Operationalising Organisational & Environmental Complexity Coalignment of the Pakistani Mobile Telecommunications Industry

A thesis submitted to the University of Manchester for the degree of MPhil in Business Strategy in the Faculty of Manchester Business School

2012

Saadia Shafeeq-Uddin

University of Manchester
Manchester Business School
DEDICATION

This thesis is dedicated to my father, Mr. M. Shafeeq-Uddin, who taught me everything he knew and then devoted his entire life supporting me to pursue additional knowledge and education. I owe you for everything.

It is also dedicated to my mother, Mrs. Seemi Shafeeq-Uddin, who taught me that even the largest task can be accomplished if it is done one step at a time.

Finally, this thesis is dedicated to my husband, Mr. Hassan Shah, for his everlasting love, support and patience.
ACKNOWLEDGEMENT

Professor Paul Jackson has been the ideal thesis supervisor. His sage advice, insightful criticisms, and patient encouragement aided the writing of this thesis in innumerable ways.

I would also like to thank all the interviewees who participated in my research by accepting to reply to my questions regarding my research. Without them, the contribution of my research would not have been that important. Unfortunately though, I am not allowed to mention their names or their companies’ names, since I have agreed with them not to reveal any such information in my Thesis or elsewhere.
DECLARATION

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.
ABSTRACT

Name of School: University of Manchester, Manchester Business School
Candidate Name: Saadia Shafeeq-Uddin
Title of Thesis: Operationalising Organisational & Environmental Complexity Coalignment of the Pakistani Mobile Telecommunications Industry
Date: 1st October, 2012

Organisational theorists have traditionally positioned their research questions towards organisations controlling and reducing the level of complexity faced by them (Stacy, 1995). However this approach has recently been challenged by complexity theorists, who believe that organisations that increase their internal complexities, as they face turbulent external complexities, will have superior performance than those with more complexity reductionist strategies (Ashmos & Duchon, 2000; Boisot & Child, 1999; Ashby, 1958). Yet one of the main problems in complexity research is that the concept has various different definitions and not a lot of empirical data supporting it. Literature has also presented evidence that alignment of organisations with their environment enables them to be competitive (De Wit & Meyer, 2010), innovative (Lawrence & Dyer, 1983; Fiol & Lyles, 1985), improves performance (Snow & Miles, 2001; Prieto & de Carvalho, 2010) and ensures their survival (Thompson, 1967). The aim of the present thesis is to operationalise the organisational and environmental complexity in the context of the mobile telecommunications industry of Pakistan, which will explore the constructs of complexity and the relationships between them. Semi-structured interview questions are designed on the basis of a preliminary framework, that is formulated from literature. 24 industrial participants are interviewed, and a thematic analysis is conducted on the transcripts in order to identify complexity constructs and the coalignment between them. This thesis will also present a final framework that identifies 8 main constructs & their 13 sub-constructs of internal organisational complexity, and 8 main constructs & their 9 sub-constructs of external organisational complexity and various linkages between them. The results also show that management of organisations in the context researched, do not perceive their organisations and their environment from the view of complexity, and in order to do so should employ complexity leadership (McKelvey, 2010; Lichenstein, et al, 2006). This thesis will contribute towards a better understanding of the concept of complexity, as well as formulate a model that will have practical uses for the improvement of organisational adaption for Pakistani telecommunications operators. Future implications of this model is that it can be used as a preliminary framework for research in telecommunications industry in other contexts.
COPYRIGHT STATEMENT

The author of this thesis (including any appendices and/or schedules to this thesis) owns certain copyright or related rights in it (the “Copyright”) and she has given The University of Manchester certain rights to use such Copyright, including for administrative purposes.

Copies of this thesis, either in full or in extracts and whether in hard or electronic copy, may be made only in accordance with the Copyright, Designs and Patents Act 1988 (as amended) and regulations issued under it or, where appropriate, in accordance with licensing agreements which the University has from time to time. This page must form part of any such copies made.

The ownership of certain Copyright, patents, designs, trademarks and other intellectual property (the “Intellectual Property”) and any reproductions of copyright works in the thesis, for example graphs and tables (“Reproductions”), which may be described in this thesis, may not be owned by the author and may be owned by third parties. Such Intellectual Property and Reproductions cannot and must not be made available for use without the prior written permission of the owner(s) of the relevant Intellectual Property and/or Reproductions.

Further information on the conditions under which disclosure, publication and commercialisation of this thesis, the Copyright and any Intellectual Property and/or Reproductions described in it may take place is available in the University IP Policy (see http://www.campus.manchester.ac.uk/medialibrary/policies/intellectual-property.pdf), in any relevant Thesis restriction declarations deposited in the University Library, The University Library’s regulations (see http://www.manchester.ac.uk/library/aboutus/regulations) and in The University’s policy on presentation of Theses.
Contents

Chapter 1 Introduction ......................................................................................................................... 12
  1.1 Chapter Introduction .................................................................................................................. 13
  1.2 Thesis Overview ....................................................................................................................... 13
  1.3 Background to the Research ................................................................................................... 13
  1.4 Industrial Overview .................................................................................................................. 16
  1.5 Research Problems .................................................................................................................... 19
  1.6 Research Aims and Objectives ............................................................................................... 20
  1.7 Chapter Conclusion .................................................................................................................. 22

Chapter 2 Literature Review ............................................................................................................... 23
  2.1 Chapter Introduction .................................................................................................................. 24
  2.2 Brief Overview of Paradigms within Complexity Science Literature ........................................ 24
  2.3 Internal Organisational Complexity Literature: ........................................................................ 27
    2.3.1 Ambidexterity: .................................................................................................................... 27
    2.3.2 Strategic Change ................................................................................................................. 28
    2.3.3 Organisational Adaptation ............................................................................................... 30
  2.4 External Environmental Complexity Literature: ........................................................................ 31
    2.4.1 Environmental Scanning: .................................................................................................. 31
    2.4.2 Complexity in the External Environment: .......................................................................... 33
  2.5 Literature Review on Complexity Coalignment ........................................................................... 35
  2.6 Conceptual Theories and Framework ......................................................................................... 36
    2.6.1 Conceptual Framework ...................................................................................................... 37
    2.6.2 Preliminary Research Model .............................................................................................. 39
  2.7 Chapter Conclusion ................................................................................................................... 42

Chapter 3 Methodology ..................................................................................................................... 43
  3.1 Introduction ............................................................................................................................... 44
  3.2 The Philosophical Stance .......................................................................................................... 44
  3.3 Research Design ....................................................................................................................... 44
  3.4 Research Methodology ............................................................................................................. 46
  3.5 Chapter Conclusion .................................................................................................................. 49

Chapter 4 Research Analysis ............................................................................................................ 51
  4.1 Introduction ............................................................................................................................... 52
  4.2 Internal Organisational Complexity ........................................................................................ 52
    4.2.1 Agent Orientation .............................................................................................................. 52
      4.2.1.1 Agent Goal Alignment ................................................................................................. 52
      4.2.1.2 Agent Personality ....................................................................................................... 54
      4.2.1.3 Agent Education, Skills and Experience ..................................................................... 55
4.2.2 Contextual Constructs
4.2.2.1 Organisational Culture
4.2.2.2 Influence of Foreign Shareholders Culture
4.2.2.3 Organisational Experience
4.2.3 Structural Constructs
4.2.3.1 Organisational Hierarchy
4.2.3.2 Interactional
4.2.3.3 Transparency and clarity in communication
4.2.4 Corruption
4.2.4.1 Embezzlement & Bribery:
4.2.4.2 Favouritism
4.2.5 Job Complexity
4.2.6 Technological Requirements
4.2.7 Strategic Complexity
4.2.7.1 Organisational Strategy and Objectives:
4.2.7.2 Intricacies of Policies, Procedures and Processes:
4.2.8 Management Approach
4.2.9 Summary of the Constructs of Internal Organisational Complexity
4.3 External Environmental Complexity
4.3.1 Predictability
4.3.2 Competitive Complexity
4.3.2.1 Competitor Objectives
4.3.2.2 Competitive Density
4.3.3 Consumer Demand
4.3.3.1 Consumer Behaviour
4.3.3.2 Consumer Segments
4.3.3.3 Literacy Rate and Education
4.3.4 Government Influence
4.3.4.1 Governing Approach
4.3.4.2 Regulatory Policies
4.3.5 Environmental Corruption
4.3.6 Cyclicality
4.3.7 Resource Complexity
4.3.7.1 Technological Change
4.3.7.2 Human Resource Factor
4.3.8 National Culture
4.3.9 Section Summary
4.4 Complexity Coalignments .......................................................................................... 111
  4.4.1 Relationships between Constructs of Organisational Complexity .................. 111
  4.4.2 Relationships between Constructs of External Environmental Complexity ...... 114
  4.4.3 Relationships between Constructs of Organisational & Environmental Complexity ... 117
4.5 Chapter Conclusion ........................................................................................................ 121

Chapter 5 Discussion and Conclusion .................................................................................. 122
  5.1 Introduction .................................................................................................................. 123
  5.2 The Constructs of Complexity: Discussion of Findings and Conclusion .............. 124
    5.2.1 Constructs of Internal Organisational Complexity ........................................ 124
    5.2.2 Constructs of External Environmental Complexity ........................................ 132
    5.2.3 Complexity Coalignment ................................................................................... 138
  5.3 Significance & Future Implications ............................................................................ 143
  5.4 References .................................................................................................................. 146

Appendices ............................................................................................................................. 161
  Appendix 1: Email sent to Participants ........................................................................ 162
  Appendix 2: Participant Information Sheet and Consent Form .................................... 163
  Appendix 3: Interview instrument sent to consultants, industrial specialists and regulators operating in the mobile telecommunications industry ........................................ .................. 166
  Appendix 4: Interview instrument sent to employees of the mobile telecommunications organisations ................................................................................................. 168

Final Word Count: 49,780
List of Tables

Table 1: Number of Subscriber’s.................................................................17
Table 2: Mobile Telecommunications Total Revenue (Pakistan Rupees, Million)..................18
Table 3: Operators and their Owners in 2011 ..................................................19
Table 4: Research Aim, Objectives and Questions...........................................21
Table 5: Sample of empirical literature..........................................................26
Table 6: Overview of Research Process ..........................................................45
Table 7: Interviewed Participant’s Organisation and Management Rank .................46
Table 8: Research Aim, Objectives and Questions...........................................123
List of Figures

Figure 1: Complexity Paradigms & Literature Overview ................................................................. 24
Figure 2: Conceptual Framework .................................................................................................... 37
Figure 3: Preliminary Research Model ........................................................................................... 39
Figure 4: Constructs of Internal Organisational Complexity .......................................................... 84
Figure 5: Constructs of External Organisational Complexity ......................................................... 110
Figure 6: Relationships between the constructs of internal organisational complexity .......... 113
Figure 7: Relationships between the constructs of environmental complexity ......................... 116
Figure 8: Relationships between the constructs of environmental complexity and organisational complexity .................................................................................................................. 120
Figure 9: Preliminary Research Model ........................................................................................... 124
Figure 10: Preliminary Research Model of Organisational Complexity ......................................... 125
Figure 11: Differences between Preliminary Research Model & Final Model of Internal Organisational Complexity .................................................................................................................. 126
Figure 12: Preliminary Research Model of External Environmental Complexity ....................... 133
Figure 13: Differences between the Preliminary Research Model and Final Model of External Environmental Complexity ................................................................. 134
Figure 14: Model of Organisational and Environmental Complexity Coalignment of the Pakistani Mobile Telecommunications Industry ................................................................. 140
Chapter 1 Introduction
1.1 Chapter Introduction

The first chapter will first introduce the thesis with a brief chapter by chapter summary. This will be followed by the summary of the background to the paradigm of 'Complexity' and its associated research. After which the reader will be provided with the overview of the Pakistani Mobile Telecommunications industry and the justification of why this context was chosen for this thesis. The chapter will then highlight the main research problems, which were outlined in the background to the research and will be explained further in the literature review. The aims and objectives of the thesis, which will strive to answer the main research problems, will then be highlighted. This will then be followed by the conclusion to the first chapter.

1.2 Thesis Overview

The thesis consists of five chapters, including the current one. The present chapter introduces the readers to the background of the research, giving an overview of the industrial context being studied and outlining the research problems and questions. As the research is about operationalising the constructs and coalignment of complexity in an industry, readers will notice that chapter 2 (literature review), chapter 4 (research analysis) and chapter 5 (discussion and conclusion) will be structured to enable the research to explore internal organisational complexity, external environmental complexity, and the coalignment that exists between them. The second chapter will review the main literature related to the study, evaluating key concepts and identifying research gaps as well as developing the conceptual framework and the preliminary model derived from the literature reviewed. The third chapter will then present the research methodology, outlining the philosophy of the thesis, as well as analysing the research design and strategy taken for data collection. The fourth chapter then presents an analysis of the data collected which is split into three main sections of internal organisational complexity, external environmental complexity and the complexity coalignments. The fifth and final chapter will then discuss the findings of the entire thesis by presenting the final research model and evaluating its constructs and the relationships between them. The list of references and appendices will be included at the end of the thesis.

1.3 Background to the Research

'Complexity'; this word is now becoming more widely recognised in strategic management research as a measurable construct rather than a self-evident attribute. Complexity science dates as far back as the 1950's, evolving in the stream of natural science by having roots in "General Systems Theory" (Bertalanffy, 1950) and "Cybernetics" (Weiner, 1950; Ashby, 1960). Many social scientists argue that notions used in complexity science were already being used in organisational sciences, just not under the label of complexity. However, the direct application and reformulation of complexity concepts to organisational science have only just emerged within the
past two or three decades, with prominent literature focusing on the development of conceptual frameworks and running computational models (Stacey, 1995; Levinthal & Warglien, 1999; McKelvey, 1999).

Complexity is a state reached by a system or environment, which has grown to be made up of a large number of variables that are intricately interconnected and demonstrate synergistic properties (Simon, 1962). This is a general definition and, as argued by Cannon (2007), Sharfman & Dean (1991) and various others, complexity has been defined in a variety of different ways in different contexts. This then leads to the problem that there is no one widely accepted and agreed set of constructs and measurements that exist for complexity (Igor, 1990; Cannon, 2007). Thus, currently the challenge for researchers is in deciphering and operationalising this intricate and multi-dimensional concept, seen as both a cause and a consequence (Kauffman, 1993; McKelvey, 1999b), in organisational science (Cannon, 2007; Sokolov 1990; Schoonhoven, 1981). This argument will be explored in more detail and will become more apparent in the review of literature, which will start by highlighting streams of natural science and organisational science study of complexity. After which the main concepts and paradigms associated with organisational and environmental complexity will also be analysed.

The review of literature will begin to outline various gaps in exploring the relationship between organisational inertia and environmental dynamism, and how each of these align themselves with the other. It can be seen that literature attempts to explore the paradigms associated with this relationship (Duncan, 1972; Brown and Eisenhardt, 1998; Burgelman & Grove, 2007), and, yet rarely does it embark on illustrating the antecedents of organisational and environmental complexity within the same context, and the extent of the relationship between them, which should be the next step for research. Various researchers often focus on either the internal (Lawrence & Lorsch, 1967a; Hannan & Freeman, 1984; Ashmos, et al, 1996; Devoldere & Bart, 2010) or the external (Boyd, Dess & Rasheed, 1993; Cannon, 2007) organisational environment. Consistency in context is important because in order to propose a complete model of complexity, the antecedents for both internal and external complexity must be formulated within the same setting, which is unique to every industry as constructs and their relationships with one another will differ. Any research which does look at both sides of complexity in an industry ends up elaborating on the relationship between specific aspects of it such as: erratic strategic decision making and environmental dynamism (Mitchell, Shepherd & Sharfman, 2010); uncertainty in decision making and environmental complexity (Duncan, 1972); administrative intensity & technological capabilities and environmental dynamism (Freeman, 1973). Use of one context will ensure consistency in theory building, which will provide an accurate foundation for testing in the future.
The study of the organisation's relationship with its environment is prominent predominantly in the fields of contingency science, strategic management and the ever emerging field of organisational complexity. Researchers have embarked on numerous studies that attempt to explore the relationship between the dialectic environmental inertia & strategic choice with various other organisational capabilities (Bourgeois, 1984; Hambrick, MacMillan & Day, 1982; Schendel & Patton, 1978). Yet, there still lacks an agreed framework of the combination and relationship between organisational capabilities and environmental variables (Cannon, 2007; Devoldere, 2010; Sokolov 1990).

This research is conducted within the context of the Pakistani mobile telecommunications industry, which provides an interesting case to study due to its vast impact on the country's economic development and also the rapid growth of the industry which has seen the number of subscribers triple over the recent few years (Gao & Rafiq, 2009). Three out of the five companies currently operating in the country's mobile telecoms is either a multinational or a subsidiary belonging to one, whilst the other two have major foreign shareholders. Pakistani telecommunications operate on a GSM (2G) network in Pakistan, even though many developed and some developing nations of the world already have 3G or are in the midst of upgrading to 4G network. Also, according to the United Nations Conference on Trade and Development's (UNCAD) Information Economy Report of 2009, Pakistan is one of the top five dynamic economies in its region for mobile penetration between 2003 to 2008.

According to Zave (1997), due to the dynamic nature of technological development, changes in the regulatory policy and the competitive nature of the organisations, telecommunications sector is deemed to be highly complex. This is also evident from the findings of Sammut-Bonnici and McGee (2004), whose research indicates presence of complex adaptive behaviour between firms operating in the UK mobile telecommunications market. The future potential of the industry, coupled with the rapidly changing strategic direction of the organisations seemingly pressured by resource, regulatory and competitive complexity (Cannon, 2007), makes Pakistan's mobile telecoms the perfect setting to study the complexity which exists within the organisations and in the external environment that surrounds them and how they align with one another.

The main contribution this research will make is offering an empirically supported model of the constructs of internal and external complexity and the relationships between them. Weick (1979) implies that researchers must think in circles (p52). Thus in order to study a multi-dimensional non-linear phenomenon, one needs to approach complexity by investigating the mutual relationships and interactions that exist between clusters of constructs. This is necessary because
prior studies are inconsistent and incomplete in their analysis of both internal organisational and external environmental complexity; and also because the relationship between them has not been studied fully. This research will then pave the way to test this model in the future in order to assess the strength of the relationship between the constructs, and to further experiment its applicability in other industries. This research will also make a methodological, conceptual and contextual contribution to this ever evolving field. Methodological and conceptual contribution will be made because this research will take a multi-dimensional approach to identifying the relationships between the antecedents of organisational and environmental complexity (Cannon, 2007) by exploring the Gestalts that exist (Miller, 1981).

Another methodological contribution would be that the inductive approach to research will enable conceptualisation to take place within the context of the telecommunications market, giving an opportunity to do deductive research in the future. Hence, a model will be formulated through the inductive approach of thematic analysis to recognise the constructs and the relationships that exists between them. Contextual and empirical contribution will be made, mainly because the research will develop and empirically assess a model applicable in an industry that has been acknowledged as being complex (Gao & Rafiq, 2009; Sammut-Bonnici & McGee, 2004; Li & Whalley, 2002; Zave & Jackson, 1997), but the extent of which has not been previously explored.

1.4 Industrial Overview

When Pakistan became independent from India in 1947, it had inherited only 14,000 landlines (Sikandar, 2009). By the beginning of 2010, the nation had a total of 3.5 million landlines and 107 million cellular connections (PTA, 2010). Pakistan’s telecommunications sector has undergone radical restructuring, from a single monopolised government institution to five competitive private sector organisations. The 1980's saw a vast amount of investment dedicated towards developing the telecommunications sector, resulting in the creation of the publicly owned Pakistan Telecommunications Corporation Limited (PTCL). However, there was a powerful need for reform due to the poor quality of service, high call traffic congestion and other inadequacies of the state owned monopoly in meeting the needs of the public (Looney, 1998).

During Mian Nawaz Sharif’s term as prime minister of Pakistan, between 1990 and 1993, mobile telecommunications was privatised, whilst providers of fixed landline services remained government owned (Gao & Rafiq, 2009). This led to the very first mobile licenses being issued to two private companies; Paktel and Instaphone, regulated by the Ministry of Communication (Gao & Rafiq, 2009, Looney, 1998). In 1996 a third licence was granted to Mobilink, a joint venture between Motorola and the local Saifullah Group, which threatened the market share of Paktel
and Instaphone by offering the technically superior and better quality 2G GSM network, whilst the latter two companies could only offer services on their 1G AMPS network (Gao & Rafiq, 2009, Looney, 1998). Mobilink’s GSM service fundamentally changed the market as it offered SMS services and roaming facilities (Looney, 1998). Ufone, a subsidiary of PTCL, broke Mobilink’s 2G monopoly when it entered the market in 2000 and was also granted the licence to operate on the GSM network (Gao & Rafiq, 2009).

### Table 1: Number of Subscriber’s

<table>
<thead>
<tr>
<th>Year End</th>
<th>Mobilink</th>
<th>Ufone</th>
<th>Paktel/Zong</th>
<th>Instaphone</th>
<th>Telenor</th>
<th>Warid</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>16,385</td>
<td></td>
<td>30,703</td>
<td>20,950</td>
<td></td>
<td></td>
<td>68,038</td>
</tr>
<tr>
<td>1997</td>
<td>52,600</td>
<td></td>
<td>39,398</td>
<td>43,029</td>
<td></td>
<td></td>
<td>135,027</td>
</tr>
<tr>
<td>1998</td>
<td>82,912</td>
<td></td>
<td>60,000</td>
<td>53,184</td>
<td></td>
<td></td>
<td>196,096</td>
</tr>
<tr>
<td>1999</td>
<td>87,556</td>
<td></td>
<td>70,000</td>
<td>108,058</td>
<td></td>
<td></td>
<td>265,614</td>
</tr>
<tr>
<td>2000</td>
<td>114,272</td>
<td>116,711</td>
<td>80,221</td>
<td>112,000</td>
<td></td>
<td></td>
<td>306,493</td>
</tr>
<tr>
<td>2001</td>
<td>309,272</td>
<td>96,623</td>
<td>220,000</td>
<td></td>
<td></td>
<td></td>
<td>742,606</td>
</tr>
<tr>
<td>2002</td>
<td>800,000</td>
<td>350,000</td>
<td>218,536</td>
<td>330,000</td>
<td></td>
<td></td>
<td>1,698,536</td>
</tr>
<tr>
<td>2003</td>
<td>1,115,000</td>
<td>550,000</td>
<td>319,400</td>
<td>420,000</td>
<td></td>
<td></td>
<td>2,404,400</td>
</tr>
<tr>
<td>2004</td>
<td>3,215,989</td>
<td>801,160</td>
<td>470,021</td>
<td>535,738</td>
<td></td>
<td></td>
<td>5,022,908</td>
</tr>
<tr>
<td>2005</td>
<td>7,469,085</td>
<td>2,579,103</td>
<td>924,486</td>
<td>454,147</td>
<td>835,727</td>
<td>508,655</td>
<td>12,771,203</td>
</tr>
<tr>
<td>2006</td>
<td>17,205,555</td>
<td>7,487,005</td>
<td>1,040,503</td>
<td>336,696</td>
<td>3,573,660</td>
<td>4,863,138</td>
<td>34,506,557</td>
</tr>
<tr>
<td>2007</td>
<td>26,466,451</td>
<td>14,014,044</td>
<td>1,024,563</td>
<td>333,081</td>
<td>10,701,332</td>
<td>10,620,386</td>
<td>63,159,857</td>
</tr>
<tr>
<td>2008</td>
<td>32,032,363</td>
<td>18,100,440</td>
<td>3,950,758</td>
<td>351,135</td>
<td>18,125,189</td>
<td>15,489,858</td>
<td>88,019,812</td>
</tr>
<tr>
<td>2009</td>
<td>29,136,839</td>
<td>20,004,707</td>
<td>6,386,571</td>
<td>34,048</td>
<td>20,893,129</td>
<td>17,886,736</td>
<td>94,342,030</td>
</tr>
<tr>
<td>2010</td>
<td>32,202,548</td>
<td>19,549,100</td>
<td>6,704,288</td>
<td>34,048</td>
<td>23,798,221</td>
<td>16,931,687</td>
<td>99,185,844</td>
</tr>
<tr>
<td>2011</td>
<td>33,378,161</td>
<td>20,533,787</td>
<td>10,927,693</td>
<td></td>
<td>26,667,079</td>
<td>17,387,798</td>
<td>108,894,518</td>
</tr>
</tbody>
</table>

Source: PTA

However, the role of government institutions proved to be highly influential towards the performance of the industry. Due to violent conflicts that shook Karachi, the government took the drastic decision of banning mobile services in the city in 1994, which meant nearly 60% of the total subscribers at that time were disconnected (Looney, 1998). Though the ban was lifted two years later, it had hindered growth and foreign investments into the industry. In 1996 the Pakistan Telecommunications Regulation Act was published, which demonstrated the continued initiative of the government to liberalise the sector. This was followed by the creation of the Frequency Allocation Board (FAB) and Pakistan Telecommunications Authority (PTA) (Gao & Rafiq, 2009, Asif, 2007). The monopoly of PTCL came to an end in 2004, when the sector was liberalised with the announcement of the Deregulation Policy, also known as the Mobile Cellular Policy, which attracted two additional entrants to the sector; Warid Telecom and Telenor Pakistan (Asif, 2007). This announcement of the policy meant increased competition in the market and reduced prices for customers, which caused the subscriber base to increase dramatically from 2004 to 2005 (see Table 1). Both these companies were service providers operating on GSM networks, which led to
a huge growth in total subscribers from 5 million in 2003 to 12.7 million in 2004, as seen in Table 1. The industry changed again, when in 2007 Paktel was taken over by China Mobile, which rebranded the company a couple of times before finally naming it Zong, by which time the company was also operating on the 2G network (Kleinman, 2008).

As telecommunications organisations operating on GSM networks prospered, Instaphone suffered because it failed to keep up with its technically superior competitors. The company started losing subscribers, and whilst other organisations prospered, Instaphone's revenue fell by 83.11% from 2006 to 2008 (see Table 2). At the beginning of 2008, PTA terminated Instaphone's license and FAB withdrew the frequency spectrum assigned to the company due to its failure in paying its dues (PakTribune, 2008). By the end of 2010, there were five main operators in the mobile telecommunications market, which had a total of 102.7 million subscribers, with Mobilink being the market leader (see Table 1 and Table 3). Currently the industry is looking towards another radical development in the form of 3G, however government regulators are hindering this. The government expects to auction each 3G licence for $210 million, which is a heavy price for the network operators to pay (APP, 2011).

<table>
<thead>
<tr>
<th>Year End</th>
<th>Mobilink</th>
<th>Ufone</th>
<th>Zong</th>
<th>Instaphone</th>
<th>Telenor</th>
<th>Warid</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>54,065</td>
<td>16,098</td>
<td>3,329</td>
<td>1,539</td>
<td>6,338</td>
<td>8,527</td>
<td>89,896</td>
</tr>
<tr>
<td>2007</td>
<td>64,654</td>
<td>21,867</td>
<td>2,897</td>
<td>472</td>
<td>22,837</td>
<td>20,405</td>
<td>133,132</td>
</tr>
<tr>
<td>2008</td>
<td>79,936</td>
<td>27,455</td>
<td>2,585</td>
<td>260</td>
<td>45,081</td>
<td>26,805</td>
<td>182,122</td>
</tr>
<tr>
<td>2009</td>
<td>83,271</td>
<td>40,060</td>
<td>8,274</td>
<td>24</td>
<td>51,561</td>
<td>29,233</td>
<td>212,423</td>
</tr>
<tr>
<td>2010</td>
<td>84,977</td>
<td>49,570</td>
<td>11,802</td>
<td>-</td>
<td>59,012</td>
<td>30,686</td>
<td>236,047</td>
</tr>
</tbody>
</table>

Source: PTA, revenue figures for 2011 not available

Pakistan's Mobile telecommunications made a major contribution to the entire nation's GDP and was responsible for attracting nearly 30% of country's foreign direct investment between 2005 and 2010 (Rab, 2011). In addition to this Pakistan mobile telecoms has also had an emerging role in the global telecommunications sector, contributing greatly towards the revenue and growth of multinational telecoms organisations. This can be seen as Telenor in Pakistan grew by 9.7% from 2010 till 2011, which surpassed the growth rate of all its European markets, including Norway its home market (Telenor, 2011b). In addition to the Norwegian Telenor Group, multinational organisations such as Etisalat, the Abu Dhabi Group and China Mobile also have a share in Pakistani telecoms (see Table 3). The strategic manoeuvre of industrial participants also makes the telecoms sector a fascinating study for organisational and environmental complexity. This can be seen as Vimplecom Ltd, a Russian telecoms organisation partly owned by the telecoms multinational Telenor Group (Telenor, 2011a), has agreed to takeover Orascom, which owns the current market leader in Pakistan; Mobilink (Schultz, 2010). However, according to Khan (et al,
since the past two years the growth in the industry has started to slow down, yet the competition is as high as it's ever been. This not only highlights the importance of this industry both nationally and globally, but also reveals that there are various environmental complexities that influence the industry and the organisations within it.

**Table 3: Operators and their Owners in 2011**

<table>
<thead>
<tr>
<th>Operator</th>
<th>Additional Brands and Packages</th>
<th>Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobilink GSM</td>
<td>Jazz, Indigo</td>
<td>Orascom has majority ownership plus management control</td>
</tr>
<tr>
<td>Ufone GSM</td>
<td>U⁺ Package, Lady’s Package, Kisan Package</td>
<td>Etisalat has majority ownership and management control</td>
</tr>
<tr>
<td>WaridTel</td>
<td>Glow, ZEM</td>
<td>70% owned by Abu Dhabi Group of United Arab Emirates and 30% owned by SingTel Group</td>
</tr>
<tr>
<td>Telenor</td>
<td>TalkShawk, Easy Paisa, djuice</td>
<td>Norwegian incumbent operator, Telenor has full ownership</td>
</tr>
<tr>
<td>Zong</td>
<td>M9</td>
<td>China Mobile has full ownership</td>
</tr>
</tbody>
</table>

Source: Asif (2007) and main operator websites

In order to maintain confidentiality of organisations and anonymity of the identities of the participants, from this point forward each of the telecommunications operators will be code named after the Greek alphabet of Delta, Epsilon, Zeta, Theta, Sigma and Omicron, in no particular order.

### 1.5 Research Problems

One of the main research problems in complexity science is the lack of an agreed model or methodology for measuring the complexity of organisations and their environments. According to Li & Whalley (2002), the main reason for the telecommunications industry to be complex is due to the intertwined value chains that are constantly being deconstructed and are contributing to organisations following rapidly changing strategies. Especially in the context of the telecommunications sector, such a model has not even been formulated, even though the industry is widely accepted as being complex (Gao & Rafiq, 2009; Li & Whalley, 2002), with research showing evidence of complex adaptive behaviour amongst firms in the industry (Sammut-Bonnici & McGee, 2004). The problems arise because magnitude of researchers agree that organisations need to adapt to their complex environments (Thompson, 1967; Porter, 1985), yet there is not one agreed model or methodology that will enable them to measure this. Ashby’s (1958) "law of requisite variety" comes close to such a model, however in many ways the application of this theory in organisational sciences has been unsuccessful. This is mainly because his constructs lack clear definitions. Another problem is the inconsistencies that exist between the findings of research (Zajac & Kraatz, 1993; Fombrum & Ginsberg, 1990), which arise due to different approaches and methodology.
Another problem that has been acknowledged in the field is the difficulty in identifying the constructs of complexity in the organisational environment. This problem emerges as researchers attempt to naturalistically apply models of complexity to organisational sciences, with the result of elaborate and inspiring concepts (Levinthal & Warglien, 1999; McKelvey, 1999b, 2004), which still need to be empirically supported by future research. This is because the antecedents related to such conceptual models are difficult to identify, due to their general context and variety of definitions. Also, such models are impressive in theory, yet they ignore the debate that laws of natural sciences are different from laws of social science (Thomas, 1967). Another reason behind this problem is that rarely any empirical research has explored complexity coalignment; usually either the research will focus on organisational or just environmental complexity (e.g.: Ashmos, Duchon & Reuben, 2000; Boisot & Child, 1999). Especially in the telecommunications industry where radical changes are taking place due to the rapid evolution of technology and increasing market turbulence, causing many past business models and frameworks to become outdated (Li & Whalley, 2002). The telecommunications industry is an important context to study due to its enormous impact on a nation’s economy (Gao & Rafiq, 2009, Li & Whalley, 2002). According to literature, there is increasing complexity in the telecommunications industry, with demand for more accurate business models to define the sector (Gao & Rafiq, 2009, Sammut-Bonnici & McGee, 2004, Li & Whalley, 2002, Fransman, 2001).

1.6 Research Aims and Objectives

The main goal of this thesis is to demystify the constructs of organisational and environmental adaptation of complexity, and complexity coalignment. The research will strive to make a methodological, conceptual and empirical contribution to this ever evolving field. In order to meet the main aim of operationalising organisational and environmental complexity within the Mobile Telecommunications industry of Pakistan, two objectives will need to be met, as seen in Table 4, which shows the research aims & objectives, and the questions & sub-questions related to them.

The research questions are focused on finding the perception of the participants, when operationalising organisational and environmental complexity. This is because organisational participants make decisions, which affect business strategy, processes and structure, based on their perception of the organisational and the external environmental (Boyd & Dess, 1993).

The first objective (objective 'a' in Table 4) will be met by formulating a model of what the perceived constructs of complexities are according to different participants in various stakeholder groups, such as regulators and mobile operators. This will enable an insight into the industry and make the conceptual model contextually relevant. The second objective (objective 'b' in Table 4) of the research will be to identify the Gestalts that exist between the constructs in the Pakistani
Telecommunication industry through in-depth semi-structured interviews, which will allow a broad, multi-dimensional approach towards understanding intricate intra- & inter-dependent organisational and environmental components. Miller (1981) defines Gestalts as commonly occurring patterns or configurations that are highly interdependent (p.3). Literature has attempted to identify Gestalts (Lawrence & Lorsch, 1967; Weick, 1976), yet the identification of Gestalts in complexity science has been limited, even though its implementation is well warranted. Clusters, that have been recognised, explore the relationships that exist between organisational structure and other variables. For example; Burns and Stalker (1961) explore independencies between organic & mechanistic forms and other internal variables, whilst Lawrence & Lorsch (1967) and Eisenhardt (2008) show relationship between organisational structures and environmental uncertainty. Lawrence and Lorsch (1967) have even argued that certain internal and external variables show interdependencies. This will be examined in depth in second chapter.

Table 4: Research Aim, Objectives and Questions

<table>
<thead>
<tr>
<th>Research Aim</th>
<th>Main Research Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Operationalise organisational and environmental complexity in the context of the Mobile Telecommunications industry of Pakistan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Objectives</th>
<th>Research Sub Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Formulating a research model, within the context of Mobile Telecommunications industry of Pakistan</td>
</tr>
<tr>
<td>b</td>
<td>Identifying linkages that exist between organisational and environmental constructs</td>
</tr>
</tbody>
</table>

This researcher believes that inconsistencies in findings apparent in various complexity studies will be reduced if conducted to identify the Gestalts that exists between the organisations and their environments within a specific context. This will enable a multi-dimensional and intricate approach to understanding a heterogenous and rarely understood phenomenon.
1.7 Chapter Conclusion

This chapter introduced readers to the concept of complexity and the industry being research. In addition to this, the problems were highlighted and the research questions were discussed. The present research will make a contribution to the growing field of organisational and environmental complexity. The main significance of this research is that it will take strong steps towards demystifying how complexity can be measured in the context of organisational science. This will be achieved through a formulation of a model of organisational and environmental complexity constructs by a thematic analysis of data provided by organisational participants and industrial specialists.
Chapter 2 Literature Review
2.1 Chapter Introduction

The second chapter comprises of the literature review on different research that makes contribution to organisational complexity theory. The chapter begins with a brief overview of literature on the different paradigms within complexity science. This is followed by a section that critically covers internal organisational complexity literature by highlighting research on ambidexterity, strategic change and organisational adaptation. After which literature related to external environmental complexity will be covered by looking at research related to environmental scanning and complexity in the external environment. The chapter will then review literature on complexity coalignment by defining the concept as well as providing a critical background into previous research. Finally the chapter will summarise the literature by presenting the conceptual framework, followed by the preliminary model.

2.2 Brief Overview of Paradigms within Complexity Science Literature

Complexity originated from the fields of natural sciences, where the literature on the concept has been well developed. However, its application in organisational sciences, predominantly the direct implementation of theoretical models, has been approached naturalistically (Levinthal, 1999; McKelvey, 1999b). This philosophical approach has limitations in that it assumes unity amongst the sciences, leading to their supposition that a methodological process applicable in natural sciences should also be relevant for social sciences (Baert, 2003; Jackson, 1995). Nevertheless, there has been literature that has recognised limitations of this ideology and has attempted to overcome it by developing empirically supported conceptual frameworks within the context of organisational science. However, there are still restrictions to this literature, mainly that they take a one-dimensional view which excludes certain variables, or their research is not conclusive. A sample of empirical research, outlining the summary of such literature and its limitations, can be seen in Table 5.

![Figure 1: Complexity Paradigms & Literature Overview](image-url)
Figure 1 shows the researcher’s interpretation of the overview of prominent paradigms and literature in the complexity science, which is divided into two; paradigms that are studied predominantly in natural sciences (heterogeneous agents & physical phenomenon) and those that are more applicable to the study of organisational sciences (strategic change & organisational ambidexterity).

Complexity within natural sciences comprises of two schools of thought; the American group which focuses on heterogeneous agents and the European group which focuses on physical phenomenon (Benbya & McKelvey, 2006). The American group, predominantly the Santa Fe institute, study heterogeneous agents or the underlying rules that direct behaviour of agents and their relations. This group consists of academics such as Kauffman (1993), Casti (1994) and Gleick (1987), who utilise computational models to study social and biological phenomenon. The European group, comprising of academics such as Prigogine & Stengers (1984) and Haken (1984), look at physical phenomenon or phenomena associated with the measure of the energy imposed on natural systems. Bioeconomics, study of the heterogeneous agent’s interactions invigorated through “energy differentials” (McKelvey, 2004), is thus a mutual concept within these two paradigms. These paradigms, mainly relevant to natural sciences, have recently been utilised in organisational science, however, their positivistic approaches are, arguably, inadequate in explaining organisational phenomenon.

The focus of the thesis lies on the organisational sciences’ side of complexity concepts, which is predominantly occupied by two paradigms of strategic change and organisational ambidexterity. Strategic change looks at ways in which firms are pressured to change strategically (such as restructuring), and under its process component, has two perspectives of strategic choice and ecology (Stacy, 1995; Zajac & Kraatz, 1993). Strategic choice takes the “process of change” approach where firms will intentionally restructure themselves in order to adapt to externalities (Stacy, 1995), and is also related to the study of ambidextrous organisations and physical phenomenon. Ecology takes the perspective of an evolutionary competitive selection process (Hannan & Freeman, 1984) and relates to both the aforementioned natural science complexity paradigms. Strategic change process is also linked with heterogeneous agents through the paradigm of adaptive agents, where agents exist in a coevolutionary network with other agents (Holland & Miller, 1991).

Organisational ambidexterity, where a firm simultaneously aligns its internal resources and capabilities, whilst adapting to the dynamics of its external environment (Birkinshaw & Gibson, 2004; Tushman, Anderson & Reilly (2003), is not a field usually referred to by complexity theorists. However the attributes of organisational ambidexterity significantly match aspects of strategic
### Table 5: Sample of empirical literature

<table>
<thead>
<tr>
<th>Sources</th>
<th>Research Aim</th>
<th>Paradigm/s</th>
<th>Methodology</th>
<th>Findings/Conclusions</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lawrence &amp; Lorsch (1967)</td>
<td>To contribute to the field of complexity science</td>
<td>Environmental complexity; Organisational Complexity</td>
<td>Comparative case study of 6 organisations operating in the same industry</td>
<td>Relationship found between the extent to which the states of differentiation and integration in each organisation met the requirements of the environment and the relative economic performance of the firm.</td>
<td>Good exploration of organisational contexts, however lacks of theoretical framework that outline the relationship between determinants.</td>
</tr>
<tr>
<td>Duncan (1972)</td>
<td>To identify characteristics of environments that contribute to decision unit members experiencing uncertainty in decision making</td>
<td>Environmental complexity; environmental uncertainty</td>
<td>First phase: 19 semi-structured interviews Second phase: surveyed 22 decision groups in manufacturing and R&amp;D organisations</td>
<td>Two dimensions of the external environment identified: static-dynamic &amp; simple-complex. Individuals in dynamic-complex environments face the greatest amount of uncertainty.</td>
<td>No clear cut-off identified between simple and complex dimension.</td>
</tr>
<tr>
<td>Zajac &amp; Kraatz (1993)</td>
<td>Examination of organisational &amp; environmental forces, and its strategic impact on the industry of higher education</td>
<td>Organisational science; strategic change; Structuration</td>
<td>Longitudinal secondary data analysis of 631 colleges from 1971 to 1986</td>
<td>Results portray that as complex environments change, organisations restructure themselves in a predictable manner. Questions ecological notions of atypical adaptation.</td>
<td>Empirical findings are contested. Also, research looks at one component of internal complexity.</td>
</tr>
<tr>
<td>Ashmos &amp; Duchon (2000)</td>
<td>Examination of organisational responses to complex dynamic environments</td>
<td>Organisational complexity; Complex adaptive systems</td>
<td>Survey of 73 hospitals in Texas</td>
<td>Organisations that chose complexity reduction approach performed inferiorly to those who chose to &quot;absorb&quot; complexity.</td>
<td>Not a conclusive test of organisational complexity.</td>
</tr>
<tr>
<td>Cannon (2007)</td>
<td>Develop a theoretical model of environmental complexity, empirically test it and find associations between constructs</td>
<td>Environmental complexity</td>
<td>Cross-sectional data analysis of 254 and 241 industries for 1992 and 1997 time points, respectively.</td>
<td>Complexity has multi-dimensions, which is proposed to be incorporated in research methodology.</td>
<td>Did not include extensive complexity factors, missing out factors such as regulation and market uncertainty.</td>
</tr>
</tbody>
</table>
complexity, where an organisation is expected to undertake contradictory strategies in order to adapt (Ashmos & Duchon, 2000). Converting organisational ambidexterity into the context of complexity, its relations with the other mentioned paradigms can be explored. Self-organisation, where a system internally changes itself without any external intervention, is a paradigm from complexity systems relating to simultaneous strategic change and agent adaptation (Haken, 2006). Simsek, et al, (2009) attempts to make literature on ambidexterity less ambiguous by formulating a typology of the ways in which ambidexterity can be pursued, in two dimensions spanning along temporal and structural. Levinthal and Warglien (1999), whilst discussing coordination of autonomous and interdependent actors in an organisation, also consider structure along with communication.

Whereas complex adaptive system (CAS)s, an intricate theory that attempts to explain behaviour of complex systems assuming that order will surface from agent interactions (Anderson, 1999), is a fundamental field within complexity in natural science. CAS conceptualises behaviour of heterogeneous agents, organisations and natural systems (Benbya & McKelvey, 2006) whereas Levinthal and Warglien (1999) outline the fundamental problems of self-organised systems can be controlled or directed. The overlap of strategic change and organisational ambidexterity gives way to organisational adaptation, which is a perspective of organisational change related to organisations existing in a coevolutionary landscape (Levinthal & Warglien, 1991). Fitness landscapes, a computational tool that illustrates complexity by mapping it using the NK model (Kauffman, 1993; McKelvey, 1999), relates to a wide variety of complexity paradigms, including agent behaviour and self organisation. Fitness landscapes adequately relates organisational ambidextrous behaviour with physical phenomenon, even though it emerges from the latter paradigm.

2.3 Internal Organisational Complexity Literature:

2.3.1 Ambidexterity:

Organisational ambidexterity was a term coined by Duncan (1976) but greatly advanced by Tushman & O'Reilly (1996) who outlined the simultaneous utilisation of proactive "incremental and revolutionary change" (p.8). However, literature has predominantly focused on what Birkinshaw & Gibson (2004) call structural ambidexterity. This is where, across an organisation, divisions have different structures that align their relevant components that are related to particular factors in the external environment (Duncan, 1976). Yet Gibson & Birkinshaw (2004b) state that such companies should also be contextually ambidextrous, which is related more towards organisational culture than structure (Raisch, et al, 2009). Further research also indicates that such organisations, having dual purposes, implement both 'exploratory' and 'exploitative' strategies (March, 1991; Raisch, et al, 2009). Markides (2004) states that ambidextrous
organisations have a greater advantage and less risk associated in implementing integrated dual business models; where a firm follows two business models without splitting its operations. However, Simsek, et al, (2009) interprets that an ambidextrous organisation can be one which operates both as a single unit or across different units, differing from Markides (2004) assumption of ambidexterity. Nevertheless, literature on ambidexterity, like that for the paradigm of complexity, is considered to be ambiguous and inconsistent.

Simsek, et al, (2009) attempted to resolve this by formulating taxonomy of organisational ambidexterity, amalgamated from relevant literature. They split the typology into two dimensions of independent-interdependent and simultaneous-sequential, categorising types of ambidexterity as: i) harmonic; concurrently pursuing exploitation and exploration from within a single unit (Gibson & Birkinshaw, 2004b; Adler, et al, 1999) ii) cyclical; the business unit alternates between focusing resources on strategies of exploration and exploitation (Gupta, et al, 2004; Rothermael & Deeds, 2004; Gersick, 1991) iii) partitional; dual business unit, each one focusing on either exploitation or exploration (Duncan, 1976; Tushman & O'Reilly, 1996; Lawrence & Lorsch, 1967b; Lin, et al, 2007) iv) reciprocal; sequentially pursuing both exploitation and exploration across business' alliances and subsidiaries (Thompson, 1967; Lavie & Rosenkopf, 2006). Predominantly, ambidexterity literature focuses more on the simultaneous dimension (harmonic and partitional), with the least focus on reciprocal ambidexterity.

Ambidexterity literature still has a long way to go empirically, with the unexplored potential of its application in organisational complexity. Organisational ambidexterity is directly related to complexity in two ways; firstly through cognitive complexity, which is the simultaneous pursuit of contradictory strategies and goals (Ashmos & Duchon, 2000) and secondly ambidexterity creates increased intra-organisational diversity (Tushman, Anderson & O'Reilly, 1997), which also enhances complexity (Ashby, 1958). Vasconcelos & Ramirez (2011) draw distinction between an organisation that is complicated and one that is complex, stating that the prior notion refers to contextual complexity and the later refers to procedural complexity. One can argue that in case of structural separation there are lower levels of complexity, whereas in organisations with contextual ambidexterity there is higher complexity due to greater levels of interdependence between agents. The significance of looking at organisational ambidexterity in the context of this thesis is that it will aid in the multi-dimensional view of the constructs of complexity.

2.3.2 Strategic Change
Van de Ven & Poole (1995) define strategic change as an occurrence when an organisation's internal constituents vary, over time, in their "form, quality and state" (p.512). According to Zajac & Shortell (1989) strategic change literature has two main doctrines; the first focuses on
strategies pertaining to the desire to change or the "content" perspective (e.g., Gibbs, 1993; Hill & Snell, 1989), whilst the second doctrine focuses on the ability to change or the "process" perspective (e.g., Mintzberg & McHugh, 1985; Porter, 1981). Depending on the doctrine followed, research about the same organisational aspect could lead to contradictory results (Rajagopalan & Spreitzer, 1996). This can be seen by the research on the effects of organisational size on the possibility of strategic change, which was a positive relationship (as the organisation increases in size, the rate of strategic change increases) according to Zajac & Kraatz (1993) and a negative one (as the organisation increases in size, the rate of strategic change decreases) according to Fombrun & Ginsberg (1990). Rajagopalan & Spreitzer’s (1996) research also shows that such inconsistencies may be addressed through utilising a multi-lens framework, rich theories and rigorous methodologies. In addition to this, many researchers take a one-dimensional approach to strategic change, viewing it as an organisation aligning itself with the external environment (Rajagopalan & Spreitzer, 1996; Smith & Grimm, 1987; Thompson, 1967), whereas the focus should be more towards coalignments and capturing the reaction of the environment towards the strategic changes made by an organisation. The concept of coalignment is explained in more detail in section 2.5.

Stacey (1995) proposes that within the concept of strategic change processes, which in literature has perspectives of strategic choice and ecology, a third perspective of organisations as complex adaptive systems (CAS) also needs to be included. Stacey (1995) argues against organisations adapting themselves in order to reach a state of equilibrium with their environments, and instead highlights that organisations need to operate in a non-stagnant manner, with the ability to be spontaneously dynamic. However, Houchin and MacLean’s (2005) empirical study critiques Stacey’s argument, and states that organisations may not be naturally complex adaptive systems but instead they are social systems that self-organise into a hierarchy and their seeking equilibrium, a state of stability, with their environment is a norm.

Nevertheless, Houchin and MacLean’s study was self-admittedly inconclusive, as their research questions the view presented by Stacey, but does not concretely refute it. Stacey (2010) revisits complex adaptive systems and instead proposes to view organisations from the perspective of 'complex responsive processes' as a challenge to systems thinking which focuses on organisational participants. Thus organisational strategy literature, more so literature on strategic change, is recently taking focus away from organisations as complex adaptive systems, emphasizing on strategic leadership (Burgelman & Grove, 2007; Mckelvey, 2010). Looking at long-term organisational performance and corporate longevity, Burgelman & Grove (2007) relate their research on leadership styles to literature on structural inertia and complex adaptive systems. They attempt to resolve two contradicting views, where one believes that superior competitive
strategy aids in longer organisational life (Porter, 1981) and the other believes that strategy does not play a role in corporate longevity (Collins, 2001).

Wiersema & Bantel (1992), on their research on the relationship between strategic change and demography of management teams, argued that continuous organisational alignment is a principal foundationary concept in the field of organisational strategy which can be achieved through appropriate and suitably timed changes in corporate strategy (Andrews, 1971; Mintzberg, 1979). Wiersema & Bantel’s (1992) research also highlighted that the demographic characteristics of management teams, such as demographic traits (managers’ age, organisational tenure, educational level, educational specialisation, etc) and demographic diversity amongst those traits, have a significant impact on the outcome of organisational strategy, such as performance and innovation.

### 2.3.3 Organisational Adaptation

Organisational researchers have long argued that for an organisation to survive it must adapt to its environment (Thompson, 1967; Porter, 1985), and research has continued in the direction of exploring what adaptation means and observing the way in which organisations react to their external environment (Barney, 1991; Bourgeois, 1985; Tung, 1971; Miller, 1987). Miles and Snow (1978) view adaptation as a "dynamic process of adjusting to environmental change and uncertainty" (p.547), whereas Astley & Van de Ven (1983) see it as a reaction to the environment by rearranging an organisation’s structure. However, a contradictory perspective towards organisational adaptation, the ecological outlook approach (Singh et al, 1986), takes an external point of view by focusing on organisational change by looking at natural selection and survival (Zajac & Kraatz, 1993). However, the stance of a study depends on whether they approach the research starting from an organisation then looking towards the environment, or the other way around. Yet, Volberda and Lewin (2003) criticise literature on adaption, arguing that research should abandon 'naive adaptation', which they define as the general view surrounding adaption, and instead consider co-adaptation as well as co-evolution where organisations and their sub-units adapt and evolve as their environments change. It can be argued that Volberda and Lewin wish literature to abandon the view that organisations adapt to environments, and instead adopt a perspective that organisations can impact environments, and as businesses change so do their environments.

Another debate surrounding organisational adaptation is whether this process can be explained by managerial action or environmental influence (Astley & Van de Ven, 1983; Bourgeois, 1984; Zajac & Shortell, 1989). However, Hrebiniak & Joyce (1985) argue that these occurrences are not mutually exclusive, but instead the interdependence and interactions between them make both
essential to clarify the dynamic adaptive process. This research regards adaptation as defined by Hrebiniak & Joyce (1985) as a proactive and reactive organisational behaviour of aligning internal capabilities with external contingencies, closer to the viewpoint of Miles and Snow (1978).

A significant contribution to adaptation comes from complexity science and was influenced by Ashby's (1958) law of requisite variety. Ashby's law states that for an organism to achieve a desirable output, its internal variety should match that of the external environment it faces. One of the limitations of this law was the lack of an agreed method of measuring this 'variety', arising from its vague definition in the context of managerial science. Beer (1984) attempted to define variety as "the number of distinguishable systemic states" (p.10), which later De Raadt (1987) operationalised as "initial events", "activities" and "outcomes" (p.535). Delving further into adaptive dynamic systems, Kauffman’s (1993) research into fitness landscapes led him to developing the NK model of organism evolution. Kauffman outlines that fitness refers to the rate of replication or infectivity of an organism illustrated by the height of a point in a landscape, with each point in a landscape referring to the proximity of organisms to one another.

The NK model has been adopted into organisational science and extended into the NKCS model (Vidgen & Bull, 2011). In Kauffman’s (1993) model, N refers the number of components within a system or organism, whereas K measures the level of interactions between each of the components (Levinthal, 1999, McKelvey, 1999b). The NKCS model, on the other hand, takes into account coupled organisms, C, and multiple species, S (Vidgen & Bull, 2011). Most of the literature on fitness landscapes for organisations has focused on conceptual and theoretical research (Levinthal, 1999; Levinthal, 1997; McKelvey, 1999b; McCarthy & Tan, 2000), with research rarely empirically supporting the model. The reason for this is that not only is the scope of collecting empirical data on a fitness landscapes quite wide, but the values attributed to N and K can be arbitrary and difficult to pinpoint, as well as the positivistic nature of the model. A complexity approach might explicate adaptation and coevolution further, but it also creates a problem for the methodology used to research this process.

2.4 External Environmental Complexity Literature:

2.4.1 Environmental Scanning:

External environment that an organisation operates in has been the main focus of various literatures; from observing the impact of the environment on the different characteristics of the organisation to how an organisation can survive or adapt in its environment (Porter, 1981; Emery & Trist, 1965; Lawrence & Lorsch, 1967b; Levinthal, 1991; Meyer, 1982; Tung, 1979; Dill, 1958). Lenz & Engledow (1986) categorise models for environmental analysis into five main types; i) industry structure model: assumes business environment to be dominantly shaped by competitive
forces (e.g.; Porter, 1979), ii) Era model: analysis societies over time, such as trends, technological use & development, ideologies, values, etc. (Yankelovich, 1982), iii) Resource dependence model: a broad analysis of resource, social structures and the natural environment (Aldrich, 1979), iv) Organization field model: focuses on mutually dependent organisations that are affected by either environmental contingencies or by changes made by one of the organisations (Thompson, 1967), and v) Cognitive model: where environment is viewed as being embodied in a cognitive structure that is made out of experiences (Weick, 1976).

Although there may be overlaps in the categorisations of the above mentioned business environments, Lenz & Engledow (1986) highlight that they have conflicting assumptions about organisational environments, how external environments change, and how organisations should gain knowledge about their environments. Frishammar (2006) revisited environmental scanning and offered four perspectives of i) adaptive, ii) resource dependence, iii) the cognitive and iv) population ecology perspective, which were built on Lenz & Engledow’s (1986) categorisation and were “concerned with areas as diverse as adaptation, external control, environmental creation and natural selection” (p.39). Frishammar offers more distinct and different perceptive compared to the environmental categorisations from Lenz & Engledow (1986).

Delving into different frameworks for environmental scanning, one of the most predominant models within the environmental analysis literature would be Porter’s five forces framework (Porter, 1981), which through time has been popularised, utilised in organisations as well as critiqued and rehashed. Porter’s framework looks at five external forces impacting a business: “threat of new entrants, bargaining power of customers, the bargaining power of suppliers, the threat of substitute products or services (where applicable), and the jockeying among current contestants” (Porter, 1979:102). Though this framework has been one of the most influential in the field of strategy, it has been criticised of not being completely applicable to emerging nations (Rugman & Verbeke, 1996), not recognising ability of business’ to influence governments (Narayanan & Fahey, 2005) and its over-emphasis on macro analysis as opposed to analysis at a micro level (Grundy, 2006) as well as being static rather than dynamic.

Freeman (2010) argues that, although Porter highlights that organisations can gain an advantage by keeping corporate social responsibility and their stakeholders in mind, his main focus is always on competitive strategy rather than on stakeholder theory. Freeman’s (1984) stakeholder theory, prominently used in business ethics and social responsibility, offers organisational management a way to identify entities in their business environment that may influence their decision making in order to perform well. Originally developed to tackle the problem of value creation and trade, stakeholder theory asks managers “to consider all the parties who will be affected by or who will
affect an important decision” (Freeman, 2010:33) such as investors, suppliers, employees, customers, trade unions, government, community, etc. Stakeholder theory has been criticised for still being in its youth due to lack of empirical evidence supporting some of its main proposals (Laplume, et al, 2008; Jones, 1995), and for overlooking that organisational boundaries are expanding to include complicated networks of interdependent stakeholders (Jones & Fleming, 2003). Jonker & Foster (2002) also argue that though Freeman did later try to highlight connections and processes between stakeholders, these were rarely included in the overall theory. In addition to this, it has also been argued that the interactions of stakeholders and their impact on an organisation is a complex multi-dimensional process that needs to be looked at from various perspectives (Jonker & Foster, 2002; Cannon, 2007; Aldrich, 1979). These stakeholders can be the government, the regulators, an organisation’s consumers, the labour pool, so on, all of which have an impact on an organisation.

Environmental scanning is important because in practice organisations both consciously and unconsciously monitor their environment before taking a strategic decision. However, the crucial aspect of viewing the environment is whether it is monitored from a subjective (or organisation’s perception) or from an objective (or archival) point of view (Boyd & Dess, 1993; Cannon, 2006). In their research on evaluating different perceptual and archival methods of environmental measurement, Boyd & Dess (1993) found that a manager’s perception of their environment is more fundamental towards changes made in organisational strategy, processes and structure compared to a managers understanding of an archival measurement of an environment. This supports the view that perceptual measurements are more advantageous when exploring an environment, and will be used in this thesis.

2.4.2 Complexity in the External Environment:
In order to study environmental impact on organisational form and adaptation, researchers have attempted to define and operationalise environmental dimensions and characteristics (Duncan, 1971, 1976; Doty, et al, 2006; Cannon, 2007). This research has gained greater momentum since the work of Emery & Trist (1965), who identified the mutually exclusive dimension of complexity and simplicity. The characteristics of complex environmental contingency are heterogeneity-homogeneity (Thompson, 1967; Lawrence & Lorsch, 1967a; Tung, 1979), dynamic-stability (Thompson, 1967; Lawrence & Lorsch, 1967a) and concentration-dispersion (Aldrich, 1979). Market heterogeneity (or diversity) and dynamics are explored by Thompson (1967) and Lawrence & Lorsch (1967a) as characteristics of environmental complexity (Jukovich, 1974). In addition to this, Aldrich (1979) has argued that perspectives of environmental complexity should be multidimensional, exploring the relationship between heterogeneity-homogeneity and concentration-dispersion, which was also approached by Dess & Beard (1984).
Research has often touched on environmental complexity, from its impact on an organisation’s strategy and performance, (McArthur & Nystrom, 1991) to its relationship to corporate entrepreneurship (Barringer & Bluedorn, 1999). However, environmental complexity has usually been treated as a construct, at times synonymously used with heterogeneity, which has rarely been operationalised in a broad manner. Cannon & St. John (2007) attempted to rectify this and identified four main factors of a complex external environment from previous literature; competitive complexity, market diversity, resource complexity and process or facility complexity. However, the limitation of Cannon & St. John’s (2007) operationalisation of environmental complexity is that it does not cover any regulatory or customer factors (as highlighted by Holm, Kumar & Rohde, 2012; Smith & Grimm, 1987; Jurkovich, 1974; Gao & Rafiq, 2009; Dill, 1958; Porter, 1981; Bourgeois, 1980) and has a narrow coverage of cyclical factors. However, Cannon’s (2007) model gives a good foundation for further research to take place.

Complex environments also shares similarities with ‘high velocity environments’, which is defined by Bourgeois & Eisenhardt (1988) as “those [environments] in which there is rapid and discontinuous change in demand, competitors, technology and/or regulation, such that information is often inaccurate, unavailable, or obsolete” (p.816). In their research, Bourgeois & Eisenhardt (1988) argue that in order for an organisation to achieve high performance, they would have to choose a strategic imperative according to the effect a high velocity environment has on the organisation. This also supports Aldrich’s (1979) research that managers make strategic decisions based on information they derive from an environment. Eisenhardt (1989) later argues that the level of performance for organisations in rapid and discontinuous environments is not only dependent on the type of decision taken, but also on how fast that decision is taken. McCarthy (et al, 2010) present environmental velocity as a heterogeneous multidimensional concept and they argue that it contains various dimensions, including technology, product, demand, regulatory and competitive. They argue that in order to measure the velocity of an environment, the rate of change within these dimensions needs to be measured, for example in order to measure technology, the number of patents granted in a given period would be looked at.

This raises the issue of whether complex environments should be operationalised objectively or perceptually. Cannon & St. John (2007) tackles this by operationalising environmental complexity using archival research methods. However it can be criticised that by using archival method of operationalising complexity constructs, Cannon & St. John (2007) were unable to take into account key constructs, such as ‘customer demand’, which Holm, Kumar & Rohde (2012) identify
as a construct. Thus, as evident from Holm, Kumar & Rohde (2012) and Boyd & Dess (1993), the most advantageous research method in this case should be perceptual.

2.5 Literature Review on Complexity Coalignment

Keats and Hitt (1988) did a study on the linkages between environmental and organisational dimensions and their relationship with organisational and market performance. However, they used complexity as a dimension of organisation, alongside munificence and instability, instead of using it as an environmental context. Their research outlines that complexity in an environment is linked directly to organisational divisionalization, which impacts an organisation’s market performance. In this respect, Keats and Hitt (1988) only took into account the heterogeneity & homogeneity as elements of complexity (Thompson, 1967; Lawrence & Lorsch, 1967), considering complexity as a linear concept rather than as a multi-dimensional context. In addition to this Keat and Hitt should have also considered stability & dynamism (Tung, 1979; Lawrence & Lorsch, 1967) and dispersion & concentration (Aldrich, 1979; Dess & Beard, 1984) as aspects of external environmental complexity as well. Another criticism of Keats and Hitt (1988) was that they were unable to consider broader associations, or the coalignment, that exists between elements of an organisation and its environment.

Coalignment has been associated with words and phrases such as congruence, matched with, internal alignment, which fall under the concept of organisational fit (Venkatraman, 1988, 1990; Drazin & Van de Ven, 1985; Thompson, 1967). However, due to the lack of agreed definition of fit and the distinction between concepts cause methodological challenges for research, which can be overcome by establishing an empirically supported unified definition. According to Drazin & Van de Ven (1985), research is divided between three interpretations of fit; selectional, where fit is seen as internal alignment between organisational context and structure (Perrow, 1976; Freeman, 1973; Fry, 1982), interactional, where focus is on relationships between organisational context and structure (Tushman, 1977; Ashby, 1956; Ashmos & Duchon, 2000) and the system's approach, which combines selectional and interactional views (Miller, 1986; Drazin & Van de Ven, 1985). Complexity researchers looking at alignment and adaption, usually take an interactional approach to fit (Ashby, 1956; Levinthal & Warglien, 1999; McKelvey, 1999; Ashmos Duchon, 2000).

However, Drazin & Van de Ven’s research focuses on internal alignment between organisational context and structure, as opposed to Olsen, West and Tse’s (1998) coalignment model which outlines that organisations align their internal environment with the forces of the external environment in order to survive as well as to improve performance.

Olsen, West and Tse (1998) define coalignment as the relationships that exist between organisational constructs and external environmental constructs, mainly strategy choice, firm
structure and firm performance and environment events. Olsen and Roper (1998) explored the model further stating that it looks at “the organizations seek[ing] alignment with the forces in their environment in order to achieve sustained performance” (p.111). However, Olsen, West and Tse (1998) focus on several internal organisational constructs associated with only one external construct of environmental events, which can lead to other constructs in the external environment that an organisation needs to align being overlooked. Comprehensive identification of the external environmental constructs and its alignment with internal organisational construct would ensure an organisation can more effectively gear towards market demand and opportunities defend against competition and to be able to continuously adapt to its environment (Fuchs, et al, 2000).

Previous research has also presented evidence that alignment of organisations with their environment enables them to be competitive (De Wit & Meyer, 2010), innovative (Lawrence & Dyer, 1983; Fiol & Lyles, 1985), improves performance (Snow & Miles, 2001; Prieto & de Carvalho, 2010) and ensures their survival (Thompson, 1967). Literature has also attempted to highlight that an alignment between forces driving change in the external environment and an organisations strategic choice, allocation of its resources and its performance with can lead to a competitive advantage for the organisation (Fuchs, et al, 2000; Powell, 1992). Fuchs’ (et al, 2000) delve further into the approach by outlining three modes of alignment: i) Elemental Alignments; the linkages of synergies that existed within an organisational group, ii) Group Alignments; relationships that exist between clusters, and iii) External Alignment; between the organisation and its environment.

2.6 Conceptual Theories and Framework

The review of literature has highlighted how studies in complexity from a natural science point of view are impacting on organisational science. Yet, application of complexity concepts in organisational science are still in the process of being developed further. The literature outlined also shows the gaps in the approach and current limitations in literature; such as many studies taking a one-dimensional approach to understanding a multi-faceted and intricate phenomenon, which then leads to inconsistencies in research (e.g.: Zajac & Kraatz, 1993; Fombrun & Ginsberg, 1990). As argued by Miller (1981), complexity research needs to progress away from the assumption that environments impact on organisations, and evolve towards exploring intricate relationships between environments and organisations, assuming the existence of non-linear feedback loops (Burgelman, 2007; Stacey, 1995; Williamson, 1983). Taking these arguments into consideration and building upon the literature reviewed, a conceptual framework for this research thesis has been developed, (see Figure 2), which has aided in the development of a preliminary research model (see Figure 3).
2.6.1 Conceptual Framework

Organisational adaptation is of great importance here as many theorists in the field of complexity believe that firms need to have flexible structures in order to survive. Burgelman (2009) believes that organisational inertia is needed to cause structural change or else businesses may get used to operating in a certain way, thus becoming blind to opportunities around them that are vital for survival (a phenomenon to which he refers to as the 'creosote bush conundrum'). Brown and Eisenhardt (1997) argue that organisations operating in a complex environment which requires them to have successful and rapidly innovative product portfolio have "semi-structures", which are flexible structures that "exhibit partial order, and they lie between the extremes of very rigid and highly chaotic organisations" (p28). Brown and Eisenhardt (1997) then state that the 'edge of chaos' is the middle point between organisations with highly flexible structures and those with very rigid structures. Brown and Eisenhardt (1997) continue to state that organisations which are continuously changing in "high-velocity" environments are likely to be viewed as complex adaptive systems which situate themselves on the edge of chaos. Brown and Eisenhardt (1997) use the concept of 'the edge of chaos' for a state of an organisation, whereas the 'edge of complexity' in the conceptual model is the state of coalignment between the organisational and the environmental complexities.

One of the main aims of this thesis is to demystify the measurement of complexity in the context of organisational science. In order to do this a conceptual framework is derived from the critical analysis of literature, which in turn contributes towards the development of the research model.
Figure 2 shows the research’s conceptual framework, which highlights the current understanding of the internal environment and external environmental concepts that contribute towards the understanding of organisational and environmental complexity, respectively. The feedback and linkages between these two environments then enables "complexity coalignment", which enables organisations, as well as environments, to adapt towards the edge of complexity (Brown & Eisenhardt, 1998).

The main concepts of internal environment of an organisation are "ambidexterity" (Duncan, 1976; Tushman & O’Reilly, 1996; Birkinshaw & Gibson, 2004), "strategic change" (Zajac & Shortell, 1989; Rajagopalan & Spreitzner, 1994; Stacey, 1995) and "organisational adaptation" (Miles & Snow, 1978; Bourgeois, 1984; Hrebiniak & Joyce, 1985). Each of these concepts, interconnected to one another, consist of different perspectives, which will be treated as mutually inclusive, perspectives that are seen to overlap, in order to adopt a multidimensional approach. Organisational ambidexterity, both structural and contextual (Gibson & Birkinshaw, 2004b), is interrelated to strategic change due to dual strategic implementation (March, 1991) and strategic changes to organisational form (Raisch, et al, 2009). Whilst strategic change, consisting of content and process perspective (Zajac & Shortell, 1989, Mitchell, Shepherd & Sharfman, 2010), is related to both proactive and reactive perspectives of organisational adaptation (Hrebiniak & Joyce, 1985) through organisations acting as complex adaptive systems by spontaneously self organising themselves (Stacey, 1995). The relationship between organisational adaptation and ambidexterity can also be seen through changes in the organisational structuration due to adaptation (Moldoveanu & Bauer, 2004).

The external environment shows the different continuums of heterogeneity-homogeneity (Thompson, 1967; Lawrence & Lorsch, 1967a; Tung, 1979), dynamic-stability (Thompson, 1967; Lawrence & Lorsch, 1967a) and concentration-dispersion (Aldrich, 1979) characterising it. The characteristics associated with environmental complexity, as seen in Figure 3, was found to be heterogeneity, dynamics and dispersion (Lawrence & Lorsch, 1967a; Aldrich, 1979; Cannon, 2007). Cannon (2007), attempting to operationalise environmental complexity, created a model which contained variables associated with these three constructs, explored in more detail in Figure 3. Thus, the interaction and feedback between the constructs of organisational and environmental complexities then enables coalignment of organisations, who position themselves at the edge of complexity (Brown & Eisenhardt, 1998). The complexity coalignment in Figure 2 shows dimensions of organisational and environmental alignment from the extremes of chaos and simplicity. Chaos is where systems are under the influence of uncontrollable complexity and unrecognisable unpredictability (Gleick, 1987; Daft & Lewin, 1990), whilst simplicity is where factors required to make decisions in an organisation are few and similar to each other (Duncan,
Here the concept of ‘coalignment’ is different from Thompson's (1967), in that it implies not only alignment of the organisation to its environment, but a continuous process of adaptation and alignment of the organisation with the environment, as well as the environment with the organisation.

2.6.2 Preliminary Research Model

One of the main problems in complexity research is the lack of an agreed definition and measurement in literature, more so for organisational (internal) complexity. Research for operationalising internal complexity has been more limited, nevertheless Ashmos, Duchon & Reuben (2000) conducted an empirical study on organisational environments in hospitals by using measurements of cognitive and interactional complexity. However, this research was also limited in its attempt as it oversimplified an intricate phenomenon and thus did not incorporate various factors. Cannon (2007) was the latest research to operationalise environmental (external) complexity, which was divided into four factors. However, there were two main limitations to this research; firstly there were other underlying dimensions that were not included, and secondly the research assumed a homogeneous environment for a phenomenon that is defined as heterogeneous in nature. It is also important to note that this research model is not definitive, instead it will be further developed by taking into account the perspectives of industrial experts.

![Figure 3: Preliminary Research Model](image-url)
The preliminary research model, as seen in Figure 3, shows the categorisation of organisational and environmental complexity that were primarily derived from the framework of Ashmos, Duchon & Reuben (2000) and Cannon (2007), which make the foundation for empirically formulating the antecedents.

**Internal complexity:** Ashmos, Duchon & Reuben (2000) outlined that internal factors consist of strategic & goal constructs (cognitive complexity) and interactional & structural constructs (relational complexity). As it can be seen in Figure 3, the research model has incorporated all the constructs, apart from "goal", which are included under "strategic" variables in order to avoid misunderstanding of the constructs. The additional constructs incorporated into the model are "task complexity", "agent orientation" and "contextual" complexities, which are supported by the literature review and the conceptual framework.

Task complexity is the degree to which the tasks in an organisation are routine (simplistic) or uncertain (complex) (Lawrence & Lorsch, 1967). Literature also emphasises the relationship between task complexity construct and the type of organisational structure (Burns & Stalker, 1961; Woodward, 1958). In addition to this, organisational structure is a prominent construct, with literature highlighting how organisations with more organic (less-formalised) structures operate in complex environment, whilst those with more mechanistic (formalised) structures operate in simplistic environments (Burns & Stalker, 1961; Lawrence & Lorsch, 1967). Organisational structure has also been related to interactional complexity and uncertainty (Lawrence & Lorsch, 1967; Davis, Eisenhardt & Bingham, 2008). Interactional complexity, as defined by Ashmos, Duchon & Reuben (2000) is the 'number and variety of participants' (p.582).

The Agent orientation variable of the internal dimension is defined as a cognitive process that looks at the way agents perceive their work, meaning whether they more focused on completing a task or creating social relationships (Lawrence & Lorsch, 1967). An agent has been defined by Axelrod & Cohen (2001) as an individual that is part of an organisation, such as a member of a team within a business. The contextual complexity can be defined as the diversity of different contexts, which are the "characteristics of the organizational setting, of the individual, of his or her role in the organization, and of any other environmental factor that may shape responses" (Rousseau, 1978: 522).

**External complexity:** Cannon (2007) hypothesized four factors for external complexity; competitive, resource complexity, process/facility complexity and market diversity, which are incorporated into the research model as constructs, with additional ones added to overcome its
limitations. The level of market uncertainty is a central issue in organisational adaptation to complexity (Duncan, 1972; Bourgeois, 1985; Milikien, 1987), which Cannon (2007) did not include in the model due to the objective nature of their measurements. In this manner Cannon’s (2007) objective measurements constrained his research by also assuming that organisations make rational strategic decisions based on non-subjective information. Additional variables incorporated in the model, especially in the context of complex telecommunication industries, are regulation (Smith & Grimm, 1987; Jurkovich, 1974; Gao & Rafiq, 2009; Dill, 1958).

In their conceptual paper Holm, Kumar & Rohde (2012) also argue that customer complexity needs to be included in multidimensional model of environmental complexity, as it is one of the main components that make an organisational external environment complex. They state that “based on the multidimensional conceptualization of complexity, a complex customer environment consists of many different customers with heterogeneous needs and where high technical intricacy is required to interact effectively with the customers and other stakeholders involved in the customer relationship management process” (p.393). Although this view is supported in previous organisational science literature (Porter, 1981; Bourgeois, 1980; Duncan, 1972; Dill, 1958; Kabadayi, et al, 2007), there is lack of empirical evidence to support consumer complexity as a construct that has been operationalised in environmental complexity literature.

**Complexity Coalignment:** Katsikeas (2006) defines coalignment as the way in which an organisation fits its strategies with its environmental context, whereas Miller (1988) views coalignment as a dynamic and cyclical process of organisations changing their strategies towards their environment and the environment changing itself by being affected by some niche changes in strategies. Coalignment also gives an organisation a greater chance of success, which can be seen from research that shows; relationship between different strategies and performance over different contexts (Ginsberg & Venkatraman, 1985; Venkatraman & Prescott, 1990), alignment of marketing strategies and environmental context improve performance (Katsikeas, 2006), for positive performance, an organisation needs to align its strategy and structure with its environment (Miller, 1988). Thus it can be seen that alignment looks at the relationships between internal organisational complexity, whereas coalignment looks at relationships between the internal organisational and the external environmental complexity. The Lukas, Tan and Hults (2001) study on Chinese electronics industry shows that fit of strategy with its environment gives organisations positive performance only in certain environmental conditions. Their research continues to highlight that a holistic approach to coalignment with environmental context is necessary that includes variables other than just strategy, but others such as organisational size and ownership structure.
2.7 Chapter Conclusion

This chapter highlights the main paradigms surrounding the development of the concept of complexity. The general literature that contributes towards the application of complexity in organisation science was critically looked at, followed by detailed evaluation of research associated with internal organisational complexity, external environmental complexity and the coalignment between the organisation and their external environment.

However, even though literature offers evidence supporting the benefits of organisational and environmental alignment, there has yet to be a model for complexity coalignment. Currently there is a lack of an empirically supported model that operationalises the constructs of internal organisational complexity. Though a model for external environmental complexity has been researched by Cannon & St. John (2007), it has limitations that the researchers themselves have identified. The main gap lies in the lack of existence of a holistic model of constructs of both organisational & environmental complexity and the relationships that exist between individual and clusters of constructs. A formulation of such a model will contribute towards filling the gap in research, as well as forming a base for future research. In addition to this, it will also answer the main research question of what the constructs of organisational and environmental complexity are, and what relationships exist between them.
Chapter 3 Methodology
3.1 Introduction
The third chapter will present and justify the methodology that was utilized for the thesis. The chapter begins with a discussion on the philosophical stance taken by the researcher. This is then followed by the critique of different research methodology, including a justification of the methods of data collection used by the researcher. After which the research is presented and explained.

3.2 The Philosophical Stance
The main aim of this research, as shown in Table 4, is to create a model of the constructs of organisational and environmental complexity in the context of the Mobile Telecommunications industry of Pakistan, which is formulated from empirical research. The researcher concurs with Silvester (2004) that before any methodology or process to procure knowledge is contemplated, the underlying philosophical position must be established (Cassell and Symon, 1994; 2004). However, one must also consider that philosophical stances are complex, and intricately entangled with various ontological and methodological positions. Majority of the research that applies complexity concepts to organisational sciences take a naturalistic approach (Levinthal, 1999; McKelvey, 1999b), assuming that laws that work in natural sciences will also hold true in organisational science.

The philosophical stance taken by this research will be interpretative, positioned closer to critical naturalism, which rejects logical positivism but holds a naturalistic perspective to an extent that science should go deeper than just establishing casual relationships and more towards exploring their mechanisms and process’ (Bhaskar, 1998; Denzin & Lincoln, 2005). As context of in which this study will take place, the Pakistani Mobile Telecommunications, has rarely been touched upon in complexity science, the approach of this research will assume that laws in natural science differ from those applicable in organisation science. Hence theoretical formulation will be induced, rather than deduced. Industrial participants will be interviewed, and a thematic analysis will be conducted on the transcripts.

3.3 Research Design
In order to conduct an exploratory research to find the constructs of internal and external complexity, the main target population was participants in the Pakistani mobile telecommunications industry. Thus the main participants, or the sampling frame, were participants who were employed by mobile telecommunications companies, industrial specialists from consultancy organisations or employees of the Pakistani Telecommunication Authority, the industrial regulator. Table 6 shows an overview of the research design.
Table 6: Overview of Research Process

<table>
<thead>
<tr>
<th>Target Population</th>
<th>Pakistan Mobile Telecommunications Industry and its Regulators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling Frame</td>
<td>Telecommunications Organisations</td>
</tr>
<tr>
<td></td>
<td>Industry Regulators</td>
</tr>
<tr>
<td></td>
<td>Industrial Experts</td>
</tr>
<tr>
<td>Sample Design</td>
<td>Purposive, non-probabilistic; snow ball</td>
</tr>
<tr>
<td>Sample Size</td>
<td>24 participants</td>
</tr>
<tr>
<td>Use of Interviewer</td>
<td>Interviewer administered semi-structured interviews</td>
</tr>
<tr>
<td>Mode of Administration</td>
<td>Face-to-face, where possible, else telephone interviews</td>
</tr>
<tr>
<td>Unit of analysis</td>
<td>Upper and lower level management</td>
</tr>
<tr>
<td></td>
<td>Industrial consultants &amp; analysts</td>
</tr>
<tr>
<td>Time Dimension</td>
<td>Cross-sectional</td>
</tr>
</tbody>
</table>

Sample sizes: Sample sizes for primary qualitative research are always arbitrary and much debated in literature. Guest’s (2006) research on data saturation concluded that after interviewing 12 participants, 86 percent of the total codes had been created, and interviewing 5 further participants only created an additional 4 percent new codes. In qualitative complexity research, sample sizes vary: Duncan (1972) carried out 19 semi-structured interviews in the first phase of their research on the contribution of environmental complexity and uncertainty on decision making; Brown & Eisenhardt (1996) conducted between 7 and 12 interviews to create 7 cases about continuous change in complex environments; Amason (1996) interviewed 15 managers about the effects of functional and dysfunctional conflict of strategic decision making; Adler (2005) interviewed between 15 to 22 participants over four units whilst researching the management of task complexity and interdependence; Ceja & Navarro (2011) conducted a longitudinal study that covered 60 interviews relating to dynamic pattern flows in a workplace from a complexity science approach. Thus it can be seen how sample sizes differ usually according to the research scope, topic clarity and quality of information (Morse, 2000). Keeping this in mind, the researcher aimed to interview between 18 to 25 high and low-level management.

Sample design for this research was purposive (non-probabilistic) and utilised snowball sampling. Purposive sampling, where the participants to be interviewed are selected by the researcher due to their appropriateness for the study, is the best sampling technique where the purpose of the research is ‘exploration’ or ‘theory development’ (Gilbert, 2002). Snowball sampling technique was used to find appropriate participants that wanted to participate in the research. Snowball, or chain sampling, is defined by Miles and Huberman (1994) as identifying participants, by asking participants to contact others who they know that are suitable for the study. This sampling technique was employed because those in the Pakistani telecommunications organisations, like various other organisations in Pakistan, are not easily accessible for research unless referred to by a contact.
To ensure quality of information in the research of organisational complexity, senior management would be an appropriate unit of analysis. On the other hand, senior management may envisage the strategic directional for the organisation based on their perception of the business and its environment, yet it is the managers that further interpret and implement the decisions passed onto them (McKenna, 2001). Table 7 below shows the overview of the number of participants interviewed, their organisations and management rank. Upper-management category means participants held official titles of "Chief Executives", "Directors" or "Head of Department", whilst middle-management included participants which held the title of "Senior Manager", "Assistant Senior Manager" and "Manager".

<table>
<thead>
<tr>
<th></th>
<th>Delta</th>
<th>Epsilon</th>
<th>Zeta</th>
<th>Omicron</th>
<th>Sigma</th>
<th>Consultants</th>
<th>Regulator</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper-Mangement</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>15</td>
</tr>
<tr>
<td>Middle-Mangement</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4</strong></td>
<td><strong>2</strong></td>
<td><strong>5</strong></td>
<td><strong>4</strong></td>
<td><strong>3</strong></td>
<td><strong>5</strong></td>
<td><strong>1</strong></td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>

The researcher also aimed to interview at least 2 participants from each organisation within the industry of Pakistani Telecommunications in order for the research to capture an all rounded industrial perception of the constructs of organisational and environmental complexity, and their coalignments.

3.4 Research Methodology

**Interview Method:** King (2004) states that there are various qualitative interview types, including 'structured', 'semi-structured' and 'un-structured', each of which share common characteristics amongst themselves under this umbrella. 'Un-structured' interviewing would be less relevant due to its amorphous nature, which may be more advantageous in circumstances where researchers believe a structure would hinder genuine views of respondents (Bryman, 2004). Meanwhile 'structured' interviews, seen as having a positivist approach (King, 1995) and akin to surveys with slightly more flexibility (Hartley, 1995), would be inappropriate where the research embarks on exploration in order to theoretically formulate rather than embark on the verification of a rigidly set framework. ‘Semi-structured’ interviews will be most appropriate for this study as it will enable the researcher to formulate a model based on the views of industrial participants, whilst utilising a preliminary research model derived from a pre-designed conceptual framework.
The method of primary data collection will be interviewer administered semi-structured interviews. In addition to this, secondary data, in the form of organisational documents, annual reports and marketing reports & bulletins, obtained either directly through the organisations, their websites, or the website of the Pakistan Telecommunications Authority, was also referred to.

**Interview Structure:** Before the interviews would take place, the interview questions were drafted in order to answer the overall research questions. Two separate drafts were made; one for participants working in telecommunications organisations and the second for regulators, consultants and other industrial specialists. Both these drafts contained the same questions, with the difference in wording depending on the participants questioned. Four additional participants were then chosen to pilot the interview questions, which revealed that some questions had to be re-worded to enhance participant understanding. For example, it was found that when the participants were asked what the factors of "organisational complexity" were, they were unsure what the questions meant, thus this question was re-phrased to "what are the factors which determine how complex your organisation is".

The final semi-structured interview instruments had three sections; i) organisational complexity, where the aim was to ask participants to highlight the constructs of internal organisational complexity, ii) environmental complexity, where the aim was to ask participants to highlight the constructs of external environmental complexity, and iii) coalignment of organisational complexity with environmental complexity, where the aim was to ask participants about the relationship between the different constructs. There were around 7 to 10 questions in each section of the interview, with the total interview time to be estimated at around an hour to an hour and a half. See appendix 3 and 4 for the final interview instrument.

Once the interviews were piloted, and a final version was prepared, an outline of these questions was then sent to participants approximately 24 hours before their interview would take place. The outline would enable participants to have a chance to look at the questions in their own time, be prepared and ask any questions that they may have prior to the research. The participants were then interviewed, with consent taken to record the interview.

**Data Collection Process:** All the mobile telecommunication communication companies, and the regulator, PTA, were contacted personally by the researcher, after being referred to them by either a mutual acquaintance or through a public directory. The industrial experts and consultants were identified through PTA’s website, which lists around 40 different industrial specialists with experience in financial modelling, international bandwidth, regulations & operations, e-
Government services, radio networks, so on. These experts and consultants were then shortlisted by making sure they specialised or had experience in operations, regulation, telecom service, planning & management or competition analysis.

All the candidates were then contacted and spoken to, in order to introduce them to the research, and asked if they would be interested in participating. Initially 52 candidates were contacted, out of which: 15 agreed to participate; 13 highlighted that they do not deem themselves as being the correct candidates for the research but referred the researcher to others in their organisation or line of work they thought would be more applicable to the study; 17 candidates could not be reached; and 7 refused to be interviewed. 25 additional candidates were added to the list, due to the reference of other candidates, out of which: 8 agreed to participate; 1 referred the researcher to another candidate who agreed to participate, 14 could not be reached and 2 refused to participate. Those who agreed to participate and those who could not be reached were then emailed with an introductory letter (see Appendix 1) that included a "Participant Information Sheets and Consent Form" (see Appendix 2), and were asked to reply with a time that was convenient for them to have an interview that may take up to 90 minutes of their time.

One of the main hindrance in conducting interviews in Pakistan was that during the period the research was being conducted was also the period when the entire nation practices the Muslim Holy month of Ramadan. During the month of Ramadan it is obligatory for all adult Muslims in Islam to fast during the daylight hours. According to research by Roky, et al. (2000), fasting decreases cognitive performance, alertness and mood. This was a hindrance to research as the Government of Pakistan also officially reduces total working time from nine hours a day to six hours. Also, its culturally impolite to contact anyone after working hours until after the last prayer of the day, which would usually take place around 10 pm, it was at times difficult to confirm a time to interview participants. At the end of the month of Ramadan, the government of Pakistan declared four official working days as a holiday to celebrate the festival of Eid. As this was also in the summer, many of the participants had affirmed that they would be going out of the country with their families for up to a month, by combining the official holidays with annual leave. Thus, this not only meant that data collection took a lot longer than usual, but some of the participants who had agreed to participate could not be interviewed due to the timing issue. In order to overcome this constraint, participants were also given the choice for phone interviews, so that they could give a time when they were most comfortable to give an interview.

Method of Analysis: After the interviews were taped and transcribed it was decided that analysing them using a thematic analysis would be most appropriate as it is a well-structured approach that will enable the preliminary research model to be researched and further developed
it according to the empirical data related to a context rarely explored. Boyatzis (1998) defines thematic analysis as a “process of encoding qualitative data” (p.iv) by the use of models, themes or other forms of codes.

Another reason for choosing a thematic analysis is the degree of flexibility that this approach provides, open to amendments when applicable (King, 2004). Other analysis techniques were also explored, such as content analysis, a technique which systematically and objectivity makes general deduction (Holsti, 1969), but it was rejected because in comparison to thematic analysis it is a lot more rigid and positivistic in its nature. Thematic analysis, however, can be used within a wide variety of epistemological positions, including within the research’s critical naturalist perspective (King, 2004). Content analysis would also have limited relevance for the research on hand, as it may be beneficial in the minimisation of researcher bias and would increase chances of generalisation, enabling application of statistical analysis to be carried out, but it would only aid in confirmation of theory-driven codes and not in the exploration of the phenomenon or the development of model (King, 1994).

Another method of analysis considered was grounded theory, developed initially by Glaser & Strauss (1968), which is a popular method used frequently in qualitative research and in the discovery of a theory through the analysis of data (p1). Unlike template and content analysis, grounded theory does not have an initial conceptual framework to begin with, but instead begins by uncovering a “conceptual scheme in a contextual way” (Lanisalmi, et al, 2004:243). Grounded theory aids in the understanding of a reality distinct to a particular group (i.e. a particular organisation), which helps in the identification and understanding of culture and meanings within the context (Lanisalmi, et al, 2004:243). Another advantage of the grounded theory is its degree of flexibility in theoretical conceptions, arguably greater than that of template analysis. However, this can also be considered as the theory’s weakness, as the greater the degree of flexibility; the more the research will be considered to be unreliable and invalid. Thematic technique, in contrast, has a degree of structure, based on a priori theory, which can credit it with greater validity and reliability than grounded theory. In addition to this, it was decided that NVivo would be used to by the researcher to organise interview transcripts and identify constructs of complexity and their relationship with one another.

3.5 Chapter Conclusion

Taking a critical naturalist approach, the researcher decided upon conducting a qualitative research by collecting data using semi structured interviewed. The justification for using semi-structured interviews were given and the appropriate sample size for the research was discussed. After evaluating previous literature, the researcher decided that the most appropriate sample size
would be between 18 to 25 participants. This was followed by the critique of different method of data analysis, which led to the conclusion that thematic analysis was the best for this study. The software NVivo was used to aid the researcher in organising interview transcripts and identifying constructs. This chapter also introduced readers to the research design as well as a brief outline of how the researcher contacted the participants, whilst highlighting any difficulties encountered.
Chapter 4 Research Analysis
4.1 Introduction
The main research question was to find what the constructs of organisational and environmental complexity are, and what relationships exist between them, as perceived by industrial participants in the Pakistani telecommunications industry. This chapter will attempt to answer the main research questions, as well as its sub-questions (see Table 4), in the fourth chapter, which is split into three main sections. The first section will examine constructs in the preliminary framework, and analyse all the constructs that participants have identified that are related to internal organisational complexity. This will be followed the analyses of all the constructs related to external environmental complexity. Finally, the relationships between these constructs will be explored, as identified by participant interviews. Each section will include a definition of each of the constructs, as highlighted by participant interviews. Each of these sections will end with a diagram that illustrates the constructs and the relationships between them.

4.2 Internal Organisational Complexity
The analysis in this section will present evidence supporting constructs of internal organisational complexity. This was asked in the first section of the interview, which consisted of 10 questions (see appendix 3 and 4), but at times participants mentioned constructs related to organisational complexity in other sections, which were coded.

4.2.1 Agent Orientation
As anticipated in the preliminary framework, one of constructs perceived to be part of the complexity within an organisation was the human resource. One of the senior managers belonging to Zeta commented:

"This is from my personal belief but organisations get complex primarily due to the human resource that are working for the organisation"

When asked to expand on how organisations get complex due to their human resource, he stated that this was because:

"...how a people drive[s] the organisation, how the people working for the organisation lead the organisation, for example every organisation has certain policies and certain procedures. The ones that make those procedures or the ones that lead those policies are actually the ones who define how complex those procedures are or how easy they could be."

The above participant attributes organisational complexity to employees that have the power to amend policies and procedures. He justifies this by highlighting that these employees can, to a
certain extent, complicate or simplify organisational complexity. This was also supported by one of the participants that is the head of a department for Delta, who stated:

"Let’s start with the type of human resources that we have. We have less complex culture if we had human resource that was pretty much aligned or have the same vision of how things are done in respective division, for example, we have a technical function, customer care function, each function has its own culture. So they have their own style of running that department. We don’t have what is known as organizational alignment where we consistently see the same culture across the entire company...we don’t have that and because at the senior level the guys who head the respective functions they have the personalities that are larger than the actual department itself. Their personalities drive that respective department. So those complexities, first of all are driven by kind of people that we have. If we have a better induction or better recruitment system in place, where we hire people that fit a particular type of profile, if we can do that then we have a more consistent culture."

In this respects the participants above are highlighting that a factor of organisational complexity is the orientation of the human resource and the management approach. In addition to this, it can be argued that the participant believes that the lack of consistencies of cultures between departments means greater complexity within the organisation.

A senior manager at Omicron also discussed employees of an organisation as an element of organisational complexity, which means that the greater differences in the personality of agents could lead to a higher level of complexity within the organisation. However he related complexity of the human resource to be attributed to their level and quality of their education:

"To some extent organisational complexity is caused by the people involved. What I mean by ‘people involved’ is the kind of HR, people that you recruit. If you are recruiting from top notch schools here, you would have a different mindset, people that are more inclined to go get things done, and they want to stretch targets and achieve and be rewarded, whilst other kind of organisations don’t really have that. They have people who just want to sit there, go to their office from 9 to 5 and get it over with and go back home, and none of them care[s] what the organisation is doing."

This provides evidence that the orientation of agents, which is the way in which employees of an organisation behave, is an element of complexity. Thus, under the construct of 'Agent Orientation', three constructs of 'Agent Goal Alignment', 'Agent Personality' and 'Agent Skills and
Experience' can be identified. 'Agent Orientation' was a construct identified in the preliminary framework, however its sub-constructs that were highlighted by industrial participants, were not.

4.2.1.1 Agent Goal Alignment
Individual organisational agent’s goal alignment was mentioned by various organisational participants interviewed. However, the process of having agents align their goals to that of the organisation was perceived as one that should be controlled by the organisation. The senior manager at Omicron, when asked whether their organisation can control the factors that caused complexity in the organisation stated the following:

"I think they can with some of the factors, but then they are caught up in doing things in a particular way. For example; if you want your employees' goals to be tuned into the company's goal, you have to spend money on it. And you have to give them huge bonuses and perks, and this and that and keep them happy. So its related to the cost."

Another participant from Omicron, a head of a department supported this view and stated:

"If an organisation wants to turn their employees' motivation towards its goals, then the organisation have to see money at the end of it, or else they will not do it."

Thus it can be seen that the process of 'Agent Goal Alignment' is perceived as being controlled by an organisation, however the organisation has to see the financial reward if they are to have its agents align their goals to that of the company.

4.2.1.2 Agent Personality
The personalities of those working in the organisation was also stated as one of the constructs of organisational complexity by various participants working within the telecommunications organisation as well as industrial specialists. One consultant interviewed stated the following:

"People are so closed minded, and companies very individualistic and selfish and their CEO's are the same."

A senior manager at Zeta also believed the direction of the organisations was attributed to the personality of the employees of the organisation. He stated the following:

"As people have been moving up the ladder, there have been instances where things have been done just based on egos, which actually effected the industry and the telecommunication's
environment as well."

A head of department at Zeta, also commented that one of the factors of organisational complexity was aspects of personality, such as ego, which made the operational of teams within a business more difficult. He explained this further by stating:

"Basically if you have a team that actually thinks as a team. things can be done a lot easier, aside from normal stuff like egos, which are normal things we can work out. I don't think you can say these are problems that will be affecting us in the long term. These are things that as a growing company we can work out."

4.2.1.3 Agent Education, Skills and Experience

When the head of the department for Omicron was asked to explain why he believed educational levels contributed to organisational complexity, he stated the following:

"It affects in the way that people who want to get the job done and they have individual goals that are aligned with company objectives as well, they don't come to just to sit in the office. They are quick to respond, they are more energetic in their responses. They take more interest, and then things get analysed in their way, the more the thought processes in the meeting. Otherwise other people, they just want to spend time and they come by, not do work and are not committed. Then if you are working with them then things are at a standstill, you get caught up in a bureaucratic processes. And things just keep on not moving."

The above is an opinion of a participant who believes that employees with a higher level or quality of education are able to work more efficiently and effectively within the organisation. Thus it can be seen that this participant believes that the level of education also attributes to how much employees are disciplined in their work habits as well as their level of commitment to the organisation.

In addition to this, a consultant commented on how the experience of the agents in the industry attributed to complexity within a particular organisation. Participants believe that the longer an agent has worked in the industry, the chances are that they have worked for more than one organisation. Which means that the experience of working for more than one organisation, can denote to the transfer of complexities between organisations through their agents. This industrial specialist states:

"Interestingly if you ask any of the people who have 7 to 8 years of experience of telecom sector,
most of them would tell you that they have already worked for 3 to 4 of the telecom organisations in Pakistan. So this is what I meant from it that yes the environment is very complex.”

This was also highlighted by various participants of different organisation who also pointed out that many of the participants 'job hop' from one telecommunications organisation to another within Pakistan. Another participant, one of the senior managers in Sigma, who had previously worked for Omicron, articulated that this was attributed to the HR practices of the organisation:

"There is a lot of employee turnover and job hopping. There’s no sense of attachment to the company or loyalty, because of all these practices. If the HR was to be strong and it would look after you, like for example Omicron. They are good with HR practice, employees working for them, if you talk to them, they are very satisfied, you don’t often hear them criticize the organisation."

It may be argued that the rapid churn and transfer of employees between organisations may mean that there is not a lot of difference between organisations if agents are able to transfer easily. However, it could also mean that organisations are more focused on hiring from their competitors than they are in retaining their current employees. Another member of Sigma also commented on their organisation’s HR practices:

“HR is a department that is supposed to look after the employees wellbeing and benefits, but somehow the only job HR does over here is dispensing salaries, and hiring and firing and that’s about it. There’s was no development, to a certain level. Now more and more companies are working on employee personal and professional development, but only organisations don’t really care about personnel and professional development. There are no trainings, no proper trainings that should be in place. To start off with our companies don’t develop HR, developing their human resources. They are not even bothered, in return the employees are not even bothered. You just do what you have to do”.

This would suggest that 'job hopping', as a phenomenon, is linked to the extent to which organisational policies attempt to increase employees' job satisfaction; the more these policies are improved, the less employees will leave their job for a rival organisation. However, it is uncertain whether employees within this industry frequently change jobs because they are dissatisfied with their current organisation's human resource policies, or because they are attracted by a rival organisation's human resource policies. In addition to this, 'job hopping' in this particular industry might be associated to other factors such as the close networking of agents within the industry which may mean when an organisation has a job vacancy, they will prefer to hire someone within the industry that they may know, rather than from outside the industry. This
is further explained by a manager in Sigma who, when asked if agents ever return back to a telecom organisation they used to work for after working for other telecom organisations, stated:

"Yes they do, there have been cases where they do, but mostly its people who are very sought after who do what they do, they often move back to the companies. Employees are like commodities, especially for some companies they are very expendable no matter how much work they do. That in the sense complicates the situation as well. Because you don't have the sense of company loyalty because no matter how much you do or you put in, you are still very dispensable to the company."

An agent's educational level is identified as a construct as many relate this to an agent's attitude and motivation towards their work environment. The experience and skill that agents develop within an organisation is a construct identified by many participants as causing complexity due to organisational policies that develop their employees' skills and the experience the agents develop by moving amongst the different organisations within the telecommunication industry, which thus causes complexity within an organisation's internal environment.

4.2.2 Contextual Constructs

Many participants identified constructs that caused complexity within the organisation that were contextual. These are constructs that relate to the internal context of the organisation, and hence differ from one company to another. Participants identified four main contextual constructs; organisation culture, influence of headquarter or foreign investor culture, organisational experience and interaction within the organisation. The preliminary framework includes 'Contextual' complexity, however, its sub-constructs of 'Organisational Culture', 'Influence of Foreign Shareholder's Culture' and 'Organisational Experience' were added to the final framework as they were identified as constructs of internal organisational complexity by participants interviewed.

4.2.2.1 Organisational Culture

Organisational culture was one of the most prominent constructs identified by both industrial experts (consultants) and industrial participants interviewed. The participants believe that culture is a set of shared values and beliefs. Some define it as a set of shared beliefs about religion, national values or organisational values. One of the consultants mentioned organisational culture and values when they were asked what factors they perceived to contribute towards organisational complexity:
"I would say both organisational culture and their values would determine complexity. What kind of culture and values the organisation has determines its working environment. What complicates this further is our Pakistani culture affects the organisation, then as you know all the organisations have shareholder’s external to the organisation, the foreign culture also impacts the organisation. Both of these combined impact the organisation’s own culture."

A senior manager in Omicron also confirms that organisational culture determines complexity, and highlights how it impacts the organisation’s working environment. He states the following;

"When you talk about the culture of the company, I compare it with other organisations in Pakistan. Before this I have worked in [a] government organization, if I compared it with that I would say it's very different, it's very easy because you talk about things like, there is no bureaucratic culture in Omicron, that’s where it is very chilled out."

When asked what 'bureaucratic culture' meant, the participants stated that it was when an organisation was rigidly structured and agents were expected to follow that structure. Another senior manager of a different department in Omicron gives further details on how the organisational culture impacts the organisation as a whole:

"If the internal culture is really pathetic, then people in the organisation are not going to be very happy, it won’t be easy to get an output out of them. So I think internal cultures should set in place, so a professional feels comfortable, they are happy, they have job satisfaction, and in turn, they will produce the best output that they can. There will be organisational loyalty, there will be less people leaving the organisation and there will be more coherence and more teamwork, and that will in general give a better result for the organisation."

According to this participant, it would appear that organisational culture, to a certain extent, can be controlled by an organisation itself. There is also a perception that the culture of the organisation impacts productivity and employee loyalty.

A head of the department for Delta highlights that each organisation has its own culture, even though their structures might be similar. He states:

"When talking about the culture there are particular differences for each company because of their mandate but in terms of service provision and the backend structure of business is pretty much same for all telecom companies in Pakistan."
Another employee of Zeta compared his previous working environment in another industry to the telecommunications organisation he was working for currently. He states:

"When I was working in United Nations, these things were very important like gender sensitivity, human rights, making sure that people were not overworked, but in the telecom sector these things don't really matter first. You have to deliver whether you work four hour a day or you work twelve hours a day, it doesn't matter, you have to deliver, you have to get the results that are required for the organization to keep surviving."

The participant above relates the working environment of a previous organisation in another industry with a current telecommunications organisation he works for. He highlights that the work pressure in a telecommunications industry is greater, which he attributes to an organisation's culture and its aims. A manager working in Sigma also commented on his organisation's culture and how it could be a hindrance to business functions:

"[Sigma] is complex, there is a lot of things that, I mean, if there weren't there, it would make our lives a lot easier. There are a lot of people that have vested interest with other functions that they have. It creates a lot of hindrance for us doing our job. Other than that, the company I work for, I would say, if you look at it in terms of politics, it's one of the most complex organisations out there. Even though the teams we have [are] smaller in number, and you would think this would keep the politics down but somehow it complicates it more."

This further supports the view from the Omicron and the Delta participants before who perceive culture is controlled or derived from the main organisational policies or 'mandates'. The way in which organisational culture causes overall organisation complexity, as highlighted by one of the participants, is that it 'hinders' operation. Many participants state that organisational culture differs from one Telecom's operator to another, and that the culture is in flux due to pressures from foreign investors, local country culture and the organisation's mandates.

4.2.2.2 Influence of Foreign Shareholders Culture

After identifying organisational culture as a construct, many other participants also highlighted cultural influence from foreign shareholders. All of the five telecommunications operators in Pakistan have major foreign shareholders which are based in various parts of the world from UAE, Norway, China and Russia. A consultant highlights this impact of foreign shareholders on their respective Pakistani organisations and states:
"As I said that Companies that have come from abroad or they have set up their extension in Pakistan, their core remains the same. Values remain the same. They try to bring in the same culture. They come up with the same values and culture and make sure that those values are retained. These are the things that also determine the organizational complexities."

From the above statement, it can be argued that the participant believes that foreign shareholder's try to impose their organisation's home culture onto their subsidiary in Pakistan. The participant believes that the combination of the imposition of a foreign culture coupled with the local organisational culture of the Pakistani telecommunications operator increases organisational complexity. An employee working as a senior manager for Omicron also highlights this:

"Because all telecom operators in Pakistan are foreign owned, that makes it complex. So I think it is always the agenda of the foreign owners for local companies in Pakistan to operate in one way. It's not really about what is really happening. For example for someone like Omicron, they are looking into every dollar and every cent being spent. So it's about the function of the foreign owners and the size of the organisation and the regional objectives as well. It's like Zeta or Sigma are in a state where they want to add subscribers and they want to grow while Delta and Omicron are more in a consolidation mode. And it's more to do with company strategies as well and what their objectives are."

This participants highlights that companies that have come into the Telecommunications' industry from abroad have an aim to try and replicate their headquarter culture in their subsidiaries. In addition to this the participant highlights that foreign shareholders also try to impose strategies used in their host organisation onto their subsidiaries. One of the Head of Department for Zeta, when he was asked about factors that determined his organisation to be complex, he stated:

"I would say it's the parent company's culture, which would include what kind of investors do you have, so if your majority [of] investors are European their concept of laying down the rules and creating a very good internal satisfactory environment, which is very important to them, which to the Chinese is not that important, who just want you to work hard, and their concept is that people who work hard remain satisfied on their own. So I think the key thing is that the principle company's culture and what society they come out of."

This view is further supported by another employee of Zeta who is a Senior Manager in another department who outlined that they also believed their parent companies culture determined how
complex their organisation is. When this participant was asked to explain why they thought this, they stated:

"Its complex in the fact that we are run by a Chinese company. Which is in the fortune 500. But the way they have done it is that back in the day [they] had a monopoly in their market in China. The only complexity which I can outright tell you right now would be just the difference of strategy. This organisation is used to being the largest player in the market in China, whereas over here they are the last player in the market. Because they have come last into the market. They already had to face Delta, Omicron, Sigma and they were all established companies over here and people know them. Now you're bringing in Zeta which is the latest player in the market; how do you go and adjust from being the strongest player in one market and then being the newest player in another market, having to compete with companies that are already established like Delta and Omicron."

The point raised by this participant is interesting as not only do participants believe that a parent company's culture affects their local company's culture but also that the parent company wants to replicate their strategy in their subsidiary company as well. A third participant, who works as a director for Zeta, highlighted that one way their parent company is influencing Zeta's culture and strategy is by making sure their top management are Chinese, which cause's further complexities in terms of cultural differences and communication. This participant had the following to say:

"I would say explaining it to the Chinese is difficult, because in Zeta, only the top management are Chinese, the rest of the management is all Pakistani especially middle management. They, I would say are still working, because they are hired through all the different operators, so as far as the language barriers are concerned, we still face that issue because we can't explain things to the Chinese. Secondly the Chinese are not used to the Pakistani culture here, especially the regulatory government, so I think that gap causes a lot of complexity at every level. It can cause miscommunication, but most likely if a project or product proposal that needs to be approved, there would be so many times we have to go back and forth trying to explain it a different way. In a way as in the Chinese are used to doing things in one way and people here, the Pakistani management team, are used to doing things in another way. So you are obviously going to have a lot of conflict and complications here anyways."

Another participant working for Zeta highlights that the 'Chinese mentality' influences Zeta to operate in a certain way. He highlights that one way they operate is that they prefer to do business with other Chinese organisations.
"One factor would be the Chinese always, they prefer to have business partners who are Chinese, for example if there’s an open competition of which companies to pick for a particular job, there has to be a Chinese company involved. In that way the Chinese mentality is strong and they want to work with their Chinese companies. Why? Because the problem is politics, such as the Chinese. What I am trying to say is that if we really want to get things done then we can go with a company like [foreign company, name omitted]. Which is a well established company, which can setup a good network around here. But problem is being a Chinese subsidiary, we are having to choose between only the two companies that would be [Chinese Company A] and [Chinese Company B]. But the problem with that is cheaper does not always mean better."

Though there could be various other reasons why Zeta prefers to hire Chinese organisations, such as lower transactional costs, the participant above perceives that because most of the organisations that Zeta grants contracts to are Chinese, that this decision is the preference of Zeta's Chinese shareholder due to their cultural background. Participants in Omicron also highlighted the influence of their parent company's culture as a construct that impacts the level of their Pakistani subsidiary's complexity. One of the participants states the following on this:

"I would say Omicron Pakistan is not very complex as an organisation. I think the history is from Norway and that's how things work in Norway, it's in the nature of an organization's people they like to do the things in [an] easy way and we have identified all the same policies in Omicron Pakistan so I think that could be the main reason."

An independent consultant also support this view when he was talking about Omicron:

"Omicron is a Norwegian based group. Values that they bring in from parent organization, where innovation is encouraged, rather than here. If I wanted to do the same in a Pakistani based operator, I will never be able to do it. Too many people will pull my leg, there would be too many hurdles."

A Director interviewed in Omicron also highlighted that their parent company has specific agenda's and regional objectives that they want Omicron to follow. He states:

"All telecom operators in Pakistan are foreign owned. So I think it is always the agenda of the foreign owners for example local companies in Pakistan operate in one way....For example Omicron [is] looking into every dollar and every cent being spent. So it's about the function of the foreign owners and the size of the organisation and their regional objectives as well."
Another manager from Omicron also stated that the organisation was replicating their global structure:

"They do things in a particular way which they try to replicate across the markets. Because their relationships are roughly structured in the same way."

A senior manager in Epsilon also supported this view:

"I think the parent company or people who have invested their money, their style of management, their vision of HR, and how they want to do things before mission and before value. I do think that these things also influence organisational complexity."

An independent consultant who has had years of experience in the Telecommunications industry highlighted how a parent company or a foreign investors’ culture impacts their subsidiaries in Pakistan:

"The parent company, the culture is derived from the parent company, you know. So for example, Omicron, they don't panic if all of a sudden there is a shock in the market. They devise this strategy at the beginning of the year, they hold on to it, they don’t react to small events. But Zeta tends to react a lot, for example if Sigma launches a package, and Zeta is threatened by it, all of a sudden they will try to come up with a new package. Omicron wouldn't do that, as they are very level headed, they are very cool headed. They don’t get shaken up, but once again that’s the result of being Omicron, Omicron having enough experience in developing markets to know how to behave."

Another industrial specialist, head of his telecommunication’s consultancy company in Pakistan, further summarised the impact of foreign shareholder culture impacting their subsidiaries:

"If you look at Pakistani telecom market, you see none of it is original any more, most of it is imported. All the Pakistani large [telecoms], are actually owned by large groups. And normally what you see is organisational complexity, they have been imported from outside and changed as per Pakistani requirements."

Thus is can be seen that various participants strongly believe that cultures of foreign shareholders greatly impacts a Pakistani telecommunication’s internal organisational complexity. This is usually due to foreign organisation’s replicating their culture within their subsidiaries. This makes the operations of a local telecoms operator in Pakistan quite complicated due to the differences
between cultures which further impacts local agents, the internal relationship's of the organisation and the ability of the business to make decisions. It can also be argued that the issue here is about the alignment of parent company culture with the pre-existing local culture, and the frictions between these cultures cause greater organisational complexity.

4.2.2.3 Organisational Experience

Another construct that many participants highlighted as being a part of organisational complexity was organisational experience, which was how long the organisation had been in operation and what it had learned during its lifetime.

A Director for Zeta describes organisational experience as determining how complex an organisation might be:

"A lot depends on the period of life of the organization which determines how complex it is likely to be. Since we are youngest operator. In terms of the fact that we have been around for 3.5 yrs. The organization is not as complex as some of the other competitors are out there in the telecom. As time goes on we mature and our market share grows, we are likely to become more and more complex to be able to sustain that growth."

The participant above outlines that in their perspective the more experienced their organisation is the more complex they become. A participant from Sigma outlines this further by comparing their organisations with others in the industry:

"Delta had an advantage for a ten year head start, and Sigma was a second entrant in the market, and we were a government entity at that time, the regulation towards us weren't that stringent at that time, until we were bought out. After Omicron who were the third company in the market, and between us and Omicron there was a good five six year gap. We have a strong position as we have a very broad customer base."

This participant describes the structure of the telecommunications industry and how organisations that have been established the longest have an advantage over the other companies. A manager for Zeta explains this further:

"We are a new company, so newer problems for us would be problems that they [other organisations] haven't dealt with. Whereas they are more established, they are dealing with issues now that we have not dealt with."
This raises the point that organisational experience is more than the organisation's lifetime but the situation a business has been through, how it has reacted to it and what they have learned from it. However, how an organisation operates in a particular market and what they learn from it will differ from company to company. Thus two business' with same life may have differing organisational experiences. This is further evident from a senior manager at Zeta:

"So we kept on changing, every year, it's pretty much because the Chinese were also experimenting as well, to see what strategy works here."

However, what makes organisational experience a more intricate construct is that it can also be derived from the an organisation's Parent company as well. This is explained by a senior manager at Delta:

"Like us, [our] competition also has its own set of complexities. Omicron to some degree is the only one that, I am just using the word 'may', may be less complex because they bring in a system which has been around for about more than 110 years. We are an organization that is 15 years old so obviously there would be a difference but some of our organisational development practices we are ahead of Omicron as well."

Even though this participant highlights that Omicron has had a greater lifetime than Delta, combined from its parent company, Delta is believed to have better organisational development practices in Pakistan. Thus organisational experience itself is can be regarded as an intricate construct. Though organisational experience is highlighted by participants to be enhanced over an organisation's lifetime, time alone does not enhance experience but the quality of what is learned during that lifetime.

### 4.2.3 Structural Constructs

Structural constructs are those that describe a business' formation and how it is configured. This can include variety of other constructs that relate to the organisation's structure and how it operates given its particular configuration. This can mean relationships within an organisation, the level of its hierarchy, the policies and procedures, the different business units and the interactions within the business. A independent consultant describes how structural constructs affect organisational complexity:

"Any organisation whether it be telecom, whether its financial it has certain business units, it has certain people who govern them, they have different roles and responsibilities supported by different processes and of course these processes are governed by the technology. All these
different layers they make up a certain layer and the more these layers are built, the more complex the organizations get until they have certain processes defined."

Another consultant also highlights structural constructs determining organisational complexity:

"Structures are being built within the organization but the processes can be too bureaucratic. See the structure has to be followed by process. I don’t have problem with building up layers and layers but these layers have to communicate well with each other. I mean in order to have clear communication, the processes needs to be defined. Unfortunately it is just not just telecom, people in Pakistan do not care much about processes. So processes are [a] very important link between these layers, between these business units. Information can flow fluently and efficiently. When information does not flow in a smooth way that is when complexity increases."

‘Structural’ constructs were included in the preliminary framework, as well as being identified by participants interviewed. In addition to this, ‘Interactional’ construct, which was included in the preliminary framework as a main construct, was identified by participants as a sub-construct as it was related to the structure of an organisation. Finally participants identified the construct of 'Transparency and Clarity of Communications', which was not highlighted in the preliminary framework.

## 4.2.3.1 Organisational Hierarchy

The arrangement of different departments and their levels are aspects of organisational hierarchy. This is a construct of organisational complexity because various participants perceive that the level of hierarchies within an organisation may determine how complex the business is. This is explained by one of the independent consultants interviewed:

"For example, if you talk of PTCL, before its privatization, before it was taken over by a foreign company, PTCL was probably the most complex and it still is one of the most complex organizations in Pakistan...There so many bureaucratic layers within the organization that you will never be able to get through."

However, a question is raised about whether all the hierarchies and department within an organisation are necessary for its operation, by an industrial specialist. This particular specialist was a previous high ranking government official, dealing with the telecommunications industry. He states the following:

"When you talk about complex there is a structure within all organisation, a system to be
sustained ... so within their structures they are complex. But at that level of [a] division, complexities are necessary, because you have to have different aspects of the organisations, we have looked at different sections, so that what is a necessity for it to operate."

Another consultant explains how information passes through an organisation's hierarchical structure so that a service is provided to a customer;

"[An] end customer calls the call centres but if you look at the highest structure there are 10, 20 to 30 departments involved in terms of supporting this. One system or business unit has released one service but to reach the customers, it has to pass through 10 to 30 different departments. My point is that if the information is passing through all these departments in a process oriented manner and in a more efficient manner, it will reach the customer with less cost and at the same time more quickly."

Thus is can be seen that though the amount of hierarchies that an information has to pass through in order to provide a service to a customer might affect internal complexities, the process of how this information is passed is just as important. The same consultant also outlines that the way a business structure is setup differs from on telecommunications organisation to another depending on the country this operate in:

"The way the structures are for example take the owners of Omicron Pakistan. Their organisational structure is a bit different, actually a lot different then what they are operating in the European models. As opposed to what they are operating in Pakistan. I think just because of the environment in these regions, it has to be more complex... in Pakistan, for example, Sigma or Delta, if you look at [our] market, you see none of it is original any more, most of it is imported. All the Pakistani large [telecommunications operators] are actually owned by large groups. And normally what you see is organisational structure or their complexity, they have been imported from outside and changed as per Pakistani requirements."

The type of structure within an organisation was also discussed by participants. One of the directors for Zeta that was interviewed explains the importance of structure within the context of organisational complexity:

"... in order to be able to deliver [a] product and also a very important factor is the fact that how centralized or de-centralized you are as an organization. That also determines how complex you are. The extent to which the organization is flat or hierarchical, whether it has a matrix system or whether it has a kind of reporting line. This also determines the organizational complexity... Our
organization has to be complex enough to be able to live up to the external complexity."

Another participant for Zeta describes their structure to be a "very simplistic ideal structure which is not very bureaucratic", whereas a participant from Delta states that they are "not very bureaucratic" even though they "have bureaucracy and red-tapism as well". However a participant from Sigma pointed out that this construct is not very easy to comprehend in the Pakistani telecommunications organisation because "the structures are not defined in the companies over here". He explains this further:

"It is a lot more complex, in a way it's very simple, because there is no defined structure at all, but in a way it's very complex, in the same way, because there is no defined structure and no job descriptions, and we have to multi task all the time, and you can't say no [to a task] because superiors can easily say, well its part of your job, and as you don't know what the written down proper job description is, you do it. And Sigma does not have a well defined structure."

A manager from Zeta outlines a lack of job description laid out within their organisation as well and compares his company to other Pakistani Telecom's operators:

"With Delta and Omicron you have everything streamlined so that every person within every department preliminarily has already a clean cut laid out job description. So when they come to the office in the morning and they do exactly what they have been doing for the next 8 to 9 hours they do that and then they go home."

However, it can be argued that these particular participants maybe highlighting the lack of clarification of an agent's job within the organisation rather than the lack of a structure within an organisation. Thus, it can be also highlighted that complexity can be looked at, at different levels, which is why defining constructs is important.

### 4.2.3.2 Interactional

Interactional construct describes the relationships within an organisation that hold it together and enable the company to operate on a day to day basis. This construct covers relationship and communication between agents or a group of agents or departments.

When an owner of an independent consultancy specialising in Telecommunication's strategy in Pakistan was asked about different factors that determine organisational complexity, he stated the following:
"Another factor is the relation between units or process. How is admin related to procurement? How is procurement to technology [department]? How is the technology department related to the call centres? How is the call centre related to the customers? So this is the whole chain that basically drives the organizational complexities. Ideally, in my personal opinion, the lesser layer you have the more quickly information passes to the customer because there are less hands involved in it. But unfortunately, in our working environment there are too many hands. In fact sometimes hands that have nothing to do with it they also get a touch of it."

This participant highlights the level and amount of interaction and the ability of information to pass through different levels of the organisation to its consumers, as well as highlighting the relationship between structures and process flows. He also raises a point that the more the 'layers' of agent are involved in an organisation, the more it would hinder the flow of information. This participant further relates interaction of agents within an organisation to the organisation's values and its culture:

"Organizational culture, organizational values, they basically add to the softer part of organizational complexity. The way people work with each other."

It can be ascertained that the participant believes organisational culture and its values to shape the relationships and interactions that form within an organisation. In addition to this, this participant later relates the "information passing through the departments" to the systems and processes in place at the organisation.

Another participant, a senior manager at Delta, highlights how a "silo culture", which he describes are departments which operate in isolation from the rest of the organisation, causes the business to be in "chaos". He was quoted to state the following:

"We have division/dept and each division runs in its own little silo culture in our organization. They exist because people in charge of that department or division are not really collaborating, coordinating or planning with other divisional heads. They sit in their own little nest and do their own planning, their own execution without realizing the impact of their roles and plans on the rest of the organization. So at the end what you have is an organization in chaos."

Thus this construct is important because for an organisation to operate it needs to have a certain degree of interaction between agents or a group of agents. It can be argued that the above statement by the participant relates to modularity in organisational design, yet the participant believes that a structure where units within an organisation do not interact or collaborate
increases organisational complexity. However too much interaction can cause a hindrance and little or no interaction at all can cause departments to be disconnected from the organisation as a whole, which can be "chaotic".

4.2.3.3 Transparency and clarity in communication
The degree to which the communication within the organisation is transparent and clear effect the overall internal complexity. However, both transparency and clarity within an organisation are factors which are not easy to control. This is highlighted by an employee of Omicron who states that:

"Increased transparency and the ease in which you can communicate with them [different departments] makes the organisation more simple".

A manager for Zeta explains the necessity of a clear communication within his organisation:

"It relates to the fact that if there is somebody who can understand the needs of the consumer, can also help you make a better price and package for that consumer. In turn it would also be easier for him to explain to other people [within the business] that, for example the finance side, they are people who are number crunchers who don’t really understand what consumers are.”

Nevertheless another employee of Zeta states that there might be a "communication gap within the organisation due to language or culture" and that it may "make operation complex" but further highlighted that their business can control this gap and can reduce it over time. Later the same employee pointed out that at times Zeta's reaction to environmental events can be slow due to communication barriers:

"If there [are] less communication barriers, I think we could be much more aggressive. We are not that much aggressive right now in the way we react to the market”.

A senior manager for Delta also describes how an organisation might become more complex due to lack of communication:

"Lack of communication creates major organizational complexities because when your plans are not aligned, your strategy is not focused on the organization strategy, what you are doing is developing plans that are not adding value to the organization and when you are not talking to other divisions, system and processes do not involve all the necessary stakeholders. That does not create a lean or effective organization. It is just complete chaos."
A head of department for Omicron also highlights that with a clear flow of information and encouragement of employees to better communicate their ideas also promotes innovation:

"*We have examples like ideas were given by employees that were eventually implemented. We can still do better. We are introducing a culture of innovation in our company.*"

Though an organisation may want transparent communication between its business units, agents working in Pakistan work in a different manner. As highlighted before, certain groups of agents that might be working in a "silo" department, may not communicate their inner operations to the rest of organisation, which can cause lack of transparency. Lack of clarity can arise due to differences between cultures, as highlight in section 4.2.2.2, which can hinder or confuse implementation of strategies. In addition to this, the lack of transparency or clarity in communication reduces the effectiveness of the organisations and hinders its processes. This is highlighted further in section 4.2.7.2.

### 4.2.4 Corruption

Corruption was a construct that was highlighted by both industrial experts and organisational participants as one that also determined organisational complexity. Corruption, as an internal construct was defined as an unlawful activity undertaken by agents to benefit them financially or for other personal gain. An independent consultant with years of expertise in Telecommunications organisations and the government regulator pointed out various organisations to be "filled with corruption". This participant further explained the level of corruption within one specific organisation:

"*Two past directors have resigned because of this [corruption]. Tons of corruption surrounds [this company]."*

Another participant working for Zeta pointed out his belief that within a rival organisation there is "a lot of corruption, and they work in a different way".

There are three different kinds of internal corruption that participants have identified: embezzlement, bribery and favouritism. 'Corruption' was not highlighted by literature and hence was not in the preliminary framework. However, it was included in the final framework as participants strongly highlighted it as a construct of internal organisational complexity.
4.2.4.1 Embezzlement & Bribery:

Embezzlement is defined as a corrupt activity undertaken by an agent who personally benefits financially from a legal activity taken by the organisation. This financial gain is undisclosed by the agent to their organisation. However, bribery differs slightly in the sense that an agent receives illegal payment so that they can divulge organisational secrets or make a certain decision that the organisation would under other circumstances not take.

A senior manager in Sigma further highlighted how he believed his organisation was corrupt:

“I can't take names, but in a few companies, the people who work at the top they have a lot of vested interest in the sense that, they have got vertical and horizontal integrations, they have stakes in the companies. Meaning shares. They are not allowed to do that, like when they join the business they have to sign a contract that says you won’t have a side business or you don’t have a business that is directly related to the Telecom operator you are working for. But the people have shares in, for example advertising agencies that work for the Telecoms, so it becomes quite biased in that sense because they favour them, they start granting those companies contracts.”

This shows that, according to the participant, specific agents financially benefit from contracts granted to a company of which the main decision maker is also a shareholder of. This makes the operations of an organisation more difficult as certain decisions are made for personal gain rather than for the strategic or financial benefit of the business.

Another independent consultant highlighted his perception on how a particular industrial merger took place solely because the top management saw it as a way in which they could personally gain financially:

"They try to skim at the top, such as the Orascom taking over Delta deal. It was all about what the top part of the structure, the CEO's, the directors, what they wanted, that they would gain from it. They also bribed government entities so that this deal could take place".

Two participants, one a manager for Sigma and one a senior manager in Zeta, explained that they perceive employees to be susceptible to briberies, which raises issues of trust within the organisation as well as hindering communication. The participant at Sigma explained this further:

"Often this results in the organisation's secrets being leaked away to the competition, that's what happens, that's what makes it complex...You know, some people they sit here and they work for you, they sit somewhere else and they will give your secrets away for a price."
The participant at Zeta also outlines that organisational "secrets" or confidential information is difficult to keep hidden. When asked what steps they take to keep information confidential, they stated:

"See, people who directly are linked to a certain confident product, like if my department is in charge of it, I will make sure my team does not release that information, try not to tell their colleagues, and keep it just with us. Even if the word goes around the floor, you know that's it, the information is compromised."

This shows how that the perception of corruption can reduce the transparency in communication as participants in an organisation feel they are unable to trust their own colleagues. This may cause inefficiency due to the possibility of duplication of tasks that happens due to the lack of communication between agents or departments.

4.2.4.2 Favouritism

Favouritism is defined as the act of an agent hiring or promoting a person because they favour them personally rather than on the professional merits of this person. This is viewed as being illegal because it is unfair for other individuals that should have been hired or promoted solely based on their expertise.

A participant at Sigma gives an example of this in further detail:

"There are people who work quite hard, because they don't per se, suck up enough, sorry to say this, but they remain in that position for the past 4 or 5 years. But people that are extra friendly towards the boss, they move on. I'll give you an example, there were two people working in a department I was in before. One of them was working there for about three years and was promised a promotion. A new person was hired, and later we found out she was a friend of the bosses wife. Anyways, when the time for promotions came, she got promoted, having worked in the company for six months, still under probation, whilst the other guy was told that the promotion quota was now full for the year."

However, an employee of Omicron praises his organisation whilst pointing out other organisations they believe to undertake favouritism corruption:

"The company best suited to take a piece at internal challenges is Omicron because of their vast experience in other countries. They have one of the best HR policies across the world. If you look at
Epsilon for example, there is a lot of favouritism, the appointment are not made on merit, Epsilon was known as a FandF company, a friends and family company. They were the worst place to manage their Human resources."

Thus if participants perceive favouritism to exist within their organisation, then they may change their behaviour in order to gain benefits within the business. Yet, as favouritism is formally refuted in organisations, businesses may have difficulty in understanding behaviour of certain participants.

Overall, corruption makes the internal business environment complex because it distorts the way in which the organisation should operate legally and the perception of how it actually operates. This not only makes the behaviour of agents within the organisation more intricate but causes the organisation as a whole to react to these perceptions in an informal manner. Though the organisations have written rules against any type of corruption, participants interviewed explained that in their perception those are formal rules that employees, usually those in upper management, do not follow.

Corruption is also difficult to trace as it is embedded in the Pakistani culture as being a norm. Certain members of the management, as perceived by other participants, make decision accounting for corruption to take place. In addition to this other decisions, such as hiring particular employees or granting contracts to specific vendors, might be taken due to favouritism or bribery.

Please note that by the philosophical design of this research, it will not be investigated whether or not corruption takes place in an organisation. Instead it is important to note this construct because in the perception of the participants corruption exists hence they will behave in a certain manner which makes organisations more complex.

4.2.5 Job Complexity
Job complexity as a construct describes the intricacies involved in the tasks undertaken by agents in a particular organisation. Various organisational participants pointed out that their job description was not well defined, which made their task within the organisation intricate. One can argue that the ambiguity of an agent’s role does not attribute to a complex job, however participants perceive that due to the lack of formal job description, responsibilities of employees span across more than just their "domain", which makes their job complex. A participant from Sigma highlights and explains this:
"There's no concept of proper job description, when you come to work for a company, like you multitask and you don't know what you end up doing, so there's no proper definition of what your job entails. And few of the companies don't even give you job descriptions. You have been working for them a couple of years, with no job descriptions, and its understood that 'this is what you are doing' and you do it."

This can cause a job to be intricate as it can cause friction within departments or amongst agents working in an organisation. Also the lack of understanding of what their job entails may also lead to the replication of tasks within an organisation. This is evident from a manager at Zeta who states:

"The positive side of a lack of job description is that you can do whatever you want, without worrying about crossing anyone else's domain. Even if you are going into their domain to do something, you are allowed to do it, so that's the good side of it, the bad side of it is if you are on the other side, when people are on a different department, different domain and they start doing your work. As far as the delegation is concerned, work is delegated, certain people its delegated a lot, they are given a lot of authority to work around, where as other people, not much."

A participant for Sigma states the following on job descriptions:

"A lot of people are cutting across different jobs descriptions so that would make it very complicated. So for example there's this one guy who's looking after handsets and he is also looking after the CSR [corporate social responsibility]. Do you know a guy who is doing handsets is also doing coverage, and he is also doing corporate social responsibility and they have nothing in common."

The construct of job complexity also describes the task intricacies where an agents job is complex because they are doing more than one task at a time, which may cut across different roles in an organisation. Another participant at Zeta describes this further:

"So when you look at the middle management it is very complicated because in Omicron and Delta things are laid out, it's very clear. And the executive who is in business intelligence will come at 9 in the morning, and he's going to look at various reports and he gives his conclusion and goes back home. When I go back home, when I go to work in the morning, for me it's not that simple, you know as I'm looking at numbers and looking at reports and then I am also creating a strategy presentations. I am cutting across a lot of different jobs. And same thing is true for a lot of people within marketing in Zeta."
When this participant was asked whether this meant that various personnel were doing the same as task someone else might be doing, they answered in an affirmative. This thus provides evidence to the duplication of tasks within an organisation which may lead to inefficiency.

Another participant relates how easy it is for them to do their job to an organisation’s complexity. This participant, a senior manager for Omicron, states:

"I think organisational complexity means for me, how easy it is for you to do your job. For example; are you like always tied up in bureaucratic processes, or can everything be done quickly. See, that's about it, because it means that you have taken on a decision that we should do this, how quick your relations can actually translate that into action."

A senior manager for Delta also highlighted how his role within his organisation was changing over time:

"Simultaneously, the employees have to do more than one role in a business. Which adds to the complexity as it can be challenging managing them as well as they would themselves have to be very organised. Previously I was only looking at marketing operations, now I'm looking at marketing operations, corporate communications besides branding."

In addition to this job complexity as a construct also describes the skills required for an employee to complete their job. A manager in Delta states that "people with certain set of skills, would be hired, that enables them to complete their job, skills that are needed by the organisation". A senior manager for Zeta describes this in further detail:

"We need to have a person to handle the government body or the military body, right? Now that person needs to have a certain set of technical specialities, when it comes to handling such bodies. Right? So a person who, for example, needs to maintain the government regulations, the person who needs to maintain the relation with the military body. Now that guy needs to have the technical specialities that is required to do that job. So your speciality is important within an organisation."

Thus the overall job complexity within an organisation attributes to how many roles an agent has in an organisation, how many different domains their job cover, the skills that they need and the ease in which they are able to complete their task. The preliminary framework included the construct of 'Task Complexity', yet due to the more broader definition of the construct highlighted
by participants, the construct of 'Job Complexity' was included in the final framework instead.

### 4.2.6 Technological Requirements

Due to the fact that the Telecommunications Operators function in an industry that is driven by technological change, they each have to comply with certain technical requirements in order to survive in the industry. Thus the organisations have to invest to make sure they have up to date technology and technical skills on hold, in accordance with the industry.

A senior manager for Delta explains their investment into their technological infrastructure in more detail:

"*Delta invested $2 billion plus initially just into its network. We are the only company in Pakistan that has earned more than trillion dollars in revenue. No other company in Pakistan is doing that. As much as we are earning, we have to spend just as much just to continuously upgrade our network and we all know now that there are still issues with good network quality in Pakistan."

A senior manager of Zeta comments on why their organisation is complex due to the technical nature of their product:

"I think we are fairly complex organization. The reason is because of the nature of the product that we are selling. It is a highly technical product. Right from the technical deployment to customer, packaging, pricing and delivery. It is all a very technical process. That is what it makes it a complex organization."

A head of department for Delta also commented on how they need more technically advanced services in order to be competitive:

"We will be launching M-commerce as well where you can do transaction through your phone. The kind of stuff we grew up seeing in west. Those services are coming here so that we can be more competitive...We are going to continue to witness these organizational complexities just because of the nature of this industry. As we continue to expand our services. Money lies not just on phone call on any more but services that we offer. That is where the money is. That is where companies are making money. So we will continue to witness organization complexity. As organization grows and expands, so does the complexities."

An independent consultant supports this view and comments that organisation’s have to invest in more than just their technological infrastructure in order to survive:
"So people back in the 90s operators would rather spend on technology infrastructure in order to boost their brand. But since 2004-5, things started changing...I was myself invited to one of the conferences in PTA and I said that all these Telco's are realizing that spending in products of technology will not give them business, it is the people and the services that will retain them. Actually with this concept they started converting in to another strategy and they started focusing more into their service quality."

'Technological Requirements' was identified by participants, however it was not in the preliminary model.

4.2.7 Strategic Complexity
The strategic complexity concept covers what the organisation's goals are and how they may achieve them, and was a construct included in the preliminary model and the final model as it was identified by participants interviewed. This construct covers the intricacies of their policies, procedures and processes and the organisation's overall objectives. All these drive the organisation, how they position themselves in the market and how they compete. The constructs that make up strategic complexity are explained in more detail below:

4.2.7.1 Organisational Strategy and Objectives:
Each of the Pakistani Telecommunication's organisation have their own objectives, which can be simple or complicated to achieve, depending on what they are. An independent consultant explains this:

"Organizations stand with a firm mission and vision. All business units, processes and people must be aligned to the overall objectives of the organization. Hence the malfunctioning in any these would have impact on the organization. For example when a new service [is] offered. The effect could be a financial impact, loss in reputation, so on."

A manager at Omicron, when asked about factors determining his organisation's complexity, stated:

"It's like Zeta or Sigma are in a state where they want to add subscribers and they want to grow while Delta and Omicron are more in a consolidation stage. It's more to do with company strategies as well and what their objectives are...I think the strategies increases strength, because our strategy is there to retain our position. But we are not tuned to compete in a particular way because we have been number one in the market, ahead of others. Because of that it becomes
more complex, because you become hesitant in taking risks, you don’t want to upset the apple cart. That’s how I think strategies make organisations more complex ”

Though the above participant states that they believe their organisation can be complex because they get used to pursuing one strategy that when the time comes to adapt to the changes in the market, this becomes difficult. A senior manager for Delta highlights on how changing conditions in the market impact each organisation:

"For example, in 2005 when Epsilon and Omicron came into the market. At that time, Sigma, Instaphone and us were already in the market. These guys were making 100% plus profit on every call that was made. They were making a lot of money. There was not a lot of competition. Epsilon came up with Strategy of playing a price, he felt that by competing on price they would be able to grab a large chunk of market share and become market leaders, all that did was to start a price war and shrink the profit margin for everyone."

Another participant at Delta explained how the market had become dynamic, which impacted on how often the organisation changed its business strategy:

"We function in highly dynamic, hyper competitive, price sensitive market. Our strategies are changing pretty much on an annual basis. It is very difficult for an organization to define a 5 year road map like we used to. You know that next year competition can come up with a very different pricing strategy."

A participant at Omicron also highlighted the following:

"When we first came into the market, we did not change our main strategies for a long time. Yet as competition increased, the price war happened, other operators started changing their strategies more rapidly, we had to do the same....Where I would say we become complex is where we have keep shaping ourselves because of the changing dynamics of market. Like I was telling you changes in price have an impact on, for example, the type of strategy that we choose to incorporate at Delta."

A senior manager at Zeta also commented on the rapid changes in strategy in their organisation:

"We used to introduce different packages with different prices. But as time has gone on and we aggressively compete on price, we are having to change more and more packages to keep up. We
are bringing prices down more, we are trying to change our packaging strategy, trying to improve our service, all so that we can gain a greater share of the market.”

The above participants describe how organisational strategies and objectives can be complex because if conditions in the market change than an organisation will have to make changes by adopting different or ever changing strategies which then impact the entire business. In addition to this, strategies have to be communicated through to the entire organisation so that employees have a clear understanding of what is required of them. As it can be seen from the analysis on participants' interviews, this is not always the case. The rate at which an organisation’s strategy changes and the different strategies that they adopt also contribute to organisational complexity.

4.2.7.2 Intricacies of Policies, Procedures and Processes:
The intricacies of policies, procedures and processes of an organisation will determine how the organisation runs and whether it is complex or simple. An industrial specialist, a previous Minister for the telecommunications industry commented on an organisation’s procedures and its relation to business efficiency:

"Will the organisation be efficient if it were to simplify the operation. Or to make them more complex, it depends on... one needs to see whether better efficiency will come through simplifying procedures or through making them more complex."

This thus raises the question on what complex or simple policies or procedures are. When a participant working in Omicron stated that an "organisation's policy and procedures it has in place can cause complexity", she was asked how this would affect the entire organisation. She answered:

"Well they would affect the entire organisation in a way that, for example, let's take the policies for example, if the policies are not well defined then the direction of the organisation is not well defined. When they are well defined, like here where the management has is clearly defined. The policies are fed into every employees contract. So I don't think they are very complex as these policies are really clear."

A manager for Zeta highlighted that he considered that his organisation has “the easiest policies and procedures in place”. When asked to define how a policy or procedure can be easy, he explained:

"If we have to do something, or coming from the market, we have to launch our product in the
market. We have the most easiest and simple procedures and policies. We can launch our product faster and with ease...the systems in place are easier to handle and are simple, the procedures and policies to make any changes are very simple."

Another senior manager from Zeta appeared to disagree with this point raised by his colleague and stated in his interview that he believed that though his organisation has standard operating procedures, these are not "reinforced properly". He also states a point mentioned before, that people in Zeta do not have "proper assigned processes, they don't know what to do" because "there's no job description".

An independent consultant also raises the point about lack of job description in certain organisations:

"So many times I have seen people within an organization fighting over email saying 'this is not my job, this is his job and this is what my job is'. This is the thing that can be eliminated if the process is crystal clear and this is how we are going to make service available to end users. So this is what the process is. If it is clear to the people they will be able to release a product or service in a better way."

This consultant also commented on the processes of an organisation and relates it to organisational structure:

"Structures are being built but within the organization the processes are too bureaucratic. See the structure has to be followed by process. I don’t have problem with building up layers and layers but these layers have to communicate well with each other. I mean in order to have more clear communication, the processes needs to be defined."

It was found that certain employees interviewed in an organisation highlighted that the policies in place in their organisation were simple, which made business operations simple. Whereas other employees disagreed with this and stated that they perceived the policies and procedures to be complex. However, though it can be argued whether the business process within a particular organisation is complex or simple, the clarity and intricacy of policies and procedure was stated as a construct of organisational complexity. In addition to this, it is evident that a business process and organisational structure go hand in hand, that a simple structure will mean a simple process whereas if a business has a complex structure then the process of operation will also be complex.
4.2.8 Management Approach

Leadership and the approach they take is another construct of organisational complexity as identified by the participants interviewed, but not included in the preliminary model. A leadership’s approach to managing their organisation can determine various factors within an organisation, such as whether the communication within an organisation is clear, what are the objectives of a business are and how it operates.

A participant from Zeta spoke about the organisational leadership:

"...how the people drive the organisation, how the people working for the organisation lead the organisation, for example every organisation has certain policies and certain procedures. The ones that make those procedures or the ones that lead those policies are actually the ones who define how complex those procedures are could be or how easy they could be."

An independent consultant who was talking about Delta, praised a CEO for his direction:

"CEO [name omitted], who started Delta from ground and took it to next level. When he left, there were two thoughts within the organization, they lost direction. Because the guy who previously took it to the next level was not there."

A manager for Zeta also commented on management approach:

"In my belief each of the [complexity] factors are depended on one, which is the management’s perspective, as long as the management has basic strategies and lets other things go ahead like they are, and it can keep the organisation simple... If the management approach changes which as I was saying in the future it would, things would go from simple to being complex, things like procedures stuff like that. For time being we do control these things"

Another employee working for Omicron commented on how a new Vice President for Human Resources meant changes in his organisation:

"We have seen some changes like recently we have a new VP for HR so we have seen things that are changing like promotion policy or leave policy, and things like that so things are changing and secondly things are also changing in terms of business, like having certain departments merge..."

Various other participants have also commented on the changes that management brings into the business, which can range from procedural changes to changes in the overall organisational
complexity. A participant for Zeta, commented on the organisational complexity, stating that they perceived in the future Zeta would become less complex. They explained this was because:

"... with the new management and the new CEO, who has a lot of in-depth knowledge about every department and has a lot of experience, and so there will be a gradual change that we will be able to see."

However, management approach is also linked with other factors like culture. This is explained in more detail by a consultant talking about Zeta:

"Direction of the organisation depends on who has the power. For example Zeta is Chinese, so the power belongs to the Chinese, what they want. Also the CEO of Zeta is Chinese, and thus what they want and who is driving the company. They come from a market quite evolved quite developed. But they run it like a Chinese company here. They change their directors but they will not have a non Chinese CEO."

From this participants view, it is evident that the culture of the parent company is also related to the management approach. As the organisation mentioned above has a parent company that is Chinese, their approach, as mentioned before, comes from the Chinese approach of management.

A participant working for Delta also comments on leadership:

"Another complexity is the lack of depth in our leadership. You need to have a proper succession plan in place where we have leaders with the same attitude, with the same mentality. Leaders who can then be groomed to taking over position of our current leaders at this time. If we don’t have that sort of structure in place of succession planning we end up with people from outside who bring different kind of culture so as such we don’t have consistent organizational culture across organization. And you know how an inconsistent culture have an impact on the overall organisation."

Thus it can be seen that the management approach as a construct has an impact on organisational complexity, as the leadership can have the ability to make their organisation more complex or less complex by be able to impact other constructs of organisational complexity.
4.2.9 Summary of the Constructs of Internal Organisational Complexity

Figure 4: Constructs of Internal Organisational Complexity

Figure 4 shows the model of internal organisational complexity. This model covers all the constructs identified by the participants in the section above. The six main constructs identified are 'Agent Orientation', 'Contextual Constructs', 'Structural Constructs', 'Corruption', 'Job Complexity', 'Technological Requirements', 'Strategic Complexity' and 'Management Approach'.
The model also shows the sub constructs identified and defined as they were perceived by the participants interviewed. This model will be evaluated in more detail in chapter 5 of this thesis.

4.3 External Environmental Complexity

The analysis in this section will present evidence supporting constructs of external environmental complexity. This was asked in the second section of the interview, which consisted of 8 questions (see appendix 3 and 4), but at times participants mentioned constructs related to the external environment in other sections, which were coded. This section will analyse eight main constructs of external environmental complexity, and their nine sub-constructs, that were identified by participants that were interviewed. The participants did not identify the constructs of 'Market Diversity' and 'Process Facility', which were included in the preliminary model. The exclusion of these constructs from the final framework with be highlighted in greater depth in the fifth chapter.

4.3.1 Predictability

Predictability was a construct that was prominently mentioned by industrial specialists. The preliminary framework included the construct of 'Uncertainty' but not 'Predictability', yet participants highlighted the predictability as a construct of environmental complexity instead of 'Uncertainty'. The construct of 'Predictability' is defined as the extent to which the environment, external to Telecommunication's organisations, can be predicted. A high ranking officer from the Pakistani Telecommunication's Authority, which is the industry's regulator, defines simplistic and the complex nature of the external environment:

"I mean a simplistic environment for an industry would be where policies don’t change that much, and organisations are able to cope with changes, the environment is very predictable. A complicated environment then would be one that is not very predictable and changes dramatically, so on and so forth."

This statement gives evidence for predictability as a construct of external environmental complexity. He also perceives a complex environment to be one that "changes dramatically". A consultant for the Pakistani Telecommunications industry raised this point as well when he was interviewed:

"The region where we live especially when we talk about the Pakistani environment is probably the least predictable. Environment in Pakistan changes so rapidly that you could not believe, and at times organisations are unable to perceive the changes before they have actually happened..."
There are also other participants that perceive the external environment of the telecommunications industry as being not only unpredictable, but unstable. A senior manager from Zeta considers his external environment to be complex, and stated the following when asked why he thought this:

"Like I said the conditions of the external environment of this industry are also reliant on the conditions of the country, the job market and the economy and an unstable environment such as Pakistan, all of these are subject to change drastically at any time."

Participants that mentioned predictability as a construct also raise points about uncertainty and stability. As it can be seen above, the participants perceived that the greater the level of negative changes that occur within an environment, the more it is considered to be unstable. If the changes that occur are unanticipated, then the environment would be considered as being unpredictable.

4.3.2 Competitive Complexity
In every industry there are different levels of competition and various participants pointed out how competitive forces can determine complexity. A manager in Zeta, two participants in Omicron and a participant in Sigma and various consultants highlighted "competition", when they were asked what determines external environmental complexity. A senior manager from Zeta also states:

"Competition determines external environment's complexity. Hyper competitive environments that we are in means that we obviously have a higher level of complexity."

Various participants referred to different elements of competition in the industry that determined environmental complexity. These were elements such as the strategy of the competitors and the amount and the size of the competitors. The preliminary model includes the construct of 'Competitive Complexity' but referred to the density of competitors and not to the objectives of competitors. Thus the final model includes the sub-constructs of competitive complexity, as identified by participants, which are explained in greater detail below:

4.3.2.1 Competitor Objectives
The strategy of the competitors was one of the main elements of competition that was mentioned, which would impact an individual organisation. One of the reasons why competition was believed to determine the complexity of external environments was because of the uncertain
strategies taken by other telecommunications operators that may have an impact on the entire industry. The extent to which certain measures taken by competition affected the industry was usually reliant on the market share of the competitor or how impactful the strategy was. This was highlighted by a participant from Omicron who states an impactful strategy could be when:

"New products [are] developed. New services [are] provided. Fresh products that are launched, when nobody else has launched it... when another telecom launches a service, it impacts us by pressuring us, whether we have a competing product or if we don't have it, why we don't have it. This is the competition factor, competing with other organisations and operators."

A senior manager for Omicron also outlined an example where a new entrant changed the dynamics of the industry by initiating a price war by offering the lowest mobile tariffs at the time. He states:

"Stepping a little back to six months, everyone was in a price war, for the last two years before that... That's what they [the new entrant] did, and then they came down to a level that wasn't possible to cut the prices anymore. The low, low prices, it started hurting everyone's revenue as well. So now the challenge is actually [to] grow your revenue but the problem is the customers have gotten used to the rock bottom prices. So how do you increase the revenue if they don't want to pay any more. This has then made the environment more complex."

A senior manager in Delta also highlights how the price war impacted them:

"That is why we have been forced to often revise our tariff rate but every time we revise our tariff rate, Sigma and other companies also end up revising their rates. It is hurting every one of us and it is just because some of the Telecoms are paying this price more and it is benefitting no one. It is not even benefitting the consumers. Consumer are paying less but that is because the Telecoms are compromising on the quality to lower the prices."

These participant explain how the price war has changed the dynamic of the industry, where customers are now used to the lower prices and the telecommunications operators were suffering because they were unable to increase their revenue by raising the price of mobile tariffs anymore. Another manager from Omicron states that competition makes the industry more complex because "sustaining market advantage is very difficult" for each individual organisation. This thus meant that telecommunication organisations started focusing on other avenues that might increase their revenue such as "value added services" or "VAS". These are additional services such as picture messaging, paid ringtones, games and data services. A head of
department for Sigma explains this:

"Now, it's all about the VAS. Whoever offers the best value added services. That's why more and more companies in the telecom sector are focusing on VAS as that is where they are getting most of their revenue from."

A senior manager for Delta also explains how each operator has to be competitive in their VAS:

"Now you have on an average 10 to 15 new services being launched every month. Obviously competition is there so you want [to] continuously remain ahead of your competitor. When you are launching these services in the beginning of the year the type of budget you have proposed for that activity continuously changes because the need of the customer continuously changes."

Participants believe that in order to compete in the industry, Telecom operators have to offer other services, which offers them greater revenue. It can be argued that this is a continual search, because any innovation in the industry will be advantageous for an individual organisation until their competitors can compete against it. Thus, the external environment is in the process of continuous change. However, organisations have to make sure they offer services according to the changing needs of the customer as well as those that are competitive to what other organisations are offering. This is explained by another member of Delta who states:

"Consumer spends his money on the type of service that you offer. If there is a good service that clicks with the customer, you know you are going to make good money on that. For example we launched a service that made us four times what we had spent on it. But eventually competition came in and copied us. So obviously they do take the slice of the pie in the process."

In addition to this, the organisations also make sure they are fast to respond to a competitors actions. This may mean copying a service or a package and releasing it into the market without evaluation. A participant from Zeta highlights this:

"When one company does something; we do the same without assessing its viability and impact on the organisation. It is not only us but most of the telecom companies are doing the same as well."

Thus the strategies taken by competitors, such as their product or services released as well as their response to steps taken by Telecommunications Operators in the market, make the Pakistani Telecommunications industry complex, as perceived by the participants. Interviews with
participants shows how sensitive the telecommunications organisations are, which makes them react in a dynamic manner in order to survive. Perhaps this sensitivity can be attributable to examples of failures of past organisations, like Instaphone, who called for bankruptcy after they could not keep up with the technological advancements of their competitors.

Thus it can be seen that organisations in the Pakistani telecommunications industry are competing in two distinct areas; voice calls and VAS. Originally the organisations were competing to see who could provide their customers with the lowest price for voice calls. When a price war was initiated and the market for voice calls was no longer profitable for organisations, they turned towards providing VAS, which became a new avenue for revenue.

4.3.2.2 Competitive Density

The density of competitors refers to the amount of organisations there are in the industry that are competing with each other and their share of the market. The Pakistani Telecommunications industry has five main organisations, the largest of which has 30% share of the total subscribers and the smallest of which has 10% (Source: PTA-Annual Report of 2011). Various participants highlight that the greater the number of competitors there are in the Telecommunications industry, the greater the level of external complexity. A manager of Delta explains this:

"When there were three organisations in the market, the industry was simple. Competing with one another was easy. Enter two more telecoms and the industry wasn't simple anymore. There was suddenly a lot more competition. Before things were simple, you released a package, and waited. It's no longer like that, and the price war only made things more competitive. If it [were] only three organisations, the price war wouldn't be that intense."

A manager in Zeta, when asked what they believed determined how complex their external environment was, he responded:

"Well, the number of competitors, that really effects it. As we have five competitors, we are spiralling downward due to pressure from the price wars and we are consistently reducing our prices to get our customers away from our competitors but the more the competitors there are, the more there's a risk of price wars"

A head of department for Sigma also comments on the number of competitors in the industry:

There's quite a few number of players and because the market is pretty much saturated now, pretty much on the urban level. So it's become very complex in the sense that it's become difficult
for companies to survive as they are not making as much as they used to... I think the next stage is going to be that, because there are such a huge number of players in Pakistan Telecommunications sector, according to the market size, so I think we are looking into mergers now in the future. Once that is there, that might make it less complex, till that happens, it is a pretty complex environment.”

Thus it can be seen from the participant above that the increase in the amount of competitors in the Telecommunications industry has resulted in the environment being more complex. In addition to this participants believe that the industry has reached a saturated point, where subscribers are concerned. The participant above predicts that in the future firms will begin to merge and the external environment would start to become less complex.

4.3.3 Consumer Demand

'Consumer Demand' was identified by literature as being a construct of external environmental complexity, and thus was included in the preliminary framework. This construct was also included in the final framework as it was identified by industrial participants. Participants believe that for their business to survive it has to meet the needs of their consumers. Yet, the needs of the consumer are ever changing as the consumer base itself is dynamic. Various participants mention the need of the business to satisfy the consumer, as well as giving evidence that 'consumer demand' is also a construct of external environmental complexity with various components. As stated by a senior manager in Delta, 'consumers have an ever changing demand, thus it is up to us to provide them with what they want'. Participants have highlighted that the reason why consumer demand determines complexity in the external environment of the Telecommunications industry is because of dynamic consumer behaviour, different consumer segments and the literacy rate & education of the consumer base.

4.3.3.1 Consumer Behaviour

The dynamic consumer behaviour impacts the Telecommunications industry's external complexity, because if the habits and demands of the consumers change more rapidly, the more difficult it is for organisations to tailor their products according to those demands. This is highlighted by a high ranking official from the PTA (the telecommunications regulator):

"Consumer behaviour changes a lot. Because what happens is that the peoples' habits shift over time and which means they are choosing products that match their changing likes. What Telecoms operators have to do is that they tailor their strategy according to different [consumer] personalities."
The introduction of mobile telecommunications into Pakistan, has had major social changes. This is highlighted by a high ranking official, part of a ministry that previously overlooked the Telecommunications Industry of Pakistan, who states:

"You see this [advancement of mobile telecommunications] has had a huge social impact because its created a lot of job opportunities for the common man, because of the low [mobile calling] rate, perhaps amongst the lowest in the world, people can communicate...Whether it's a plumber, or electrician, or refrigeration mechanic, or whoever, its created a huge social impact and a corresponding economic impact through the advent of mobile telephony, and that has led to an improvement, in the standard of living of many common people because of this facility that we have in Pakistan."

In addition to this, societal changes that occur also affect the behaviour of the consumer. Five to ten years ago, only the middle-class or higher could afford mobile phones in Pakistan. However, due to the falling prices of handsets and cheaper packages, most of the population of Pakistan now carries a mobile phone. This is highlighted by a consultant who states that the 'common man' of Pakistan, who are usually employed as farmers, construction workers, domestic help, so on, can carry a mobile with them. Five years ago, this would have been unheard of in Pakistan.

In addition to the above, there are also other aspects of consumer behaviour in Pakistan that can impact complexity in the industry, such as high sensitivity to price and brand consciousness. Those consumers in higher socio-economic groups are less price sensitive but more brand conscious. These are perceived to be consumers who would be happy to spend slightly more in order to have services from organisations that are considered to be more prestigious. This is highlight by a senior manager of Delta who states:

"There is part of the market that is quite price sensitive but another which is very image conscious especially the consumer segment that has money. So our consumer segment that has money do not want to associate themselves with what are called as the 'poor man’s brand.'"

Nevertheless, participants also highlighted that consumers within lower socio-economic groups, who have a greater share of the market, are highly price sensitive. This is outlined by a manager in Delta who states:

"Majority of our consumers are poor and these consumers have ever changing demands. They want a good service at the cheapest price. And whoever offers that to them they switch over."
Brand loyalty is quite an issue. Rarely do Telecommunications operators enjoy brand loyalty from these consumers.”

This makes operations of Telecommunications organisations more difficult because the operators may risk losing many customers if they release a service or change a particular policy that consumers are unhappy with. In addition to this, the industry becomes more competitive as organisations try to increase their market share. A senior manager in Omicron gives an example of how consumer’s high sensitivity to prices can cause difficulties for organisations:

“When the customers see that something better is out there, they will always call up call centres and say 'Epsilon or Zeta is giving this offer, do you have a similar offer, and if you don’t then I am going to leave your network’...Consumers can push you to bring in new things. To quote another example; SMS is very cheap in Pakistan, so what we tried to do is charge a cheap rate for Omicron to Omicron SMS and a more expensive rate for Omicron to other networks. This was to try and increase Omicron subscribers. It was a failure! We had a drastic negative public reaction. Customers were calling up call centres and saying ‘we don’t like it, we are leaving Omicron’, and then they turn off their SIM. After losing a lot of subscribers over two or three month period, we realised what a mistake we have done and had to change our policy back to what it was.”

In addition to this, participants also highlighted an interesting behaviour of consumers to own various 'SIM cards'. Various participants point out that nearly everyone in Pakistan who owns a mobile phone has more than one 'SIM card'. A participant from Sigma attributes this behaviour to high price sensitivity and the low cost of SIMs. He explains this further:

“A phenomena we have here is the multiple SIMs, which is that an average person has more than two SIMS. Thus one person could be, for example; a Sigma customer, Zeta customer and a Omicron customer. This occurs mostly because the Pakistani market is extremely price conscious, and they would use one provider for SMS, then another for calls, and they can interchange the SIMs when a particular network comes with a certain promotion. Another reason for this is also that SIMs are very cheap.”

Participants also highlight that there is still potential for growth in the lowest value customers, who make up the majority of the organisations’ subscriber base but also contribute the least revenue per subscriber. The importance that organisations give to the segment of the market that consists of the lowest value customers is interesting, and perhaps this importance is given because it gives organisations greater access to customers who they can sell value added services (VAS) to.
The way in which consumer's behave in the Pakistani Telecommunications market is attributable to their socio-economic group, which makes consumers quite price sensitive and others more brand conscious. In addition to this, as the Telecommunication's market is reaching saturation, this means organisations are more competitive, and more reactive to what other organisations are offering and what their consumers are demanding. In addition to this, it is also evident from above that consumers also have a greater bargaining power over the Pakistani Telecoms operators.

### 4.3.3.2 Consumer Segments

As seen in section 4.3.3.1, consumer behaviour, the different segments that make up the Telecommunications market have a great impact on an organisation and its strategies. Different organisations will attempt to gear themselves to different consumer segments. However, the reason why consumer segments is regarded as a construct of external environmental complexity is that there are various different segments of the market. In the section above, it was evident that lower income consumer are regarded as segments of the market and whilst various organisations will cut their prices to retain or attract that segment, other organisations will gear themselves to higher income consumers that are less price sensitive and more brand conscious. In addition to these income segments, there are other segments of the market that organisations are positioning themselves for. However, the needs of consumers in a particular segment might change over the short term, such as different seasons, or over a long term. This is highlighted by a manager from Delta who states:

"The environment is complex because I think the nature of the industry, the demographic and the depth of the segments that you are targeting and services that are you providing, everybody's telecom needs are different."

Another manager from Zeta outlines other segments that his organisation is gearing its strategy towards:

"Basically there's the rural market, the niche market, the female only segments, then you have the youth segment which are all different demands. And catering to those demands it's not really difficult. But you have to have completely different strategy for each of the segments."

As evident from the participant above, organisations are targeting genders groups, age groups and income groups. With regards to the different income groups, the Pakistani
Telecommunications organisation usually tailor their strategies to either only target lower income groups or higher incomes groups. This is highlighted by a manager in Delta who states:

"So Epsilon and Zeta have positioned themselves more as the poor man’s brand. In a poor man’s brand where more than 85% of their target market comprises of pre-paid customers. Pre-paid customer only make up 15% of your revenue. So pretty much 85% of your consumer market is only earning 15% of your revenue, whereas Delta played smart at that time they decided that are still the most expensive in the market but positioned themselves as the premium brand. This is because there are lots of people in the market who would be willing to pay a little bit more because they enjoy the status of holding a Delta number."

The participant working for Delta highlights that this organisation positioned themselves as a premium brand. It can be argued that this kind of positioning reduces complexity within that particular segment as the organisation is appealing to a sub-set of customers and less competition.

Other than income groups, recently, many organisations have started gearing their packages towards the youth market. One of the senior managers from Delta highlights this:

"From a brand point of view there is a big focus on the youth market because roughly 60% of the population is under the age of 35. Which makes us [Pakistan] one of the largest youth populations in the world."

However, this can make the environment more complex because the different segments have changing needs, some of which can be cyclical. A manager at Sigma highlights this:

"For an organisation it’s not about changing the strategy, it’s about changing your approach to attract the market... the thing is we need to attract certain markets, at a certain time, in a certain way. For example during summer the youngsters have their vacations so their consumer cycle is different, so you have to keep adapting according to everybody’s needs..."

It can be seen that one of the main reasons why consumer segments are an attribute to environmental complexity is because there are various different segments and each of these different segments that are targeted have their own dynamic needs. Hence for an organisation to target different segments and remain competitive, they need to have various different approaches and strategies which need to change as fast as their market changes. This can thus, not only make the external environment to be complex but can also the organisation itself will be
more complex. This is outlined by a director in Zeta who states that the "more diverse the target market is the more complex organization is in order to be able to address issues and requirements of that target market."

Segmentation of a market can mean that the level of competition in each of the segments is different. In a way the greater the level of segmentation means that each of the segments has lower levels of environmental complexity for organisations as it consists of a sub-set of consumers and less competition. However, it can also be argued that increased level of segmentation can mean greater levels of environmental complexity for the organisation as a whole, because each business has to adopt different market strategies according to the segment they are aiming for which can put greater pressure on an organisation's resources.

4.3.3.3 Literacy Rate and Education

The level of education and literacy rate of Pakistan, greatly affects the demand of mobile phones in the country. Many participants have stated that the higher the literacy rate and education rate, the greater the consumer base is as well as the higher chance of success for advanced technology based services. The change in the literacy rate and education impacts upon the external complexity, because this dynamically impacts the types of telecommunications services the consumers will demand. This can be seen by a director in Zeta who states that complexity in the external environment "also depends on how well educated or less educated your target market is".

A participant, who is an owner of a Telecommunications strategy consultancy for Pakistan, also supports this by stating the following:

"I mean education, literacy in the external environment effects Pakistan. The telecoms can have a hindrance, because you have to wait for the population to move on as you may have the technology but the people, if they are not willing to except it then you would need to move slower."

The above participant perceives that although the Telecommunications organisations in Pakistan may be able to launch products that are more technologically advanced than what is currently in the market, they are hindered from launching it because the majority of the population of the market may not be educated enough to avail that technology. Thus organisations have to take their time and release a new service or technology when they are sure that they will have enough consumers for that new product for it to make a profit. An example of this is the issue of the release of the 3G license in Pakistan. The government is currently trying to auction off the 3G
licenses in the country, but for the past year and a half, they are unable to get the required bids from organisations, because the Telecommunications operators believe that there is not a large demand for 3G services in Pakistan due to the low level of education and literacy rate in the market. This is highlighted by a participant who is a free lance consultant for the Telecommunications industry:

"The 3G licence would change the way voice and data are transferred....But then again it's a rich and educated mans product... So in order for it to work, the market would need to be educated."

Various participants refer to the educated segments, which they can sell more expensive services like data packages to, as being a 'niche market'. This is because most of the consumers who are subscriber's of SIM cards (this includes pre-paid and post paid packages), are usually consumers with lower levels of income, literacy and education. Yet those that are part of the higher levels of income in Pakistan may not necessarily have a high literacy and education levels as well. This is explained by a manager in Zeta, who states:

"The external environment is very complex due to our consumer base. More, with regards to their levels of education. Usually are services, such as internet or data services on your mobile phones are used by our subscriber base that is educated and literate. If a customer cannot read or they can read but are not educated, this means that they really would not be interested in having data services on their phones where they are getting emails and keeping up with the news or using applications that require the use of internet on their phones. Thus our niche market is those who can afford these services and are educated and literate enough to make use out of them. This makes positioning our services tricky because our industry is complex that way."

This participant implies that segmentation makes the industry more complex. It can be argued that, from an organisation's point of view, the great the amount of segments they have to target, the more complex the environment is perceived by them. However, segmentation can also lead to a simpler environment because organisations can focus at a sub-set of the market. Another head of department at Zeta comments on how a less literate consumer base affects the telecommunications industry:

"We have a lot of illiteracies in the market, which, for example in a developed country a lot of people use their mobile phones for a lot more than calls now, right? Well in Pakistan, a less developed country, we are running into that barrier because the masses are not very well educated and they can barely write a text message so there are a lot of complications."
However, an interesting point was raised by a participant who is a consultant specialising in Pakistan's telecommunications strategy. He outlines that after the advent of affordable handsets and cheap calls & SMS's in the country, members of the population that were classified as being illiterate in the English language, have learned how to use a mobile phones and send SMS messages. This is evident from the consultant who states:

"For example people would not reckon that Pakistan is a highly educated country so what they do is they say, not a lot of people will SMS. Until they realise that billions of people are SMS'ing one another, and these are so called uneducated people who have learned phonetics and they are writing Urdu [Pakistan's official language] to each other in roman English."

Various participants have also outlined that in order for the organisations to cope with the complexity of their consumer's demand, the telecommunications operator will have to try educating their consumers so that their niche market can be expanded. This is evident from a manager at Sigma who states:

"Basically in a country like Pakistan you would say ten percent is the educated mass over here. So another thing is to educate these people so that they know that there are new things that can be done with their mobile, so we can introduce new things to them as well. When you are talking about 10 years ago, a lot of people had mobile phones, when you see 15 years ago only the niche market had mobile phones. Today almost everyone in this country has a mobile phone."

Even though another participant at Delta agrees that an increase in the level of education would be advantageous to Telecommunications organisation, he states that "although we have the technology, we can't cement it because we can't go into the field and start educating customers, we are hindered."

4.3.4 Government Influence

The government is one of the main stakeholders who has a great influence on the entire external environment. This is no different in the Telecommunications environment in Pakistan, where various participants have mentioned the different ways the nation's government affects the industry. They influence the environment both directly, by their governing approach, the policies of the regulator, and indirectly such as the political situation of the nation. One of the main reasons of the rapid growth of the Pakistani telecommunications industry was the deregulation of the telecommunications industry in 2003. This also encouraged foreign organisations to invest in the industry and the market experienced a rapid growth. After this, other policies were also introduced which reduced the cost of calls on a mobile network for the consumers. Government
influence was thus also recognised as a construct of complexity because governing approaches and regulatory policies can change over time, which can mean erratic changes in the industry. The preliminary framework includes 'Regulatory Policies', yet it does not include 'Governing Approach' as a construct of external environmental complexity. These constructs will be explained in greater detail below:

### 4.3.4.1 Governing Approach

Governing approach refers to the main aims and objectives of the national government, which mainly dependant on who is in power and their approach to legislations and policies. In Pakistan's history, many different political parties have taken over and, as apparent from the interviews with the participants, each political party has their own objectives which is translated into the policies they bring about. This is evident from a participant who was a previous high ranking official for a Ministry in charge of Mobile Telecommunications, who highlights how the Ministry's objectives changed when a new government came to power:

"One thing that I do regret is that, I wanted to have mobile telephones manufactured in Pakistan, because I could see the opportunity, so a plant in Hari-Pur, which is not far from Islamabad, is called the Telephone Industry of Pakistan, or TIP, and I have visited there, and we were planning to take that over to look at the safety of establishing a mobile telephone manufacturing facility, but unfortunately I was just [in the Ministry] for two and a half years, so when my time ran out, and I transferred to another ministry, the mobile manufacturing plan was put on the back burner and forgotten."

This is also highlighted by a senior manager in Zeta, who states:

"In the 90s, when telecom was evolving in Pakistan, things were very slow and in first five years of the 2000’s there was suddenly a rapid transformation and now again it has slowed down. It has a lot to do with government's focus towards the telecom industry. The more the government is focused towards it, the more change is taking place, new regulations are there, new policy framework are being designed, etc. Lately, government focus has lessened. In Mushraf’s [a General who led the country from 1999 till 2008] era the focus was very strong and during that time telecom grew a lot."

Participants interviewed believe that the different political leaders and the ministers that are assigned have a great impact, and as the government changes so does Pakistan's Telecommunications' industrial landscape. Currently, telecommunication organisations are concerned about the release of the 3G license by the regularity authority. With a minimum
auction price of $210 million, various participants believe that the 3G license has been over-priced by the PTA (the regulator), because the government of Pakistan wishes to increase its national income. The auction has been postponed again recently due to a lack of bids. Organisational participants interviewed state that the price of $210 million is not feasible for the telecommunication operators of Pakistan because they do not perceive the revenues from selling 3G services to be high enough to cover the cost of the license in a short term. A senior manager from Sigma highlights this:

"There is the 3G licensing issue, they have been trying to auction 3G license for the past two or three years, because PTA asked for extortionate amount of money for companies to do that. The companies are not willing to put that amount... In addition to that, the taxes are increasing on a monthly to a daily basis. I mean when this government came into place taxes were jacked up by ten percent straight away, and this is making it more and more difficult for companies to conduct business...that's what is making the environment more complex."

A manager from Zeta also gives evidence to why he believes PTA has set a high starting price of the 3G license:

"The reason they [PTA] are charging so much is that it looks like the government wants to collect more money this year for their budgets, as they have a higher budget they need more tax and more income."

This shows evidence of how governing approach can attribute to complexity in the external environment due to changes in the government and the policies they implement. Participants interviewed compared various politicians and political parties who had come into power since the introduction of mobile telephones in Pakistan. Their interviews highlighted how they perceived the changes in the political landscape had a direct effect on Pakistan's Mobile industry.

4.3.4.2 Regulatory Policies
Regulatory policies was also highlighted as a construct of external environmental complexity. This is different to governing approach because the government of Pakistan can have general policies, however only PTA is officially allowed to change or establish policies that affect Telecommunication operators in Pakistan. Participants voice the view that not only is the environment more complex depending on how often PTA's policy changes, but also how rigid these policies are.
A senior manager working for Zeta highlights how the regulator might make the operations of the organisations more difficult:

“When we do something, when we plan to bring out something, there are certain steps and procedures that actually complicate the processes. We have to follow these procedures just because of the regulators.”

A manager working for Sigma highlights an example of how a sudden change in policies issued by the PTA made business operations more complex.

"The regulations are getting more and more stringent now, because there was so many sales in the past twenty years, we did not realise how many of them would be dummy sales. Dummy sales is when people get a SIM, but they give improper identification and misuse those SIM’s...PTA asked the telecoms operators to clamp down on them and verify whether the actual owners were using the number or not. Many telecoms operators suffered great loses, they had loss of revenue and subscribers. In addition to this PTA also tried to enforce a limit of one SIM per customer only, but after they realised that was not going to work, they put the limit to be five SIM's."

In Pakistan, mobile SIM cards have to be activated by the customer who register their government issued identification number with their mobile service providers. The participant from Sigma highlights how many mobile users had registered improperly, which meant that the PTA had to release a policy that required telecommunications operators to find anyone who had incorrectly registered their SIM’s. This meant that many organisations had to invest additional human resources and find a way to track down illegal SIM usage due to a sudden change in the regulator’s policy.

A consultant also highlights a rigid policy implemented by PTA a couple of years ago, where the regulatory authority required a national ban of various internet WebPages:

"One incident that comes to my mind is the rule by the Pakistan Telecommunication Authority regarding the ban of the blasphemous content on websites. This environmental change was to be implemented by all telecom organizations in Pakistan. However, as telecom organizations did not have a sophisticated mechanism for blocking only blasphemous content hence for a certain period of time all internet based services on mobile phones had to be blocked like blackberry services and access to social networking applications such as Facebook, Twitter etc. This resulted in the extraordinary increase in the traffic for the call centres and subsequently less revenue."
Nevertheless, other participants also believe that organisations can have a certain level of peer pressure on the policies or the operation of PTA. A senior manager at Delta explains this:

"The telecoms are the one of the biggest sources of foreign direct investment so they [PTA] are obliged to make sure we are happy. We do have a certain peer pressure on PTA, especially when all operators come together and demand something. But each operator individually does not have much power."

A head of department at Zeta also agrees with the above to a certain extent, however he also highlights his perception that although all the organisations together will have an impact on the policies of PTA, certain large telecommunication organisations that are contributing the most in terms of tax revenue may individually be able to impact the decisions of the regulator to a certain extent. He implies that for other organisations, such as a relatively young organisation that he works for, this makes operating in the external environment intricate and difficult. Nevertheless other participants have also given examples of PTA passing policies or legislations that make the operations of the organisations easier. An example of this is given by a manager at Delta who states:

"When Delta launched one of its brands at the beginning, the connections would be sold for about Rs.30,000 at that time, but now you can buy a SIM card for only Rs.120. It's a massive difference. The reason for this was that in 2001, PTA passed a legislation that stated that calling party pays, when before everyone was charged for receiving calls."

As seen from above regulators can issue policies and procedures that can both make operations of an organisation easier or more difficult. Participants highlight that the uncertainty of what policies will be released by the regulatory also makes the external environment complex. In addition to this, how rigidly the PTA expects the organisations to follow any new rules, and the type of changes the telecommunication operators would have to make to abide by those rules can also contribute towards how complex the regulator’s policy is.

4.3.5 Environmental Corruption

The preliminary model did not identify environmental corruption as a construct of complexity, yet participants interviewed have a high perception of corruption practices taking place in the external environment of Pakistan. There are various types of corruption that can exist in an environment, however unlike organisational corruption, participants outlined embezzlement as a main environmental corruption activity.
One of the main examples of embezzlement was related to the issue of the 3G licence. As explained briefly in section 4.3.4.1 about governing approaches, participants greatly perceived that the government is charging an 'unreasonable' price because the government officials want to increase the national revenue as well have greater funds to be able to embezzle from. A participant working in Zeta states the following:

"If we had a less corrupt government then there will be less demand from our regulators, which would make things easier for us. For example it would make this 3G license more affordable for us, and we can offer it to our consumers in a more affordable way."

A consultant also shares the belief of the above participant. He also insinuates that the advancement of the telecommunications industry is being hindered by the 'greed' of the government:

"See everything is data, and 3G is the step ahead to get that data going faster. Future is data not voice. And we have the technology to advance to that future. But 3G is too expensive because the government is too greedy."

Other than the 3G licence, a manager from Delta also comments on how his perception of a corrupt government is effecting his organisation:

"Because of the kind of corrupt government that we have here, they are continuously finding ways to tax the telecom market. They know that billions of dollars of foreign direct investment as well as consumer spending all comes from Telecom market. And they want a share of it."

From the view of the consultants and organisational participants, they perceive the government to be the main stakeholders responsible for the corruption in the telecommunication industry's environment. Interestingly, a previous high-ranking official working for a ministry that impacted the Telecommunications industry in his time, also had a similar view, although he added that both politicians and certain private companies are responsible for 'siphoning off funds':

"Yesterday, [Politician A], who was on the TV conference, he was saying that [Politician B] is responsible for siphoning off telecoms funds, and corruption is a grey traffic.... Another grey traffic is whirling through the accounts of our federal minister. So if you assume it's true or not, I don't know, but there has been a lot of grey traffic coming into Pakistan, with good private companies siphoning off funds so that money that should have gone to the government coffers, has gone to their coffers instead. So that's another aspect of environmental complexity to be looked at."
Corruption is an important construct of both internal and external complexity because participants perceive every aspect of the business to be surrounded by it, both internally and externally. This is highlighted by a senior manager in Zeta, who states:

"I would count corruption as a factor which causes complexity. You see here in Pakistan the corruption level is that it completely surrounds us. It effects our every way of working, be it whether it's a senior executive in a company that takes a bribe or whatever, or whether it's about paying a bureaucrat something extra to get some work with the government done."

Corruption does not only make the external environment more complex for the organisation's operating in it, but also the authorities that are governing it. There is a lack of transparency in the flow of funds and certain processes, which makes the governing of the environment as well as operating within that environment more difficult.

### 4.3.6 Cyclicality

Whether it's an economy, an organisation or an industry, they all change over their lifetime. Many participants believe that all three of these follow a cycle, from growth to maturity to decline. Cyclicality is considered as a construct because various elements of the environment can behave in a different manner, depending on where they are in their lifecycle. The environment is affected by economic cycles, and many participants have emphasised that if the economy is turbulent or in a recession, then the external environment would become more intricate and difficult for an organisation to manoeuvre around or adapt to. A senior manager at Zeta highlights this:

"If you want to look at complexity in the environment, you need to look at the economic environment. I mean is the economy in recession? Which is difficult for our business, or any business. Or instead is the economy growing? Which is easier for us because we benefit a lot more and it’s easier for us to reap the revenues, there will be a lot more breathing space for the senior management, and they won’t be pushed to constantly change and adapt."

A manager from Delta also comments on the impact of Pakistan's economic cycle on the Telecommunication's organisations:

"There is a massive economic downturn in Pakistan currently, which means that the people do not have a lot of disposable income. This means that once they are done with their basic spending on accommodation and food and clothing, what left is disposable income and that is what they will spend on communication. But as the economy is squeezing, they are cutting down on telecom and
this is affecting our average revenue per customer."

One can see that if the economy is in growth then governments would set different legislations, consumers would have more disposable income and organisations would have the opportunity to earn more revenue than if the economy was in recession.

Whether the Telecommunications industry is cyclical or not, is unclear. However various participants were frequently commenting on which part of its life cycle phase the industry was on in the past and which phase they think it is at currently. A manager working for Delta describes how his organisation has different strategies from its competitors due to their position in their life cycle:

"We are at a very different stage in our life cycle. We have been in operation for 15 years, some of our competitors have been in here for a lot less. They are basically following an acquisition strategy, whilst we are following a retention and churn management strategy."

Over time the Telecommunications industry of Pakistan has been changing. When Mobile Telecommunications was introduced in Pakistan, the industry went through a rapid growth. Some participants, whose organisation’s are not experiencing the same growth as before, perceive the Telecommunications industry to have entered its maturity or saturation point. A senior manager for Zeta perceived the Telecommunications industry to be in its mature phase:

"If you look at the Fast Moving Consumer Goods, or FMCG industry, it has been in Pakistan since the last 40 to 50 years. So they have gone from their previous hyper growth to a mature level now. The mobile phone market in Pakistan started mid nineties. And then after five or ten years there was a rapid boom ... But now, five companies is too much for this market. This industry will mature further and the market will not be able to sustain the ones that are not efficient or profitable, they will be left out."

However a head of a department in Sigma perceived the Telecommunications industry to have reached saturation point:

"The telecoms business isn’t the same as it was 5 or 6 years back, when it was in boom. Right now it is pretty much at a saturation point. Some people say its reached the saturation point, others say there’s still a lot of potential for growth... So the market has become very complex in the sense that it’s become difficult for companies to make as much revenue as they used to. I think the next stage is going to be that, because there are many players in Pakistan's telecoms sector, according
to the market size, I think we are looking into mergers now in the future. Once that is there, that might make it less complex, till that happens, it is pretty complex environment"

One can argue that as participants are used to the notion of cyclicality, they might perceive their industry to be in a particular stage of its life cycle, Thus stakeholders within the environment might behave in a different manner because they believe that's how they should behave when an industry is in that phase of its lifecycle. In addition to this, the participant above highlights how they believe the environment will become less complex in the future because as the market has become saturated and there is less opportunity for organisational growth, mergers and acquisitions will mean there will be fewer organisations. Although a participant in Delta also shares the view that the industry has reached saturation point, he perceives that the environment will become more complex because in order to survive, organisations will have to adopt different strategies. This participant states the following:

"The industry is saturated, or past saturated. The way I see it, the environment will become more complex as organisations will not focus on new customers but retaining their existing customers and also stealing customers from their competitors."

Cyclicality is a pattern of progress for the industry or the economy. Once participants experience a growth, they might decide that the growth can be categorised as the phase before maturity or saturation, where the industrial or economic growth will be at a slower pace. In a way the environment can become slightly more predictable as participants try to extrapolate whether the near future would hold a favourable or an unfavourable outcome, depending on the phase they have experienced in the past. Nevertheless, depending on the phase the national economy or the industry is in, will bring different pressures to the different stakeholders effected by it. 'Cyclicalty' was included in the final model, but was not identified in the preliminary research model.

4.3.7 Resource Complexity

Whilst talking about the different aspects of environmental complexity, most of the participants mentioned the resources available in the Telecommunications industry. Participants mainly highlighted two resources; technology and human resource. Technology is the backbone of any Telecommunication industry, and participants mentioned that the environment can be more complex due to changes in technology, such as innovation or advancement. Human resource, was another aspect of environmental complexity. Though it was mentioned in internal organisational complexity, the availability and behaviour of human resources in the Telecommunications industry, specifically those with technical skills specific to the industry, makes human resource a construct of external environmental complexity. This construct and its sub-constructs were also
included in the preliminary research model.

4.3.7.1 Technological Change
Technology required for the operation of the telecommunications industry can range from cell towers to software required by telecommunications operators to the specification of hand held devices available in the market. Technological advancement contributes towards the progress and growth of the telecommunications industry. A participant, the owner of a telecommunication's consultancy company, highlights the technological change and its importance in the industry:

"Technology is ever shifting and because of that voice communication is changing. As these changes occur, organisation can either adopt them, which will affect their marketing dynamics itself, or they can keep the current system and risk falling behind in the market...This is what happens in technology, it advances, moves, and the current technology an organisation has becomes more expensive to keep and operate. Thus this shift has a huge significance on the industry."

Another consultant comments on the risks of not adopting to new technology in the telecommunications market by using the example of Instaphone:

"Instaphone was using the AMP's technology, which at that time was cutting edge. But after that, for ten years, they did not realise that they had to start innovating and changing. And suddenly GSM came around.... slowly GSM caught on, and Instaphone died, they died because of the frequency they had, because they could not look beyond the AMP's technology."

A senior member of the Pakistani Telecommunication's Authority (the regulator), also highlighted that advanced software also gives organisations an edge:

"In 2005, the software to bill the customer was very different, but now it's changed, it's advanced, more flexible and faster, able to calculate with more parameters than before. This enabled organisation's here to offer their customers more competitive and flexible packages."

A director for Zeta also highlights the advancement of technology, and looking into his perception of the future, he relates this advancement with the internal complexity of the organisation as well as the external environmental complexity:

"Anything and everything that you think you can do, you can do with your mobile. It is going to be even easier, more user friendly. It is happening now in Far East and to some extent in Europe that
you use your phone for financial transactions, for mobile, you go the market you scan product barcode and they get delivered to your place. This will be helped with the introduction of 3G, then 4G, which is yet to come. When these Innovations take place, it makes the environment complex, which means organizations become more complex and future oriented in order to cope with the change."

A previous member of a ministry in charge of Telecommunications, also comments on how the technological change will affect the environmental complexities of the industry:

"Before we had one particular technology, each for its own use. A television was for your TV programs, a radio or CD player was for music, computers for browsing, and a mobile was for communicating. Now, those lines have blurred and we are moving into a new era of integration. A mobile can now be used for browsing, watching videos, listening to music, playing games, taking care of bank transactions, keeping track of news, accessing libraries and so much more. This has made the Telecommunication's environment so much more complex."

Telecommunications operators have to cope with such technological advancement by keeping up-to-date or more advanced technology than their competitors. This is explained by a head of a department for Delta:

"We have a very creative and innovative services such as you can use your phone even when you are flying at 35,000 feet altitude. We offer this service to be competitive and ahead of our competition."

However, a consultant also highlights that with technological advancement there is also the element of the society to adapt to it as well:

"You have a technological change and that remains in the market until the society catches up to it. For example by education, etc, or vice versa society waits for technology to develop and then society catches up to the technology. Either way technological change complicates the market, for both the organisations and their consumers."

Thus it can be seen that the advancement of technology impacts the environment and puts an added pressure on the telecommunications operators to invest in adopting it. There has been examples in the past, such as Instaphone, an organisation who was unsuccessful because it failed to update their technology. This makes technological change a construct of external environmental complexity.
4.3.7.2 Human Resource Factor

The availability, the behaviour and the change in the technical skills of the human resource have an impact on the telecommunications industry. As the demands of the consumer changes, the technology advances and the strategies of the different telecommunication operators vary, the demand for the human resource also changes, especially the requirement of certain set of skills. This is highlighted by a manager in Zeta:

“Our business is ever changing, and hence to keep up with those changes, either we train the current human resource or we try to hire people with the certain set of skills we require from the market. The Pakistani telecommunications market is different in that we usually try to hire individuals from our competitors who have the skills we require. This saves us from training our current employees or fresh graduates with little experience.”

The reason why the changes in the human resource make it a construct of environmental complexity is the behaviour of the industrial work force. As mentioned before in section 4.3.1.3, Agent Education, Skills and Experience, those employed in the Pakistani telecommunications industry have a tendency to change jobs regularly. Participants believe that individuals are loyal to the telecommunications industry, but not loyal to the operator, and hence tend to switch between operators. A manager for Sigma comments on this:

“The thing in the Pakistani telecoms sector is that there are a couple of big names, and they keep moving from one company to another and they have no sense of loyalty in any company. And they are the ones that are quite high up in the hierarchy. Which then cause those under them to follow in their example. Thus it becomes difficult for organisations to hang onto good employees as these employees keeping skipping from one operator to another.”

A consultant agrees with this as well by stating:

“People from one telecom have switched in such a quick succession to another that they have taken all the complexity factors with them to other organisations. For example, when Delta was there they were the only one then came Sigma, then came Epsilon then Omicron. People did not come from abroad. Majority were snatched from one organization to another. When people went from one organisation to another, they took with them the inherent risk they had or the internal complexities they had in those organisations. This in turn had the knock-on effect of making the industry more complicated.”

In addition to this, because human resources move amongst organisations, participants have also
have the perception that employees working in the industry are very well connected, regardless of the telecommunications operator they work for. Participants also highlight that due to this high degree of connectivity between individuals, information between them travels fast. This is highlighted by a consultant who states:

"The people within the telecommunications organizations are very closely connected to each other. Like 10 people within Delta will know 10 people in Epsilon, 20 people in Epsilon would know 50 people in Omicron, so on. So there is like a very close circle. Any rumour that is spread will be quickly disseminated into entire sector. There have been rumours in the past that probably one of the telecommunication operators will be taken over by another one. But it was not a rumour it was a genuine news. It affects the stake holders. If I have invested and I get news of merger I would think what would happen of my money so in that case there is always an impact on environment."

Thus, as seen from extracts of participant interviews, human resource complicates the telecommunications environment due to the erratic behaviour of individuals shifting between organisations and changes in the skill set demanded by organisations.

4.3.8 National Culture

'National Culture' was a construct that was subtly mentioned by consultants and organisational participants, but not included in the preliminary research model. Participants would usually hint at national culture with phrases such as 'that's the way things work in Pakistan' or 'in Pakistan people are known to work this way.' Only one participant, a consultant specialising in the nation's telecommunications industry, used the phrase 'Pakistani Culture', when he was talking about organisational culture:

"I would say both organisational culture and their values would determine complexity. What kind of culture and values the organisation has determines its working environment. What complicates this further is our Pakistani culture affects the organisation, then as you know all the organisations have shareholder's external to the organisation, the foreign culture also impacts the organisation. Both of these combined impact the organisation's own culture."

Compared to the national culture, impact of international culture through the organisation's shareholders was more prominently recognised. One may argue that many participants may not perceive this construct prominently because they are immersed in the national culture and hence take it for granted that it is understood to exist.
4.3.9 Section Summary

There were 17 constructs and sub-constructs of external environmental complexity that were highlighted in this section.

Figure 5 illustrates these constructs, which were identified from participant interviews.

![Diagram of Constructs of External Organisational Complexity]

**Figure 5: Constructs of External Organisational Complexity**

The main constructs highlighted were 'Predictability', 'Competitive Complexity' (with sub-constructs of 'Competitor Objectives' & 'Competitive Density'), 'Consumer Demand' (with sub-
constructs of 'Consumer Behaviour', 'Consumer Segments' & 'Literacy Rate & Education'), 'Government Influence' (with sub-constructs of 'Governing Approach' & 'Regulatory Policies'), 'Environmental Corruption', 'Cyclicality', 'Resource Complexity' (with sub-constructs of 'Technological Change' & 'Human Resource Factor') and finally 'National Culture'.

4.4 Complexity Coalignments

In section 1.5.1, the various different perspectives of coalignment within literature were looked at. Within the context of complexity, coalignment is the relationships that exists within and between internal organisational and external environmental complexity constructs. This research has identified the constructs of both of the internal and external environment in sections 4.2 and 4.3 above. In the current section, the different relationships that exist between these constructs will be identified from the perspectives of the participants interviewed. Section 4.4.1 will look at relationships between internal constructs, whilst section 4.4.2 will look at relationships between external constructs. Section 4.4.3 will then look at relationship between internal and external constructs.

4.4.1 Relationships between Constructs of Organisational Complexity

Questions 'd' and 'e' in the first part of the interview, asked the participants whether they perceived any relationships to exist between the different constructs of internal organisational complexity that they had mentioned before. The relationships mentioned here are only those that were identified by participants, and does not mean that other linkages between constructs do not exist.

A relationship identified was between 'Management Approach' and 'Influence of Foreign Shareholder's culture. This linkage was mainly highlighted by participants of Zeta and a consultant. A senior manager in Zeta relates the style of the 'Chinese management' with the way the organisation is managed:

"You see, Zeta is the typical example of a Chinese style of management. Because they will only have a Chinese CEO, this CEO will always make sure the organisation operates the way they operate their organisation in China."

This highlights the perception of this participant that the shareholder's culture influences the management approach. A consultant also comments on the management of Zeta:

"Direction of the organisation depends on who has the power. For example Zeta is Chinese, so the power belongs to the Chinese, what they want. Also the CEO of Zeta is Chinese, and thus what
they want and who is driving the company. They come from a market quite evolved quite
developed. But they run it like a Chinese company here. They change their directors but they will
not have a non Chinese CEO."

A participant working for Zeta also perceived the existence of the relationship between
'Management Approach' and 'Organisational Culture'. He believes that those in the position of
power to drive the organisation will also have an influence on the general organisational culture.
He justifies this relationship:

'Leadership is something of an individualistic thing you know, and culture is more of a collective
thing. So of course the top management is always in a position to influence the general prevalent
culture of the organisation'

Another relationship identified was between 'Management Approach' and 'Intricacies of Policies,
Procedures and Processes'. A participant from Zeta states the following:

"...every organisation has certain policies and certain procedures. The ones that make those
procedures or the ones that lead those policies are actually the ones who define how complex
those procedures are could be or how easy they could be."

This participant perceives that 'Management Approach' has an impact on the complexity of
policies and procedures within an organisation.

In addition to this participants have also highlighted a linkage between 'Intricacies of Policies,
Procedures and Processes' with 'Transparency and Clarity in Communication'. This is evident from
an organisational participant who states:

"I mean in order to have clear communication, the processes needs to be defined. Unfortunately it
is not just telecom, people in Pakistan do not care much about processes....Information can flow
fluently and efficiently. When information does not flow in a smooth way that is when complexity
increases."

This participant highlights a subtle link between communication within an organisation and its
business processes. He perceives that for information to flow 'smoothly', processes have to be
defined, which would then have an impact of reducing organisational complexity.
Figure 6: Relationships between the constructs of internal organisational complexity
In addition to this, a participant also pointed out a relationship between 'Job Complexity' and the organisations 'Technological Requirements', stating that even employees not directly associated in implementing the new technology have to have an understanding of it to do their job. This can be seen from the following statement by a manager working for Zeta:

"Our technological requirements are changing with time, which has an influence on my work because I have to make sure that employees working for me are aware of any new technology that we have taken on. For example when 3G comes in, obviously the technical department will be responsible for implementing it, but people in our departments also have to know how the 3G will impact our organisation and how we can get the most revenue out of it."

The final relationship highlighted between the constructs of internal organisational complexity was between 'Organisational Experience' and 'Organisational Hierarchy'. A consultant perceives this link to exist, outlining those telecommunications organisations that have foreign investors 'import' or copy organisational structure from those investors. This is evident from the example of Omicron, where organisational participants working for this telecommunications operator in Pakistan, state that their business was structured according to Omicron's experience of owning subsidiaries around the world.

The relationships highlighted in this section are illustrated in Figure 6 above.

### 4.4.2 Relationships between Constructs of External Environmental Complexity

Questions 'e' and 'f' in the second part of the interview asked the participants whether they perceived any relationships to exist between the constructs of external environmental complexity that they had mentioned before. The relationships mentioned here are only those that were identified by participants, and does not mean that other linkages between constructs do not exist.

One of the relationships identified was between the consumers 'Literacy Rate & Education' with 'Technological Change'. This relationship can be seen from the analysis in section 4.4.3.3, where a consultant stated the following:

"I mean education, literacy in the external environment effects Pakistan. The telecoms can have a hindrance, because you have to wait for the population to move on as you may have the technology but the people, if they are not willing to except it then you would need to move slower."
This highlights that technological advancement in the industry can be hindered if consumer literacy rate and education does not advance. It was perceived that organisations may decide not to update their technology if they feel there was no demand for it in the market. This can be seen from the auction of the 3G licence, which is highlighted by the following statement from a consultant:

"The 3G would change the way voice and data are transferred....But then again it's a rich and educated man's product... So in order for it to work, the market would need to be educated."

However, it was also noted that 'Technological Change' also has a relationship with 'Regulatory Policies'. This relationship was identified in section 4.4.4.2, where regulatory policies could both hinder or aid technological progress. The possible hindrance of technological progress by the regulatory policies was highlighted by participants when they gave the example of the 3G licence. Organisations in the industry are unable to implement this technology because, according to organisational participants, the licence is 'over-priced'. Regulatory policies were also perceived to aid technological change through quality assurance. They was mentioned by a participant who was previously a high ranking official working for a ministry in charge of Telecommunications, states:

"See the technology has further advanced probably because the regulatory authority implements policies associated with quality assurance, making sure that the organisations meet the minimum quality requirements. Thus organisations, in a way, are pressured to update their technology according to the industrial standards."

There was also a strong link highlighted between the constructs of 'Regulatory Policies' and 'Governing Approach'. Participants perceive that the existence of this relationship increases the complexity of the telecommunications industry because policies implemented by regulators are controlled by the motivations of the government. This is evident from an example outlined by a consultant on a policy implemented by the regulators that required the ban of social networking sites on mobile telephones. This policy was implemented because the government of Pakistan condemned certain content on specific social networking sites.

Participants also indicated that 'Governing Approach' also has a relationship with 'Environmental Corruption'. A manager for Zeta outlines this in the following statement:

"Yes, we have corruption in the external environment, and that has existed for a long time. It fluctuates depending on the government in power. If we have a government that was half way
honest, then the corruption that we have in the industry would decrease. But currently that is not the case. The government is corrupt and hence we see corruption in the environment increasing.’

Figure 7: Relationships between the constructs of environmental complexity

The relationship between environmental corruption and governing approach was also prominent in section 4.3.5, when certain participants perceived certain government official’s to be responsible for ‘grey traffic’ and ‘siphoning off telecoms funds’.

The relationships identified in this section are also illustrated in Figure 7.
4.4.3 Relationships between Constructs of Organisational & Environmental Complexity

Question 'e' in the third and final part of the interview asked the participants whether they perceived existence of any relationships between the constructs of internal organisational complexity and those of external environmental complexity, that they had mentioned before in the previous part of the interview. Once again, please note that the relationships mentioned here are only those that were identified by participants, and does not mean that other linkages between constructs do not exist.

Participants mainly highlighted connections between the internal organisational complexity constructs of 'Organisational Strategy and Objectives' and 'Technological Requirements' with various constructs of external environmental complexity. Looking at 'Organisation Strategy and Objectives', participants perceived this construct was related to 'Competitor Objectives' and 'Consumer Behaviour'. In addition to this participants also highlighted a relationship between the internal complexity construct of 'Intricacy of Policies, Procedures and Processes' with the external complexity construct of 'Regulatory Policies'.

A manager from Delta highlighted that he perceived the industry to be reactive. When asked to explain this he stated the following:

"See, all the organisations are very reactive to one another. Take us for example, if we see that a competitor has a particular market strategy, like they release a new package, we react to it, by changing our own strategy to adapt to that. This can be to release a similar package or make changes to our existing packages, in order to be competitive."

According to this participant, as the market is highly competitive, organisations are sensitive to the strategies of one another. A participant at Omicron had similar view, where he highlighted that his organisation would reduce its prices, if another telecommunications operator was offering a low price in the market, in order to sustain their consumer base. A senior manager at Zeta agrees with the view that organisations in the market are reactive and states that this is the reason why there is currently a price war in the market.

In addition to this, the construct of 'Organisational Strategy & Objectives' was also perceived to be related to the construct of 'Consumer Behaviour'. This was highlighted by a high ranking official from PTA who states:
"Consumer behaviour changes a lot. Because what happens is that people’s habits shift over time and which means they are choosing products that match their changing likes. What Telecoms operators have to do is that they tailor according to different [consumer] personalities."

Thus Telecommunication's operator have to adapt their strategy according to consumer behaviour. An example of this relationship was given by a senior manager in Omicron who stated:

"When the customers see that something better is out there, they will always call up call centres and say 'Epsilon or Zeta is giving this offer, do you have a similar offer, and if you don't then I am going to leave your network'...Consumers can push you to bring in new things. To quote another example; SMS is very cheap in Pakistan, so what we tried to do charged a cheap rate for Omicron to Omicron SMS' and a more expensive rate for Omicron to other networks. This was to try and increase Omicron subscribers. It was a failure! We had a drastic negative public reaction. Customers were calling up call centres and saying 'we don't like it, we are leaving Omicron', and then they turn off their SIM. After losing a lot of subscribers over two or three month period, we realised what a mistake we have done and had to change our policy back to what it was."

It can be seen that this participant perceived that consumer behaviour impacted their organisation’s strategy to a certain extent. In this example the strategy of the organisation to try and charge a different rate for the different network provider the consumers were connecting to, was a failure and hence Omicron had to revert back to its original mobile charges.

'Technological Requirements' was also identified by participants to be related to 'Regulatory Policies'. The relationship between the external construct of 'Technological Change' in the industry was also connected to 'Regulatory Policies'. It can be argued that 'Regulatory Policies' is connected to both 'Technological Change' in the industry environment, as well as the 'Technological Requirements' within an individual organisation. Thus a link can also be identified between the external complexity construct of 'Technological Change' with the internal complexity construct of 'Technological Requirements'. This relationship was highlighted mainly by consultants, who perceived that any technological changes in the industry would put a pressure on an organisation to update its technology as well. A consultant also highlighted that this pressure mainly exists because of the example of Instaphone, an organisation that was forced to declare bankruptcy because it failed to upgrade to GSM technology, which means that current Telecommunications operators do not want to risk the same fate.

It was also highlighted that 'Intricacies of Policies, Procedures & Processes' was also connected to 'Regulatory Policies'. A participant, working for Sigma, gave the example of PTA changing its
policies about the limit of the amount of SIM's one person can own. These policies directly impacted organisations, who had to change their policies to accommodate the new regulation issued by PTA. This particular relationship is expected, as well as highlighted by participants, because any regulatory changes made by the PTA impacting the Telecommunications operators, would impact these organisation's policies and procedures.

The relationships between the external and the internal constructs of complexity are illustrated in Figure 8 below, where the dotted lines that denote to the relationships between the constructs have differing colours to make it more visually clear.
Figure 8: Relationships between the constructs of environmental complexity and organisational complexity
4.5 Chapter Conclusion

After the initial set of interviews were conducted, it was obvious that there would be changes made to the preliminary framework of internal organisational and the external environmental complexity, relevant to the mobile telecommunications industry of Pakistan, presented in Chapter 1 of the thesis. This chapter identified and analysed the main constructs of internal organisational complexity, which were 'Agent Orientation', 'Contextual Constructs', 'Structural Constructs', 'Corruption', 'Job Complexity', 'Technological Requirements', 'Strategic Complexity' and 'Management Approach', with sub-constructs of 'Agent Goal Alignment', 'Agent Personality', 'Agent Education, Skills and Experience', 'Organisational Hierarchy', 'Interactional', 'Transparency and Clarity in Communications', 'Embezzlement & Bribery', 'Favouritism', 'Organisational Strategy & Objectives' and 'Intricacies of Policies, Procedures & Processes'. The main constructs of external environmental complexity were also identified and analysed, which were 'Predictability', 'Competitive Complexity', 'Consumer Demand', 'Government Influence', 'Environmental Corruption', 'Cyclicality', 'Resource Complexity' and 'National Culture', with their sub-constructs of 'Competitor Objectives', 'Competitive Density', 'Consumer Behaviour', 'Consumer Segments', 'Literacy Rate & Education', 'Governing Approach', 'Regulatory Policies', 'Technological Change' and 'Human Resource Factor'. The relationships between these constructs were also explored, according to the perception of the participants.

This chapter also looked at phenomena associated with these constructs, such as the high rate of job hopping of employees between different telecommunications operators in Pakistan and the propensity of consumers to own multiple SIMs. The research gave interesting results of the perception of industrial participants on the organisational and environmental complexity of the Pakistani telecommunications industry. These results will be evaluated in further detail, comparing them to literature, in the final chapter of this thesis.
Chapter 5 Discussion and Conclusion
5.1 Introduction
This chapter will present the findings of the research, evaluating them in full detail. Table 8 shows the research aims, objectives and questions, which this chapter will clearly answer, drawing on the findings and literature explored in the past chapters. In section 5.2, findings of the research will be discussed, including the differences between the preliminary framework and the final model illustrated from the results. The section is structured so that the first part discusses the constructs of organisational complexity, leading to the second part that outlines constructs of environmental complexity, both sections focused on meeting the first objective (1a) of the research. The final part of the section will then meet the second objective (1b), discussing the coalignment of complexity. Section 5.3 will then look at the significance and future implications of the results of the thesis, highlighting how this research can contribute to complexity literature as well as benefit the Pakistani telecommunications operators.

Table 8: Research Aim, Objectives and Questions

<table>
<thead>
<tr>
<th>Research Aim</th>
<th>Main Research Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Operationalise organisational and environmental complexity in the context</td>
<td>What are the constructs of organisational and environmental complexity and the</td>
</tr>
<tr>
<td>of the Mobile Telecommunications industry of Pakistan</td>
<td>coalignment between them in the Pakistani Mobile Telecommunications Industry?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Objectives</th>
<th>Research Sub Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Formulating a research model, within the context of Mobile Telecommunications</td>
<td>What are the perceived constructs of organisational complexity?</td>
</tr>
<tr>
<td>industry of Pakistan</td>
<td>What are the perceived constructs of environmental complexity?</td>
</tr>
<tr>
<td>b. Identifying linkages that exist between organisational and environmental</td>
<td>What are the perceived relationships between the internal constructs of complexity?</td>
</tr>
<tr>
<td>constructs</td>
<td>What are the perceived relationships between the external constructs of complexity?</td>
</tr>
<tr>
<td></td>
<td>What is the perceived coalignment between constructs of organisational and environmental complexity?</td>
</tr>
</tbody>
</table>

123
5.2 The Constructs of Complexity: Discussion of Findings and Conclusion

This section of the chapter presents the main findings of the research, linking them back to literature. The first chapter of this thesis outlined the preliminary research model, which can be seen in Figure 9 below. This model was derived from literature related to organisational and environmental complexity. This was the preliminary research model that was designed to aid in the answering of the main research question, which asked; 'what are the constructs of organisational and environmental complexity in the Pakistani Mobile Telecommunications Industry?'.

<table>
<thead>
<tr>
<th>Organisational Complexity</th>
<th>Environmental Complexity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Task Complexity</td>
<td>Competitive Complexity</td>
</tr>
<tr>
<td>Strategic</td>
<td>Market Diversity</td>
</tr>
<tr>
<td>Agent Orientation</td>
<td>Resource Complexity</td>
</tr>
<tr>
<td>Contextual</td>
<td>Process Facility Complexity</td>
</tr>
<tr>
<td>Interactional</td>
<td>Uncertainty</td>
</tr>
<tr>
<td>Structural</td>
<td>Regulatory</td>
</tr>
<tr>
<td></td>
<td>Customers</td>
</tr>
</tbody>
</table>

**Figure 9: Preliminary Research Model**

5.2.1 Constructs of Internal Organisational Complexity

This section will answer one of the first sub-questions, 'what are the perceived constructs of organisational complexity?', comparing it to the preliminary research model and organisational complexity literature. As it can be seen in Figure 10 below, the preliminary model identified six main constructs highlighted in literature; 'task complexity', 'strategic', 'agent orientation', 'contextual',

124
'interactional', and 'structural', all of which were either identified as 'cognitive' or 'relational' complexity.

Figure 10: Preliminary Research Model of Organisational Complexity

After analysing the interviews of the industrial participants using a thematic analysis methodology, additional constructs of organisational complexity were identified for Pakistan’s telecommunications industry.

Figure 11 shows the final model of organisational complexity in this industry, and highlights constructs not perceived in literature. The constructs identified in the preliminary model, Figure 10, are the known aspects of complexity, whereas results show that there are additional constructs not previously considered. Thus it can be seen that 'Corruption', 'Technological Requirements' and 'Management Approach' were the additional constructs of organisational complexity that were found to exist in the industry, that were not considered by previous literature. In addition to this, even though 'Contextual Constructs' were highlighted by Rousseau (1978), 'Influence of Foreign Shareholder Culture' and 'Organisational Experience' are not prominently mentioned by literature.
Figure 11: Differences between Preliminary Research Model & Final Model of Internal Organisational Complexity
The constructs in the preliminary model of internal organisational complexity (see Figure 10), are split into 'cognitive' and 'relational' complexity (Ashmos, Duchon & Reuben, 2000). According to Ashmos, Duchon & Reuben, cognitive complexity constructs focus on the flow of information amongst the members of the organisation, whereas relational complexity focuses on the interactions and the way in which these members are structured (p581). However, the analysis of the interviews highlighted that splitting constructs between 'cognitive' and 'relational' dimension would be general, whereas the data revealed specific constructs associated with a multi-dimensional view of the internal organisational complexity. Each of the constructs in the final model of organisational complexity will now be evaluated in more detail, comparing each construct from the point of view of the literature and the perspectives of industrial participants.

**Agent Orientation:** Lawrence & Lorsch (1967a), view agent orientation as a way in which employees of the organisation perceive their work; whether they are more focused on completing a task or creating social relationships. The analysis of the construct of 'agent orientation' outlines that employees working for the organisations of the Pakistani telecommunications industry, are perceived to impact the internal complexity. This is justified due to the perception that employee's behaviour, the extent to which they follow organisational policies, their loyalty towards to company and their commitment towards their work contributes to how complex the telecommunications operator's internal environment is. The participants did not highlight a differentiation of the orientation of organisational members along the task-social dimension (Lawrence & Lorsch, 1967a), instead members were perceived to be more task orientated if they had a higher level of education.

Though to a certain extent the respondent's views agree with Lawrence & Lorsch 's (1967a) argument that each subsystem within each organisation will have differing set's of agents' goal alignment, time orientation and interpersonal connections, it was also found that each specific employee's goals, time orientation and interactivity differed according to individual personality and their education & experience. Thus 'agent goal alignment', 'agent personality' and 'agent education, skills and experience', were sub-constructs structured under 'agent orientation' in the final model of this research. Though Rousseau's (1978) research supports the view that an employee's work experience and positional & job characteristics are associated with their attitude and behaviour, it does not highlight an additional connection of this with their level of education. Even though, Wiersema & Bantel (1992) highlight that educational level and specialisation of the management has an impact on organisational strategy, this was inconclusive from the results of this research.
Kaplan & Norton (2005) argue that employees will have their own personal goals, thus organisations need to align such agents with their business strategy using performance management and incentives. Various participants agree with this view, stating that for employees to tune their goals with their organisation, the business has to make an investment in terms of incentives. In addition to this, various participants also highlight, what they perceive to be, a failure in the operation of the way human resource departments within the organisations operate in Pakistan, a department which Kaplan & Norton (2005) outline should take charge of aligning employee goals. It was pointed out by participants interviewed that alignment of employee goals to an organisations’ can be achieved through better training and management approach. However, it can be argued that organisations invest more into attracting employees from their competitors, then they do in investing into their own human resource.

**Contextual Constructs:** In ambidexterity literature, Birkinshaw (2004) differentiates contextual and structural dimensions of the organisation. However, complexity literature does not clearly highlight contextual complexity constructs. Although Stacey (1995) associates agent behaviour with culture, and Bourgeois (1985) has related corporate culture to lingering old business goals, it is not prominently defined how organisational culture attributes to internal complexity. Nevertheless, participants in the Pakistani telecommunications industry identified organisational culture as one of the main constructs. One consultant stated that *‘both organisational culture and their values determine complexity’*. In addition to this culture was associated with employees' motivation and commitment to their work.

Additionally, an interesting find was the extent to which organisational participants strongly believed that the influence of foreign shareholder's culture impact overall organisational complexity. Although Boisot & Child (1999) have mentioned the relation of organisation's national culture as the extent to which the organisation chooses to reduce or adapt to complexity, the influence of international culture through main shareholders has rarely been looked at in organisational complexity literature. Yet participants strongly associated influence of a shareholders foreign culture on organisational complexity, as they perceived certain aspects of their organisational environment, such as the structure, the policies and the process, to be determined by the culture of the main shareholders. However, participants also spoke of organisational experience, including the experience of the shareholders, to determine their organisational environment as well as the Pakistani telecommunications operators’ strategic direction.
This might lead to a question of how separable the 'Influence of Foreign Shareholder's Culture' and the 'Organisational Experience' constructs are. Participants at times have given statements that can merge both of these constructs, such as the following statement from a participant in Omicron:

"I think the history is from Norway and that's how things work in Norway, it's in the nature of an organisation's people they like to do the things in [an] easy way and we have identified all the same policies in Omicron Pakistan"

Nevertheless, other participants have also identified these constructs separately, highlighting that 'Organisational Experience' is not only the experience of the shareholders, but is also combined with the previous experience, if any, of the telecommunications operator before the investment from their foreign shareholder.

**Structural Constructs:** As it can be seen from Figure 11, both 'Structural' and 'Strategic Complexity' constructs and their sub-constructs were highlighted by literature (Ashmos, Duchon & Reuben, 2000; Burns & Stalker, 1961; Lawrence & Lorsch, 1967; Davis, Eisenhardt & Bingham, 2008). Different telecommunications' industrial specialist have highlighted how some organisations can have 'bureaucratic' structures, which they define as an organisation with many formal hierarchical layers but lack of defined processes. Though some organisational participants agree that there is a lack of defined processes in their organisations, these participants also argued that this is the same case with their corporate structure, which is what they believe increases complexity in their business. One may argue that perhaps these organisations, that started off with a formal structure, are in a continuous cycle of breaking down their structures and processes and then re-defining them, due to the increasing external environmental complexity (Stacey, 1995). Stacey argues that this process occurs in systems at the edge of chaos, and thus the form of structure that these organisations eventually take is unpredictable.

'Interaction', a sub-construct of the 'Structural Construct', was identified as participants highlighted the importance of relationship between different organisational members and sub-systems, and the ability of information to pass between levels of these members and sub-systems. Anderson & Crabtree (2005) highlight that the key to understanding a system is in understanding the relationships between different organisational members. However, Anderson & Crabtree (2005) point out that interactions can generate complexity within an organisation, yet participants highlight that an organisation with lack of interactions between agents and the sub-systems, such as those
with a 'silo culture', will lead to a chaotic business. In complexity literature, organisational structure has also been related to interactivity between agents (Lawrence & Lorsch, 1967; Davis, Eisenhardt & Bingham, 2008). Nevertheless, it may be argued that a 'chaotic' organisation might be a result in both instances where there is lack of interaction between sub-systems as well as in cases where there is such a high level of interaction that can confuse the lines of communication.

Within the construct of 'Strategic Complexity', participants identified both 'Organisational Strategy & Objectives' and 'Intricacies of Policies, Procedures and Processes' as its separate sub-constructs. Strategic change literature views strategies of organisations from either the 'content' or the 'process' perspective (Zajac & Shortell, 1989). From an organisational complexity point of view, it can be seen from the results that both the content of strategies and the process of their implementation contribute to organisational complexity. In addition to this organisational participants have also highlighted that complexity can arise from operating with stringent policies and unchanging strategies whilst conditions in the external environment are in constant flux. Participants also believe that strategies have an impact on organisational life, pointing out the example of Instaphone, an operator who did not change its technological strategy and had to declare bankruptcy. Porter (1991) agrees with the existence of a link between strategy and organisation longevity, whilst Collins (2001) disagrees with this.

**Management Approach:** 'Management Approach' is a construct that results show as a driver in policy and strategic changes. Participants believe that the *direction of the organisation depends on who has the power*, and those with leadership will either make changes within the business that increases or decreases organisational complexity. McKelvey (2010), on his research on leadership styles, highlights that successful leadership may occur when an organisation is viewed as a complex adaptive system. McKelvey argues that management should consider their organisations as a complex system, and managed the complexities within their organisation through complexity leadership. Though Lichtenstein (et al, 2006), define complexity leadership as an 'emergent event, an outcome of relational interactions among agents' (p.2), McKelvey (2010) highlights that management should invoke complexity leadership within their organisations. Though participants mention the impact of management approaches on organisational complexity, results show that leadership in the Pakistani telecommunications industry are not perceived to view their organisations from a complexity perspective.
**Technological Requirements:** The results show that participants view the construct of 'Technological Requirement' as being highly impacted by technological change within the industry. Results of this research also agree with both Rousseau (1978), who relates organisational technology with job characteristics, and Bourgeois (1985), who talks about the impact of environmental technological volatility on an organisation's internal technological requirement. Participants have also highlighted the need of the organisation's to adapt to environmental technological change in order for the business to survive.

**Job Complexity:** 'Job complexity' was highlighted as many participants who identified their organisation to be complex attributed it to the lack of a formal job description which meant that individual employees had to multitask across a range of business teams. Though it can be argued that this ensured the organisation was ambidextrous (Birkinshaw, 2004), it also meant that participants felt they might be replicating tasks. Lawrence & Lorsch (1967) also highlight that uncertain task definition within an organisation can be associated with job complexity.

**Corruption:** Though organisational corruption was highlighted by various participants to determine internal complexity, this has rarely been a prominent construct recognised in organisational complexity literature. However, Ashforth, (et al, 2008), deem organisational corruption as a complex phenomenon but they also highlight that it is not well understood in literature and call for framework to aid organisations in the reduction of corruption. Yet, participants in the Pakistani telecommunications industry did not deem corruption as a phenomenon, but a daily occurrence that was known to exist to which they had little control over. Organisational corruption was identified as impacting supply chain management, recruitment and business to business transactions. As a controversial construct of complexity, corruption can be easily overlooked, which would mean that some of the observable organisational practises and processes would be unexplained. However, the researcher understands the difficulty of studying corruption, but highlights its significance in understanding internal organisational complexity. It can be argued that corruption might makes organisational operation easier because it defines an additional set of rules of operation. Alternatively, it can also be argued that corruption can cause more complexities, because organisations have an additional set of rules, which are contradictory to legal or official rules and processes, which means that there has be a sense of negotiation between the different set of rules.
As it can be seen, the literature on internal organisational complexity is disjointed, due to differentiated views on the concept. Inconsistencies in literature may be attributed to complexity, which is a multi-dimensional concept, being viewed with a one-dimensional approach (Zajac & Kraatz, 1993; Fombrum & Ginsberg, 1990). Thus, organisational complexity in the case of the Pakistani telecommunications industry was researched using a multi-dimensional approach. Main constructs for the preliminary framework for organisational complexity were derived from ambidexterity, strategic change and organisational adaptation literature. Results showed changes to the preliminary framework as participants highlighted and justified three additional constructs and five sub-constructs. Out of these constructs, 'Corruption', with 'Embezzlement & Bribery' and 'Favouritism' and 'Influence of Foreign Shareholder's Culture' were not anticipated by literature but strongly identified by participants. The results contribute to the understanding of organisational complexity because it highlights that organisations in different contexts have different unique perception of constructs that attribute to making it more or less complex, and how organisational participants act on those perceptions.

5.2.2 Constructs of External Environmental Complexity

This section will answer the second of the first set of sub-questions, 'what are the perceived constructs of environmental complexity?', comparing it to the preliminary research model and environmental complexity literature. The main research on the constructs of environmental complexity was presented by Cannon and St. John (2007), who operationalised external business environment by empirically validated theory and quantitatively analysing objective data.

In addition to Cannon and St. John's research, additional constructs of 'Customers' was added following the contribution of Holm's (2012) research on measuring customer profitability in complex environments, 'Uncertainty' which was derived from research by Duncan (1972), Bourgeois (1985) and Milikien (1987) and 'Regulatory' from the research of Gao & Rafiq (2009), Smith Grimm (1987) and Jurkovich (1974). As it can be seen in Figure 12 below, the preliminary model identified seven main constructs highlighted by Cannon & St. John (2007) and Holm (2012); 'Competitive Complexity, 'Market Diversity', 'Resource Complexity', 'Process Facility Complexity', 'Uncertainty', 'Regulatory' and 'Customers'.

132
Figure 12: Preliminary Research Model of External Environmental Complexity

The final model for external environmental complexity, as seen in Figure 13, included three additional main constructs of 'Environmental Corruption', 'Cyclicality' and 'National Culture' and three sub-constructs of 'Competitor Objectives', consumer 'Literacy Rate & Education' and 'Governing Approach' are identified from the thematic analysis of research participants' interviews.

Predictability: Initially the preliminary framework included the construct of 'Uncertainty', derived from organisational adaptation (Miles & Snow, 1978) and environmental contingency (Bourgeois, 1985) literature. Though uncertainty and predictability are treated as separate environmental states, participants in the Pakistani Telecommunications industry perceived the extent to which the environment was predictable to how complex the external environment was. In addition to this, participants remark that any unanticipated events occurring in the environment that are thought to have a negative impact on their organisation, meant the environment was unpredictable and thus complex. Daft & Lewin (1990), however associate predictability with organisational behaviour rather than as business' perception about their environment. Thus uncertainty, as defined by literature (Miles & Snow, 1978; Bourgeois, 1985) is a broad concept, and participants interview identify
predictability as a construct of complexity which is more narrow concept they give greater importance to.

Figure 13: Differences between the Preliminary Research Model and Final Model of External Environmental Complexity
**Competitive Complexity:** Though participants identify 'Competitive Complexity' as a construct, they rarely clearly specify that they perceive their competition to be 'unpredictable'. Results show that to a certain extent the construct 'Competitive Complexity' was perceived to be consistent with Cannon and St. John's (2007) view that the concentration of competitors in the industry impacts on environmental complexity. However, as Cannon's research is based on objective data, where he analyses competitive complexity using Herfindahl's Index and concentration ratios, the current research, by using perceptual data, reveals that 'Competitor Objectives' has to be taken into consideration as well. Cannon and St. John's limitation was that their research methodology only allowed the evaluation of constructs which were quantifiably measurable. However the results of this study show that in order to operationalise constructs of complexity, the first phase should be to have an exploratory qualitative analysis to identify constructs as perceived by industrial participants. Participants in this industry identified two distinct areas of competition; voice call, where revenue has now been minimised due to price war, and Value Added Services, where operators are competing through quality and content of the service provided.

**Consumer Demand:** Though 'Consumer Demand' was not a construct included by Cannon & St. John (2007) in their research, it is still a prominent component of environmental complexity (Holm, 2012; Bourgeois, 1980; Duncan, 1972). This research also finds that the Pakistani telecommunications' environment is complex due to the heterogeneous needs of the customers, where organisations have to employ different strategies to meet the needs of their consumers (Holm, 2012). Though, Holm only recognises customer behaviour and segmentation, the result of this research have identified the additional dimension of customer literacy rate and education. It can be argued that due to the nature of the telecommunications industry operating in a developing country, 'Customer Literacy Rate and Education' is a prominent component of environmental complexity in this context. Yet results show that it will be difficult for organisations to 'educate their customers' to increase revenue, but instead they have to focus on launching services that greatly appeal to the market, so that customers may proactively educate themselves, as they have done in the past.

**Resource Complexity:** Results related to the construct of 'Resource Complexity' agreed with Cannon & St. John's (2007) research that both technology and human resource impact on environmental complexity. Participants however believe that technological change is a prominent component of environmental complexity as it puts an added pressure on telecommunication operators to adapt to it, whether it is seen to be profitable or not. In the Pakistani telecommunications industry this could be because the organisations fear meeting the fate of Instaphone if they do not adapt to
technological advancements. Even though none of the operators have currently placed a bid for the 3G licence, various participants perceive that as soon as one organisation purchases this licence, the rest of its competitors will have to follow suit, even if they perceive the provision of this service as not being profitable.

The behaviour of human resources in the industry is interesting, as participants identify what they perceive to be a 'Job Hopping' phenomenon where employees of the sector have low levels of organisational loyalty and are quick to switch jobs within the industry. This trend is aided by organisations as results show that they invest more capital into hiring employees from their competition than into training their own human resource. This increases complexity in the environment as many participants perceive that as employees switch from one organisation to another, they bring their previous organisation's complexity with them. Even though participants do not explain this in detail, it can be argued whether participants who are exposed to a specific organisational culture and its complexity, carry those traits with them to their next workplace. Though Cannon and St. John (2007) identify labour diversity, results show that behaviour of human resources is a prominent component of environmental complexity.

**Government Influence:** Regulatory changes as a component of high velocity environments has been outlined in various literature (Bourgeois, 1988; Jurkovich, 1974; Smith & Grimm, 1987; Dill, 1958). In addition to this Cannon & St. John (2007) highlight that the lack of inclusion of regulatory forces is a limitation of their model. This is supported by the results of the research as changes in and how stringent 'Regulatory Policies' are, is highlighted as a construct that was perceived to cause complexities within the environment. In addition to this other governing influences such as 'Governing Approaches' of the political party in power, though separate from regulatory policies, was also perceived to impact environmental complexity. Though governing approaches generally impact various other industries and other parts of the nation, they prominently impact the telecommunications sector as the industry is renowned to greatly contribute to government revenue in terms of taxation. Participants highlighted how every political party that has been in power since the growth of telecommunications industry in the 1990's has had a plan for the sector that translates into different rates of taxation, deregulation policies and degrees of impact on PTA, the regulatory authority. However, Bourgeois (1985) does highlight that socio-political components such as regulatory control and political attitude towards the industry need to be taken into consideration.
Cyclicality: The results identified three additional constructs of 'Cyclicality', 'Environmental Corruption' and 'National Culture', that were not included in the preliminary model. Though Bourgeois (1988) mentions that cyclical industries are not dynamic or volatile, cyclicality has not been seen as a separate component of complexity. Though it can be argued that impacts of cyclicality might be covered by looking at dimensions of predictability and uncertainty, results outline that participants are highly aware and greatly take into account industrial and economical lifecycles whilst making decisions.

National Culture: Surprisingly, 'National Culture' was a construct that only one participant, a consultant, clearly stated as causing complexities in the environment, though various participants use statements hint towards national culture, such as highlighting that the way of working in Pakistan is different. Culture is a prominent area of study in strategic management literature, and Stacey (1995) identifies that a clash of 'countercultures' can lead to chaos, whereas Boisot & Child (1999) state that organisations or societies with different cultures may vary in their choice to reduce or absorb their environmental complexity (p.239). However, many participants were more vocal about the impact of foreign culture through the main shareholders of their organisation and as many participants did not clearly identify national culture, how this construct effects the overall environment is difficult to say.

Environmental Corruption: According to a survey conducted by Transparency International Pakistan (2011), taxation is the section of the government perceived to be the third most corrupt, with land administration and police taking the first and second rank, respectively. Environmental corruption has rarely been a topic covered in organisational complexity literature, though after the collapse of Enron there is increasing research on the subject in general organisational science research (Ashforth, 2008). "Environmental Corruption" was identified by various participants, including a previous high ranking official working for the government. Results show that both the government and the industry are perceived to be corrupt, which make the environment complex both financially, because cash flow can become even more difficult to track in a corrupt environment, and for business operation, as avoiding corruptional practises might make the conduct of business complicated.

Market Diversity and Process Facility: Figure 13 shows that both the constructs of 'Market Diversity' and 'Process Facility', which were highlighted in the preliminary framework from the research by Cannon (2008), were not identified by this research. Cannon uses 'Market Diversity' as a means of
comparison of industries and 'Process Facility' to determine the level of mechanisation and systemisation among manufacturing processes. Though participants at times did compare the level of their industry's complexity with those of others, 'Market Diversity' was not included in the final model because it was not prominently identified as a construct. In addition to this, as only the participants in the telecommunications industry were interviewed, comparison between industries would have been irrelevant to the main aim of this research to operationalise constructs within the Pakistani telecommunications context. Whereas 'Process Facility' was not included in the final model because the research covers a service industry and participants related capital intensive processes to their 'Technological Requirement', which made 'Process Facility' an unrelated construct in this context.

Compared to organisational complexity, literature for environmental complexity is a lot more obvious in clarifying its constructs, though admittedly there may still be limitations and room for further advancement (Cannon & St. John, 2007). The results of this research have offered further clarity in the operationalisation of environmental complexity constructs. Within the context of the Pakistani telecommunications industry, this thesis has identified seven main constructs and sub-constructs, as well as removing the two constructs of 'Market Diversity' and 'Process/Facility Complexity'. Arguably, constructs such as 'Environmental Corruption' might be applicable within the specific context of Pakistan as it is a developing nation, although corruption might still exist in developed nations, organisations are not as immersed in corruption in developed nations to the extent perceived by participants in this research. Thus the next step for results in this domain would be to compare the operationalisation of constructs of the same industries between a developing and developed nation.

5.2.3 Complexity Coalignment

Coalignment has been covered in various different organisational science literature, with equally as many definitions (Venkatraman, 1988; Drazin & Van de Ven, 1985; Thompson, 1967). Research has been published, associated with internal organisational alignment (Perrow, 1976; Freeman, 1973; Fry, 1982; Fuchs, et al, 2000) and alignment of the organisational with the external environment (Olsen, West & Tse, 1998). The results of this research identified the relationships within and between internal organisational and external environmental complexity, as seen in Figure 14.

**Internal Alignment:** Results of this research show that internal organisational alignment may be achieved in the context of the Pakistani telecommunications industry through the relationship of the
complexity of 'Organisational Culture' with 'Management Approach', 'Organisational Hierarchy' with 'Organisational Experience', 'Transparency and Clarity of Communications' with 'Intricacies of Policies and Procedures', 'Management Approach' with 'Intricacies of Policies and Procedures' and 'Management Approach' with the 'Influence of Foreign Shareholder's Culture' constructs. Research by Kaplan & Norton (2005) suggests that organisations can enhance performance through aligning their employees goals to their strategy, whilst Tushman (1977) and Ashmos & Duchon (2000) suggest business' should focus on relationships between their organisational structure and context. However, it was interesting to see that participants did not identify the relationship of 'Organisational Hierarchy' with any other constructs.

**External Alignment:** With regards to external environmental alignment, results suggest that relationships exist between consumer 'Literacy Rate & Education' and 'Technological Change', 'Regulatory Policies' and 'Technological Change', 'Regulatory Policies' and 'Governing Approach', and 'Governing Approach' with 'Environmental Corruption'. Looking at the construct of 'Environmental Corruption', it was surprising participants did not identify a relationship of this construct with 'National Culture'.

Arguably, as culture can be defined a set of shared values and beliefs, one would predict that in an environment where corrupt practises are considered to be a norm, then 'National Culture' and 'Environmental Corruption' might be linked. On their research on the transformation of the mobile telecommunications Gao & Rafiq (2009) also highlight the allegations of nepotism and corruption in the industry, reported between 1990 and 1995, in awarding telecommunication licenses, but they do not identify environmental corruption as a component of the industry's environment and only identify culture to have an impact on the adoption of mobile services in a society. In addition to this, Gao & Rafiq (2009) also highlight the link between industrial regulations and technological changes in the market.
Figure 14: Model of Organisational and Environmental Complexity Coalignment of the Pakistani Mobile Telecommunications Industry
**Internal and External Coalignment:** Results show that in order for the telecommunications operators in Pakistan to reach coalignment with their environment, they need to understand the alignment of the environmental constructs and align their internal complexity constructs. In addition to this they also need to co-align with their environment by maintaining the relationship of their internal 'Technological Requirements' with the external constructs of 'Competitor Density', consumers' 'Literacy Rate & Education', 'Regulatory Policies' and their 'Organisational Strategies & Objectives' with external constructs of 'Competitor Objectives' and 'Consumer Behaviour' as well as their internal construct of 'Intricacies of Policies, Procedures & Processes' with 'Regulatory Policies'. The coalignment of complexity constructs can be seen illustrated in Figure 14.

Literature on organisational adaption, environmental contingency and strategic change all highlight the need for organisations to align themselves with their environment, although with a differing theoretical perspectives (Thompson, 1967; Houchin & MacLean, 2005; Fuchs, et al, 2000). Various different perspectives of literature were primarily taken into account in order to develop a multi-dimensional model of complexity coalignment. However, different perspectives of literature propose different components of complexity and highlight differing and, at times, contradicting relationships between these components (Zajac & Kraatz, 1993).

Literature also has a predominant view that dynamic environments impact organisations, but rarely are organisations able to impact their environments. Participants interviewed were split into two groups that had contradicting perspectives on this. Results show that whilst some participant agree with the above statement, others highlight that to a certain extent organisations with greater market share might be able to impact specific environmental complexity constructs, such as government regulations.

This thesis defines coalignment within the topic of complexity, as the relationships that should exist between the internal organisational and external environmental complexity constructs. The results of this thesis has given a richer understanding to the constructs of complexity and the relationships between them, as perceived by industrial participants. However, this thesis does not measure the extent of dependency or correlation between the constructs, but instead operationalises the constructs of complexity, paving the way for future research to measure and test the components of the model. Participants did not clearly define relationships of other constructs, though arguably other relationships might still exist. However, the differences in the alignment of components highlighted in literature and those identified by this research might occur because of the additional
constructs included in the final model and the context of an industry in a country not previously researched in complexity research before. Testing the model presented in future research would be advantageous in order to confirm the above recognised relationships, and highlight any others that exist.

5.3 Significance & Future Implications

Until the research of Ashby (1958), orthodox business thinking implied that organisations could improve performance and survival by reducing their internal business complexity. Complexity theorists have, since then, offered evidence that suggest that organisations need to align themselves with the complexity of their environment, rather than reduce them (Boisot & Child, 1999). However, Ashby’s (1958) research on the framework of requisite variety presents the argument that in order to survive, organisations have to be as complex as their environment. Alignment then implies that if organisations manage the relationship between their organisational complexity constructs and external environmental constructs, then they will be able to better adapt to the environmental complexity and become a self-organised system. As complexity is becoming more widely recognised in strategic management research, established literature on the concept are still disjointed, varying in perspectives and at times contradictory.

One of the main gaps, when researching complexity as a concept and not a dimension of various organisational components, is a single agreed definition and a model that clearly outlines its constructs. This thesis attempts to make progress in closing this gap by contributing both methodologically and conceptually. A contribution made by the results of this thesis is to recommend a perceptual account of operationalising the complexity of the organisation and it environment with an open mind. The model has identified that within specific context certain constructs pose a great significance to organisations, such as ‘Corruption’, which have not been looked at in literature previously. However the model goes beyond adding additional constructs but also highlights that these constructs are defined and perceived by organisational participants in a different way. The future for complexity to be developed further is not in additional conceptual models, but the empirical understanding of those models and the practicality and application of them in contexts. This thesis conceptualised the model of complexity, by providing a broad framework as perceived by industrial participants of the telecommunications in Pakistan, where such a model had not been applied previously.
In addition to this, the results have outlined that the management implication for organisations in the Pakistani telecommunications sector is to perceive their organisations as a complex system operating in a complex environment. In this respects, many of the difficulties faced by these organisations, such as a rapid technological changes, environmental corruption, dynamic regulatory policies and changing consumer behaviour, can be adapted to. Thus it can be proposed that management can apply complexity leadership in order for organisations to increase performance and survive (McKelvey, 2010; Lichtenstein, 2006). Thus, this model has practical usability for managers applying complexity leadership by making sure their organisational complexity constructs are aligned internally, as well as co-aligned with the external environmental complexity constructs.

This thesis also tries to make methodological contributions, arguing that literature on complexity is disjointed because both organisational and environmental complexity will vary according to the context. Thus, the importance of highlighting constructs of both internal organisational and external environmental complexity is the practical usage of the model to be applied to the organisational environment. Within the context of the Pakistani telecommunications industry, the constructs of complexity are illustrated in Figure 14. Although this model is applicable within this particular context and significant for Pakistani telecommunications operators to understand their environment and to co-align themselves, as the industry is perceived to become more complex in the future, this thesis also has a broad implications for telecommunications industry in other contexts as well. The current model can be used as a preliminary model for research for telecommunications industry in other developing nations. Literature has also presented evidence that alignment of organisations with their environment enables them to be competitive (De Wit & Meyer, 2010), innovative (Lawrence & Dyer, 1983; Fiol & Lyles, 1985), improves performance (Snow & Miles, 2001; Prieto & de Carvalho, 2010) and ensures their survival (Thompson, 1967).

Current scholars in this area focus on conceptual or empirical research on parts of complexity; strategic change (Van de Ven & Poole, 1995; Zajac & Shortell, 1989), organisational adaptation (Thompson, 1967; Bourgeois, 1985; Miller, 1987) or environmental complexity (Cannon, 2007; Holm, et al, 2012). As understanding of the concept of complexity evolves, scholars build on aspects of previous work in the field, and focus on an element of complexity. However, rarely has literature on complexity attempted to look at the entire environment, which includes the internal organisation as well as its external environment, and the relationships that exist between them. Kauffman's (1993) NK, which has been extended into an NKCS model (Vidgen & Bull, 2011), is the closest literature has come towards presenting a framework that covers the concept of complexity broadly. However, the
Limitations of the NK and the NKCS model is that it still needs to be empirically supported and it does not offer clarity into the various different constructs of complexity within fitness landscapes. Thus an implication for the future would be to test this model and measure its constructs alongside organisational life and performance.
5.4 References


APP 2011. Cabinet body to make policy for 3G licences. The Express Tribune.


DEVOLDERE, B. 2010. What is the relationship between internal fit and dynamic capabilities, and how do they both relate to firm growth and survival? European Academy of Management Conference 'Back to the Future'. Rome, Italy.


LICHTENSTEIN, B. B., UHL-BIEN, M., MARION, R., SEERS, A., ORTON, J. D. & SCHREIBER, C. 2006. DigitalCommons@University of Nebraska - Lincoln.


MCKELVEY, B. 1999a. Complexity Theory in Organization Science: Seizing the Promise or Becoming a Fad? Emergence, 1, 5-32.


OPPENHEIM, A. N. 1992. Questionnaire design, interviewing, and attitude measurement, London ; New York, Pinter Publishers; Distributed exclusively in the USA and Canada by St. Martin's Press.


Appendix 1: Email sent to Participants

Dear ________,

I am a researcher for the University of Manchester, currently doing my MPhil thesis, which is entitled "Operationalising Organisational & Environmental Complexity Coalignment of the Pakistani Mobile Telecommunications Industry".

I found your information on PTA's website, where it states that you are a consultant for the telecommunications industry. Your expertise in telecom managed services and operations makes you an ideal candidate for my research and hence I would like to request if it is possible that I may interview you.

The interview will only take up to an hour and a half of your time and can take place in person or over phone or skype for your convenience.

To give you a brief summary about my research, it is about the different factors of complexity and how they influence an organisation. The results of this research would greatly contribute towards organisations making individualised strategic decisions based on their organisational complexity versus their environmental complexity.

I would like to thank you very much in advance for your time and concern. I will call you soon so as to arrange a day and time convenient for you.

Best Regards,
Saadia Shafeeq-Uddin

--
Saadia Shafeeq-Uddin
MPhil Student and Researcher
University of Manchester - Manchester Business School
Division of Marketing, International Business and Strategy
Address: MBS, Booth Street West, Manchester, M15 6PB, United Kingdom
Pakistan Mobile: +92 42 312 9222 267
UK Mobile: +44 7701025801
Appendix 2: Participant Information Sheet and Consent Form

**Title of Research:** "Operationalising Organisational & Environmental Complexity Coalignment of the Pakistani Mobile Telecommunications Industry"

**Participant Information Sheet**

You are being invited to take part in a research study as part of a student project for an MPhil thesis. Before you decide it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

**Who will conduct the research?**
Ms. Saadia Shafeeq-Uddin  
MPhil Student  
University of Manchester - Manchester Business School  
Division of Marketing, International Business and Strategy  
Address: MBS, Booth Street West, Manchester, M15 6PB, United Kingdom  
Pakistan Mobile: +92 42 312 9222 267  
UK Mobile: +44 7701025801

**Title of the Research**
Identifying and determining the factors related to organisational & environmental complexity of the Pakistani Mobile Telecommunications Industry, and how they align with each other.

**What is the aim of the research?**

<table>
<thead>
<tr>
<th>Research Aim</th>
<th>Main Research Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Operationalise organisational and environmental complexity in the context of the Mobile Telecommunications industry of Pakistan</td>
<td>What are the constructs of organisational and environmental complexity and the coalignment between them in the Pakistani Mobile Telecommunications Industry?</td>
</tr>
</tbody>
</table>

**Research Objectives**

<table>
<thead>
<tr>
<th>Research Sub Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
</tr>
<tr>
<td>b</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Sub Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Formulating a research model, within the context of Mobile Telecommunications industry of Pakistan</td>
</tr>
<tr>
<td>b. Identifying linkages that exist between organisational and environmental components</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Research Sub Questions</th>
</tr>
</thead>
</table>
| a. What are the perceived constructs of organisational complexity?  
b. What are the perceived constructs of environmental complexity? |
| a. What are the perceived relationships between the internal constructs of complexity?  
b. What are the perceived relationships between the external constructs of complexity?  
c. What is the perceived coalignment between constructs of organisational and environmental complexity? |

The interview questions will be different from the above mentioned research questions and sub-questions. The interview questions will be emailed to the participant 24 hours before the scheduled time of the interview.

**What language will I be interviewed in?**
For the sake of analysis, the complete interview will be carried out English.

**Why have I been chosen?**
You have been identified as being a participant of an organisation or a regulator or a consultant operating in the mobile telecommunications industry of Pakistan.

What would I be asked to do if I took part?
You would be asked to participate in a recorded interview where you will be asked a few questions related to the above mentioned aims and objectives.

What happens to the data collected?
The interview will be recorded and then transcribed. The transcripts will then undergo a thorough analysis by the above mentioned researcher.

How is confidentiality maintained?
Full confidentiality will be maintained meaning the participants' name shall not be mentioned anywhere in the research study or the thesis. Participants' comments might be paraphrased or referred to within the thesis, however, their identity will remain confidential.
The recorded interview and their transcripts will be collected from the participant and then stored in the researcher's computer and on a back-up. This transcripts will be held for 12 months, after which they will be destroyed/deleted.

What happens if I do not want to take part or if I change my mind?
It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason and without detriment to yourself

Will I be paid for participating in the research?
Research is on voluntary basis only.

What is the duration of the research?
There will be one interview, which will take up to 1.5 hours. Participant may also be contacted again in the future if the researcher has any follow-up questions.

Where will the research be conducted?
The interview will take place in person or on Skype or over the phone.

Will the outcomes of the research be published?
The outcomes of the research will be published in the form of a thesis and may also be used in the future for journal publications.

Contact for further information
Ms. Saadia Shafeeq-Uddin
MPhil Student
Pakistan Mobile: +92 42 312 9222 267
Email: saadia.shafeeq-uddin@postgrad.mbs.ac.uk
Title of Research: "Operationalising Organisational & Environmental Complexity Co-alignment of the Pakistani Mobile Telecommunications Industry"

CONSENT FORM

If you are happy to participate please complete and sign the consent form below

1. I confirm that I have read the attached information sheet on the above project and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.

2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason and without detriment to any treatment/service.

3. I understand that my interview will be recorded and transcribed for the purpose of analysis. I also understand that the recording will be destroyed/deleted after 12 months of the interview taking place.

I agree to take part in the above project

Name of participant: __________________________________________ Date: __________________________ Signature: __________________________

Name of person taking consent: __________________________ Date: __________________________ Signature: __________________________

Saadia Shafeeq-Uddin: __________________________ Date: __________________________ Signature: __________________________
Appendix 3: Interview instrument sent to consultants, industrial specialists and regulators operating in the mobile telecommunications industry

Saadia Shafeeq-Uddin
MPhil Student
Manchester Business School
Title of Research: “Operationalising Organisational & Environmental Complexity Coalignment of the Pakistani Mobile Telecommunications Industry”

Part 1: Organisational Complexity

a) What does the term "organisational complexity" mean to you?

b) Do you consider Pakistan’s telecommunication’s organisations to be complex?

c) What are the factors that you think determine how complex an organisation is?

d) Which of these factors do you perceive as being related to one another and to what extent?

e) How do these different internal factors affect the overall organisation? In what way do the interrelations of these internal factors affect the overall organisation?

f) In the future, do you see organisations looking to increase, decrease or do nothing to change how complex their organisation is?

g) Can these telecommunications organisations control all these factors?

h) How often do these organisations change their business strategies?

i) Exploration strategies are defined as those which seek to discover new possibilities, such as risk taking, innovation, discovery, so on. Exploitation strategies are defined as those which utilize old certainties, such as efficiency, implementation, production, so on. (March, 1991). Which of these strategies are used by these organisations?

j) What are the main strengths that are being developed by the organisations in the telecommunications sector?

Part 2: Environmental Complexity

a) What does the term "external environmental complexity" mean to you, how would you define it?

b) Do you consider the telecoms environment to be complex?

c) How rapidly does the telecommunications sector’s environment change?

d) What are the factors that you think determine how complex telecommunication sector’s environment’s is?

e) Which of these factors do you perceive as being related to one another and to what extent?

f) How do these different factors affect the individual telecommunications organisations?

g) In the future, do you perceive the telecommunications environment becoming more complex, less complex or remain unchanged?
Part 3: Coalignment of Organisational Complexity with Environmental Complexity

a) Do telecommunication organisations adapt to their factors that determine how complex their environment it? If so how?

b) Are there any telecommunication sector’s environmental complexity factors that organisations have difficulty adapting to?

c) Does the telecommunications sectors environment adapt to the different complexities of organisations?

d) Do you think all organisations in the telecoms sector face the same organisational and environmental complexity factors and with the same force?

e) Do you think there are any organisational complexity factors that are interrelated to any environmental complexity factors?

f) Are organisations as complex as the environment in which they operate? Why or why not?

g) Do you see organisations making themselves more complex, less complex or as complex as their environment?
Appendix 4: Interview instrument sent to employees of the mobile telecommunications organisations

Saadia Shafeeq-Uddin
MPhil Student
Manchester Business School
Title of Research: “Operationalising Organisational & Environmental Complexity Coalignment of the Pakistani Mobile Telecommunications Industry”

Part 1: Organisational Complexity

a) What does the term "organisational complexity" mean to you?

b) Do you consider your organisation to be complex? How complex is your organisation compared to other telecoms organisations?

c) What are the factors that you think determine how complex your organisation is?

d) Which of these factors do you perceive as being related to one another and to what extent?

e) How do these different internal factors affect the overall organisation?

f) In the future, is your organisation looking to increase, decrease or do nothing to change its organisational complexity?

g) Can your organisation control all these factors?

h) How often does your organisation change its business strategies?

i) Exploration strategies are defined as those which seek to discover new possibilities, such as risk taking, innovation, discovery, so on. Exploitation strategies are defined as those which utilize old certainties, such as efficiency, implementation, production, so on. (March, 1991). Which of these strategies are used by your organisation? Can you give examples? Do these strategies influence how complex your business is?

j) What are the main strengths of your organisation that are being developed? How are these related to the level of your organisations complexity?

Part 2: Environmental Complexity

a) What does the term "external environmental complexity" mean to you, how would you define it?

b) Do you consider your telecoms environment to be complex?

c) What are the factors that you think determine the how complex the telecommunications sector's environment is?

d) Which of these factors do you perceive as being related to one another and to what extent?

e) How do these different factors affect you?
f) How often do you think your competitors change their business strategies?

g) How rapidly does the telecommunications sector’s environment change?

h) In the future, do you perceive your external environment becoming more complex, less complex or remain unchanged?

**Part 3: Coalignment of Organisational Complexity with Environmental Complexity**

a) Does your organisation adapt to the factors that determine how complex its environment is?

b) Are there any telecommunication sector’s environmental complexity factors that your organisation cannot adapt to?

c) Does your telecommunications sector’s environment adapt to your organisational complexity?

d) Do you think your competitors face the same organisational and environmental complexity factors with the same force that your organisation faces?

e) Do you think there are any organisational complexity factors that are interrelated to any environmental complexity factors?

f) Is your organisation as complex as the environment in which you operate? Why?

g) Do you see your organisation making itself more complex, less complex or as complex as your environment?