversial driver in this sub-heading is that the position of the Main Contractor that had acquired their targeted profit margin, hence having ‘nothing lo lose’ to go ahead and cooperate in the PAS shift. Had this not been the case, six of the interviewees agree that they were somewhat skeptical that the outcome would be as successful.

Again, similar with NA1, although circumstantial, this third driver act as a conjunctive factor that helped reinforce the cultural shift to alliancing. This came in the form of

“punctuating and modifying individual perspective on the network of issues" (Vidaillet , 2008; p. 431; see also Langley et al, 1995) that pervade the entire ecological structure of the TMO – hence, providing flexibility and opportunity for each TMO function to re-define its culture. This bring us to the following sub-section to highlight the enabling and supporting factors that affect the eco-evo-devo in the TMO’s culture as the project transition to another stage in its lifecycle.

Enabling and Supporting Factors

Similar to the previous two case studies, the enabling and supporting factors deal with the key areas that can affect the project ecology and hence, influence the incremental development of the TMO’s culture evolution. The research analysis suggests that there are 3 key enablers:

1. Shift in project management philosophy, particularly pertaining to the iron triangle (time-cost-quality) and early contractor engagement.
2. Supportive and aligned project-wide culture,
3. The active leadership of the Project Alliance Board (PAB).

Again, similar to both LA and NA1, NA2 was run as a TMO.

To begin with, interviewees (mainly those with Engineering roles) from NA2 found it difficult to draw a clear picture of what the role of PAB (this is similar to NA1 where interviewees with Engineering related roles found it difficult to draw a clear picture between an Alliance and normal projects) is in promoting the Alliance and hence, CWS. Some understood that PAB provides leadership on how Alliancing collaboration should work and what kind of behaviour is needed. Few argued that the leadership is visible and tangible enough to be felt whilst most others argued that they sometimes felt abandoned with this arrangement. One of the senior management interviewee also showed some degree of concern on the extent of effectiveness of the current CWS and PAS structures – whether or not it could maintain its momentum for the long-term.

There are several reasons that were found and will be explained further in the next section.

1. **Shift in project management philosophy, particularly pertaining to the iron triangle (time-cost-quality) and early contractor engagement.**

It can be said that although both NA1 and NA2 share the came Client Organisation, there are two starting points for the shift into PAS for each project. As mentioned earlier, NA1 is said to be more of a pilot collaborative working project to assess the feasibility of introducing the concepts of Collaboration and Alliancing. According to the Director of Collaborative Working, NA2 was more thoroughly structured as an Alliance. As stated in the first headline driver, tensions coming from the traditional adversarial contractual nature and commercial effects were the major driver that sparks the Client's initial efforts to shift into PAS and developing the CWS.

However, and similar with the problems encountered in NA1 after the introduction of the shift, what was not given attention to in particular was the importance to firstly introduce a shift in the Client Organisation's programme management philosophy at corporate level. This is crucial as part of a basis to relay leadership messages and support from corporate to project level as one of the foundations for a robust corporate-project relationship in the case of influencing cultural evolution path. This is reflected in the following quotes:

> "*Both [the Client] and [Tier 1] struggled with the systems and previous control [they] had. A lot of people at [the Client] don't know the concept of Alliance. Both [The Client] and [Tier 1] struggled with the systems and previous control [they] had. A lot of people at [The Client's side] don't know the concept of Alliance. There are problems/de-sync from top-bottom in terms of practical perception*." [NA2 Alliance Director]

> From the Client view, the Alliance Director Further stated, "*There are some challenges: there are ambiguity in role and identity, need to learn how they operate at [Client] level to cushion the blow into the parent organization cause there's a lot of different ways of doing things. We need support from PAB as a sort of speaker*."

> On the other hand,*"[Tier 1] is a payment mechanism. It's like night and day. They don't understand what Alliancing means at the time. Thus, the [Tier 1 HQ] was confused and not supportive at all. They were competitive individuals and isolated*." [Alliance Delivery Manager]

It was mentioned by five of the interviewees that there were efforts to shift contractual focus of the traditional iron triangle (time-cost-quality management) criteria to a focus on project requirements, risk/opportunities profile and benefits ratio characterized by collective sharing of risks, no blame culture, unanimity of decision-making. However, it was not quite as visible yet for them. This shift in philosophy and values to PAS are translated in three different ways by interviewee members and are reflected in the following quotes. The first pertains to the systems and processes that are restructured following the PAS. The second quote pertains to the fit between technical expertise

and the introduced alliancing culture. The third quote illustrates concerns pertaining to the impact of the culture shift to the project financially.

According to the Alliance Engineering Manager and Alliance Services Manager, the Alliancing scheme is not very complex in terms of engineering. It is very complex in terms of delivery."*There's office records and regulations, lots of interdisciplinary issues and lots of stakeholders. Stakeholders management is the real issue here. As an engineer, it is easier to be in the old type of contract rather than in Alliancing. You have all the cards and sitting behind the contract. But in Alliancing it is about progressive assurance – assist and help as the project goes. There are not much impact from charters and standards, because people are not consciously thinking about it. Some people are not really exposed to these high-level ideas, formal workshops, etc. you are subconsciously protecting your parent company*."

"*It is [the PAB and the Client's top management's] vision to do Alliancing. But Engineering is the key difficulties*." The Alliance Controls Manager said that the CWS is not as visible yet to him.

"*Alliancing need money investment up-front but that money had been spent. So, to achieve best for Alliance, there has to be compromise on scope. Value, etc. so there's a question of 'it's best for the Alliance, but is it best for industry?'*" [Alliance Commercial Manager]

From the above quotes, it can be seen that contrary to NA1, the Alliancing mindset penetrated deeper into individual members within NA2. The Alliancing Scheme is no longer only a "front face". Further, although there was some mentioning that it is still hard for departments within the TMO to understand the purpose of PAB or the role of PAB, nobody mentioned not liking the mission and project goals – as was the case in NA1. This suggests that The Client's efforts to replicate their Alliancing programme (and hence the Culture to make it work) as part of their long-term procurement strategy from one TMO to another is working. The primary issue to be addressed now is what is missing and what could be done better.

Behavioural mindsets and formal work ethos, that is the values underlying PAS must be explicitly communicated in a tangible manner. This is due to different Supply Chain components that come and go as the project moves from one stage to another. Again, contrary to NA1, where it was mentioned that there was not time to fight all the battles to mould everyone in the project, in NA2, this is done rigourously. For example, the Alliance Delivery Manager reflected on how people "from the ones pouring concrete to the Alliance Director" are encouraged to saying and seeing all the TMO artifacts to "get it to stick". It was said that there will be days where people who can "recite" the project's mission, Health and Safety mottos and other Alliancing related charters will be rewarded by artifacts such as mugs, pens and so on.

However, on top of the above exercise, a number of the interviewees were asking whether or not they could trust the Alliance to be sustainable and change the Alliance skeptics at other TMOs. Interviewees at the project level in NA2 agreed that for now, the problem is "not scratching under the surface". That is to say, there has to be something that is nurtured from the Client's corporate level. Thus, to begin with, it can be said that to achieve sustainable Alliancing, other Supply Chain organisations must be able to buy into the Alliancing mindset in a short time[26]. To emphasise again, to get the TMO's Alliancing culture right, it is only appropriate if the corporate level management and the PAB focus on shifting traditional cost-time-quality triangle to reflect governance, assurance and resources management as was recommended for NA1 (cf. Winch, 2014) (See figure 23).

Further, a thoughtful use of 'loose-tight' management can be implemented. This means that some aspects were tightly controlled so as to achieve highly consistent results, whereas other aspects were loosely managed, which gave room for flexibility and change (e.g. moving the dialogue phase with Designers and Main Contractors to the front-end whilst at the same time formal processes are being well structured and protected).

It was also mentioned that the shift from traditional contracting to PAS had caused:

1. 'Culture Shocks' for project members in particular and,
2. Difficulties to cope with new process mechanisms and controls for the corporate HQs.

Theoretically, the rationale behind loose-tight management is that each contractor already had their way of doing things in engaging their preferred Supply Chains. Thus, better to provide an objective and challenge the contractors to find their own route to achieving it – outcome driven. Early dialogue from loose-tight management can also serve as initial stepping stones for the Alliance protagonists to get to know each other early on from the project front-end. Thus, will reduce complacency throughout.

These findings lead to the need for a soft mechanism as a mean of control to complement the hard mechanisms, in the form of integration and interface

[26] Short time here pertains to the time needed for the parent organisations in the TMO to agree to be involved in and commit to the alliancing scheme and not the time needed to mould desired behaviours completely and so on.

management processes. More effort needs to be done by the PAB Director and the Director of Collaborative Working on developing the consistent dynamics of the inter-personal corporate-project relationships. Arguably, this is the key effort that will determine the level of awareness and solidity by which the CWS and PAS is pursued and executed. This brings us to the next point.

2. Current Cultural Integration.

It was stated that formal 'hard' organisational arrangements can only go so far in driving efficiency and effectiveness of desired outcomes. In theory, they must be accompanied by a supportive 'soft' managerial element, i.e. Culture. Culture and Organisational Culture is crucial for driving the 'open and collaborative' behaviours that underpin success. For example, in an alliancing TMO, an AP is required as a soft overlay to guide and remind project members of the desired collaborative working climate from time to time. When teased with a question about this, both the PAB Director and the Director of Collaborative Working agreed. The same sentiment is shared with the Alliance Director.

It was found that there are several important aspects in NA2 that may impact the transferability of a perfect sustainable alliancing culture for future projects. Contrary to NA1, these are:

- It was found that in NA2, their basic assumption is that there is a closer relationship between NA2 and PAB in communicating and exercising the transition to Alliancing. Although the Alliance Director stated some challenges in the form of role and identity ambiguities, proper Alliance branding was established to dilute corporate barriers and identity (e.g. not differentiating who works for which company). This was done through a series of Culture workshop sessions. Promoting the branding of the Alliance includes changing the project artifacts to some extent. It was also recognized amongst the NA2 interviewees, "*BS11000 is just a means to an end. It gives you a tool, but not encouraging people towards an Alliancing mindset. But it is the default thing for the delivery team"* [Alliance Delivery Manager]. Another said, *"F2A modelled people's behaviour based on BS11000, but didn't educate people according to their parts. It does not really deal with the softer side*" [Alliance Controls Manager]. Hence, there is a conscious understanding that the Alliance Director has to constantly steer behaviours:

"*You get tuned to the old way of doing things and this Alliancing thing is very new. But at the end, behaviours do change because the contract arrangement is different*."

However, it has to be noted that the Alliance Director also saw some negative points coming out of this rigourous exercise, that it is complacent and encourages the "going native" phenomena. This means that the adoption into the TMO culture is very deep in the end that the TMO members dread going back or adjusting back to the corporate level culture.

In the end, the Alliancing scheme was such a success in the end that every team member dreaded going back to 'normal' working environments. As such, members have gone 'native' to the NA2 environment and will find it very hard to accept or re-adapt to traditional project processes and to some extent, the formal mechanisms that are in place at the corporate level. This is most strongly reflected in the following quote:

"*I would even resign from my current position at [Tier 1] just to be able to work with these guys again and you can tell the PAB*." [Alliance Delivery Manager]

The end of the Alliance is more de-motivating for some people in NA2. This is because presence of site visits are rare, sometimes making the project members feeling "abandoned". The Alliance Services Manager said there is a fine line between being abandoned and given freedom. There is a bias toward Alliancing. This poses challenges to the Client's senior management team in the sense of re-establishing corporate identity in-between projects.

Further, the rigid branding and identity led to strong perceptions that unanimity of decision-making must be underlined by 'what is best for the Alliance'. Coupled with the 'going native' perception, this is a dangerous area. There needs to be a balance between what is best for the Alliance and what is best for the industry – which is the Client's long-term goal.

To recite once more, whilst it is clear that things must be done, senior management cannot simply impose Culture and Organisational Culture. They develop in response to a number of formal 'hard' processes. Although senior managers' actions and pronouncements (leadership) are important, developing a desired culture is also

influenced heavily by tangible 'soft' factors. These are the artifacts overlaying the 'hard' mechanisms and guide behaviour.

Cultural Artifacts in this sense must not be mistaken as the branding and alliance protocols, slogans, banners and mottos that were put in place during NA1 and NA2's change process. Cultural artifacts here must be developed from top-bottom as part of detailed PAS planning to relay the desired codes-of-conduct and setting the boundaries to which Alliance identities are allowed to change at the project level. The inclusion of BS11000 standard as part of the Client's CWS alone is not enough. Most if not all interviewees saw BS11000 as having little impact in helping to relay collaboration messages. BS11000 was thus perceived as only a default tool, but not encouraging people towards an Alliancing mindset. More needs to be done in this respect. For example, shifting core programme goals to focus on governance, assurance and resources (Figure 23) allows flexibility and freedom for projects to be innovative whilst not forgetting the Client's goals as a business. Hence, corporate attachment acts as guiding principles in approaching autonomous Alliance management. This is what it meant by the need to have a high level of inter-dependency management or interface management to ensure behavioural understanding.

The requirements for a mindset change in providing Cultural Artifacts support in leadership and management to fully meet greater performance challenge will be discussed further in the next section.

3. The active leadership of the Project Alliance Board (PAB).

From both the NA1 and NA2 case studies, it is clear that PAB is appointed to act as 'middle persons' in bridging the corporate-project gap. To recall, it was said that,

> "*The Alliance Board brings together the project and us [The Client HQ]. we rule the Alliance[s], making sure things are driven for the best of the Alliance [s]. we don't deal with the day-to-days of the Alliance though. [The Client] set up something called the Alliance Authority – it involves independent assurance, so we talk to the Alliance[s] in an independent way, for example, trying to limit change [deviate from the contract, cost, risks, etc].*" [PAB Director]

As such, its role should be broader than a conventional Programme Director. Contrary to NA1, where interviewees are not really sure of their cultural standings (i.e. identity, allegiance, whether to the TMO or to respective parent organizations), for the NA2 interviewees such problems above were less significant. However, there were notions

collected that suggest a sense of negligence or abandonment – as implied and quoted by the Alliance Services Manager earlier on – coming from corporate HQ (the Client's side in particular) as the project goes along. Parable to the proverb, 'plants are grown by the sound of steps', active presence and leadership from corporate HQs are another important aspect to remind project members of their identity and purpose.

While it may be tangential to the thesis, there is an additional finding that can be drawn from NA1 and NA2 cases that is interesting and worth mentioning here. There is a parallel study focusing on leadership conducted by Dr. Derek Walker from RMIT, Australia, on the same Client's organisation department. There are 3 key experiences and 7 key characteristics that an Alliance Manager should have. They are:

1. Technical skills and experience,
2. PM skills and experience,
3. Business skills and experience,
4. Reflectiveness,
5. Pragmatism,
6. Appreciativeness,
7. Resilience,
8. Wisdom,
9. Spirit,
10. Authenticity.

However, given the above findings, this research suggest that Alliance Managers should be seen as a collective group of people involved in PAB. Thus, it should aim to evolve under a certain path to achieve a number of goals. These are:

- Embedding the rhetoric as a change of mindset,
- Specifying detailed project management processes,
- Providing project assurance,
- Promoting clear identity and unity – emphasizing internal communication to aid awareness,
- Providing problem solving expertise and pro-active management of skills requirements at the operational level,
- Managing the change process,
- Managing the interfaces within the Project Alliance and between the Project Alliance and the supply chain.

From the above, PAB should evolve over time too, to provide specific and effective capability to projects and to maintain healthy corporate-project relationship. It should be noted that implementing goals would only yield maximum benefit with the pro-active support from corporate senior management. As mentioned in the headline drivers' section, there was and still is some skepticism coming from members in the CWS board. The most apparent, is the extent to which the current CWS and PAS format will be sustainable for the rest of the project.

Table 11 sums up the key quotes from the NA2 case study. How this relates to the TMO's culture eco-evo-devo will be discussed in more detail later on in Tables 12 and 13.

Table 11 NA2 Case Table of Evidence

NA2 Case – Table of Evidence	
Roles in influencing the culture-climate interplay	**Quotes** depicting the dynamics in the form, function, congruence and development of culture-climate interplay
Alliance Board **The interviewees in this sub-heading represent the top-down view in the culture-climate interplay.*	• People's thought process are important. It's the balance between social interaction and emotional energy. • It is important to understand audit and compliance to home process. • The Alliance Board brings together the project and us [[the Client] HQ]. We rule the Alliance[s], making sure things are driven for the best of the Alliance[s]. We don't deal with the day-to-days of the Alliance though. • [The Client] set up something called the Alliance Authority – it involves independent assurance, so we talk to the Alliance[s] in an independent way, for example, trying to limit change [deviate from the contract, cost, risks, etc. • Alliancing for us add value for money. However, there are challenges legally coming from the form of contract. • We try to build an Alliance identity, create a brand to tie people [create artifacts]. One of the ways we do this is to take teams away and do workshop[s]. • We also created a Collaborative Working Strategy to guide this process. • We identify [maintain] the level of engagement through a number of techniques, such as through questionnaire. • [NA2] is more appropriately structured as an Alliance. We are more knowledgeable and ready so to speak compared with [NA1] because we already know what to do and how to do it from the previous experience [the [NA1] project. • We are confident with our approach to Alliancing. You can see that compared to the Alliancing that other company is currently doing [referring to the LA case Alliancing], our Alliancing is more properly structured. We understand the importance of BS11000 and have incorporated this in our documentation [referring to the CWS document]. • I [PAB Director] control the Alliance Board, I know every detail of it [with the supervision of the Director of

	Collaborative Working].
Alliance Director **The interviewee in the sub-heading represents views in how the culture-climate interplay are managed and translated top-down as well as bottom-up to achieve a "healthy" level in the TMO.*	• [The Client] provides 100% assurance in the project while delivery is conducted 90% by our main contractor [the project's Alliance partner]. • The relationship within the project is like this: [Tier 1] rep----→[PAB]←----[the Client] representative (Alliance Director + independent rep from [the Client] HQ) • [NA2] got accredited in BS11000 and transferred to Alliancing in Summer 2012 just after the contract [lump sum] has been awarded. There was lots to learn in the transfer – lots of culture shock. • People we deal with from [Tier 1] have never been in an Alliancing before. So it's a complete culture change from [Tier 1]'s HQs/ they drain and sack the Alliance for info, but [NA2] is trying to reduce duplication. We are trying to remove company branding and replace with [NA2] branding. • Both [the Client] and [Tier 1] struggled with the systems and previous control [they] had. A lot of people at [the Client] don't know the concept of Alliance. • Our current barrier is the third party. They are not into Alliancing mindset – trying to hold on to their businesses. So, lot of differences in goals. • Personally, I think Alliancing is a Relationships Contract, and the mechanics of the contract is very important. The contract always dominates the landscapes of a working environment. • We did a lot of culture workshop [behavioural workshop]. → Series of sessions (discussions) with different departments to negotiate the best systems for [NA2], depending on who you're dealing with and at times you need to threaten a bit. • There are problems/de-sync from top-bottom in terms of practical perception. • There are KRAs (Key Results Areas) agreed between [NA2] protagonists and talks about behaviours, comparing traditional and Alliance behaviours. • We do build up our own [organizational] structure, or at least try to. We think about what [NA2] needs and designed the organization based on the role even if it may be different from the HQ. but the dynamics are pretty much similar, like a linked-pin organization, like a family in a family. • You have to get people to think Alliance and rowboat in their thought process. [So they get people to think inside out, everything is based on the interest of the Alliance. So in a sense, external culture is redundant]. • There are some challenges: ○ There are ambiguity in role and identity, need to learn how they operate at [the Client] level to cushion the blow into the parent organization cause there's a lot of different ways of doing things. We need support from PAB as a sort of speaker. • Initially, staffs are quick to recognizing authority. In this way, they adapt very quickly to the new [NA2] design. The main underlying rule is, "for the interest of the Alliance" and everything will follow through. • Branding includes changing project artifacts to some extent. • Some negative points: it is complacent and going native.
Rest of Project	• The Alliancing scheme is not very complex in terms of engineering. It is very complex in terms of delivery.

**The interviewees in this sub-heading represent the bottom-up view in the culture-climate interplay. That is to say, how the changes and contingencies along the project lifecycle informs (and re-informs) the TMO's heuristics and therefore define (and re-define) the TMO climate and act as the stimuli for adaptation.*	"There's office records and regulations, lots of interdisciplinary issues and lots of stakeholders. Stakeholders management is the real issue here". • As an engineer, it is easier to be in the old type of contract rather than in Alliancing. You have all the cards and sitting behind the contract. But in Alliancing it is about progressive assurance – assist and help as the project goes. • Co-location would have helped in the design phase. [Although this turned into going native in the end]. • There is the commercial effect as well. • It is [PAB and [the Client] top management]'s vision to do Alliancing, but engineering is the key difficulties. Project Controls Manager said the CWS isn't as visible to him yet. • Alliancing need money investment up-front but that money had been spent. So, to achieve best for Alliance, there has to be compromise on scope. Value, etc. so there's a question of "it's best for the Alliance, but is it best for industry?" • BS11000 is just a means to and end. It gives you a tool, but not encouraging people towards an Alliancing mindset. But it is the default thing for the delivery team. Another said that [NA2] modeled people's behaviour based on BS11000, but didn't educate people according to their parts. It does not really deal with the softer side. • [The Alliance Director] steers behaviours. You get tuned to the old way of doing things and this Alliancing thing is very new. But at the end, behaviours do change because the contract arrangement is different. • My motivation is to get continuity of job, track record because I am a contractor [freelancer]. To retain position, you have to adapt. Adapting to the new way of adapting. Gaining extra personal skills. • There are not much impact from charters and standards, because people are not consciously thinking about it. Some people are not really exposed to these high-level ideas, formal workshops, etc. you are subconsciously protecting your parent company. • The project has a very complex scope of work and is very geographically challenged. • From [Tier 1]'s perspectives, it's hard to get the right people. [having a contractor mindset]. But I myself was from a client background, so it's easier for me to build relationships with [the [NA2] leadership team] because I still have [the Client] mindset. • A lot of people in the office are Ex-[Tier 1]/contractor, so they know each other already before the [Alliancing] switch. • [Tier 1] is a payment mechanism. It's like night and day. They don't understand what Alliancing means at the time. [Thus, the [Tier 1] HQ was confused and not supportive at all]. They were competitive individuals and isolated. Everyone not fit for the environment was removed – unlocking other potentials. • Artifacts as is "saying it, seeing it repetitively to get it stick, hibituation process to sell safety and quality messages. People "from the ones pouring concrete to the Alliance Director" are encouraged to saying and

	seeing all the project artifacts to "get it stick". There are days where people who can "recite" the project's mission, Health and Safety mottos and other Alliancing related charters will be rewarded by artifacts such as mugs, pens and so on. • [Tier 1] HQ was challenged and [NA2] were given the agreement to reduce formal bureaucratic hierarchy. • There were that much trust that boundaries of governance would never be broken. The bond is around implicit trust. It's like the 4 musketeers around here. One less and it will change the dynamic. • [NA2] became such a sensation at [Tier 1] HQ it was marketed internally to change the culture of the [Tier 1] HQ. • Going native: I would even resign from my current position at [Tier 1] just to be able to work with these guys again and you can tell the [the Client] PAB. The end of the Alliance is more de-motivating for some people in [NA2]. This is because presence of site visits are rare, sometimes making the project members feeling "abandoned". Services Manager said there is a fine line between being abandoned and given freedom. There's a bias toward Alliancing. • Alliancing reduced powerplay. Nobody is bossing around. • At corporate level, interviewees were asking the question whether or not they could trust the Alliance to be sustainable to the project and change the Alliance skeptics. Because some people in [NA2] have gone native and going back to the rigid parent company is a culture shock. For now, the problem is "not scratching under the surface".

Overall, the NA2 case illustrates the culture evolutionary curve during the middle stages of the project lifecycle. Namely, during the construction stage and the beginning of the closure stage. The headline drivers act as the trigger of the TMO's culture evolution whilst the enabling and supporting factors act as the elements to influence the evolution trajectory. In sum, both elements feed back into the three factors constituting the evolution mechanism. In relation to the proposition and postulate, it can be seen that the NA2 case further corroborates the indicators found on the two previous cases in terms of Proposition 1. That is, a TMO's culture does indeed evolve through a set of recursive stages.

Here, it was illustrated from the headline drivers that, after the introduction for a shift towards an alliancing scheme, NA2's culture undergone development from stages 2 to 4 in accordance to Proposition 1[27]. Contrary to NA1, the post decision processes that triggers the start of NA2's culture evolution is dealt with in a more organised manner.

[27] The Propositions will be discussed in further detail in the Discussion section.

This is due mainly to the mix of resources and their existing heuristics within NA2's TMO organisational structure and is classified as a conjunctive event in the headline drivers.

The subsequent analysis surrounding the enabling and supporting factors have found that early introduction and a formal shift in project management philosophy is central in influencing the way the established alliancing culture is perceived. In NA2's case, dynamics surrounding the hindsight of knowledge and control relations coming from the Client and especially from Tier 1 Corporate HQs are of particular importance and must be rigourously noted. Again, the importance to pay attention on the dynamic intensity between the corporate-project relationships at a particular lifecycle stage to manage the culture evolution path is corroborated.

Thus, in the context of eco-evo-devo, in the NA2 case, it is found that (aside from the conjunctive events factor), the effectiveness of the corporate-project relationships within the current project ecology affects the incremental development of the TMO's culture which in turn, feeds back to mould the culture evolution trajectory for the next lifecycle stage. In the particular case of NA2, it is essential to further note that one of the problems on cultural efficacy comes mainly from the "going native" phenomena experienced by the TMO members. Thus, it can be concluded that although a conjunctive event may facilitate culture evolution in the beginning, it could also be a reason for cultural efficacy in the future.

Summary

From the three case studies, it must be recognized that no two organisations are the same. Each Corporate HQ has specific characteristics that will inevitably shape the trajectory of cultural development as an Alliancing TMO. The clearest example is that any contractual arrangement that was effective during an earlier stage of the project was quite catastrophic when it comes to the later stages when the Organisational Culture stays outdated against the current TMO ecosystem.

Further, it can be seen that although the trigger to evolution in the LA case was the organisational perspectives[28], it was the TMO member's heuristics towards the Organisational Culture[29] that caused the TMO to reach cultural efficacy during the

[28] See Illustration 3 in Chapter 4.
[29] See Illustration 2 in Chapter 4.

transition stage to detailed design. This phenomenon is similar to the NA1 case. In the NA1 case, the heuristics of the TMO members were so sceptical that it could not maintain the collaborative nature of the Alliancing culture beyond the project lifecycle. However, contrary to both LA and NA1 cases, the NA2 TMO members were able to adjust their heuristics towards the newly established Alliancing culture through collaborative exercises and therefore, maintain their integration and coordination effectiveness (at least throughout the period of study).

Thus, contrary to Fellows and Liu's (2013) claim that once established, a "culture will remain quite stable due to its roots lying in shared values which are underpinned by fundamental beliefs and assumptions" (Op cit, p. 403), it can then be summed up that – to be able to effectively carry forward initial successes in terms of maintaining and predicting how culture evolves at the TMO level – there be[30]:

- A high level of detailed planning to reduce likelihood of problems caused by inevitable construction problems and external factors,
- A high level of visibility of performance throughout to avoid (in this case) designers/contractors failing to do what they say they would do,
- A high level of inter-dependency management or interface management to ensure behavioural understanding and alignment between the Alliance protagonists and design, and between design and construction,
- A robust way to identifying and dealing with problems and changes across the entire project duration.

Before going on to the discussion section, these bullet points can be further broken down to a more micro-practical and manageable points to illustrate a number of indicators and constraints that constitute the selection mechanims surrounding the three TMOs' cultural evolutionary paths. These are:

- Having a balanced role appointment between who is the Alliance Manager and who is the Commercial Manager. It is found that when the Alliance Manager and Commercial Manager come from different companies, it will be easier to gain trust from the rest of the supply chain,

[30] After the duration of study, the author had one final meeting with the senior members of LA. It was found that the research did have an impact to their organisational structure, in that the G4 is now a G5. Thus, changing incrementally the balance of the initial Alliancing values because the G5 now includes a commercial representative, and illustrated an effort to evolve.

- Innovative approach to Health and Safety that moves away from the paperwork culture – a culture that puts priority on paperwork,
- Involvement of all Alliance Members (in the extreme, from those handling the shovel up to Project Management team) in internally marketing the notion of Alliancing,
- Expertise and real world experiences gained from previous projects set the basis for behaviour. Hence, the need for internal Alliancing marketing nurtured from top-bottom.
- Facilitating co-location from the procurement and design stages.
- Difference in personal development as permanent or non-permanent staff.
- Less power play between Alliance members is important – especially for engineering.
- Promoting enthusiasm to codify the processes and mechanisms that happened and will develop as 'An Idiot's Guide to Project Alliancing in Rail Infrastructure'.
- Geographical project placements such as site remoteness and being away from home significantly influence individual commitment levels,
- Peer pressures and keeping up with other competitors in the industry (e.g. reputational pressures),
- The degree of importance in addressing demands from external third party stakeholders and gaining their support,
- The stage that the project is in currently. There was evidence that more commitments and willingness to adapt are built up when project is at an important stage (e.g. nearing completion and handover to asset management).

With this, this research is ready to attempt the next step of the 2nd stage analysis, that is, to link back these raw findings to the theories, propositions and postulate claimed in the earlier chapters.

Discussion

The previous section of this Chapter dealt with the first stage of analysis of the raw interview findings from the case studies. As stated, the 2nd stage of analysis is where practice facts are combined with the theories claimed in the earlier chapters. In accordance with the RRREIC structure, this discussion section deals with the second and third Rs (redescription and retroduction) – as explained in Chapter 5.

This section will be structured according to the propositions and postulate put forward. To recall, these were:

Proposition 1: *The TMO's culture evolves through a set of recursive stages.*

1. Imposed firm-level cultural values during start-ups
2. Mixture of values from other institutional contexts poses pressure for integration of coordination
3. Conventional norms and routines challenged – searching for a new working project culture
4. The TMO begins to detach itself from the prevailing cultural values of its respective parent organisations, towards evolving into a new form of organisation with its own working culture fitting its current institutional context
5. Recursive loop from 2 across the project lifecycle

Proposition 2: *Across the project lifecycle, the culture of the TMO itself can only work throughout several different cyclical stages depending on the types of interplay at that given situation*. *In other words, the culture of the TMO undergoes several lifecycles during one lifespan of the project*. This is illustrated in the **HR diagram concept**.

Proposition 3: *Culture is brought upon to the firm level through this dynamic evolutionary process of change that is rationalized and routinized; becoming the next taken for granted reality of the construction firm level organisational conduct*.

Postulate: *The evolutionary process and features of culture can be mapped systematically through a 4-class combination of features: form, congruence, function and development. This gives 16 possible trajectories and categories of potential cultural evolution paths to increase an organisation's functional transferability. This combination constituting the 4 classes encompasses the aforementioned interplay between the three levels of cultural hierarchy, thereby, facilitating the aforementioned conceptual Organisational Culture synthesis among ecology, development and evolution within the construction TMO.*

The research discussion proceeds by taking each element in turn.

Proposition 1

Proposition 1 was derived as a gateway to lay the foundation to underpin the mechanisms of a TMO's cultural evolution. As such, the nature of this proposition is to simply capture the big picture of whether or not a TMO culture is usually formed as theoretically predicted on the ground in practice. In the extreme, this is to say that,

Proposition 1 plays a large part as to whether the rest of the propositions and postulate can be established.

According to the case study summaries, the TMOs' cultures did evolve through a set of recursive stages throughout its journey along the project lifecycle. This materialized in the form of changes in structures, project management philosophies and altercation of previously established espoused values and beliefs. For example, the shifts from the traditional contracting behaviour and blame culture to the more collaborative-minded Alliancing schemes. Another example is the fact that corporate HQs are more open-minded and supportive to accommodate such changes at the project level as opposed to being rigid. Thus, facilitating some feed-forward and feedback learning process, in which lessons learned can be formalized and standardized as new norms, that is integrated with current external institutional requirements.

So in short, the answer to Proposition 1 is "Yes" this is true on the ground in practice between the three case studies. To recall, interviewees across the three case studies corroborated each other that after the decision to shift towards an alliancing scheme the TMOs then started to challenge the conventional norms and routines in search for a new working project culture that fits with the new collaborative-based climate. From this, we can move on to the 2nd proposition.

Proposition 2

Proposition 2 digs deeper into the concept of cultural evolution that was put forward. This proposition recognizes that every evolution has a *starting* and *dying* point. Thus, this proposition unpacks the details in identifying what mechanisms and events influence the cultural evolution cycle(s) in one TMO's lifecycle.

Firstly, it was stated in Chapter 3 that Casey's (1996) model of culture are the starting points from which the theorisation emerges that a TMO's culture evolves and needs constant maintenance during the different stages of the lifecycle. Further it was stated in Chapter 4 that organisational perspectives and heuristics are the two forms of trigger for culture evolution in a construction TMO. Hence, as stated in Chapters 1 and 2, with the emphasis on the how and evolutionary aspects of culture, discourses focus on issues surrounding:

1. The Culture-Climate interplay,
2. Corporate-project ecology dimensions,
3. Project lifecycle, and,

4. Structuration in the organisational processes after the decision-making event.

These four issues were then integrated into the theorization of the HR Diagram (Figure 12) as presented in and built up over Chapters 2, 3 and 4[31] with the aim to capture and illustrate the whole ecology-evolution and development (eco-evo-devo) process.

To recall, the HR Diagram depicts the external cultural forces that may affect how a TMO's culture will evolve. Coupled with the literatures reviewed in Chapter 2, these forces form the TMO's ecosystem (Figure 5), and are summarised as coming from the parent organisations forming the TMO and/or the institutional level (e.g. external stakeholders, regulations, etc). With this, each of the case study's cultural evolutionary mechanisms and paths are presented with narrative explanations as below.

LA Case

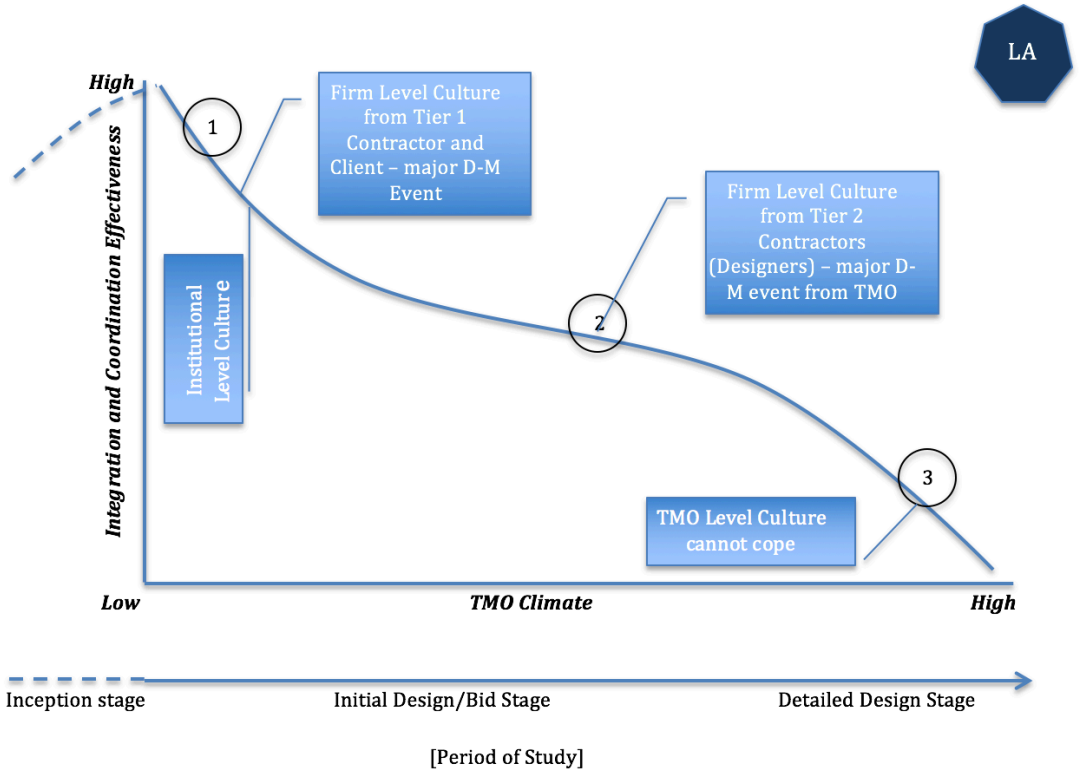


Figure 24: LA Culture Evolution Path

Explanation:

Point 1: The LA TMO was initiated early on at the project's inception stage. There was no formal Alliance Protocol (AP) or anything other supporting documents that were formally issued at the corporate HQ level – Client Organisation and Tier 1 Main

[31] See Chapter 3 last section for recollection and full description of the HR diagram.

Contractor. Support for Cultural shift from the traditional transactional atmosphere to that of Alliancing comes from the motivation of both companies to be the leader for change and innovation. Drive also comes from the need to particularly focus on the current needs of the customers (end-users) and hence to embrace this external institutional level culture. Also of note is the willingness of both companies to learn and develop together as a team at the TMO level.

The willingness of each of the contracting companies to adapt to the newly introduced environmental ecology – that is, the collaborative relationships in the form of ICE and Alliancing – created and paved ways for a 'smooth' acceptance of a new combine and consolidated new values at the TMO level. This was quickly formalized into a new cultural values and guidance for codes of conduct and behaviours through the materialization of an innovative procurement scheme (the ICE).

At this stage, things seemed to be working effectively with only 2 Corporate level influences driving the cultural change, that were, the Client and the Tier 1 Main Contractor.

Point 2: At the initial stages on the detailed design, a new Tier 2 company, that is, the Principal Designer, with major responsibility came into the equation. These designers now have more influence into what should be done with the project.

This new variable disturbed the TMO's previous Culture equilibrium. Firstly, due to increased responsibility of the designer's in the decision-making process, and secondly, due to the project members (from both the Client and Tier 1 main contractor) clinging to the "effectiveness" of the established norms and values. This is in line with what Schoenberger (1997) stated about reaching a state of Cultural Efficacy. That is, as mentioned in the case study narrative section above, there are two groups of people in LA's current cultural standings at the time of the study. The first are the In-Group, those who cling on the belief that the established cultural values during the ICE process is still effective; and the second, the Out-Group, those who does not understand and cannot buy into the old cultural values and stated that since the TMO has moved on from the ICE, an adapted version of the TMO's culture should also follow to accommodate collaborative behaviours from newly joined members.

Thus, the above caused frictions within the TMO's behaviour, with different groups of people claiming differences in the Organisational Climate being felt, that is experienced

and perceived. In the extreme case, one or two of the project members interviewed begin to retract to the old authoritarian culture, stating that new members should just and will eventually follow what's been established. However, this is in contrast to what is going to happen on the ground. Newly joined project members did not agree and could not grasp the meaning of the Alliancing scheme, rendering the supposedly established collaborative culture largely useless. This finding, is also contrary to some previous literature that claimed establishing rigid governance structure automatically ensure the moulding and maintaining a desired Organisational Culture for the whole duration of the project lifecycle, as has recently been argued elsewhere (cf Smyth, 2015).

Point 3: The TMO Culture eventually could not cope with the new environment – the relational project ecology being shifted from having 2 major players (Client and Tier 1) to 3 major players (Client, Tier 1 and Designer). Project members start to experience difficulties in reaching consensus and understanding, especially surrounding decision-making processes involving the designers. Phrases such as "engineers are square people" and "designers are circle people" started to arise. Some blame this on the lack of an AP as an overlay to the stated Alliancing Cultural values and others on that established norms were said to be captured in the vision and mission of the project. Thus, in this sense, co-location is also becoming a redundant factor in the effort to maintain an integrated TMO culture that is detached to the corporate HQs. As such, although previous studies (e.g. Scarbrough et al, 2004; Briscoe et al, 2004) stated or recommended that co-location could help increase Organisational Culture understanding and acceptance, this does not necessarily guarantee that it will happen as other forces are a bigger influence.[32] In this sense, it can be said that co-location indirectly helps people to share norms and evolve common processes, but it is not managed nor does it happen automatically.

[32] As stated previously, after the period of the research, the researcher found that LA has begun to change some of its previous day-to-day routines and organisational structure, e.g. financial representative is now a part of the senior Alliance leadership team within LA. This is due to the fact that cost was one of the main problems causing the disruption with the designers.

NA1 Case

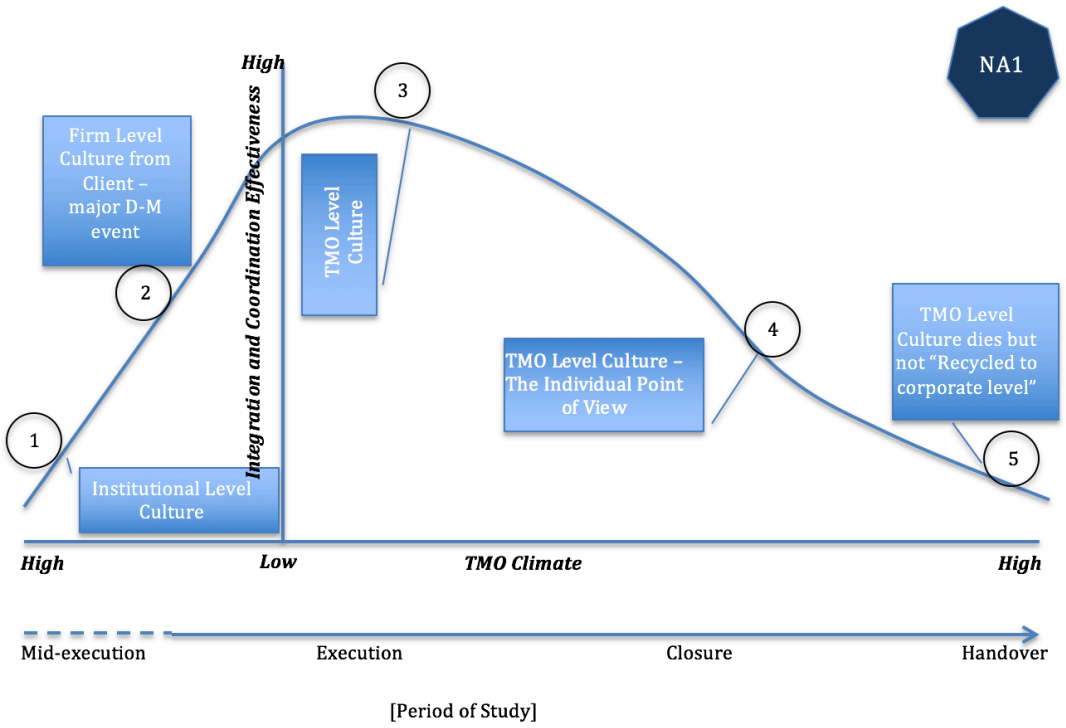


Figure 25: NA1 Cultural Evolution Path

Explanation:

Point 1: Initially, NA1 is not started or geared to be run as an Alliancing collaboration-based culture for the TMO; It started-off as a traditional lump-sum work contract. Hence, it bore the traditional 'blame culture', common in the construction industry. However, during the mid-execution-stage, the traditional contracting practice yielded much adversarial behaviour. This adversarial behaviour was also due to external pressures from the local community to finish the job on time. Thus, the Client decided to initiate a collaborative working strategy (CWS) to help reduce cost and increase profit margin factors that were the primary driving force of the TMO's norms and values.

Point 2: The CWS introduced by the Client shifted behavioural norms within the TMO. Although only superficially assimilated this (only the senior project members seem to have bought and rigorously adopt to the new values in the end), the move proved to be a positively crucial decision in influencing a cultural shift within the TMO. The new collaborative and Alliancing values are codified to help cool-down the organisational climate. The willingness of both the Client and the Main Contractor to commit to the changes played a crucial role. Thus, this emphasized the importance of an optimized

relational ecology between the corporate-project relationship in order to mold and maintain a TMO level culture. That is to say, culture should not be imposed top-down, but should be nurtured from the bottom-up to control the evolutionary trajectory.

Point 3: During this stage, the TMO level culture has stabilized at a superficial level. Mainly, this is due to the fact that the major players (Client and Main Contractor) involved in the cultural shift process are set and clear. Thus, unlike the case with LA, there is little disruption that come from other contracting organisations in the TMO boundaries that could 'challenge' the newly established Culture. However, there was little top-down efforts given beyond this point to maintain the newly established culture beyond the project closure. This leads to the next point.

Point 4: Nearing the project closure and handover period, forces that disrupt the equilibrium of the members' understanding and perception of the Alliance Culture come from the individuals' assumptions within the project itself (whether from the Client or Main Contractors' sides). Some project members stated that there are new projects waiting and would just need to divest attentions. Co-location, again, are just a symbol at this stage. Whatever glue was holding the collaborative cultural values together had thinned, reduced into a form of respect "to see things through" to the end to secure reputation, for example, for repeat business.

Thus, Organisational Climate produced is not as conducive, rendering motivation to finish the project one of the most important drivers for successful cultural reforms. Another factor that affected the decline of NA1's TMO Culture is also the fact that there are separation and dysfunction with Operations and Management side, thus, reducing the sense of ownership and identity towards the project. However, to investigate this further would be beyond the scope of this study.

Point 5: The final point of NA1 is self-explanatory. It was found that incorporating such Alliancing mental revolution at the individual level is hard, especially when the pilot project was initiated halfway into the lifecycle. Thus, re-assimilation to the corporate level (from the Client side, as they were the ones composing the CWS in the first place) was treated as generic lessons learned and done in an overarching way. Any routines, formalization, standardization or rule setting processes done in NA1 was not recorded in detail to be improved for application in next projects. This is illustrated in the NA2 case.

NA2 Case

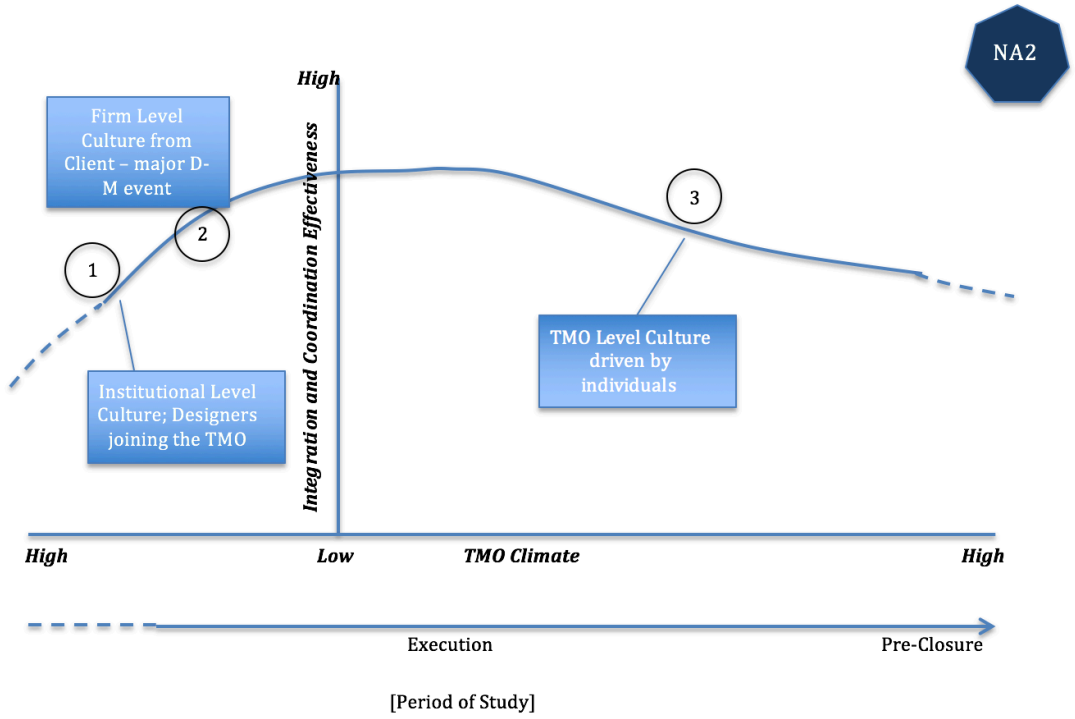


Figure 26: NA2 Cultural Evolution Path

Explanation:

Point 1: The NA2 Alliance was initiated in a similar manner to NA1. Lump sum traditional contracting failed to cope with changing project ecology. This, added with design requirements and a number of additional social and economics targets to be met, rendered the traditional adversarial culture redundant. Thus, the Client decided to introduce the PAS with the aim to overcome the differences in perceptions around the project goals within the TMO.

Point 2: At the time, the Client organisation, having pocketed the experience gained from the NA1 Alliancing pilot, introduced a more elaborated Project Alliancing Scheme (PAS). Some culture shocks were reportedly present due to the fact that the scheme was introduced midway through the project lifecycle; and also the fact that the Tier 1 Main Contractor is well-known in the industry to be very rigid and not open-minded to adapt to such contemporary changes in managing TMO cultures.

However, the incongruence between the corporate-project ecology was tackled by rigorously promoting the new Alliance collaborative Culture through the production of cultural artifacts and internal marketing of value artifacts and formal codes of conduct. Thus, the Organisational Climate was cooled down effectively, and decision-making

process as well as integration and coordination effectiveness rocketed through this exercise.

Point 3: Being the TMO that has the most elaborated AP amongst the three case studies researched, it was found that the day-to-day management succeeded in getting the project members to buy into the Alliance Culture mindset quickly. This has two implications in evolutionary context. Firstly, the "ease" was due to the fact that some (if not most) of the senior project members are freelancers. So, they have less resistance to the Cultural shift and little difficulty to adapt and evolve to the current ecology. Secondly, due to the rigidity of the Tier 1 corporate level Culture, the change have caused some of the project members to have gone 'native'. This is very apparent during the research period that will affect the development trajectory of the next projects in the programme pipeline should the Client organisation wish to replicate the Cultural evolution process of NA2.

From the above illustrations, the HR Diagrams show the evolutionary paths of each project's TMO Culture; Highlighting key forces/factors (both internal and external) that helped shape the Cultures. Hence, the diagrams serve as the first step toward mapping how cultural development evolves during the design, commissioning, execution and closure of a project lifecycle.

In proving and elaborating the 2nd proposition further, it is now essential to tabulate and describe in more detail categorization to shed some light into what factors affect which part of cultural construction, maintenance and change during the project lifecycle of a TMO, that is to say, to "operationalize" the proposition.

In Chapter 4, the theoretical synthesis stated that a cultural evolutionary path is conditioned by the three different categories. These are:

1. The structure of population,
2. Adaptive and developmental constraints, and,
3. Intensity of variability at different ecosystems.

According to this, we can therefore categorise which evolutionary mechanism falls into which category to help ease identification of institutional constraints at play, as per Scott's (2008a; 2008b) institutional theory.

Factors Affecting the Structure of Population

a. Structure of Procurement

This pertains to the planning and coordination structure during the initial inception / bid stage. Early contractor engagement changes the relational dynamics and hence the project ecology from that of a traditional contracting behaviour to a more collaborative approach (cf. Baum and Singh, 1994; Weeks and Galunic, 2003; Grabher and Ibert, 2011; Morris, 2011; Merrow, 2011).

b. Shift in Project Management Philosophy
   The iron triangle was changed to emphasize a bumper bubble focusing on governance, assurance and resources. Hence, facilitating less power play (cf. Winch, 2014; Bergrenn et al, 2002).
c. Systems design
   This pertains to the shift from a lump sum work into explicit specification of a series of targets and principles around base case scenarios. Thus, a collaborative mindset is "planted" early on to prompt transition towards an effective Alliancing Culture. This also affects the clarification of organisational interdependencies, and hence shape relational space (cf. Grabher and Ibert, 2011; Clegg et al, 2002).
d. Structure of business and/or customer interest
   This pertains to the magnitude or balance between the purpose of the project to fulfill market demand (e.g. congestion relief), for which external institutional culture (regulations) will need to be taken into account more or vice versa (cf. Lundin and Söderholm, 1995; Winch et al, 1997; Clegg et al, 2002).
e. Current industry trends and resources partitioning
   The division and role appointment between the Alliance Manager and Commercial Manager is found to be the crucial factor in building a conducive organisational structure, influencing the positive interpretation of collaborative Culture, norms and values (cf. Briscoe, 2004).

Now that we have dealt with this category, we will move on to the second selection category.

Factors Affecting Adaptive and Developmental Constraints

a. Project purpose and end-user needs balance
   This is similar to 1D, but pertains more to changes in project documentations and routines midway, as project practices are always embedded in history, organisational scope and long-term institutional contexts (cf. Engwall, 2003; Cicmil et al, 2006).
b. Interface management and character displacement

This pertains to support from corporate level management, particularly from the Client and Tier 1 Main Contractor; the willingness of each contracting organisation to be flexible and open to new forms of work routines and to adapt to current demands in the relational ecology – reducing cultural distance.

c. Rigidity/flexibility of established TMO management and leadership
   This is crucial especially during transition stages (e.g. from procurement, bid-stage, detailed design, execution), since a normative approach cannot handle the complexity of the TMO's ecosystem well (cf. Miller and Lessard, 2000; Jaafari, 2003; Milosevic and Patanakul, 2005).
d. Strategic decision-making coming from corporate levels
   For example, the decision of NA1 and NA2's Client Organisation to introduce PAS as part of its new corporate and project working policy; as well as LA's G4 development to G5. This affects the structuration of the organisational process at the TMO level in that it moulds the desired cultural schema (cf. Giddens, 2001; Sewell, 1992)
e. Co-location
   Co-location has been found to have both positive and negative implications. It posed as a constraint as shown in the LA and NA2 cases due to members going "native" at the end of the evolution cycle (Lampel et al, 2009; van Marrewijk, 2010).

Now that we have dealt with this category, we will move on to the third and final selection category.

Factors Affecting Changes in Intensity and Variability at Different Ecosystems

a. Transition between project stages
   This pertains to the coming and going of other major parent organisation(s) – apart from the Client and Tier 1 Contractor – that significantly influences and tests the ability of an established TMO culture to survive.
b. Intensifying requirements
   As found, the recent trends of an intensifying focus on Health and Safety and Sustainability issues affect the routines of the TMO functions. Hence, the knowledge of technical and regulations development is critical in influencing the cultural trajectory of the TMO (cf. Briscoe, 2004).
c. Geographical project placements

This pertains to site-remoteness and the fact that “being away from home” significantly influence individual commitment levels and adaptability to cultural shifts and its incremental development.

d. Permanent or non-permanent project members
   The number of freelance personnel in the TMO structure influences the degree of flexibility in interpreting and exercising the established cultural-cognitive elements and steering into what it needs or supposed to be perceived.

The three-way categorization above, covering structure, constraints and change, of the cultural selection mechanisms is tabulated in Table 12 below.

Table 12: Mechanisms and Outcomes of The TMO's Cultural Process of Selection

Selection Category	Selection Mechanism/Factors	Type of Relationship Dynamics in TMO's Cultural Ecosystem	Potential Implication(s) for Practice
1. The Structure of Population	a. Structure of Procurement b. Shift in project management philosophy c. Systems design d. Structure of business/end-user interest e. Current industry trends & resources partitioning	1. Corporate-Project Level → *History and Routines* 2. National/Institutional-Project Level → *Institutional requirements and norms*	How the TMO is structured from the very beginning greatly influences the Culture evolution path across th project lifecycle. Other than technical procedures, it is therefore not recommended to standardise organisational processes, e.g. coordination of information and interfaces.
2. Adaptive and Developmental Constraints	a. Project purpose and end-user needs balance b. Interface Management and Character Displacement c. Rigidity/flexibility of TMO management and leadership d. Strategic decision-making coming from corporate levels e. Co-location	1. Corporate-Project Level → *Formalisation and Standardisation* 2. Corporate-Project Level → *Contractual relationship established between parent organisations (adjustments)* 3. Institutional-Individual Level →*Shared common reality* 4. Institutional-TMO-Individual Level → *polyphyletic society*	Clarifying dependencies between the corporate-proje interfaces (in this case between the Client, Tier 1 and TMO) will make it easier for the TMO to understand it ecosystem, i.e. the elements of institutional constraint it will be facing, how they can materialise and affect it culture development. This will allow departments with the TMO to organise their processes to suit each othe
3. Changes in Intensity and Variability at Different Ecosystems	a. Transition between project stages b. Intensifying requirements (e.g. Health and Safety and Sustainability) c. Geographical project placements d. Permanent/non-permanent project members	1. Institutional-TMO-Individual Level → *Polyphyletic society* 2. Corporate-Project Level → *Contractual relationship established between parent organisations (feedbacks)* 3. Corporate-TMO-Individual Level → *Shared common reality (identity and ownership towards the project)*	Formal project documentations do not automatically guarantee acceptance of the established TMO culture from new members. As such, contractual arrangements such as the NEC3 or the target-cost contracts (which are intended to encourage collaborative behaviour at the TMO level) do not always automatically mould perspectives into established culture. A soft overlay emphasizing on norms is needed.

Putting it in a more holistic perspective, in a lifecycle of a TMO, these mechanisms of constraints towards the evolutionary path of the TMO's culture is tabulated as (See Table 13):

Table 13: The TMO's Cultural Selection Mechanism as per Lifecycle Stages

Lifecycle Stages	**Selection Mechanism/Factors**	**Selection Category**	**Influential Cultural Strata in relation to the 3rd wave of MoP and Institutional Theory**
Inception/Design/Bid	1A, 1B, 1C, 1D	1	a. Regulative Elements – **Rule settings, arenas of control, compliance and systems regulations** (i.e. setting the basic cultural artifacts in place)
Commissioning/Pre-execution	1E 2A, 2B, 2C, 2D, 2E 3A, 3C, 3D	1,2,3	a. Regulative Elements – **Establishing arenas of control** b. Normative Elements – **Establishing prescriptive, evaluative and situational obligations between the parent organisations within the TMO** c. Cognitive Elements – **Establishing the project boundaries of acceptable and not acceptable** (i.e. setting the values and shifting individuals' basic assumptions)
Execution	1D, 1E 2C, 2E 3A, 3B, 3D	1,2,3	a. Regulative Elements – **Compliance and systems regulations** b. Normative Elements – **Degree of evaluative and situational obligations that predominate the Corporate-Project relationship**

			c. Cognitive Elements – **Established symbolic aspects that form what is right or wrong** (i.e. re-affirming established values)
Closure/Handover	2E 3D	2,3	a. Normative Elements – **Situational obligations** b. Cognitive Elements – **Individuals' basic assumptions**

As an effort to sum up Proposition 2, it can be recalled that this Proposition deals with the mechanisms of cultural evolution – illustrating the relationship between ecology, evolution and development (eco-evo-devo) as to how the selection mechanism materialize and how TMOs as social structures defines itself as an outcome of evolution. That is to say, this Proposition unpacks the way in which cultures evolve in a TMO on the ground, what factors supports them, as well as what factors constraint them, be they internal or external.

As stated in Chapter 4, to achieve effectiveness in the effort to integrate different corporate and institutional level cultures into a TMO level culture, a balance between the organisation's internal and external elements is needed. This balance is achieved here as part of evolution, in which evolution addresses the processes by which "social structures are established, become stable, and undergo changes over time" (Scott, 2012; p. 29). Thus, relating it back to the context of the Third Wave of MoP (Morris et al, 2011; Morris and Geraldi, 2011) and Scott's (2008b) Institutional-based approach, the three selection categories identify the magnitude of effects that the outcomes (as presented in Table 12) can have toward the underlying ingredients in institutional systems, as introduced by Scott (2008b; 2012)[33]. Thus, the empirical version of Figure 14 is depicted in Figure 26 below, and is further a foundation in which the Postulate is based on later on this research.

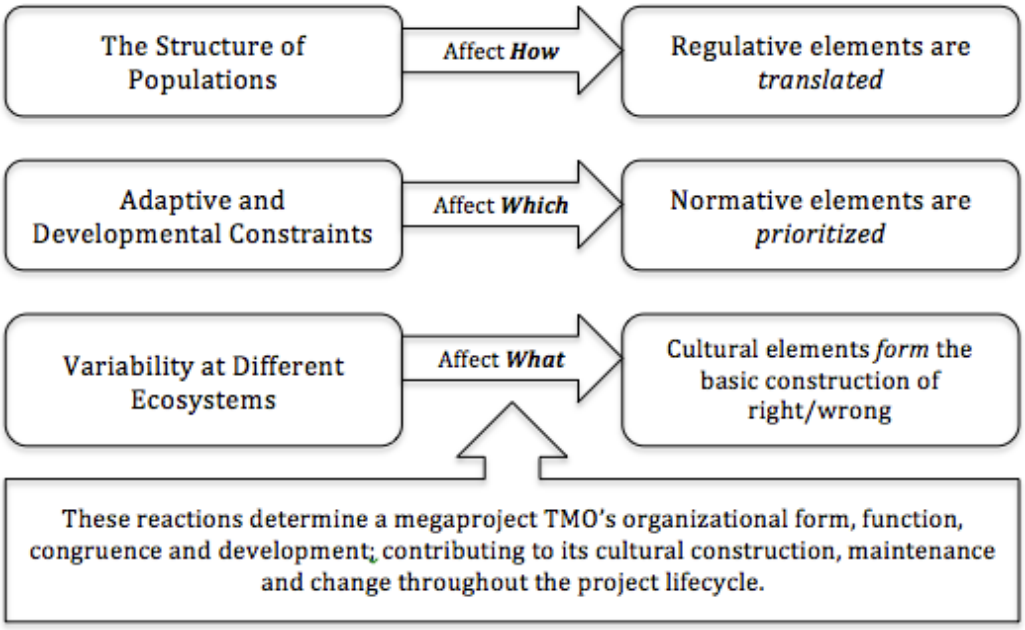


Figure 27: Elements of Institutional Constraints and How They Materialise and Affect Cultural Evolution in Construction TMOs (See also, Kusuma, 2014)

[33] This argument is depicted in Figure 14 previously in Chapter 4.

Before going on to discuss this research's postulate, let us briefly visit the 3rd Proposition.

Proposition 3

Proposition 3 was intended to investigate the extent of cultural evolution; whether or not cultural evolution can transcend the boundaries and hierarchies of polyphyletic levels as depicted in the Cultural Ecosystem (see Figure 5, Chapter 2). For example, whether or not evolution at a micro level can trigger an evolution at a macro level in the ecosystem. However, findings for this proposition are tentative at the moment in the sense there is insufficient to report at a detailed level from this study. In general and implicitly towards the more detailed level, this research has found that incremental developments are happening at the corporate level due to lessons learned at the TMO level. For example, the Client Organisation of NA1 and NA2 are changing and updating their CWS and APs to improve them for their next projects in the programme pipeline. Further, individuals at LA stated that they wish to create a legacy within their corporate HQ in the form of making "an Idiot's Guide to Project Alliancing" at the end of the project, also as part of the Client organisation's lesson learned.

However, such changes are, again, incremental and will take more effort and time to be able to yield visible results at industry level. Some interviewees stated, "We need events, something really big, like Crossrail, to be able to trigger any significant changes in corporate culture in the construction industry as a whole". Even then, as stated in Chapter 5, even Crossrail is still struggling to integrate the ecological differences between their senior management and TMO perception of the importance of Organisational Culture as a whole.

Developing the discussion further, this research will consider the 4-Class System, a postulate that aims to cogently map the trajectory of cultural evolution given certain mechanisms that are in place in a construction project TMO.

The 4-Class system – A Postulate

The 4-Class system of form, congruence, function and development, is a theory in development and is a major part of the theoretical contribution of this research. It is introduced in the attempt to increase the ability to gauge Cultural dynamics in a complex project TMO, mapping[34]:

[34] To recall, this is the main aim of the research and is the answer of the 3rd research question.

1. How Cultural development itself evolves, and,
2. How the control of developmental processes is mutually effected by the culture surrounding the internal and external institutional systems embedded within the ecosystem of contracting organisations imposed to and inherited within the TMO.

From the previous sections, the HR diagrams and the two tables (Tables 12 and 13) have answered the 2nd research question. Thus, we now come to the point where we try to justify and illustrate our postulate. As per the RRREIC analysis framework, the postulate is the "I" (identification) part of the analysis. We will begin by first re-summarizing and linking our discussion in the 4-Class system context.

Feature Form

As stated in Chapter 4, feature Form argues that the structure of an organisation is a representation of its cultural schema. We have seen from the case studies that at the beginning every TMO's structure inherited – or is a representation of the histories (Engwall, 2003) and routines of their corporate HQs. Dissimilarities of structure from the corporate HQs occurred when resources (project members) partitioning started to happen during the start of co-location, where the TMO's own culture start to materialize, influenced by the corporate centres of each firm represented in the TMO. In this sense, we can tabulate the trajectory trigger of the TMO's cultural evolution. It can be first gauged when:

a. Form is similar [to Corporate HQ] as in the NA1 and NA2 case studies – congruence. As stated in the case studies section above, at the beginning of the project (before the period of study), the organizational structure of both NA1 and NA2 are of the traditional project management in nature where management in the TMO is treated as the same with management in the Corporate HQs. In other words, the TMOs were not recognized and distinguished as autonomous from the Corporate HQs. As found, this caused adversarial behaviours to be present.
b. Form is dissimilar [to Corporate HQ] as in the LA case study – divergence. On the contrary, the LA TMO is recognized and distinguished as autonomous from the Corporate HQs, having their own organizational structure that is built upon the context of the TMO's ecosystem.

Congruence

Feature Congruence deals with the ecological intensity of the corporate-project relationships during the lifecycle of the project, that is character displacement and evolutionary history – whether or not the TMOs shared a common cultural trait with

their Corporate HQs or being considered and "out-group". It concerns the changes in the dynamics of the regulative elements coming from the corporate HQs, e.g. the decisions made to introduce an Alliancing programme (as in NA1 and NA2 case studies) as part of their procurement and project collaborative working strategy (CWS and PAS). Or the ICE procurement structure introduced that changes the structure of the project procurement method as in LA case study.

Although the period of research covers the later stages of the project in the NA1 and NA2 case studies, when the APs have been introduced, it was found from the interviewees that before the research period, the TMOs were part of the "in-group" cognitive element that is homologous (having shared cultural trait) to the Corporate HQs[35]. In the LA case, as can be seen from the HR diagram, the corporate-project interface for the TMO is homoplastic. That is, the TMO's culture is divergent from the Corporate HQs – developing its own unique cultural trait through the ICE exercise. That is to say, the Corporate HQs allowed and supported the LA TMO to develop its own cultural schema that is conforming more to the project environment and relational ecology. In this sense, we can tabulate that the congruence trigger of the TMOs cultural evolution start when:

a. Congruence is homologous before the period of research – as in the case of NA1 and NA2 case studies.
b. Congruence is homoplastic during the period of research – as in the case of NA1 and NA2 case studies.
c. Congruence is homoplastic before the period of research – as in the case of LA case study.
d. Congruence is homologous during the period of research – as in the case of LA case study.

Feature Function

Whilst feature Form represents organisational structure and feature Congruence represents character displacement and evolutionary history between the corporate-project relationship, feature Function represents the ability of a TMO to integrate with its environment's relational ecology. That is, the adaptability of the TMO to adapt to the changing project environment, whether the change comes from the different decisions made by the Corporate HQs or due to the changing magnitude of responsibility between the ecosystem of contracting organisations within the TMO boundaries. Thus, feature function is a representation of existing organisational processes and rule

[35] Corporate HQs here pertain to the Client and Tier 1 Main Contractor organisations.

settings that are embedded in the "current" behaviours, values, identities and core purpose of culture-coordination elements within the TMO.

In this sense, we can tabulate that integration function of the TMO's cultural evolution are:

a. Function is non-adaptable before the period of research – as in the case of NA1 and NA2 case studies.
b. Function is adaptable during the period of research – as in the case of NA1 and NA2 case studies.
c. Function id adaptable before the period of research – as in the case of LA case study.
d. Function is non-adaptable during the period of research – as in the case of LA case study.

In relation with feature Congruence, it is widely known in the industry sector studied and amongst the interviewees that the Client Organisations involved in the TMO Alliances usually practice traditional project management and hence, having a traditional cultural trait (e.g. blame culture, emphasis on technical expertise, contract and control, etc). Thus, if the Congruence of the TMO is homologous, it means that there is tight control coming from the Corporate HQ(s) – in this case the Client – on how the TMO should operate. In this sense, it is expected that feature Function will be non-adaptable to the current project's ecosystem – it is harder to integrate with its relational ecology that is different from the HQs[36]. That is to say, when feature Function is adaptable, then the balance between history, routines and context (as put forward by Engwall, 2003) are recognised and would materialize in a healthier TMO culture.

Feature Development

Feature Development is equivalent to the incremental changes within a given period of time with respect to the TMO's ecological environment. For example, the changes stated between the before and after the period of research observed in the case studies. This has been illustrated in the HR diagrams for each of the case study. Development here can be used to mean unconsciously constructed (conformational) cultural development path[37] and/or be used to indicate consciously constructed (comparable) control and regulations that come from the Corporate HQs[38].

[36] This pertains to the connect-the-dot analogy and the fact that TMOs' contexts are not a blank canvas analogy towards the end of Chapter 2.

[37] For example, the way project members have gone "native" in the end (as in NA1 and NA2 cases), or treating new comers as an out-group (as in the LA case), which is expected due to their tight-knit

In relation to feature Congruence, it can be expected (and as was evidenced in the case studies narratives section) that if the TMO's Congruence is homologous, then its cultural development path will not be conformational to its ecosystem and ecological environment with a degree of constraints coming from the Corporate HQs and other parent organisations and vice versa.[39]

In this sense, we can tabulate that incremental changes of the TMO's cultural evolution trajectory are:

a. Non-conformational with comparable constraints before the period of research – as in the case of NA1 and NA2 case studies.
b. Conformational with non-comparable supports after the period of research – as in the case of NA1 and NA2 case studies.
c. Conformational with non-comparable supports before the period of research – as in the case of LA case study.
d. Non-conformational with comparable constraints after the period of research – as in the case of LA case study.

Given the above, the tabulated version of the 4-Class system and the 4 possible trajectories and categories of potential Cultural Evolution paths are as below (see Table 13).

Alliancing structure. Conformational also means whether or not the development of the TMO's culture is as desired by the Corporate HQs given the initial support/constraints established.

[38] Forms of support or constraints coming from decisions made from top management in Corporate HQs. This also pertains to whether or not such supports or constraints are tangible enough to be replicated by other organisations in other situations.

[39] In this research in particular, most constraints primarily come from the Client Organisations as the driver to shift to an Alliancing – and hence cultural evolution. The degree of constraints and supports also varies between TMOs. For example, in the NA2 case, the constraint come from the Tier 1 Main Contractor's highly adversarial nature and the support come from the Client and enhanced by TMO level individuals to make it a success.

Table 14: The TMO's Cultural Trajectory According to the 4 Class System

Case No. & Period of Study	Form	Congruence	Function	Development
Case 1 Before	Dissimilar	Homoplastic (Unique)	Adaptable	Conformational with non-comparable constraints
Case 1 During	Dissimilar	Homologous (Shared)	Non-adaptable	Non-conformational with comparable constraints
Cases 2&3 Before	Similar	Homologous (Shared)	Non-adaptable	Non-conformational with comparable constraints
Cases 2&3 During	Similar	Homoplastic (Unique)	Adaptable	Conformational with non-comparable constraints
…	…	…	…	…

Recalling the notions of Critical Realism, it is said that, "Social structures conditions our actions, yet through our actions we (re)-produce these very social conditions" (Welch et al, 2010; p. 748). Thus, it re-affirms the possibility to predict the trajectory of cultural evolution paths through Table 14. In interpreting Table 14, it is like saying for example, if an Alliancing TMO started with similar Form, shared Cultural trait – homologous congruence and having non-adaptable Function, then its Cultural development and evolutionary trajectory will/should be non-conformational with respect to the TMO level institutional context(s), given comparable regulative and normative constraints coming from the Corporate HQs. This is particularly true during the transitional stages in a project lifecycle.

Now, it was stated in previous chapter (Chapter 4) and sections (e.g. Figure 5), that this postulate – the combination constituting the 4 classes encompasses the aforementioned interplay between the three levels of cultural hierarchy, thereby, facilitating the aforementioned conceptual Organisational Culture synthesis among ecology, development and evolution within a construction TMO. As such, it is intended as a future reference to increase organisational functional transferability between TMOs in the same programme/project pipeline. In other words, the 4-Class system postulate is a cogent referential instrument, providing guidance to enable Corporate HQs to implement pre-emptive measures to help ensure and increase the effectiveness and transferability of the desired culture, for better and sustainable collaborative success.

In practical terms, it can be said that if the Tables 12 and 13 mentioned previously are recommendations concerning the day-to-day processes and recommendations for the TMO level, this table is concerned more with how the findings can be operationalised by corporate-level management. For example, it gives the corporate-level management an overall view and/or guidance on how they want or should design their TMOs and what could happen if they design them in particular ways. Thus, giving hints on what could happen and how to plan for preemptive strategies.

Having 4 different Features, it is only logical that mathematically, the 4-Class system can be expanded to having 16 different evolution trajectories. However, the current completed research yielded an initial 4 different trajectories from 3 different case studies. Thus, it must be noted that there were some other variables that had not been taken into account. Such limitations cover:

1. The geography and geographical locations of the projects chosen as case studies.
2. The time span of research – a PhD programme could not possibly cover a whole lifecycle of a major infrastructure project, let alone 3 different projects.
3. The scale of the projects chosen. Typically, a small, medium or larger scale projects will yield different evolution trajectories due to the different Forms of organisations involved. Hence, producing a different dynamics to feature Congruence, feature Function and therefore, its development.

However, this research hopes that it has opened and encouraged a new way of thinking and measuring Culture and Cultural Developments in a complex TMO environment. This brings Chapter 6 to a close and provides a starting point for the conclusion chapter next.

Part IV

Chapter 7

Conclusion and Recommendations

This concluding chapter will serve as an overview of the background objectives and aims of this thesis. The chapter will start with a summary of the key findings. A theoretical contribution will be drawn out and a discussion on managerial implications will follow. Limitations of the thesis and suggestions on direction for future research related to this study will also be outlined.

Key findings – Answering the "So What" Question

The main objective of this study as stated in the introduction chapter is to underpin a way forward in understanding Organisational Culture in the dynamic ecosystem of major construction projects. The objective is to go beyond the static perceptions of culture that dominate theories and practices to date – focusing on the *how* questions rather than the *what* questions. That is to say, to understand the dynamics and mechanisms surrounding the eco-evo-devo in a construction TMO's culture.

To recall, the research questions guiding this thesis are:

Primary Research Question:

1. *"How does Organisational Culture (both the contracting firms' and the TMO's) form, operate and evolve?"*

In order to address this question in a project context two scales of examination are required – culture and climate – prompting the questions:

2. *"How does the Organisational Culture of the project form, operate and evolve under the management and influence of the ecosystem, the contracting firms and within the temporary multi-organisational team?"*

3. "How are both the Organisational Culture of the contracting firms and the TMO affecting and being affected by interplay of the relationships and interactions in decision-making at the project level and across the project lifecycle?"

And finally,

4. "To what extent can trajectories of evolution be predicted to increase the transferability of TMO culture and hence organisational process?"

The main fields of analysis are corporate-project relationships, cultural evolution and the process of organisational selection comprising a project TMO. Due to the complex nature of the theories on culture, the emphasis in conducting the case studies focused on the issues surrounding:

- Culture-climate interplay,
- Corporate-project dimension within one TMO,
- Points of events where different organisations in TMOs coalesce,
- Structuration within organizational processes as an evolving outcome stemming from key decision and major decision-making events that feed back into cultural evolution.

To answer the research questions, the theoretical perspectives and empirical data have been analysed. Theoretically, the thesis offered an evolutionary perspective in viewing the management of major projects as a kaleidoscope of temporary structures in the form of TMOs. Thus, the theoretical standpoints of the research are:

- An evolutionary view of culture in projects as TMOs (Hobday, 2000; Davies and Hobday, 2005; Davies and Frederiksen, 2010; Engwall, 2003; Weeks and Galunic, 2003; Baum and Singh, 1994); this incorporates Casey's Corporate Designer culture (1996),
- The process of structuration and institutional theory (Giddens, 2001; Sewell, 1992; Scott, 2012),
- Evolution and evolutionary mechanisms (Hall and Hallgrimsson, 2008).

Typically, the focus of a TMO is to deliver the project on time and budget within the scope and quality paremeters (the traditional iron triangle). The effectiveness aspects

such as the soft and behavioural aspects are often neglected. As such, the importance of acknowledging and managing the interfaces between the parent organisations in understanding culture have not been adequately given attention, especially its dynamics across the project lifecycle. As stated in the literature chapters, extant studies paid either more ethnographic attention or pouring efforts to re-validating cultural measures using static theories[40]. A mechanism to guide better TMO shaping in terms of coordinating different corporate cultures at the TMO level seem to have been missed. For this, the thesis has answered the 3 propositions and a postulate stated in Chapters 2 and 4.

To recall:

Proposition 1: *The TMO's culture evolves through a set of recursive stages.*

1. Imposed firm-level cultural values during start-ups.
2. Mixture of values from other institutional contexts poses pressure for integration of coordination.
3. Conventional norms and routines challenged – searching for a new working project culture.
4. The TMO begins to detach itself from the prevailing cultural values of its respective parent organisations, towards evolving into a new form of organisation with its own working culture fitting its current institutional context.
5. Recursive loop from 2 across the project lifecycle.

Proposition 2: *Across the project lifecycle, the culture of the TMO itself can only work throughout several different cyclical stages depending on the types of interplay at that given situation*. *In other words, the culture of the TMO undergoes several lifecycles during one lifespan of the project*. This is illustrated in the conceptual framing and trajectory provided by the **HR diagram**.

Proposition 3: *Culture is brought upon to the firm level through this dynamic evolutionary process of change that is rationalized and routinized; becoming the next taken for granted reality of the construction firm level organisational conducts*.

Postulate:
The evolutionary process of culture can be mapped systematically through:

[40] See review on Chapter 3.

1. Form → similarities or dissimilarities between structures/systems/relations;
2. Congruence → reflection of recent ancestry (history);
3. Function → adaptive or non-adaptive to ecological features;
4. Development → comparable or non-comparable between TMOs.

Giving possible trajectories and categories of potential cultural evolution paths to increase transferability and management.

Tackling the enigma of cultural studies, this research tried to integrate cultural Dynamics, Ecology and Development, termed eco-devo-evo, to underpin how culture evolves overtime within Alliance project TMOs. Linkage between cultures at the national, institutional, organisational, and project levels needs to be isolated and determined given the complex and temporary context of a project TMO coalition. Therefore, providing new theoretical development in attempting to increase the ability to notice propensities and predictions for a more transferable, optimized and effective continuity of the TMO's performance across the project lifecycle. It is concerned with the problem of coordination (Berggren et al, 2001) and the front-end planning and management, that is the shaping process of a TMO (Merrow, 2011).

The results – gathered from 3 major infrastructure projects in the UK – revealed that it is possible to capture and map culture and trajectories of cultural evolution in a project TMO. Owing to the view that every organisation is a cultural schema (Sewell, 1992; Giddens, 2001) and a changing corporate-project relationship across the project lifecycle. Articulating the cultural evolution path of a project TMO through the understanding of the project ecosystem[41], the thesis have found the links between how organisational selection affects the way institutional norms are perceived and thus, how cultures are translated (see Figures 13 and 23). Further, this led to the conclusions on the trajectory of a project TMO's cultural development, the upfront nature of the TMO and magnitude of effect coming from the dynamics of cultural diversity between the parent organisations. These have been illustrated through the findings summarized in the H-R diagrams and the process of selection tables that eventually builds up to the 4-class system mapping (see Tables 12, 13 and 14).

Firstly, the proposed Selection Mechanism (Chapter 6 Tables 12 and 13) aims to guide coordination and management for smooth cultural transition between the corporate-

[41] Ecosystem is described in Chapter 2 Figure 4.

project relationships at different stages of the TMO lifecycle. Whereas the 4-class system (Table 14) aims to guide future TMO shaping given the organisational selection present in the TMO's ecosystem, i.e. to increase organisational functional transferability for future projects. In general, the 4-Class System emphasized the utilization of knowledge and strategic decision-making on cultural dynamics from the corporate level parent organisations.

These findings point to the importance of acknowledging and managing the cultural impact that comes from the dynamics of magnitude of involvement between each parent organisation. As presented, it is seen and proven that changing institutional and organisational roles can have heavy repercussions on the established culture of the TMO. Hence, cultural efficacy is inevitable, first, at the corporate level and secondly at the TMO level. To recall, key findings presented in Chapter 6 is summarised as the following:

- Traditional project management philosophy such as the Iron Triangle can no longer suit the Cultural need for the industry to achieve better collaboration and sustainable value in projects.
- The TMO structure or how it is structured greatly influences how Organisational Culture develops. It was found that the primary barrier to a healthy maintenance of the established culture is the fair distribution of personnel between the Client and the Tier 1. For example, if the Project Director is from the Client company, then the Commercial Manager should be held by someone from outside the Client company, e.g. Tier 1.
- It was said that it is very difficult to maintain a collaborative culture at the TMO level without proper open-minded support coming from parent organisations. The case studies indicate that most TMO members experience 'going native' phenomena at the end of the project and dreaded by the fact that they now have to work on new projects.
- Well-structured project documentations do not automatically guarantee acceptance of the established TMO culture from new members. This is contrary to what is commonly believed by senior management and project directors. As such, contractual arrangements such as the NEC3 or the target-cost contracts (which are intended to encourage collaborative behaviour at the TMO level), comprehensive CWS and PAS do not always automatically mould square perspectives into circle perspectives. A soft overlay, in this case, an Alliance Protocol emphasizing on norms is needed.

- Each major decision made by either the parent firms in the ecosystem or at the TMO level greatly influence the stability of established cultural values, as is apparent in all of the case studies. Not incremental ones made from day-to-day activities at TMO level, but the major ones. That said, any incremental change and flexibility must be nurtured rather than imposed top-down to allow room for new principal project members that have just joined to understand and keep-up with what is already established.

From the above, it has been highlighted that a TMO's culture needs constant maintenance due to (i) its dynamic ecosystem and (ii) the mechanisms surrounding its eco-evo-devo. The bullet points represent the key institutional factors that affect the evolution path and trajectory of the culture. Thus, stressing the key areas to be paid attention to at the (i) corporate level, (ii) TMO level and (iii) the corporate project relationships. Having described the "so what" answer, the next sections sum up these key findings in relation to the theories developed in Chapters 2-4, in relation to the chosen theoretical backgrounds and contributions.

Theoretical Contributions

This research contributes mainly to the project business management research field, particularly concerning the third wave of the management of projects (Morris et al, 2011). At an alternate level, it provides a theoretical contribution to the main management research stream on Culture. The contributions made primarily to project management research are:

- Addressing the call for a shift in Cultural studies in the construction industry beyond the static and normative extant research in using a different theoretical lens entirely (Auch and Smyth, 2010; Tijhuis and Fellows, 2011; Fellows and Liu, 2013; ESRC, 2012; Cicmil and Gaggiotti, 2014). In this sense, this thesis brings new insights into culture through its evolution, evolutionary paths and the mechanisms of the process of organisational selection during the lifecycle of a major infrastructure project.
- Expanding the research findings of ethnographic-based cultural studies on different geographical construction projects done by van Marrewijk and his colleagues (van Marrewijk, 2005, 2007, 2010; van Marrewijk and Veenswijk, 2006; van Marrewijk et al, 2008). Taking the authors' research a step further to initiating the development of a new theoretical stance to culture. Though the research approach is different, this thesis brings a robust new insight into addressing the barriers and assumptions of cultural non-transferability through

mapping the dynamics of cultural evolution in the HR Diagram and the 4-class system.

The following sections will further describe and unpack each contribution with relation to the key literatures from which the research gaps were adopted.

Contribution to research into culture as evolutionary

The first contribution of this thesis is that it integrated the different yet critical elements in organisational cultural studies – especially in construction project management. This initially manifested in the form of the articulation of a project as a TMO and that it has a cultural ecosystem. This traces the traditional cultural theories, anthropologically, sociologically and from a more modern management perspective (e.g. Giddens, Hofstede). From these, it is established that the enigma of culture is the problem of (i) coordination between corporate-project relationships, (ii) collaboration at the TMO level and (iii) transferability of learned cultures to different TMO contexts.

As such, more precisely, the contribution of this research is surrounding its perspective of treating the evaluation of Organisational Culture from its evolutionary path and the fact that every evolution happens due to a process of selection. In this case, a process of organisational selection that is divided into three different categories (Figure 14 and 27).

As presented in Chapter 4 different selection categories is more dominant in determining and/or undermining the *health* of the established cultural values. For example, it can be seen that during the early stages of the project, types of selection mechanisms pertaining to the structure of the TMO is more dominant rather than the other two (adaptive and developmental constraints and variability at different ecosystems). This emphasizes the need for practitioners to acknowledge that social dimension of the TMO ecology plays an important part in affecting cultural evolution. Although researchers mentioned have advocated this, the sentiment had only been explicitly put forward during a recent ESRC (2012) seminar series on Culture. This thesis has tried to take an important step forward in addressing the current research agenda in general and for project management. By shifting thinking of Organisational Culture to the proposed ecosystemic and evolutionary theme, capabilities of parent organisations and project TMOs can be developed as to the understanding and capturing of lessons learned from one TMO to another. Also, as to the understanding of why it is very necessary to integrate the relevant contextual and institutional

parameters to managing the dynamics of inter-organisational relationships during the project lifecycle.

In sum, this first theoretical contribution answered research questions number 2 and 3.

Contribution to research into addressing cultural non-transferability

This second contribution follows from the first one. As stated, in developing a new theoretical stance on understanding culture in construction project management a new perspective of a cultural ecosystem was established. This is to explicitly illustrate the forces of culture that are influencing a project TMO during its lifecycle. From this, the next step was to try and generate a guide to map the trajectories of how culture evolves over the TMO lifecycle.

Extant studies conducted mainly by van Marrewijk and his colleagues (van Marrewijk, 2007; 2008; 2010) in the Netherlands had been trying to capture the forces and the kind of culture that had been enveloping project TMOs in the context of megaprojects. The authors had described and labelled the types of culture that occurred during the different stages of a megaproject (Project name: Environ, cf. van Marrewijk, 2007). However, the authors did not take it a step further to attempt to document and classify how it happened beyond the narrative content. This documentation and classification is thus the second contribution of this thesis.

The selection mechanism categories (Tables 12 and 13) and the 4-class system (Table 14 tabulated the factors influencing a project TMOs culture, and hence, extending the understanding of how the eco-evo-devo integration unravels. The empirical research found that whilst obviously every TMO has different cultural values, what can be or what is transferable is the managerial process in shaping the TMO's culture and to prevent it from decaying during the different stages of the project lifecycle. In the proposed 4-class system, this can be done through understanding the adaptability and congruence in the relationships between the corporate-level organisations and the TMO. As such, this contribution also expanded the works of (Clegg et al, 2002).

Aside from the theoretical contribution, the findings of this research also have a number of practical implications. This is presented in the next section.

Implications to practice and industry

In the beginning of this thesis, it is said that Organisational Culture is the barrier to managing an effective project TMO due to the number of corporate-level organisations involved, making it a complex ecosystem. In practice, this simple, yet critical point is often neglected by management. Thus, to be able to develop pre-emptive capabilities for coordinating and maintaining culture over the TMO lifecycle:

- The parent firms involved in the TMO contract should be flexible and able to distance themselves to some extent to allow for the TMO members to mould new cultural values.
- The TMO should realize that culture evolves from behavioural interactions, as well as from the technical and contractual regulations surrounding the inter-organisational interfaces. Cultural efficacy tends to come up when such organisational artifacts are the throwback to how norms are perceived i.e. used to determine culture in a mechanistic way.
- Casey's model of culture-climate interplay was used to illustrate how management can utilize and/or influence cultural development. If this practical recommendation is acknowledged, the cultural integration between eco-evo-devo will have a positive impact in how parent firms could capture the lessons learned and transfer/improve it for future projects. For example, the Olympics Delivery Authority had initiated the "Learning Legacy programme", however, managing the coordination of different cultural values in the next context-similar project has yet to be successful beyond new contractual arrangements to create a new collaborative atmosphere.

Limitations and Future Research

This research on cultural evolution and the process of organisational selection is not without limitations. Thus, limitations will be discussed here from the perspectives of the theoretical selection and research design.

Firstly, the aim of this thesis forced a notion of being something new, innovative and fresh. Thus, from the theoretical perspectives, it relied on literature that sees culture as something that is dynamic, appearing around organisational ecologies and institutions and is the result of a cycle of structuration. In addition, insights from fields on science have been referred to, in order to help with the theoretical and empirical development. Efforts have been made to review extant cultural theories and amongst all, only one cultural theory was chosen as an influence – Casey's theory on culture since it

embodies the ability to accommodate and to some extent the essence of evolution and structuration.

The mixed perspective, including that of Casey's approach to culture can be viewed as a strength of the research or could be viewed as a limitation. The strength is to use theoretical and concpetual influences in the effort to achieve new breakthroughs in organisational cultural studies in construction project management. This theoretical perpective was submitted to a peer-reviewed journal and its acceptance for publication can be taken as some evidence of its credibility and hence strength (Kusuma, 2014). More extensive support is provided to the arguments here. Concerning the limitation it could be argued that the research insufficiently builds of the range of cultural theories and models on offer. However, the shortcomings of these moels as dynamic and their limited ability to address how culture evolves in a systematic way has also been proposed as a argument to this counter the limitation.

Secondly, with reference to the research design, the research focused on 3 different major infrastructure projects from two different clients. The industry is the same, however, the numbers of functions that have been studied was limited to three. The research was time-limited for gathering the empirical data. Thus, it was impossible to do a lengthy longitudinal study on three different projects or even one that follows the whole lifecycle of a project. Also, due to different Alliancing structures adopted, there are slightly different numbers of interviewees though they represent the same levels of roles in each TMO. In essence, the chosen case studies represent the beginning, middle and closure of the project lifecycle. In this sense, these three case studies capture the critical events needed to understand the dynamics of culture and its evolution. The conclusions drawn are based on the empirical data provided through semi-structured interviews. Data was then interpreted and analyzed by the researcher and initial findings were reported back to the participants (i.e. Project Directors). The final findings are then the result of an iterative process between collected data, comments on the report, theoretical reasoning and objective validation of the result.

Third, conceptually and in the cases, the focus was confined to TMOs. The broader coaition was not considered (cf. Winch, 2002). Coalitions are broader and looser structures and could become a focus to explore the extent to ewhich the theorietical contribution set out here also applies to the coalition.

Fourth, and in relation to the above points, research variables, terminology, and theoretical understanding were developed so as to increasingly drill down as the research process unfolds. As the empirical study proceeded, the greater the cultural evolution and its selection process were revealed and the philosophy was progressively developed to be more explanatory and robust. Thus, these limitations serve also as the critical element that helped make the thesis unique and the proposed theoretical development possible.

Having citing the limitations of the thesis, it also offers some way forward that can be replicated and adapted for future research to provide more insights.

To grasp more fully the concept of cultural evolution and the process of organisational selection proposed, the selection mechanism table and the 4-class system tables need to be developed. If further research is conducted, knowledge for understanding different variations of cultural trajectories could be enhanced. To this intent, future research could take account of some of the variables that could not be included in this thesis, such as:

- The geography and geographical locations of the projects chosen as case studies. As with every cultural-based research, there will always be the geographical elements that could change the dynamics of culture trajectory and evolution paths.
- The time span and level of study spanning the whole lifecycle of a single project – to include a longitudinal study where the focus could be on ascertaining at a more micro level the different selection mechanisms at different levels of the supply-chain.
- The scale of the project – the current research was conducted using 3 different large infrastructure projects. Typically, a megaproject bounded with more institutional norms may have more factors influencing its selection mechanisms. Thus, yielding slightly different evolution trajectories – producing different dynamics in feature Form, Congruence, Function and therefore its development.
- The coalition as a broader and looser structure that also includes more permanent as well as temporary organisations and thus the influence of the dofferent context on eco-devo-evo.

Learning and knowledge creation is an ever-developing process. Therefore, through the findings of this study, it is hoped that it has opened and encouraged a new way of thinking and evaluating culture and its evolution in a TMO and for the project environment. Thus, providing initial guidance, enabling corporate-level organisations to implement preemptive measures to help ensure and increase the effectiveness and transferability of the desired culture for better, sustainable, collaborative and coordination success.

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Appendix 1
INTERVIEW QUESTIONS

INITIAL INTERVIEW QUESTIONS (Before Industry Review)
KEYWORDS: Culture-Climate Interplay, Evolution, Congruence and Development, Adaptive or Non-Adaptive Functions, Macro-Micro interactions
How would you describe the project so far? Covering:

Interdependencies, autonomy, difficulties and challenges

How were said difficulties and challenges approached?

How can you be sure that the organisation's / the project's aims and purposes are what they seem?

Are there any criteria which must be satisfied in order for it to be reasonably deserving of belief / agreement?

How is the distinction between the required, the permitted, and the forbidden approached as models for interpreting norms and values?

Between the institutional / network and firm level

Between the firm and project / TMO level

Between the institution / network and project / TMO level

To what extent do environmental features such as institutional norms and routines inform the choice of processes, norms, and routines within the TMO at the beginning of the project and across the project lifecycle?

At the corporate-project interface, how does the parent organisation go about this?

To what extent do partiality of knowledge and concerns for interests influence commitment and passion to reach understanding?

Where do the principles between right or wrong come from and fit in the quest to reach agreement?

To what extent do you see that your role in the TMO is a part of the regulative system to maintain relationships and governance?

Between functions vertically at the firm level and horizontally throughout the different stages of the project lifecycle?

Who and what drive governance and relationships?

In occupying your role in the organisation and the TMO, How does this inform interactions and structuration in decision-making process?

In occupying your role, to what extent do you see that your duty and actions within the TMO are affected by your affiliations to the parent organisation? | In occupying your role, to what extent do you see that your duty and actions within the parent organisation are affected by the need to maintain an effective TMO for the benefit of the project?

To what extent are project missions and goals reflected upon and maintained through action within the TMO and throughout the supply chain?

How is 'balancing the optimal' (judging between not good enough and good enough) pursued?

How do you know when you have achieved the optimal?

How does it look like on the ground between the different stages of the project lifecycle?

The questions (in the research's context) are categorised as:
Introduction
Culture-Climate interplay (and between the ecologies)
Macro-micro interactions – development in relation to the project ecology
Integration – which I think where macro and micro could be developed further
Evolution
Congruence and development – same as above
Culture-Climate interplay from a more practical congruence and development point of view
Evolution over the project lifecycle

REVISED INTERVIEW QUESTIONS (After Industry Review)
On the Project Overall

Describe the project so far? Covering:

The project goals? E.g. complex or simple, are there many parties, are the dependencies straightforward

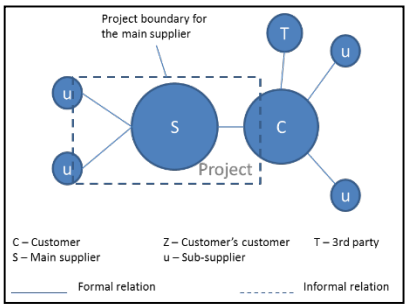
Interdependencies, autonomy, difficulties and challenges during:

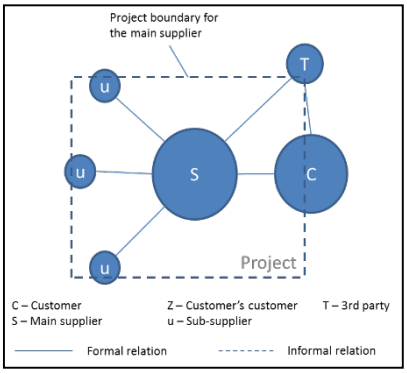
Project start-up (Front-end)

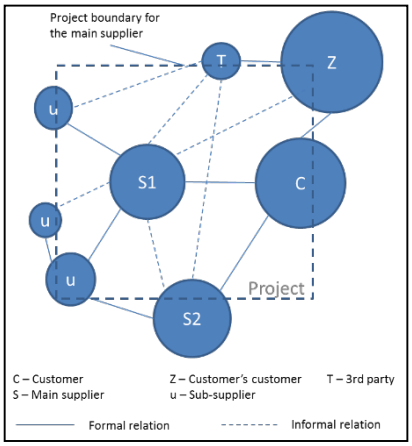
Execution

How were said difficulties and challenges dealt with?

Please illustrate your Alliancing boundary. For example:







On Relationships with Parent HQs

How would you describe the Alliance's relationships with the Parent HQs? E.g. the balance between what is expected and required by the Parent HQ and what is needed for the Alliance to work.
What is challenging and why?

How do you decide what is right or wrong in the Alliance? E.g. the best way to go about things given diverse sets of expertise and interest.

On Culture (Integration Management and Inter-Organisational Relationships)

What drives governance and relationships within the Alliance?
What level of engagement is needed from the key protagonists in the Alliance?
In what ways are these engagements build and maintained during the course of the Alliance? E.g. what threatens or constrains the engagement.

What kind of governance is best suited for an effective Alliance and how to maintain it?

What type of organisational structure is needed? E.g. to allow for better information flow between parties.

What kind of limitations might come from the Parent HQs? What measures can be put in place to mitigate? E.g. what is needed to gain support from Parent HQs.

Appendix 2