THE IMPACT OF TEAMWORK QUALITY ON NEW PRODUCT DEVELOPMENT CYCLE TIME: EVIDENCE FROM SAUDI ARABIA TELECOM INDUSTRY

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ABSTRACT

The research filled a gap in existing knowledge regarding the impact of teamwork quality on new product development (NPD) cycle time through the mediation of internal market orientation in the telecommunication industry in Saudi Arabia. The present research also considered environmental turbulence as a moderator in the relationship between teamwork quality and NPD cycle time. Specifically, this research extended previous effort done by providing evidence that high teamwork quality and internal market orientation could decrease the time taken in producing new products or services. Random sampling was used to select respondents for a survey from among members of NPD teams in Saudi telecommunications firms with total respondents 149 teams and response rate of 88.67 percent. PLS-SEM was used to analyze the direct and indirect relationships between teamwork quality, internal market orientation, environmental turbulence, and NPD cycle time, while path coefficient and assessment of measurement and structural model used to test the research hypotheses. Findings indicate that five out of six teamwork quality factors had significant effects on NPD cycle time but not on communication among teamwork members. Internal market orientation was found to affect positively NPD cycle time. Internal market orientation fully mediated the relationship between balance of member contribution and mutual support, and NPD cycle time. Internal market orientation partially mediated communication, coordination, efforts and cohesion, and NPD cycle time. Environmental turbulence moderated the relationship between two factors of teamwork quality, namely, communication and coordination, and NPD cycle time. Environmental turbulence did not moderate balance of member contribution, mutual support, effort and cohesion. The findings suggest that managers should facilitate an environment conducive to teamwork. The study also provides a theoretical understanding of how teamwork qualities drive new product development cycle time. Recommendations for future research and limitations of the study are also highlighted.

Keywords: product, development, cycle time, teamwork quality, Saudi Arabia

ABSTRAK

Kajian ini telah memenuhi lompang dalam bidang ilmu yang sedia ada berkaitan kesan kualiti kerja berpasukan terhadap kitaran masa pembangunan produk baharu (PPB) dengan mengambil kira orientasi pasaran dalaman sebagai pengantara. Kajian ini dilakukan dalam konteks persekitaran yang kompetitif dan perubahan teknologi yang pantas iaitu dalam industri telekomunikasi di Arab Saudi. Kajian ini turut mengambil kira gejolak persekitaran sebagai penyederhana dalam hubungan antara kualiti kerja berpasukan dan kitaran masa PPB. Secara khususnya, kajian ini memperluas kajian terdahulu dengan menyediakan bukti bahawa kualiti kerja berpasukan dan orientasi pasaran dalaman dapat mengurangkan masa yang diambil untuk menghasilkan produk dan perkhidmatan baharu. Persamplen rawak telah digunakan untuk memilih responden bagi menyoal-selidik ahli-ahli pasukan PPB dalam firma telekomunikasi di Arab Saudi. Sebanyak 149 pasukan dan kadar respons sebanyak 88.67 peratus telah diperoleh. PLS-SEM digunakan untuk menganalisis hubungan langsung dan tidak langsung antara kualiti kerja berpasukan, orientasi pasaran dalaman, gejolak persekitaran, dan kitaran masa PPB manakala pekali laluan dan penilaian dan pengukuran model berstruktur digunakan untuk menguji hipotesis kajian. Dapatan kajian menunjukkan bahawa lima daripada enam faktor kualiti kerja berpasukan mempunyai kesan yang signifikan terhadap kitaran masa PPB tetapi tidak pada komunikasi antara ahli-ahli pasukan. Orientasi pasaran dalaman didapati memberi kesan yang positif terhadap kitaran masa PPB. Orientasi pasaran dalaman mengantara secara penuh hubungan antara imbangan sumbangan ahli, sokongan bersama, dengan kitaran masa PBB. Bagaimanapun, orientasi pasaran dalaman hanya mengantara secara sebahagian hubungan antara komunikasi, koordinasi, usaha dan perpaduan dengan kitaran masa PPB. gejolak persekitaran menyederhanakan hubungan antara dua faktor kualiti kerja berpasukan iaitu komunikasi dan koordinasi dengan kitaran masa PPB. Sebaliknya gejolak persekitaran tidak menyederhanakan imbangan sumbangan ahli, sokongan bersama, usaha dan perpaduan. Dapatan kajian mencadangkan agar pengurus menyediakan persekitaran yang menggalakkan kerja berpasukan. Kajian ini juga menawarkan kefahaman teoritis tentang bagaimana kualiti kerja pasukan dapat mengurangkan kitaran masa pembangunan produk baharu. Cadangan kajian akan datang dan kekangan kajian juga turut diketengahkan.

Kata Kunci: produk, pembangunan, kitaran masa, kualiti kerja berpasukan, Arab Saudi

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LIST OF ABBREVIATIONS

ANOVA	Analysis of variance
ATM	automated teller machines
AVE	Average Variance Extracted
B2B	Business-to-Business
B2C	Business-to-Consumer
CE	Concurrent Engineering
CEO	Chief executive officer
CFA	Confirmatory Factor Analysis
CITC	Communication and Information Technology Commission
CR	Composite Reliability
e.g.	Exempli gratia (= for instance)
EDI	Electronic Data Interchange
EFA	Exploratory factor analysis
ET	Environmental Turbulence
GoF	Goodness of Fit
i.e.	Id est (that is)
ICT	Information and Communications Technology
IMO	internal market orientation
KACST	King Abdul Aziz City for Science and Technology
MICT	Ministry of Communications and Information Technology
MO	Market Orientation

NPD	new product development
p.	Page
PEU	Perceived environmental uncertainty
PLS	Partial Least Squares
QFD	Quality Function Deployment
R&D	Research and development
RBV	resource-based view
SEM	Structural Equation Modeling
SPSS	Statistical Package for Social Sciences
STC	Saudi Telecommunication Company
STITC	Saudi Telecommunications and Information Technology Commission
TQM	Total Quality Management
USA	United State of America
UUM	Universiti Utara Malaysia
VAF	Variance Accounted For

CHAPTER ONE

INTRODUCTION

1.1 Introduction

In Saudi Arabia, the telecommunication industry is highly competitive in nature particularly during the past decade with the emergence of a number of telecommunication companies into the local market. For example, after many years of dominating the market, the Saudi Telecommunication Company (STC) is now facing tremendous challenges of maintaining its market share as customers are moving to rival companies. According to El Emary, Alsereihy, and Alyoubi (2012), STC's challenges that threaten its growth and profitability include attrition and erosion in the market share, reduction in telephone and Internet prices due to activities of rivals and increased demand from the customers for better services. But at the same time, rival companies are facing the challenge of attracting customers who have been with the STC that has been dominating the market for years. Furthermore, an intensified competition in the Saudi Arabia telecommunication industry took place in 2013 when customers could switch between all companies while at the same time maintaining their contact numbers (Al-Malik, 2013; Ibrahiem *et al*., 2012). This system puts a great pressure on all service and new product providers in the Saudi telecommunication market to keep their customers loyal and to work hard to attract customers from other rival companies.

New products are the lifeblood of companies and innovation and early launching of products are perhaps the final frontier for companies to gain competitive advantage (Ceccagnoli, 2009; Langerak *et al*., 2008; Lichtenthaler & Frishammar, 2011; Moore, 2007; Parry *et al*., 2009; Schneider & Hall, 2011). With new products companies can fulfill new customer needs, capture new markets and extend their prominence in a competitive environment (Gotteland & Boulé 2006; Katz, 2005; Liu *et al*., 2012; Thamhain, 2003). The need for companies to innovate and develop new products at an accelerated pace is further heightened by corporate and market globalization. This can be viewed as a natural consequence of the steady decline in international free-trade barriers that have occurred over the past few decades. The result has been a substantial increase in competition among suppliers of goods, services, and capital equipment across all industries (Danneels & Sethi, 2011; Schilling & Hill, 1998).

There have been a number of essential trends impacting manufacturing and rapidly changing services industries. Among these, there has been a significant trend towards expediting the new production development (NPD) cycle time. Some organisations have made essential progress in decreasing the NPD cycle times (Ali, 2000; Mishra & Saji, 2010; Schneider & Hall, 2011; Suss & Thomson, 2010), whereby determine speed up techniques can be used in this effort (Gonza´les & Palacios, 2002; Langerak & Hultink, 2008). Reduction of time in new product development offers a new source of competitive advantage (García-Zamora *et al*., 2013; Gupta *et al*., 1992; Yam *et al*., 1996). As the processes of new product development (NPD) are becoming a vital factor in managing product introduction mainly because there is a significant decrease in the life cycle of the product, speed is imperative due to an increase in competition, all of which use technological progress and globalization when developing new products. As such, scholarly studies that focus on the cycle time of NDP are crucial.

Speed of new product development (NPD) refers to the process by which firms reduce their cycle time in manufacturing diverse novel merchandise (Griffin, 1997; Carbonell & Rodriguez, 2006; Langerak, *et al*., 2008; Liu *et al*., 2012; Parry, *et al*., 2009). In other words, firms ought to reduce the elapsed time between product definition and product availability in the market. Thus, trying to find ways to decrease the cycle time of NPD is one of the highest priorities for most senior managers as this would yield fast reactions to the rapidly changing and competitive market. When the cycle time of NPD is decreased, products will be ready for use in the hands of end users (consumers) in a shorter pace of time by dedicated qualified teamwork equipped with all skills and competencies needed to complete all related tasks. This would in turn help organizations perform better as it would save them time and money that might be needed for future innovations (Moore, 2007).

Griffin (1993) argued that in order to keep up with the competition and continue to grow in the face of shorter product life cycles, companies are driven to move more products to market faster. Many other researchers have also addressed the importance of decreasing the NPD cycle time to gain better competitive advantage in the market. Rosenau (1988) states that new product development (NPD) cycle time is critical because life cycles are shrinking (Guveritz 1983; Mu & Benedetto, 2011; Rosenau 1988; Su *et al*., 2013), and obsolescence is occurring more quickly than in the past while competition also has intensified (Griffin, 1997; Hayes, Wheelwright, & Clark 1988; Su, Peng, Shen, & Xiao, 2012; Womak, Jones, & Roos, 1990). To keep up with competition and continue to grow in the face of shorter product life cycles, it has become necessary for companies not just to try to bring products to market as announced, but also to move more products to market faster (Carlson 1994; Lukas &

Ferrell, 2000; Vesey 1992; Sarin & Mahajan, 2001; Schneider & Hall, 2011; Wei & Gima, 2009).

The telecommunication industry is an example of an industry characterized by rapid changes given the rapid technological development in the past decade or so. Internet, advanced computers and mobile phones have contributed a great deal to this revolution where companies' success and survival depend heavily on how fast they respond to such technological changes. In this context, Lynn *et al*. (1999) argue that the target of today's companies particularly technology-related industries is to manufacture products or provide services that would satisfy the increasing needs and desires of the customers and also to achieve a competitive advantage the market.

1.2 Statement of the Problem

Studying the determinants of a firm success continues to be important for marketers in their attempt to achieve positive business outcomes in a competitive environment. But identifying the determinants continues to pose an issue for practical implementation due to the complexities of the business environments (Jayachandran, & Bearden, 2005). Nonetheless, a number of researchers are of the consensus that New Product Development (NPD) cycle time constitutes a strong determinant of the performance of organisations as it helps them deliver products faster to the market. In this context, Gupta et al. (1992), Su et al. (2013) and Yam et al. (1996) argued that companies that initiate new products faster successfully obtain the competitive advantage in the market. In the context of telecommunication industry, reduction of NPD cycle time is crucially important as this industry is characterised by extremely rapid changes due to the advancements in technology and internet (Brock, 2001; Chong et al., 2009; Liu et al., 2012; Saji & Mishra, 2012).

A number of factors have emerged in the literature to influence an effective reduction of NPD cycle time keeping in mind that developing new products is a complex process through different production stags that usually includes many functional teams within a firms as well as external teams such as suppliers (Parry et al., 2009; Siguaw, Simpson, & Enz, 2006). One of the important factors that have been hypothesised to influence NPD cycle time is teamwork quality (Hoegl & Gemuenden, 2001; Hsu, Shih, Chiang, & Liu, 2012). However, Hoegl and Gemuenden (2001) identified two main limitations with regards to successful innovative teams: (1) previous research did not address the multifaceted nature of teams but rather focused on the relationship between team-based organizations and performance (Gupta, Ray & Wileman, 1987; Hise, O'Neal, Parasuraman, & McNeal, 1990; Cooper & Kleinschmidt, 1995); and (2) there are conflicts in the literature about the impact of teamwork on team success (Thamhain & Kamm, 1993; Campion, Medsker & Higgs, 1993; Cohen, Ledford & Spreitzer, 1996). In order to address these issues, Hoegl and Gemuenden (2001) studied the influence of six teamwork quality (TWQ) factors which include communication, coordination, balance of member contribution, mutual support, effort, and cohesion on the success of innovative projects. They based their model on the fundamental idea that the success of teams depends on the degree to which team members are able to collaborate with each other. Their results were promising: the TWQ factors were significantly correlated with performance ratings.

In addition, Dayan and Benedetto (2009) stated that teamwork is one of the fundamental factors of NPD that provides a systematic and integrated procedure to the introduction and develop of new products. Also, they emphasized that managers recognize the importance of good teamwork in NPD because the complementary skills and capabilities of the various team members are required to bring successful products to the market. Dayan and Benedetto (2009) investigated the impacts of antecedent variables such as functional diversity, team stability, and transactive memory system on the multiple facets of TWQ, and determined the effects of improved TWQ on several performance measures commonly accepted to be important to product managers. They were team learning, speed-to-market, and new product success. The bivariate correlations demonstrated that TWQ had a positive association with team learning, speed-to-market, and new product success. When teams establish effective interactions (high TWQ) among themselves, they are able to develop the new product with fewer problems, find and solve the problems that caused customer dissatisfaction, and launch products faster and better.

An example of teamwork quality is the cohesion within new product development group which influences the NPD performance. Teamwork quality is also related to project commitment and coordination with other teams (Hoegl, Weinkauf, & Gemuenden, 2004; Parumasur & Govender, 2013). It was also found that a high level of teamwork quality leads to a high level of team performance (Hoegl & Parboteeah, 2006; Hoegl & Gemuenden, 2004). But models of teamwork quality do not consider a number of variables that can affect the interaction quality of a teamwork such as organizational, environmental, and internal market orientation (Dietrich et al., 2010). In addition, despite its importance, there is limited research on the impact of teamwork quality on reducing NPD cycle time. Even if any, the research did not attempt to examine the direct impact of teamwork quality on NPD cycle time; rather it attempted to examine the impact of teamwork quality on the performance of organizations assuming that NPD cycle time is a strong determinant of performance (Dayan & Benedetto, 2009; Hoegl & Gemuenden, 2001; Hsu, Shih, Chiang, & Liu, 2012). Thus this study attempts to fill the gap in the literature regarding this matter by examining the impact of teamwork quality on the NPD cycle time in the Saudi telecommunication industry.

In addition, literature also indicates other factors hypothesised to affect NPD cycle time. One of them is internal market orientation (IMO) (Ahmed & Rafiq, 2003; Akgün & Gary, 2002; Carbonell & Rodriguez-Escudero, 2009; Gupta & Souder, 1998; Lings, 2004; Lings & Greenley, 2005; 2010; Sulaiman, Abdul Rahim Othman, Perumal, & Hussin, 2013; Swink, Talluri, & Pandejpong, 2006; Zirger & Hartley, 1996). An internal market orientation is an integral part of overall marketing orientation containing the use of marketing techniques within the firm to originate and communicate corporate values (Hogg & Carter, 2000; Lings & Greenley, 2010). Additionally, the IMO construct has not been tested to support definitive correlations with other constructs such as on external organizational factors or business outcomes (Gounaris, 2008; Gounaris et al., 2010; Lings & Greenley, 2005). Internal market orientation has been linked to the speed of new product development (Deshpande & Farley, 2004; Gotteland & Boule, 2006; Hills et al. 2008; Im & Workman, 2004; Kessler & Chakrabarti, 1996; Lings & Greenley, 2010; Lukas & Ferrell, 2000; Menon et al., 2002; Samra et al., 2008; Stalk & Hout, 1990; Swink, 2002; Wei & Gima, 2009). Several reasons are able to shed light into the effect of IMO on the speed of NPD. First, communication provides the channel through which important information is exchanged, which may provide the basis for decision making within the team. Second, timely exchange of information may reduce response time and allow team members to react more proactively to errors. Third, communications allow team members to influence decision preferences of others within the group (Hirokawa & Rost, 1992; Hsu, Shih, Chiang, & Liu, 2012). Thus, in this research internal market orientation is hypothesized as a mediating construct to enhance understanding of the process of fast delivery of new product development supported by Baron and Kenny (1986), stated that a mediator is a variable representing the generic mechanism through which the independent variables are enabled to positively impact the outcome variable. By doing so, this study may provide some insight into some aspects of the service provider-customer relationship.

Recent literature in marketing researches shows that when it comes to obtaining success of newly new products launched in an organization, teamwork quality is of vital importance. Hoegl and Gemuenden (2001) contended that innovative projects and success of a team depends on the quality of interaction or collaboration between team members. The quality of interactions between team members in teams is captured in the construct teamwork quality. Six teamwork quality factors are integrated in the concept of teamwork quality, encompassing the collaboration of team members working together. Both task-related and social interactions within the team are covered. Since the focus is on the quality of interactions within the team, the quality of interactions with external parties such as management, clients or other teams is out of the scope of the their study. In this research, we investigate teamwork quality with specific dependent variable, namely, NPD cycle time, which was not considered before.

The level of accuracy, coordination and organization of teamwork members in new product development by focusing on satisfying the customer's needs determines organizational success. In this regard, commitment from top management down to the lowest level team members is vital (Gounaris, 2008; Thompson, 2011). According to Kennedy et al. (2002), consistent with earlier investigations of IMO, the true concept of marketing can only be achieved when customer orientation is considered to be a working philosophy for all teamwork members. For this reason, the effect of teamwork on IMO at the functional level has begun to appear as a highly important field of study. Even though teamwork quality has been conceptualized as part of IMO, several commentators (e.g., Brown et al., 2002; Kennedy et al., 2002; Parumasur & Govender, 2013) have pointed out the limited research on the role of teamwork quality in influencing IMO, which hinders our understanding on the topic.

Although internal market orientation was developed from market orientation and internal marketing, there is still a lack of empirical research into these individual constructs (Gounaris, 2005, 2006; Kaur, Sharma & Seli, 2009; Lings, 2004; McGrath, 2009; Rafiq & Ahmed, 2000; Sulaiman et al., 2013). By combining these construct into this study, it may add to the present understanding of new product development processes. This may give some insight the connection between the internal and external activities to improve time to deliver new product and services to the market.

Apart from the relationship between IMO and NPD cycle time, a number of researchers have reported the effect of IMO on business performance (Chang & Chen, 1998b; Kolhi & Jaworsky, 1990; Kirca et al., 2005; Krepapa et al., 2003; McGrath, 2009; Narver & Slater, 1990; Sheng, Zhou, & Li, 2011; Tortosa, Moliner & Sanchez, 2009). However, research that looks into the antecedent of IMO such as teamwork quality and its effect on new product development within a single model is almost non-existent. Thus, by combining these constructs in a single study, we will be able to shed some insight into how teamwork quality can affect internal market orientation, which leads to reduced new product development cycle time. Despite the importance of teamwork quality within production teams, the current literature has not adequately identified nor empirically tested the meditating variable of teamwork quality. In this manner, this study attempts to fill this gap in the existing body of knowledge to meet the recommendation made by McGrath (2009), who suggests that future work ought to take into account the possible mediating impact of IMO on the relationship between teamwork quality and NPD cycle time.

Literature also suggests that environmental factor could influence the relationship between teamwork quality and firm performance (Sheth, 2011). When the association between two variables depends on a third one, moderation occurs. In this case, the third variable is considered as a moderator variable. Baron and Kenny (1986) described a moderator as a qualitative or quantitative variable that affects the direction or the relationship strength between independent and dependent variable. In this context, the environment of the institution displays the level to which a firm can allocate value on new products (Gans, Hsu, & Stern, 2008). In developed economies, firms tend to depend on intellectual property rights laws to safeguard the innovations value from external market entities' appropriation. However, in emerging economies, underdeveloped institutions like inefficient legal systems, negatively affects the allocable value of new products (Zhao, 2006). Hence, the NPD strategies effect like its speed and technological dynamism, would largely depend on the environment of the institution. Environmental factors include market turbulence, technology, and competition, which may destabilize industries (Hobday & Rush, 2007; Song et al., 2005; Su et al., 2013).

In the telecommunication industry, environmental factors play a critical role in shaping the policies and processes that govern organizations, keeping in mind that this industry is rapidly changing due to the changes taking place in the marketplace around them (Acur et al., 2009; McEvily et al., 2004; Su, Peng, Shen, & Xiao, 2012; Su et al., 2012). This is also supported by Kleinsehmidt et al. (2007) who suggested that future work should examine the moderating impact of environmental factors on the relationship between teamwork quality and NPD cycle time. This study attempts to respond to this recommendation by examining this moderating link.

In sum, the present research seeks to examine the role of teamwork quality on NPD cycle time. It also attempts to shed some theoretical insight into the role of IMO in mediating the relationship between teamwork quality and NPD cycle time and also the moderating role of environmental factor. In the literature of NPD cycle time, all the factors have been studied separately and very limited research has attempted to examine how these factors affect NPD cycle time as a single model. The validation these factors in a single model will allow us to understand the inter-relationships and the dynamics of these factors in affecting the NPD cycle time.

The validation of such model is significant in the context of Middle Eastern countries in general and Saudi Arabia in particular as most of the research conducted on NPD cycle time has been conducted in developed countries. Furthermore, testing the model in the telecommunication industry is pertinent as this industry is facing turbulent changes in the market. Therefore, this study will help add to the existing body of knowledge by offering theoretical explanation on how the NPD cycle time can be enhanced by considering the role of team quality, internal market orientation, and environment.

1.3 Research Questions

Based on the above gaps, this study attempts to answer the following questions:

1. To what extent does teamwork quality affect NPD cycle time in the telecom industry in Saudi Arabia?

2. To what extent does teamwork quality affect NPD cycle time through the mediating influence of internal market-orientation in the telecom industry in Saudi Arabia?
3. How does environmental turbulence moderate the relationship between teamwork quality and NPD cycle time in the telecom industry in Saudi Arabia?

1.4 Research Objectives

Consistent with the research questions above, the objectives of this study are fourfold. The main focus of the study is to provide empirical evidence on the effect of teamwork quality, internal market orientation, and environmental factor on the cycle time of NPD in the telecommunication sector in KSA. Specific objectives of our study are as follows:

1. To examine the extent to which teamwork quality affects new product development cycle time in the telecom industry in Saudi Arabia.
2. To examine the extent to which teamwork quality affect NPD cycle time through the mediating influence of internal market-orientation in the telecom industry in Saudi Arabia.
3. To examine whether environmental turbulence moderates the relationship between teamwork quality and NPD cycle time in the telecom industry in Saudi Arabia.

To achieve the above mentioned objectives, development and validation instruments for capturing and measuring the relation between teamwork quality and new product development cycle time across all telecommunication firms in Saudi Arabia must be utilized. However, this study will highlight this issue in more detail.

1.5 Significance of the Study

The primary goal of the present study is to examine the impact of teamwork quality on NPD cycle time in the Saudi telecommunication industry. This impact is also investigated through the mediating variable of internal market orientation and the moderating variable of environmental turbulence. By achieving this goal, the study is believed to attain both theoretical and practical significance. In other words, the study is expected to have contribution to the whole body of research on the field of NPD cycle time. Simultaneously, the study is also expected to contribute to the Saudi telecommunication sector as the study is expected to generate some recommendations that can be taken into consideration by the Saudi telecommunication companies which would in turn contribute to a faster NPD cycle time and in turn faster delivery of products to Saudi market. This would then be reflected on the performance of these companies which would finally contribute to a better and stronger Saudi economy. The following sections address the theoretical and practical significance of the present research.

1.5.1 Theoretical Significance

It has been mentioned earlier that in the literature on NPD cycle time, the relationships between teamwork quality, internal market orientation and NPD cycle time have been studied separately and very limited research has attempted to examine the multiple relationships among all these factors and their relationship with NPD cycle time. The present study takes a step further by examining the inter-relationships between all these factors and their effect on NPD cycle time together with the examination of the moderating influence of environmental factors. This contributes to the body of knowledge in that the purported links between the variables are grounded on recent recommendations suggested by researchers in the field of marketing and management.

In addition, the present research is expected to add to the existing body of knowledge by providing empirical evidence within the context of a Middle Eastern country. To date, most of the previous research studies have been conducted in the West while emerging countries in general and Middle Eastern countries in particular have been left with scarce research (Griffin, 2005). Furthermore, in Saudi Arabia, no study has thus far attempted to investigate the influence of teamwork quality on the NPD cycle time which in turn will influence the organizational performance of the telecommunication companies. This means that our understanding of these variables and the way they are related is grounded on Western theories and research studies, which may not be relevant and valid due to cultural differences.

Another issue pertains to the tendency in prior studies to concentrate on Western, developed economies with structured institutional regimes, like patents, copyrights, trademarkets, trade secrets and other intellectual property protections (Ceccagnoli, 2009; Durand, Bruyaka, and Mangematin, 2008). While adopting such theories could be useful in the Saudi context, they might not provide a deeper understanding of the interplay between them keeping in mind the cultural differences between individuals from different countries (Hofstede, 1992). Thus, the present research is expected to provide a theoretical significance by examining the influence of teamwork quality on the NPD cycle time in an emerging country context, namely, Saudi Arabia and by doing this, the study is expected to provide a better understanding of how the previous variables interplay.

1.5.2 Practical (Managerial) Significance

The present research will help firms diagnose the existence and level of attention paid to these factors. In particular, it will assist managers in recognizing that the potential downsides of teamwork quality may cause rigidity in a firm's performance, which may reduce new product development cycle time. In other words, this research is expected to help practitioners and companies in general and Saudi telecommunication companies in particular to understand the most influential factors that could lead to reduction in NPD cycle time and in turn faster delivery of products to the customers. This would in turn help these companies perform better by securing a better competitive advantage in a highly changing environment.

1.6 Scope of Study

To answer the research questions and meet the objectives specified above, this study was conducted amongst teams of new product development in the telecommunication industry in Saudi Arabia. Justification of why this group of study was particularly considered to examine new product development cycle time is presented in the method chapter. Saudi Arabia, in particular, is chosen as the context of the study because previous studies have been largely conducted in developed countries. In the context of Middle Eastern countries in general and Saudi Arabia in particular, no study thus far has investigated the inter-relationships among the variables that were hypothesized to influence the cycle time of NPD particularly in the telecommunication industry. In addition, telecommunication industry is highly competitive in nature particularly during the past decade with the emergence of a number of telecommunication companies into the local market.

In order to accomplish the research objectives set above, a survey was carried out encompassing distribution of questionnaires amongst new product development teams (more detailed explanation on the sampling procedure is offered in Chapter Four). The use of survey in the present research was appropriate because the research is concerned about knowing how teamwork quality can influence reduction in the period of new product development by including internal market orientation as a mediating variable and environmental turbulence as a moderating variable. The data collection period took place within two months in the April and May 2013.

1.7 Operational Definitions

To reiterate, the present study aims to examine the impact of teamwork quality on new product development cycle time. To assist in understanding the research, the operational definitions are offered as follows:

- **Teamwork Quality**

Teamwork quality (TWQ) refers to the degree and quality of team members' interaction which focuses on how teammates collaborate with each other in the pursuit of team goals; it includes neither task work behavior nor human sentiments. It is further agreed that the overall construct of teamwork quality is manifested in six dimensions. They are communication, coordination, balance of contribution, mutual support, effort and cohesion (Hoegl & Gemuenden, 2001). The following operational definition of each concept is taken from Hoegl & Gemuenden (2001).

a. **Communication** refers to the quality of communication within a team in terms of the frequency, formalization, structure, and openness of the information exchange. Communication also provides the channel through which information and knowledge can be exchanged and evaluated, and activities can be coordinated.

b. **Coordination** refers to the development and agreement of a team of a common task-related goal structure, with well-defined subgoals for each member, without any gaps or overlaps.

c. **Balance of member contribution** refers to delegating tasks to those who have the capability to perform them by bringing their expertise to bear for the tasks.

d. **Mutual Support** refers to the idea that members of the team address conflict in a cooperative way, it is based on the idea of mutual support of the team members rather than the competition between them.

e. **Effort** is a shared expectation regarding the behavior of team members, which means that a team's success hinges upon team members' willingness to exert effort on behalf of the team.

f. **Cohesion** refers to the level to which the members are empowered to stick to each other and to remain in the team and a desire to remain as part of the team. Without a sense of belonging and a desire to stay on the team and keep it going, high quality teamwork seems improbable.

- **New product development cycle time**

New product development cycle time is defined as the time between initial development efforts and the introduction of a new product in the marketplace (Kessler & Chakrabarti, 1996, 1999).

- **Internal Market Orientation (IMO)**

Internal market orientation (IMO) refers to the multidimensional marketing concept that recognizes the need for an element of marketing that focuses on the internal environment of the firm (Lings & Greenley, 2005).

- **Environmental Turbulence**

Environmental turbulence is defined by three dimensions: technological, competitive, and market turbulence (Jaworski & Kohli, 1993).

a. **Technological turbulence** refers to the level the rate of change that the product and process technologies undergo to make inputs into outputs.

b. **Competitive turbulence** is an important success factor that has to be considered and developed functionally to maintain the consistency between the business unit's strategic behavior and environmental turbulence.

c. **Market turbulence** is defined as the attractiveness of a target market, which reflects market characteristics such as size and growth.

1.8 Study Outline

The present study is organized into six chapters. The content of each is summarized as follows:

Chapter one: An overview of the practical issues within the telecom industry in Saudi Arabia is offered before gaps in teamwork quality, internal market orientation and environmental turbulence and their impact on new product development cycle time are identified. Based on the research gaps, research questions and problems are identified. The scope and significance of study are then highlighted.

Chapter two: A review of past and existing empirical works in the area of teamwork quality in the telecom industry and their effect on new product development cycle time, the moderating effect of environmental turbulence, and the mediating effect of internal market orientation is presented. This chapter also discusses the main theory that underpins the present research.

Chapter three: This chapter presents a theoretical model and framework adopted in this study. It also hypothesizes the interactions within the research model.

Chapter four: A broad description of the research methodology and design is offered. Particularly, the operational definitions of the variables, research design, and instrumental refinements are presented. Also included in this chapter are details of the preliminary study as well as the main study. They are presented together with methods of data collection, sampling, and analysis.

Chapter five: Research findings based on the analyses of data collected and their subsequent interpretations are presented.

Chapter six: Discussion of the results, practical and theoretical implications, research limitations, and future research directions are presented. Concluding remarks are also offered to summarize the key points of this research.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The primary goal of the present study is to investigate the impact of teamwork quality on the cycle time of new product development (NPD) in the telecommunication industry in Saudi Arabia. This investigation also considers the moderation of environmental factors and the mediation of internal market orientation in the relationship between teamwork quality and NPD cycle time. To achieve these objectives, the present chapter reviews pervious literature on the four main constructs of the study, namely, teamwork quality, NPD cycle time, environmental factors and internal market orientation, to propose how they are related. The chapter concludes with the theoretical underpinnings upon which the study is grounded.

Information on the telecommunication industry, its history, growth and development in Saudi Arabia (the focus of this research) will be presented in appendix A. Appendix A introduces an overview on the growth and history of the telecom industry in Saudi Arabia, and then continues with a historical background of the telecom industry in Saudi Arabia followed by the telecommunication market structure in the country. The industry's growth including its different classifications is then presented.

2.2 Teamwork Quality

Teamwork is the activity of multiple interdependent individuals (Salas, Cooke, & Roosen, 2008). It is a set of interrelated components of performance that are needed to efficiently and successfully facilitate coordinated and adaptive performance (Baker, Gustafson, Beaubien, Salas, & Barach, 2003; Salas *et al.*, 2008; Cannon-Bowers Tannenbaum, Salas, & Volpe, 1995; Parumasur & Govender, 2013; Salas, Bowers, & Cannon-Bowers, 1995). Even though they are distinct components, both task work and teamwork are important for teams to be effective in complex situations (Gwynne, 2012; Judeh, 2011; Morgan, Glickman, Woodward, Blaiwes, & Salas, 1986). The multilevel process that arises when team members are involved in managing their individual task- and teamwork and the teamwork processes, is defined as team performance (Kozlowski & Klein, 2000).

Teamwork quality is a superordinate construct that refers to the degree and quality of team members' interaction (Hoegl and Gemuenden, 2001). Since this concept focuses on how teammates collaborate with each other in the pursuit of team goals, it includes neither task work behavior (i.e., the technical aspect of the task that exists independent of the team, Morgan, Salas, & Glickman, 1993) nor human sentiments (e.g., emotion, motivation). Hoegl and Gemuenden argued that the overall construct of teamwork quality is manifested in six dimensions. The conceptualization of teamwork quality as a six-dimensional construct is consistent with past research that tends to cluster teamwork into two categories: tasks and interpersonal processes (Bales, 1958). Specifically, task processes include three dimensions: effort, balance of member contribution, and coordination. These dimensions are related to the accomplishment of team goals and perform functions that allow teams to provide solutions to the problem that the group is committed to (Gladstein, 1984; Hsu, Shih, Chiang, & Liu, 2012). Interpersonal processes include three other dimensions: mutual support, cohesion, and communication. These dimensions perform maintenance functions (Gladstein, 1984) that are designed to build, strengthen, and regulate group life.

The construct of teamwork quality along with its measures was investigated in empirical research conducted by Easley *et al*. (2003), Hoegl and Gemuenden (2004) and Hsu *et al*. (2012). With regards to high teamwork quality, team members often practice open communication regarding task materials (Hauptman & Hirji, 1996; Katz & Allen, 1988), activities coordination (Adler, 1995; Faraj & Sproull, 2000), and contribute their knowledge (Seers, 1989). They also practice mutual support among them in discussions and individual tasks (Tjosvold, 1984; Cooke & Szumal, 1994), lay down and sustain standards of great effort (Hackman, 1987; Weingart, 1992), and encourage team cohesion (Mullen & Copper, 1994; Gully *et al*., 1995). Therefore, different levels teamwork quality can have varying impacts on project performance (Hoegl & Gemuenden, 2001).

In this research, Hoegl and Gemuenden's (2001) teamwork quality (TWQ) model was chosen as a basis for this study because it is one of the prominent models in teamwork and is regularly applied to explain the phenomenon. . Below is a description of all six dimensions.

2.2.1 Communication

Communication is crucial to a team's success because it provides the channel through which information and knowledge can be exchanged and evaluated, and activities can be coordinated (Burgoon, 1977; Cragan & Wright, 1990; Hsu, Shih, Chiang, & Liu, 2012). Indeed, communication has been described as the heart of a team process (Shaw, 1981). Team communication has a number of dimensions including frequency, formality, and openness. Frequency refers to the amount of interaction between team members. It can take the form of face-to-face or computer-assisted communications. Frequent communication is particularly important when the task is complicated or innovative and requires a high level of coordination (Hirokawa, 1990). Formality of communication concerns the preference between formal means (e.g., memo, scheduled meeting) and unstructured means (spontaneous conversation or meeting) of communication.

It is broadly recognized that communication is a fundamental component of teamwork. It provides a means to exchange information, share ideas among team members, coordinate efforts and provide feedback (Pinto & Pinto, 1990). Not only is the exchange of information important, even more important is that the information is delivered to the right person and interpreted in the way the sender intended to (Brodbeck, 2001; He, Butler & King, 2007; Gwynne, 2012; Pinto & Pinto, 1990). Lu, Xiang, Wang and Xiaopeng (2010), for example, found that a lack of communication or the existence of misunderstanding between team members and stakeholders of a project were the two main causes of project failure. Also other studies recognize the importance of communication for project success (e.g., Griffin & Hauzer, 1992; Katz & Allen, 1998).

When people are not capable of communicating among each other, no inter-departmental or inter-functional co-ordination will exist. In the context of an open environment, individuals perceive easiness in providing suggestions without worrying about reprisal and criticism. Moreover, criticism can be offered as it is not as likely to be misconstrued and it is more likely to result in enhancements. The accuracy level of information flowing across the organization is important as it prevents mistakes and develops trust among the organizational members. On the other hand, ineffective communication prevents market-oriented activities as it results in conflict via “misunderstandings, incorrect strategies, and mutual feelings of frustration” (Etgar, 1979, p. 65).

Past research suggests that teams that communicate informally tend to be more effective than those that have to rely on structured channels of communications. The reason is that informal communication is less time consuming and may allow team members to respond in a timely manner to market turbulence or customer demands (Hsu, Shih, Chiang, & Liu, 2012; Pinto & Pinto, 1990). As Hoegl and Gemuenden (2001) argued, when team members do not communicate with each other directly, it may interfere with the exchange of information and knowledge and lead to delay in the implementation of decisions within the team. Openness of information is also important because when information is not shared among team members, the expertise of team members cannot be integrated, which may lead to poor decisions (Stasser, 1992).

Naude´ *et al*. (2003) argued that communication is a vital prerequisite for a well-functioning internal market orientation culture. Hogg and Carter (2000) claimed that internal marketing is significant portion of the overall marketing orientation, and it involves the employment of marketing methods in the organization for the creation and communication of organizational values. As such, most of team projects require frequent, open, and informal communication among team members. Such communications facilitate the exchange of information. Network researchers argue that social relationship is an important antecedent of the exchange of task-related information (Albrecht & Ropp, 1984; Parumasur & Govender, 2013).

There are a number of reasons to expect that effective communication may improve the NPD cycle time. First, communication provides the channel through which important information is exchanged, which may provide the basis for decision making within the team. Second, timely exchange of information may reduce response time and allow team members to react more proactively to errors. Third, communications allow team members to influence decision preferences of others within the group (Hirokawa & Rost, 1992; Parumasur & Govender, 2013). Moreover, communication provides a basis for other factors that determine team performance. For example, communication is needed to coordinate team member's efforts and knowledge (Han, Lee, & Seo, 2008). Furthermore, it is needed for a team to understand the collective missions (O'Connor, 1993), to be sure the team shares the same mental model continuously (Salas, Cannon-Bowers, & Johnston, 1997; Salas & Rosen, 2013), and to facilitate trust within a team (Jarvenpaa & Leidner, 2006). Communication can thus be seen as a primary tool that is needed to create a high-performing team. Therefore, we decided that communication should be part of the TWQ model.

2.2.2 Coordination

Marks, Sabella, Burke, and Zaccaro (2002) defined coordination as "the management of synchronous and/or simultaneous activities and involves information exchange and mutual adjustment of action to align the pace and sequencing of team members' contribution with goal accomplishment" (pp. 5-6). According to Zalesny, Salas, and Prince (1995), coordination includes four components: goals (identify the goals for the team), activities/task (decompose the overall goal into sub-goals and decide the tasks required for the accomplishment of these sub-goals), team members (assign task to members who possess the skills required for task accomplishment), and interdependence (coordinate task activities).

Coordination is vital to a team that requires contribution from all team members and the effectiveness of one member's action hinges upon the action of another team member. A team is well coordinated when it specifies actions needed for task completion, scans for potential conflicts in subtasks, and ensures alignment between member behavior and the goals of the team (Kabanoff & O'Brien, 1979; Judeh, 2011). This allows teams to integrate each team member's behavior to produce a coherent collective effort. In contrast, an ill-coordinated team tends to produce poor outcomes because it prevents members from performing at a logical sequence, hinders them from performing at the best of their potential, and may result in duplicated or wasted effort.

Teams engage in coordinating activities when they formulate action plans in relation to the team goals (Hackman & Morris, 1975; Judeh, 2011; McGrath, 1984). Such activities include identifying tools and techniques, delegating tasks to each team member, and specifying the optimal sequence of NPD process (Weldon, Jehn, & Pradhan, 1991). Coordination provides the mechanism to integrate team members' skills and knowledge and minimize problems during developments of new product, which may be related to speed up NPD. According to Zalesny *et al*.' (1995) model of coordination, an important component of coordination is to map team members to task in order to increase the efficiency of task accomplishment. Faraj and Sproull (2000) found a significant positive relationship between coordination of expertise and team performance. This relationship was stronger than the relationship between (merely) the presence of expertise and performance.

Hoegl and Gemuenden (2001) included coordination and balance of member contributions in their TWQ model. Coordination refers to the degree of structure and synchronization of individual efforts within a team, while member contributions balance considers the level to which members are capable of bringing their expertise to the optimum. Faraj and Sproull's (2000) measure of coordination of expertise, to a certain degree, is a combination of Hoegl and Gemuenden’s (2001) measures of coordination and balance of member contributions, supplemented with the link to expertise. Since software development is knowledge work, we considered the link between coordination and expertise to be important. Therefore, we decided to use Faraj and Sproull’s (2000) measure of coordination of expertise instead of Hoegl and Gemuenden’s (2001) measures of coordination and balance of member contributions.

2.2.3 Balance of Member Contributions

Teams can balance members’ contribution by delegating tasks to those who have the capability to perform them (Seers, 1989). This is particularly important when team members come from different functional backgrounds and possess complementary expertise (Gwynne, 2012; Lovelace, Shapiro, & Weingart, 2001; Randel & Jaussi, 2003). In these teams, it is critical that team members bring their expertise to bear for the tasks (De Dreu & West, 2001; Salas & Rosen, 2013). Recent research on cross-functional teams speaks about this issue. Although cross-functional teams are believed to be key to the success of innovative projects that require diverse perspectives, empirical findings on these teams have been mixed (Ancona & Caldwell, 1992). One important reason is that team members fail to apply their expertise to the task. It is possible that team activities (decision-making process) are dominated by a few team members who discourage others from engaging in activities beneficial to the team (Hoegl & Gemuenden, 2001). As a result, team members may be unwilling or unable to contribute their expertise to the task.

When there is a balance of member contribution, teams may have a larger pool of diverse knowledge and expertise that can be used to improve performance and new product launch (Gebert, Boerner, & Kearney, 2006; Judeh, 2011). Additionally, balance of member contribution may also ensure that team members perform activities within their expertise area (Milliken & Martins, 1996). In support of this argument, Hoegl and Gemueden (2001) found that balance of member contribution was related to the innovative performance of software development teams which led to improvement in the NPD cycle time. Team members may also shift their focus from NPD process and activities to interpersonal problems. As such, they may opt to avoid interpersonal conflict by withholding the expression of task disagreements (Mooney, Holahan, & Amason, 2007), which may interfere with a team's ability to incorporate the skills and expertise of its team members to find integrative and innovative solutions.

2.2.4 Mutual Support

Mutual support is related to the degree to which the members of the team address conflict in competitive or cooperative way, helping one another, and developing and respecting each other's ideas. Tjosvold and colleagues (Alper *et al*., 1998, 2000; Chen, Liu, & Tjosvold, 2005; Thompson, 2011; Tjosvold, 1998; Tjosvold, Hui, & Yu, 2003) introduced the notion of competitive versus cooperative conflict within the team. In a cooperative conflict, team members recognize that they all share a common goal. Therefore, conflict, while inevitable, may be resolved by sharing information, taking each other's perspective, communicating feelings directly, and providing support to each other. In contrast, in a competitive conflict, team members place their self-interest above the interest of the team.

As a result, they see conflict as a zero-sum game whereby one's gain comes at the expense of others in the team. A competitive conflict may lead team members to avoid direct communication, dismiss others' ideas, amplify differences instead of resolving them, and damage the relationships. Past research suggests that while cooperative conflict tends to lead to positive outcomes such as a higher level of innovation and performance, competitive conflict tends to result in decision impasse and strains relationships among team members (Alper *et al.*, 1998, 2000; Tjosvold, 1998).

When team members believe that they are pursuing the same goals, they may be more likely to frame their conflict as cooperative (Tjosvold, 1998). As such, they cooperate with each other as they move towards the NPD cycle time. Such cooperation may promote the exchange of new ideas, improve relationships, and increase commitment to the tasks (Tjosvold, Tang, & West, 2004). In contrast, when team members believe that their goals are not congruent with each other, they may be more likely to frame their conflict as competitive (Tjosvold, 1998). As such, they may undermine each other's effort in the pursuit of team goals. Such competitions may strain relationships and impair NPD cycle time.

Competition between people can exert a positive influence on the motivation and performance of individual tasks. For interdependent tasks such as software development, however, cooperation or mutual support amongst team members is more important. Team members working on a shared goal should try to support instead of trying to outdo each other. They should show respect, give help and support when needed, and stimulate ideas of other team members and develop them further. If, on the other hand, team members demonstrate competitive behaviors, this can lead to distrust and frustration within the team (Tjosvold, 1995). Both quality and acceptance of ideas generated by members of the team increase when members cooperate (Cooke & Szumal, 1994). Mutual support, therefore, is an important element of teamwork and needed to be able to reach team goals. The better team members support each other, the more effective and efficient these goals can be reached.

2.2.5 Effort

A team's success hinges upon team members' willingness to exert effort on behalf of the team. In teams whose success depends on the effort of all members, performance deficit may occur when one or more members make little effort towards goal attainment (Kidwell & Bennett, 1993; Liden, Wayne, Jaworski, & Bennett, 2004; Thompson, 2011).

Research on social loafing suggests a number of reasons why team members may fail to perform at their full potential. First, since individual effort may not be identifiable in a team context, individuals may be able to hide in the crowd. The tendency to withhold effort increases when the task is highly interdependent, which renders it difficult to identify individual contribution (Williams, Harkins, & Latane, 1981). Second, team members may also fail to exert sufficient effort because they believe that others also fail to do so. As a result, the notion of being taken advantage of (because others are putting in less effort while receiving the same amount of reward) is aversive, which may motivate one to reduce effort for the team (Schnake, 1991).

Effort reflects the physical and mental energy that team members expend towards the completion of team tasks. Weingart (1992) suggested that effort includes two components: intensity and duration. When group members focus more attention on the task (intensity) and work longer (duration), the NPD process may be faster. However, the new product development process may suffer when some members fail to contribute to the best of their effort (Shepperd, 1993). Supporting this argument, past research on social loafing has found that team performance and productivity declines when some team members do not expend sufficient effort (Hardy, 1990).

2.2.6 Cohesion

Cohesion refers to the level to which the members are empowered to stick to each other and to remain in the team (Beal, Cohen, Burke, &McLendon, 2003). Researchers have found that cohesion is an important property of a team, predicting team outcomes such as performance, perceived team utility, communications among team members, and conflict (Beal *et al*., 2003; Mullen & Copper, 1994; Thompson, 2011). In situations of high team cohesion, team members are more likely to bond together. As such, they may be motivated to work together, become committed to team goals, assist each other, and coordinate their activities (Hackman, 1992; Wech, Mossholder, Steel, & Bennett, 1998).

Following previous research (Mullen & Copper, 1994), Hoegl and Gemuenden (2001) suggested that cohesion includes three dimensions. These are the extent to which team members are attracted to each other, the extent to which they are committed to the task, and the extent to which they identify themselves with the team. In a recent meta-analysis, Beal and colleagues (2003) found that all three components of team cohesion were all independently and significantly related to team performance. Consistent with these findings, Hoegl and Gemuenden (2001) incorporated all three dimensions into their conceptualization of the construct of cohesion.

There are a number of reasons to expect that group cohesion may also be an important antecedent of NPD cycle time. First, when group cohesion is high, there is a motivation to improve the performance of the team (Mullen & Copper, 1994) which positively affects the NPD cycle time. Second, a cohesive team also provides more opportunities for team members to interact with each other (Ehrhart & Naumann, 2004). The frequent interaction may allow them to observe each other's team and improve the NPD processes. Based on the multidimensional model of Carron, Widmeyer, and Brawley (1985), Chang and Bordia (2001) studied the relationship between group cohesion and performance. A direct relationship between specific dimensions of group cohesiveness and performance was found. Cohesion was indicated to be an antecedent of performance. In their meta analytic study, Beal *et al*. (2003) showed that cohesion wass related to team performance and NPD cycle time (effectiveness and efficiency). However, Mullen and Copper (1994), in their meta analytic study, revealed disagreements on the relationship between group cohesion and performance. They concluded that the relationship between cohesion and performance is significant but small. Chang and Bordia (2001) assigned the disagreement in literature to the inconsistency in measurements and definitions of cohesion and performance. They postulated that consistency in the definition and measurements of cohesion and performance was needed to give a more decisive answer.

2.2.7 Previous Research on Teamwork Quality

The construct of teamwork quality has been used in a number of recent studies. In their initial effort to validate the construct of teamwork quality, Hoegl and Gemuenden (2001) surveyed 145 software development teams. They found that teamwork quality was correlated significantly with team performance as evaluated by team members, team leaders, and project managers (although it explained more variance in performance rated by team members than performance rated by team leaders and managers). Teamwork quality was also found to be significantly related to perceived personal success of team members. These results were later replicated in a longitudinal study involving 39 cross-functional teams (Hoegl, Weinkauf, & Gemuenden, 2004). These teams engaged in both intrateam and interteam coordination in a new product development project. Results of the study indicated that although teamwork quality was significantly related to team performance, the effect was stronger at the initial phase of the project than at the later phase of the project. These findings suggest that teamwork quality is important for a team to deal with the challenge of uncertainty at the initial stage of the project. Its importance is somewhat reduced at the later stage when the low level of uncertainty requires less collaboration among team members. Additionally, teamwork quality was related to project commitment and coordination with other teams.

Hoegl, Ernst, and Proserpio (2007) investigated whether the effects of teamwork quality on performance may be moderated by team member proximity. They argued that the effects of teamwork quality on performance would be stronger when team members are more geographically dispersed, for two reasons. First, teamwork quality is more likely to leverage the knowledge potential of all team members who are dispersed. That is because as teams become more dispersed, teamwork quality becomes more relevant. In other words, in these teams, it is more important for team members to share information, exert sufficient effort towards team activities, coordinate each other's action, provide mutual support, use all team members' potential, and identify themselves with the team. Second, the role of team leaders in dispersed teams becomes less critical because they are less likely to have direct access to all team members. As such, in these teams, the weaker influence of team leaders on team activities can be compensated by a high level of teamwork quality. In other words, a high level of teamwork quality can ensure that dispersed teams continue to function even without the hands-on supervision of team leaders. Based on the same dataset used in Hoegl and Gemuenden (2001), they found substantial support for their hypothesis.

Hoegl and Proserpio (2004) investigated the relationship between team member proximity and teamwork quality. They argued that proximity, defined as the extent to which teammates are physically close to each other, may have positive effects on the six facets of teamwork quality. The reasoning was that close proximity of team members may facilitate the frequent and spontaneous communication within the team, allow members to structure their activities to improve synchronization, draw on each other's strength, provide assistance to each other when needed, develop strong ties among team members, and reduce the tendency of social loafing. Results of a study using 145 software development teams from Germany showed that five of the six factors of teamwork quality were significantly correlated with team members proximity (with the exception of balance of member contribution).

Hoegl, Parboteeah, and Gemuenden (2003) hypothesized that the relationship between teamwork quality and team efficiency and effectiveness may be moderated by the level of innovativeness of the team project. They found that the relationship was stronger when the team projects were high on innovative, but lower or even non-significant when the level of innovation was low. The reasoning was that projects that are highly innovative require more collaboration among team members and exchange of resources. As a result, teams that have a high level of teamwork quality may be better equipped to head off these challenges. In contrast, when projects are low or moderate in innovativeness, they require less collaboration among team members. Thus a high level of teamwork quality may be less relevant in these situations.

Hoegl and Parboteeah (2006) examined the effects of the distribution of decision-making authority on teamwork quality. The decision-making authority can rest either inside or outside of the team. When decisions are made external to the team, team members may experience a low level of autonomy. As such, it may interfere with the distribution of information, create difficulties with the coordination of team activities, undermine task-oriented motivation (effort and task knowledge), result in less mutual support, and reduce team members' identification with the team. In contrast, when team members share the responsibilities to make decisions, they may be motivated to expend effort towards the tasks, exchange task-related information, coordinate their activities, balance each other's contribution, and eventually lead to more mutual support among team members. Results of a study using 145 software development teams from Germany provided mixed support for these arguments. Specifically, external influence on team decision making was significantly related to effort, cohesion, and balance of member contribution, but not significantly related to the other three dimensions of teamwork quality. Additionally, internal equality in decision-making was significantly related to five of the six dimensions of teamwork quality with the exception of team coordination.

Easley, Devaraj, and Crant (2003) examined teamwork quality in the context of the use of team-based work systems. Using 24 teams of MBA students, they found that teamwork quality was related to a team's use of collaborative system, which in turn was related to the team's creativity performance. Hoegl and Parboteeah (2003) examined the moderating role of teamwork quality on the relationship between team goal setting and team performance in innovative projects. They reasoned that a high quality of teamwork may reduce the uncertainties involved in innovative team projects, which may enhance the effects of team goal setting. Results of a study using 145 software project teams in Germany provided substantial support for this argument.

Overall the evidence suggests that teamwork quality is related to team performance, and NPD cycle time facilitates the team goal setting process, and compensates for the lack of geographical proximity of team members. Additionally, the effects of teamwork seem more pronounced when the team project is innovative and when teams are at the early stage of development. Given the importance of teamwork quality as a team process, it is important to examine the impact of teamwork on NPD cycle time.

2.3 New Product Development

Depending on the industry they compete in, firms need to continuously engage in new product development in order to remain competitive. New products or improved products is not sufficient for a competitive environment that is modern knowledge-based. New product development (NPD) must be complemented with the rapid introduction of new or significantly improved products in order to prevent obsolescence. The following sections address the definition of NPD, and then introduce the construct of NPD cycle time including its measurement and reduction techniques.

2.3.1 Definition of New Product Development (NPD)

New product development includes a set of activities that moves a new product project from the point of idea generation to market launch and post implementation review. Many firms employ NPD as a means of pursuing future profitable growth. Variants of NPD include identifying a market opportunity and trying to match the needs of that market with the appropriate technology (i.e. market demand initiates the NPD process), seeking a market that might be interested in a newly developed technology (i.e. pushing the new technology onto a market), building a new product from pre-existing technology (e.g. platform product), or making slight variations to a product in order to customize it for individual market segments (Ribbens, 2000; Ulrich & Eppinger, 2000).

A new product development process is essentially a guideline on how to go about a new product project beginning from the idea phase to the market launch and over (Cooper, 1994; Mishra & Saji, 2010; Mokhtar, & Yusoff, 2008; Suss & Thomson, 2010). One of the most common NPD processes is the stage-gate system developed by Cooper (1990). Different from the cumbersome and time-consuming NASA-based Phased Review Process of the 1960s, it focuses on business risks along with technical/engineering aspects of the product project (Cooper, 1994; Cooper & Kleinschmidt, 2007; Fekri *et al*., 2008; Millson & Wilemon, 2008; Saji & Mishra, 2012; Nepal *et al*., 2011). It consists of five stages (workstation) that are opened by five gates (checkpoint), at which point a multidisciplinary team oversees inputs (clearly specified deliverables/a set of exit criteria (items upon which project is judged and potential hurdles), and the output in order for a decision to go, kill, hold, or recycle to be made (Cooper, 1990)

A new product development process is not exempt from the need to respond to new environmental, organizational, or situational conditions. Until recently, it was believed that the NPD process indicated that a controlled approach should be adhered to throughout the phased-review process or "Stage-Gate" system. This was utilized in order to reduce NPD cycle time which, in turn, increases the probability of new product achievements (Cooper & Kleinschmidt, 1986, 1987a, 1987b, 1991; Johnson

& Luo, 2008; Langerak, *et al*., 2008; Millson & Wilemon, 2002; Parry *et al*., 2009; Shepherd & Ahmed, 2000). This is referred to as die "structured school of thought." Inspired by this school of thought, an additional two other schools of thought have pursued to enhance the NPD process.

The first new school of thought focuses on how to enhance the structured NPD process. Cooper and Kleinschmidt (1995) also agreed that a structured process should be abided by; however, they added that stages can be combined or even skipped. They emphasized that a NPD process should still encompass the structured approach; however, they did stress that the activities within each stage need not be fully executed prior to proceeding through a “gate.” This first school of thought is referred to as the "flexible school of thought." Improvisation is the second school of thought. It is the most extreme case of flexibility. In the "improvisation school of thought," there are no structured frameworks that the NPD process follows. Due to frazzled structures, it causes NPD teams to improvise throughout the progression of each project. Moorman and Miner (1998), among others, believed that improvisation can have an affirmative effect on new product outcomes.

The success of NPD may be assessed by performance measures such as the level of customer satisfaction, acceptance of customers, revenue goals met, growth in revenue, break-even time, margin goals attainment, profitability goals achievement, internal return rate, investment return, cost of product development, timely launching, technical performance of product, quality guidelines met, speed-to-market, and the sales percentage provided by products of not more than 5 years (Cooper & Kleinschmidt, 2007; Fekri *et al*., 2008; Griffin & Page, 1993; Kleinschimdt & Cooper, 1995; Nepal *et al*., 2011). Previous studies have also addressed the success of NPD by measuring the speed-to-market for products of firms within the electronics parts and components industry or similar type industries. These fast-cycle industries often face short product life cycles and see speed as a key source of competitive advantage (Datar *et al*., 1997). Speed essentially translates in the reduction of NPD cycle time and will be referred to as such throughout the remainder of this manuscript.

Lester (1998) argued that to achieve success in such areas, NPD relies on five main critical factors: (1) senior management commitment; (2) supportive organizational structure and processes; (3) attractive new product concepts that are possible to develop; (4) appropriately staffed and resourced venture teams; and (5) reduction of uncertainties using project management. Together these allow for significant reduction in delays, time and money.

2.3.2 New Product Development Cycle Time

A new product development cycle time is critical because life cycles are shrinking, and obsolescence is occurring more quickly than in the past while competition has intensified (Griffin, 1997). In today's world economy, regardless of the industry, organizations are searching for new ways to compete more effectively and efficiently. In their efforts to do so, they are confronted with numerous competitive challenges. It is no longer sufficient to meet the traditional requirements of product cost, performance, quality and dependable delivery.

A new significant challenge involves reducing the time required to successfully bring new products to market. Due to the vast amount of product offerings in the market, keeping up with the competition means that companies are bringing newer products to market faster, resulting in rapid product obsolescence (Crawford, 1992; Griffin, 1993; Johnson & Luo, 2008; Langerak *et al*., 2008; Liu *et al.*, 2012; Millson *et al*., 1992; Parry *et al*., 2009; Sherman *et al*., 2000; Sun & Zhoa 2010;

Takeuchi & Nonaka, 1986; Towner, 1994). Time has become a scarce resource and an economic necessity. Reducing time allows for market share growth by accommodating customers earlier, increasing customer satisfaction, and increasing quality since time requires things be right the first time (Liu *et al.,* 2012; McDonough & Barczak, 1991). Time is an especially important factor of the competitive environment within which companies operate. Being second to market can often mean lost investment costs and missed market opportunities. With advanced manufacturing technologies and other technological advancements, products are more rapidly becoming obsolete and companies are challenged by the possibility of their customers replacing their products with those of their competitors. With increased globalization, markets are further becoming competitive and those companies that don't achieve speed-to-market often risk decline and even death in their industry.

According to a study by Scott (2000), the reduction of cycle time ranked third out of the top 24 issues for product development in high technology (following strategic planning and organizational learning). In this regard, the Product Development and Management Association sponsored a study that highlighted the fact that 40% of firms decreased their NPD cycle time over a span of five years. These firms include Honda, Xerox, AT&T, Hallmark, and Chrysler. They all decreased their cycle time by half (Calantone and DiBenedetto, 2000; Griffin, 1993; Trygg, 1993).

The importance of shorter product development cycle time is heavily stressed in business research journals. There is an abundance of research on techniques (practices, tools, etc.) that can be used for reducing the product development cycle time (Griffin, 1997). What remains unclear, however, is how much improvement these techniques, tools or practices, actually make to reduce the time it takes to commercialize a product development cycle time (Griffin, 1993).

2.3.3 Measures of New Product Development Cycle Time

If not defined properly, cycle time can be analyzed from different angles as it has many different meanings. Rusinko (1997) defined time as the degree of success in meeting a project time goal. McDonough (1993) measured the time it takes for products to be developed by assessing how close the project is to meeting its time goal: ahead or behind by a certain percentage, or on time. Cooper and Kleinschmidt (1994), and Chryssochoidis and Wong (2000) also measured time by how well the project stays on schedule. De Toni and Meneghetti (2000) focused on external cycle time (i.e. changes in the time that products and services become visible to customers), or internal cycle time (i.e. changes to the design and manufacturing processes that allow development activities to occur more rapidly). Griffin (1993) divided cycle time into three: Time-to-Market, Concept-to-Customer and Development Time.

Time can also be identified by the NPD stages it encompasses, such as, the cycle time from conception to production, whereby the understanding of time depends on clear definitions of conception and production. The goal of measuring time becomes even more elusive when the start of NPD stages is “fuzzy” or ill-defined. This is particularly the case with the front-end stage of the NPD cycle, where the start of concept development is much less clear than the start of detailed design and prototype development (Cooper & Kleinschmidt, 1994; Griffin, 1993). The interesting aspect of the "fuzzy" front-end is that it could be the bargain basement of cycle-time reduction opportunities... [it has] the least expensive opportunities [for achieving] large improvements in Time-to-Market (Smith & Reinertsen, 1998). Kumar *et al.* (1994) also found that reducing NPD cycle by making the right decisions on product features, performance dimensions, and product costs early on is important to product success. Thus it becomes necessary to determine ways to reduce the time that the front-end stages add to NPD cycle time. This would mean using time variables that measure different stages of the NPD process.

In order to be able to measure the actual steps of the development process, Griffin (1993, 1997) used project timing, which chronicle[s] the dates when various phases of development [begin]. As mentioned already, Griffin measured NPD cycle time in terms of Time-to-Market, Concept-to-Customer and Development Time. Each one of the time variables begin with different stages of the NPD process, but the series of activities of interest end just before the product launch stage begins, which Kumar *et al*.(1994) called the production stage of the NPD process, for the purpose of treating time as an internal variable. The stages described here become easier to measure as the development process moves forward. The earliest stages are the most difficult to uncover. Stages 0 and 1 are usually estimates kept informally with marketing or planning groups. The transition from stage 0 to stage 1 is especially fuzzy (general uncertainties of start dates). Conversely, Stages 2, 3 and 4, are usually recorded in logbooks kept by design/development or manufacturing (Griffin 1993, 1997). Now that the stages have been identified, the time variables are defined in Table 2.1.

Table 2.1
Phase Timing Variables

Time variables	**Definition**	**Measures**
Time-to-market	Stage 0 through production	Firm's ability to identify a market opportunity and come up with a suitable product for the customers in that market.
Concept-to-customer	Stage 1 through production	How difficult it is to figure out the right product.
Development time	Stage 2 through production	How efficiently a product goes through production.

Source: Griffin (1993)

The initial duration of a five product development phases are needed for every project. The first stage (Stage 0) is referred to as the concept generation stage where the idea for the product surfaces. This is followed by Stage 1 which is the project evaluation where approval of product strategy and target market is sealed and the project is given a green light for specifications development. The actual times for the initiation of Stages of 0 and 1 are sometimes unsure as the idea may just be juggled around in marketing or development for some time without employment. The initial step of some projects may be listed down with clarity in memorandums bringing forward the idea or in case of a project conducted to satisfy competitor's entry, the data the other product was publicized in the market. This is followed by Stage 2 where the first R&D money was spent on physical product development. Stage 3 is the manufacturing development where the documentation takes place concerning the development of the processes. This is followed by Stage 4 that concerns commercialization – in this phase, the manufacturing production trials are initiated. The initial dates are procured easily from the time sheets of engineering and manufacturing as well as business memorandums.

Owing to the uncertainties existing in Stage 0 to 1, three various initial points are used to gauge cycle time namely, development time, concept-to-customer time, and total time. The development time (DT) starts from Stage 2 throughout introduction of product - this time identifies the efficiency of the firm in taking a product to production, provided that the functions of the product are clarified. The duration of (CTC) is Stage 1 through product introduction; the time identifies the difficulty of the firm in figuring out the functions of the product, provided a known set of customer targets. The total time (TT) is Stage 0 to product introduction indicating a firm's ability to categorize a market, determine customer having issues that require resolution and lay down a strategy for product development.

Griffin (1997) pointed out that the process of NPD cycle time consists of five main stages. The first stage is the ‘market finding’ in which the firm attempts to find a chance in the market where a possible product might find its way into this market. In this stage, an idea of a produce first surfaces. The second stage is the ‘new product strategy’ which refers to developing a strategy to make this new product. In this stage, the market and the idea of the product has been approved. The third stage is ‘detailed design and prototype development’. In this stage, a new product stems from an idea – an idea refers to a descriptive statement that can be written or orally stated. Such an idea is then refined into a product concept that comprises of consumer benefits and product features. The concept is then transformed into a prototype – a prototype refers to a working model or the initial product version. Following several changes, the prototype is finally perfected and developed into the final product (Thomas, 1993).

The fourth stage of NPD cycle time process is the ‘pre-production’ stage which refers to testing the prototype product to get feedback about its performance and also about the customers’ satisfaction with this new product. Finally, the ‘production’ stage is when companies finalize the product so it is ready for customers’ use in the market (Griffin, 1993). If a firm accelerates the pace of these five stages, the result would be gaining higher competitive advantage which in turn would result in better organizational performance (Saryeddine, 2005).

The previous five stages are done by a number of departments in a company. Depending on how established the company is, this number is normally more than one department. In big companies worldwide, tens of departments might be involved in these five stages. This means that cycle time of NPD is directly influenced by the employees of these departments.

The problem with Griffin's NPD process and hence the measure of time, however, is similar to that inherent in many other NPD models; Griffin does not account for the fact that the stages of NPD do not always occur sequentially. Figure 2.1, on the other hand, reflects the overlapping nature of various stages. Different functional departments all play important roles in developing the product and their involvement does not always commence after another department completes its role. Overlapping or concurrent development, often referred to as CE, has become a dominant feature of NPD. The most important aim for applying CE is shortening of the product concept, design and development process from a serial to a parallel one (Shina, 1991).

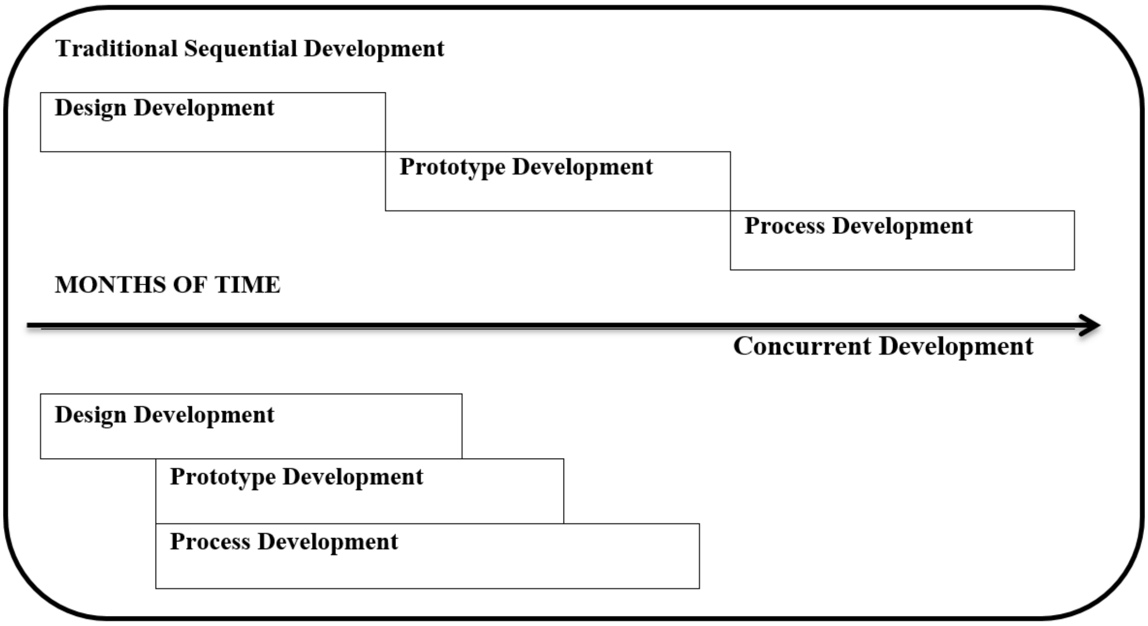

Figure 2.1
Mechanism for Product Development
Source: Saryeddine (2005)

Considering this problem, Griffin's (1993) model can be taken one step further for the purposes of meeting the objective of his research; addressing the CE practices that reduce NPD cycle time in terms of Time-to-Market, Concept-to-Customer Time and Development Time, whereby each time variable begins with a different NPD stage and the stages overlap. Figure 2.2 illustrates how time and the NPD stages coincide.

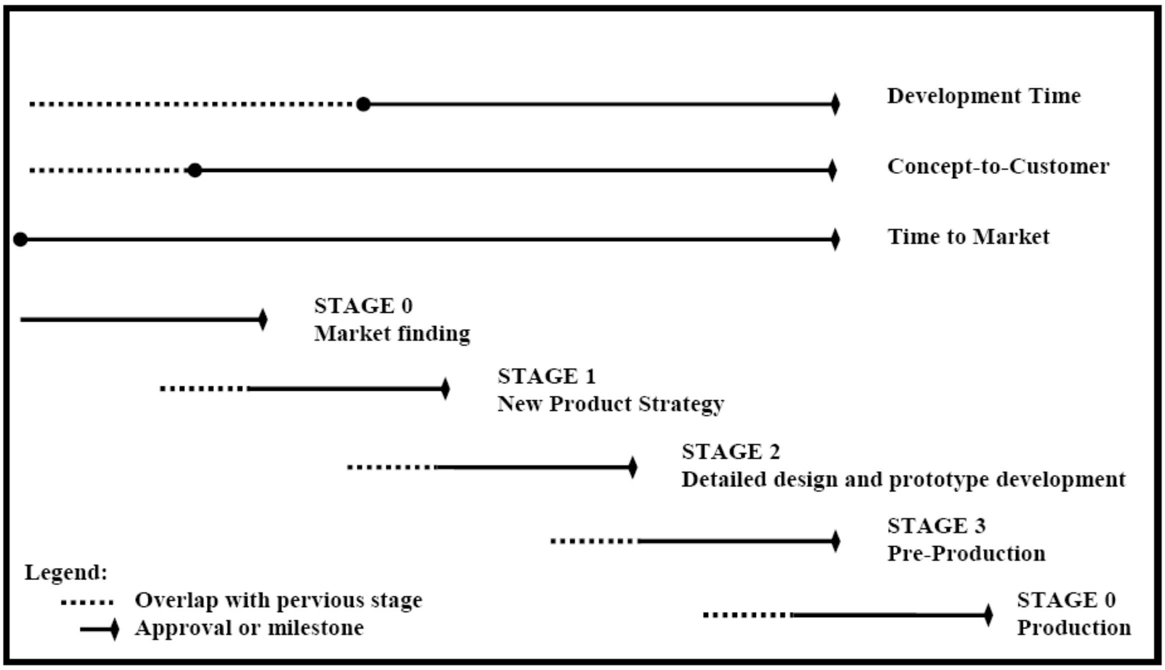

Figure 2.2
Time Metrics for NPD Stages
Source: Saryeddine (2005)

2.3.4 Reduction of NPD Cycle Time

In business literature NPD cycle time has been labeled as a crucial strategic area for determining the success or failure of the development endeavors of a firm in a time sensitive industry. Major subject areas found in the literature regarding this topic encompass: the factors or practices that influence the reduction of NPD cycle time, the effectiveness of overlapping activities for reducing NPD cycle time, the measurement of NPD cycle time, and the implications of NPD cycle time reduction. These topics have been explored thoroughly by various researchers.

The strategic importance of cycle time reduction clearly translates into the need to find appropriate techniques for reducing NPD cycle time. It is a product development technique that involves employing practices of CE in order to change the traditional process of developing products through overlapping or concurrent processing of NPD activities. Whether or not the adoption of CE practices lead to a reduction in cycle time measured in terms of Time-to-Market, Concept-to-Customer Time, and Development Time is to be investigated.

The success of NPD depends upon a number of different performance measures. These goals can be grouped into three dimensions: time-related, efficiency-related, and quality-related (Griffin & Page, 1993). There are always tradeoffs, however, when focusing on any one of the three performance dimensions in isolation of the others. While speed is significant, expedient development of a low standard product of a high standard one along with unproductive utilization of organizational resources may lead to adverse outcomes (Lilien& Yoon, 1990; Liu *et al.*, 2012). Crawford (1992) identified five major risks of focusing on reducing NPD cycle time: focusing on quick innovation at the expense of breakthroughs; sacrificing necessary information-finding steps for the sake of time; "people costs" of managing cross-functional teams; constrained innovation due to time budgets; and teams consuming large amounts of firm resources.

Despite these findings, however, several studies dedicated to product development revealed positive relationship between performance dimensions like speed and productivity or speed and quality (Clark & Fujimoto, 1991; Shi & Liao, 2013; Stalk & Hout, 1990). This paradox may be attributed to the fact that practices contributing to speed, contributes at the same time to both productivity and quality. Furthermore, the penalties for being late to market in growing businesses can far outweigh other costs.

Cycle time reduction is not only important for introducing new products sooner, but it permits for a later start on product development. This allows a firm to make use of the newest technologies and realize the most current customer needs, thereby increasing product performance and quality (Scott, 2000). When trying to achieve cycle time reduction, focusing on time and putting aside other performance goals may be crucial. If development time is excluded from the performance measure, time will not be focused on as other product goals like cost, quality and performance of product (Shi & Liao, 2013; Zirger & Hartley, 1994). Simply setting time as an explicit goal can affect the reduction of product development cycle time (Rosenthal & Tatikonda, 1993; Zirger & Hartely, 1994). McDonough III (1993) asked project leaders how important product development cycle time reduction was in producing a product. On a scale from 1 to 7, projects receiving a score of less than 5 were omitted from the study.

Companies began to visibly be uneasy with the high failure rate in NPD throughout the 1960s and 1970s (Cooper, 1994). This was accredited to many reasons such as inadequate market analysis, higher costs than anticipated, a lack of effective marketing, and technical production defects (Cooper, 2001). One suggestion to this problem was to utilize an official NPD process. This confirmed to be essential in gaining success. This formal process was developed by NASA. NASA brought directive to an otherwise chaotic method. The newly structured process was heavily controlled and fragmented into discrete stages. Most firms found this process to inflexible. On the other hand, government organizations are required to follow the official process.

The purpose of the design was to ensure that every facet of the project was finalized. The process is directed strictly to the development of the product, and thereby utilizing engineering teams that were driven; cross functional teams were not employed. Sometimes this caused delays with the project. Projects were held up at different gates while preceding activities were being completed. There was little to no flexibility involved in this procedure (Cooper, 1994). Both domestic and abroad, increased opposition made speed to market essential for new products to succeed. It also increased management’s urgency to stress the significance of speed in the NPD process.

According to Ridderstrale and Nordstrom (2000), there are only two kinds of companies, “The quick and the dead.” They declared that speed is king, agility rules, and in this industry it is “Be fast or be forgotten.” Cooper and Kleinschmidt (1994) believed that speed enhances competitive advantages; therefore, being the "first in" harvests greater accomplishments. The majority of revenues come from products that did not exist a year ago at Hewlett-Packard, in the USA and in Tokyo. Within a week, a customized Toyota order can be processed and delivered (Ridderstrale & Nordstrom 2000). Despite conflicting evidence on whether faster product launch yields greater performance, studies show that there is a high parallel between speed and success. A majority of companies that succeed in making it to the market ahead of their competition gain an advantage to responding to market changes more swiftly. In recent decades, there has been a visible pattern proving that technology is ever changing and improving. Due to continual progress, the lifetime of a new product has been reduced significantly (Cooper, 1994).

The complete formality of an NPD process does not provide an overview of the possibility of flexibility throughout the stages. The general processes in NPD are considered as the degree of proficiency utilized in the execution of every stage of NPD but does not explicitly consider the degree structure or improvisation needed at every level. Cooper (1994) suggested basic modifications to the "StageGate" system. The changes required one to be capable of fluidity and spontaneity. It entailed integrating "fuzzy gates," which are both conditional and situational, ultimately striving to be more pliable. Cooper called this process the "Third-Generation Process." Each stage of the project is to be completed before proceeding to the next stage. If under pressure and time constraints, this process could result in failure and/or present major problems for businesses.

In the interest of saving time, some companies opt to skip essential phases in the process; this only diminishes the quality of the final product. However, larger, high-risk projects may benefit from the "Stage-Gate" process. Blind obedience to the formal NPD process can create excessive work and delay smaller, low risk projects. Decreasing the long-lead time, the more flexible, new product process permits the implemented NPD stages concurrently. This is effective because the stages can be run consecutively. This is an example of utilizing "fuzzy gates." Rather than creating an absolute "Go/Kill," using the “fuzzy gates” enable the NPD team to choose when a project is ready for an alternative gate, even without previous activities being executed.

Thus, realizing how important NPD cycle time and its reduction to the businesses and general and the telecommunication industry in particular, the present study attempts to examine whether the Saudi telecommunication industry adopt efficient NPD cycle time reduction. However, reduction in NPD cycle time requires a collaboration of team members who adopt an internal organization organizational culture in which NPD cycle time is among the main goals the team work to achieve (Sun, Zhao & Yau, 2009). This internal organization organizational culture is referred to as the internal market orientation (IMO) (Homburg & Pflesser, 2000; Lings & Greenley, 2010). The following section addresses this concept.

2.4 Internal Market Orientation

Market orientation (MO) is considered to be the very heart of modern marketing management and strategy to both academicians and practitioners (Narver & Slater 1990; Kaur, Sharma & Seli, 2009; Mohd Mokhtar, & Yusoff, 2007; Sulaiman *et al*., 2013). In its current academic meaning, market orientation is a relatively recent term with only some studies attempting to find a suitable definition of its measurement (Deng & Dart, 1994; Gray, 2010, Jaworski & Kohli, 1993; Kohli & Jaworski, 1990; Kohli *et al*., 1993; Kaur, Sharma & Seli, 2009; Narver& Slater, 1990). Other alternative terms synonymously utilized for the concept include market oriented, marketing oriented, and customer oriented.

2.4.1 Definition of Market Orientation

Market orientation has been defined from two perspectives: (1) organizational culture (Deshpandé, Farley, & Webster 1993; Homburg & Pflesser, 2000; Narver & Slater 1990); and (2) organizational behavior (Kohli & Jaworski 1990). The cultural perspective refers to market orientation as the culture of the organization that produces the required behaviors effectively and efficiently for the development of superior value for buyers and therefore, ongoing optimum business performance (Homburg & Pflesser, 2000). Within this school of thought, researchers theorize market orientation based on three magnitudes: (1) Customer orientation: The firms' understanding that they must create superior value in order for their buyers to continue to return; (2) Competitor orientation: The firms' understanding of the strengths and weaknesses in the short team, and the capabilities in the long-term, as well as both existing rivals and potential rivals; and (3) Inter-functional coordination: Inter-functional coordination is the synchronized use of company resources to create optimum customer value (Gresham, Hafer, & Markowski, 2006; Kahn, 1998).

Market orientation has also been viewed from organizational behavior as it is referred to as an organizational culture that influences the behavior of the team members working in this organization (Abdul-Talib & Abd-Razak, 2012; Deshpande & Farely, 2004). When leaders adopt market orientation policies and set the goals to achieve market orientation objectives, such leaders tend to promote and encourage a workplace culture in which employees work and cooperate to achieve the goals of the organization (Gummesson, 1987).

Market orientation is referred to by Kohli and Jawrski (1990) as the organization-wide production of market intelligence concerning current and potential customer needs, spread of intelligence throughout departments and the responsiveness of the organization towards it. This definition reflects three components of marketing information processing: (1) marketing intelligence generation; (2) dissemination; and (3) responsiveness in a learning organization. Ruekert's (1992) definition is similar, as he focused on the strategic planning by business units. Baker and Sinkula (2002) defined marketing information processing as to the extent to which the analysis of the firm of external marketing environment affects the process of strategic planning. Thus, market orientation is defined in this study as the ability of the firm to create, distribute and utilize high quality information pertaining to both clients and competitors. Slater and Narver (1998) believed that these views do not coincide with the market orientation theory found in marketing literature.

2.4.2 Definition of Internal Market Orientation (IMO)

Following the considerable focus of literature dedicated to marketing, service managers are extensively accepting the marketing significance internally. Service organizations that are desirous of developing stronger market orientation are employing the philosophy of internal market and developing internal market orientation to achieve it. Internal market orientation is a continuous firm marketing focus that is geared towards the employees and it encourages the employees with the objectives of the market and it urges them towards better performance and quality service provision, which consequently maintains customer retention and improves company success. In the context of studies, the main employees' role in creating market orientation and subsequently, customer-centric practices, is well documented (Gounaris, 2008**;** Lings, 1999; Lings & Greenley, 2005; 2010; Tortosa, Moliner & Sanchez, 2009).

Scholars seem to agree that IMO enhances employees' adoption of strategic directors given by superiors (Gounaris, 2008; Grönroos, 1985; Gummesson, 1987; Harris & Piercy, 1999; Lings & Greenley, 2010; Piercy & Morgan, 1990; Tortosa, Moliner & Sanchez, 2009). Generally, employing strategic directions and integrating them in daily work behavior reflects the employees' adherence to, and completion of, formal job tasks described as in-role behavior (Katz, 1964; Lings & Greenley, 2010). In particular, IMO is reported to positively impact employees' adherence to, and fulfillment of, certain market oriented directives (Harris & Piercy, 1999; Harris, 2002; Lings & Greenley, 2005). Nevertheless, empirical evidence to reinforce these assumptions is still lacking to date and the influence of IMO upon organizations continues to be a significant area of study (Gounaris, 2006; Sulaiman *et al*., 2013).

Literature has also stressed firms' requirement of enacting IMO for their successful implementation of market orientation (Ahmed *et al.*, 2003; Conduit & Mavondo, 2001; Gronroos, 1983; Kaur, Sharma & Seli, 2009; McGrath, 2009; Piercy, 1995). The successful implementation of a market orientation needs all employees to produce information concerning external market, relay this information to the right people and react in a suitable manner. If an organization has already established an effective response to the internal market and improves values for employees, they are more inclined to enact their in-role behavior as well as employ market-oriented behaviors like obtaining customer feedback and relaying it to management. This employee's role is a significant source of market research information that is well-acknowledged (Ballantyne, 2003; Gray, 2010). Moreover, IMO has the potential to involve employees who are well-enlightened of the firm's strategic objectives and who are equipped with accurate response to customer requests (Kaur, Sharma & Seli, 2009; Rafiq & Ahmed, 1993; Wasmer & Brunner, 1991).

Although IMO's standard definition has not been agreed upon (Ahmed & Rafiq, 1995; Kaur, Sharma & Seli, 2009; Rafiq & Ahmed, 2000), Hogg and Carter (2000) maintained that internal marketing is a crucial part of the aggregate internal marketing orientation that involves the employment of marketing methods within the firm to create and carry out corporate values. IMO measurement hence entails the assessment of the level to which this internal marketing function has been achieved successfully.

Prior studies on market orientation proposed measurement scales of internal market orientation (e.g., Ahmed *et al*., 2003; Gounaris, 2006; Gounaris, 2008; Gray, 2010; Lings & Greenley, 2005; 2010; Tansuhaj *et al*., 1987; Tortosa *et al*., 2009) in an attempt to conduct an analysis of the potential impact of internal marketing on the variables of business performance such as customer satisfaction or relative competitive position. Internal market orientation (IMO) was defined by Tortosa, Moliner and Sanchez (2009) as a multidimensional concept which is developed via four elements namely unofficial generation of internal information, official generation of internal information, dissemination of internal information and reaction to the generated internal information. Meanwhile, Gray (2010) defined it as the attempt at realizing business success as it offers a platform for both employees and customers to operate.

Lings and Greenley's (2005) proposed scale of measurement has recently been employed in other studies (Gounaris, 2006) as it covers more than the enumeration of human resource management activities (i.e. the selection, training, and development, incentive systems or empowerment) displayed by other constructs in an attempt to reflect internal marketing (Ahmed *et al*., 2003; Foreman & Money, 1995; Tansuhaj *et al*., 1987). In particular, Lings and Greenley (2005) adopted market orientation of Kohli and Jaworski (1990) and identified the following five scale components:

1. The informal production of internal information that is not management-planned;
2. The formal production of internal written information with the help of questionnaire, surveys, among others;
3. The formal face-to-face production of internal information with the help of interviews and meetings that are management-planned;
4. The management dissemination of internal information to their employees; and

5. The design and employment of management's reaction according to the internal information produced and disseminated.

2.4.3 Dimensionality of IMO

The consistent categorization of managerial behaviors with the current marketing thinking/market orientation (Kohli & Jaworski, 1990) enables the perspective of internal market orientation to be considered as internal reflection of the market orientation in its external counterpart. The customer intelligence generation for the development of the strategic and tactical decisions of the firm has traditionally been conducted by the marketing section of the firm. However, the generation of intelligence is not only confined to the marketing function's responsibility. In the context of highly technical companies, engineers as well as scientists often have accurate ideas regarding the trends of preferences of customers that they can obtain from scientific journals, conferences, and even with their interactions among their peers. Customer intelligence may also be developed by the sales representatives and front-line personnel with their direct interaction with the customers

In addition, production may also deal directly with customers when they deal with complaints or inquiries concerning processed products or previously bought products. Accordingly, IMO entails the production and dissemination of intelligence concerning the employees' wants and needs, and the design and employment of suitable responses to satisfy these wants and needs. The IMO behavioral dimensions are provided in detail in the following sub-sections.

2.4.3.1 Internal Information Generation

Several researchers have identified the need to produce information concerning internal market (e.g., Briscoe 1980; Berry 1981; Cobb, Samuels, & Sexton 1998; Gomez-Mejia 1988; Huseman & Hatfield 1990; Johlke & Duhan, 2000; Stauss & Schultze 1990; Tortosa, Moliner & Sanchez, 2009). Prior studies dedicated to this area concentrated on the following attempts: (1) to identify the kind of information to be generated; and (2) to identify the way information can be generated.

Management need to produce information concerning issues of value that are interchanged within the internal market is often acknowledged (Ewing & Caruana 1999; Kaur, Sharma & Seli, 2009; McDonald, de Chernatony, & Harris 2001). This entails the identification of the advantages that team members look for in their responsibilities, what they are ready to sacrifice to obtain these benefits and what competitors are proposing in terms of substitution employment. This information may be utilized to make jobs more appealing towards potential and current employee compared to competitor's job offering (Berry 1981; Huseman & Hatfield 1990; Kaur, Sharma & Seli, 2009; Stauss & Schultze 1990).

Production of information within the internal market is concentrated in three primary tasks: to determine the perception of employees regarding their job inputs, to determine the perceptions of employees regarding their outputs or what they receive, and finally, to determine the perceptions of employees regarding the equity of this exchange (Huseman & Hatfield, 1990; McGrath, 2009).

Competitor intelligence akin to customer intelligence exists in different types that stem broth external sources as well as internal ones. Hence, these sources determination is important. Traditionally, competitive intelligence is generally built on assessing the goals, financial outcome and success of the competitor's as well as their failures, assumptions of the industry and of themselves (Porter, 1980). This type of intelligence may also be generated throughout different firm functions specifically in firms that have facilities of production that are characterized by technological complexity, where scientists or engineers are the sources of valuable competitive intelligence. With the right technique, technological experts can identify the potential next-generation products and technologies. They also have to understand the significance of this intelligence to the overall firm.

Three methods of generating information are documented in literature on the basis of various interactions between managers and employees in the front line. They are formal written information generation, formal face-to-face information generation, and informal face-to-face information generation. Formal written information generation appears in two methods with the use of written media as with the case of job satisfaction surveys and questionnaires, formal face-to-face interactions like interviews, appraisals as well as meetings (Cobb *et al*., 1998; McGrath, 2009). Similar with the external market research case, both methods of information gathering complement each other with questionnaires and surveys that allow the degree of anonymity of respondent and face-to-face interviews that allows a higher level of evaluation of unexplained employees' concern. Managers' close physical proximity to their front-line staff provides an opportunity for information daily.

Despite the conceptualization of Johlke and Duhan (2000) of the informal and formal communications into the two extremes in a continuum, in an internal market, it is more plausible that formal and informal communications and in turn, formal and information generation concerning the wants and needs of employees, take place independently and concurrently. In these situations, maximizing the use of formal surveys and focus groups does not always translate to reduction of informal daily, face-to-face interactions between front-line employees and management.

2.4.3.2 Internal Communications

Communication refers to the method by which firms relay information from a department to the next (Johlke *et al*., 2000; Hsu, Shih, Chiang, & Liu, 2012; Tortosa, *et al*., 2009). As a result, it affects the front-line staff's performance. Dissemination of information is a crucial requirement for aligning the attitudes and behaviors of employees with the goals of the organization (Boswell & Boudreau, 2001; Guest & Conway, 2002; Kaur, Sharma & Seli, 2009). Communication is the core to an effective IMO culture. When people refuse to communicate among each other, there will be absence of inter-departmental, inter-functional and inter-coordination. Therefore, internal communication is the key element of the process (Gronroos, 1990; Hsu, Shih, Chiang, & Liu, 2012). The relationship between employees and management facilitates opportunities for this communication type, and opens up opportunities for the collection of information concerning the employee's wants and needs, as previously explained, and also for information dissemination. The communication process is also crucial in encouraging organizational identification (Smidts, Pruyn, & van Riel, 2001) and subordinate job results (Keller, 1994). Specifically, bidirectional informal communication between management and staff positively impacts front-line staff (Johlke & Duhan, 2001). This is certainly significant in IMO as the close proximity of employee and management indicates that bidirectional communication makes up an integral portion of behavior in the workplace. Information dissemination is hence, brought forward as the next dimension of internal market orientation (IMO).

Literature is rife with models dedicated to explaining organizational communication climate (Falcione *et al*., 1987). O'Reilly and Roberts's (1976) worked to determine the aspects of accuracy and openness. In an environment where members of the organization are inclined and able to communicate the frequency of information exchange is maximized. In an open environment, people readily provide suggestions without having to worry about being taken seriously. Criticisms are expressed freely and hence more likely to result in enhancements. The accuracy level regarding information flow through an organization is imperative as it not only helps steer clear of mistakes but also develops among the many organizational members. On the other hand, ineffective communication prevents market-oriented activities and it results in conflict due to misunderstandings, erroneous strategies and feelings of frustration (Etgar, 1979).

As evident from the preceding section's discussion, intelligence may already be residing internal to the organization. Even so, this intelligence is valueless unless it is disseminated to the concerned decision-maker(s). Hence, the systematic dissemination of intelligence is significant and it may be challenging for many reasons. One of the reasons is that employees may not be aware of the value of the information they are privy to as they lack the training to generate and assess intelligence systematically. Intelligence from employees is often a part of a larger puzzle which makes it challenging to determine what and when to report.

The competitive intelligence dissemination is basically akin to dissemination of customer intelligence and its reception by the relevant executive at the right time is equally imperative. Therefore, the effective dissemination of both customer and competitive intelligence calls for awareness of the organization of the content of relevant intelligence, the formal and informal means of actual dissemination, and the incentives to intelligence-sharing.

2.4.3.3 Responsiveness to the Internal Market

IMO's fifth dimension mentioned in literature entails reacting to the information produced concerning the employee's wants and needs. In marketing literature, among the top widely recommended uses for IMO information is the creation of job products that meet the needs of employees and satisfy and motivate them (Berry & Parasuraman, 1991; Gray, 2010; Sasser & Arbeit 1976; Stauss & Schultze 1990). According to Sasser and Arbeit (1976), employees generally exchange time, energy and values for the firm's money and this is analogous to an external market exchange wherein customers primarily provide cash to obtain goods or services. On the basis of prior market orientation literature, action taken is catered to gather favorable customer reaction (Kohli & Jaworski, 1990). For the maximization of customer value and response, firms may either minimize their customers' perceived costs in relation to the benefits or they may maximize the benefits in relation to costs (Zeithaml, 1988).

Kohli and Jaworski (1990) argued that by modifying internal product offerings with such things as flexible work hours, benefits and salaries, managers are able to facilitate internal exchange. This was also contended by Tansuhaj, Wong and McCullough (1987), who claimed that important attributes of the job include incentives, salaries and allowances and Huseman and Hatfield (1990) who suggested that reduce perceptible social benefits are crucial in the internal exchange. They included status, recognition for exception work and a sense of achievement. As a result, developing jobs to satisfy the employees' needs entails the consideration of their financial as well as social wants and needs.

Literature dedicated to HRM highlights various reactions to internal market research information. Specifically, Gomez-Mejia (1988) stated that such collected data should be utilized to create suitable employee reward systems. In addition, Briscoe (1980) contended that there are four primary responses that firms may employ, namely, change the people, change the organization, change the interaction between team and organization and individualize the firm. These methods entails activities like the development of individualized reward systems, performance reviews, changing work hours, providing adaptable environment and training. These activities are covered under the umbrella of job design.

It appears that the most useful information into responding to informations in the internal market is provided by equity theory. The theory postulates that teamwork evaluation of their jobs is based on the comparison they put into their jobs (inputs) and the benefits they get out of it (outputs) (Huseman & Hatfield, 1990). Research of internal market highlights how satisfied staff become with what the benefits they get from their jobs. Where low satisfaction is shown to a specific output, management can re-design jobs to enhance these outputs or modify the employees' perceptions of them.

2.4.4 Antecedents and Consequences of Internal Market Orientation

Internal market oriented behaviors outcomes (external and internal) are evidently provided in literature. In the internal sense, it is well documented that management behavior towards subordinates impacts the latter's behaviors and attitudes (Ahmed & Rafiq, 2003). IMO is considered to affect employee behaviors with regards to their work satisfaction and encouragement to provide effective product to customers. Additionally, Tansuhaj *et al*. (1988), McGrath, 2009 and Comm (1989) claimed that internal market orientated attitudes on the management part results in maximized levels worker satisfaction and motivation and this forms the core of internal marketing, which is based on the notion that happy and motivated front-line employees are crucial in good service delivery to customers (Abdul-Talib & Abd-Razak, in press; Berry 1984; Berry & Parasuraman, 1991; Gounaris, 2008; Gray, 2010; Sasser & Arbeit, 1976; Tortosa *et al*., 2009).

Moreover, literature of human resource considers the managerial consideration concept to be closely related to IMO. Managerial consideration refers to the level to which managers enhance a workplace equipped with psychological support, friendliness, mutual trust, helpfulness, and respect (Johnston *et al*., 1990). Managers are the basic conduit between the staff and the organization (Katz & Kahn 1978), and considerate management attitude encourages the employees' identification with the organization and minimizes the latter's dysfunctional attitudes (Ramaswami, 1996). As a result, employees are more inclined to adhere to organizational strategies that aim at creating customer satisfaction (Piercy & Morgan, 1990). It is also claimed that staff retention and their intentions to leave are the IMO outcome as employees who are motivated and satisfied will not likely look for other employment (Kaur, Sharma & Seli, 2009; Ozment & Keller, 1999; Taylor & Cosenza, 1998).

In the external context, significant degrees worker satisfaction and retention are believed to affect both satisfaction and loyalty of customers. Despite the fact that the employee satisfaction and customer satisfaction relationship has been focused on for more than twenty years (e.g., George, 1977) and is widely accepted, it is still a controversial issue (Piercy, 1995; Rafiq & Ahmed, 1993) as only few studies explored the accurate nature of their relationship. Although there is lack of evidence, majority of researchers who work under the premise believe both employee and customer satisfaction are positively and significantly related (Bansal, Mendelson, & Sharma, 2001; Gounaris, 2008; Gray, 2010). To create employee satisfaction, IMO comprises a core competency of the firm that creates a potential competitive edge through loyal and satisfied customers and this consequently results in maximized market share and profits in comparison to its counterparts (Greene *et al*., 1994; Tortosa, Moliner & Sanchez, 2009).

The internal market orientation is the debate about the relationship between market orientation and business successful. Following the development of comprehensive definitions and valid and reliable operationalization of MO, many research attention has concentrated on examining the antecedents and consequences of MO (see Jaworski & Kohli, 1996). Theoretical and empirical studies in the United States include those of Baker and Sinkula (1999a); Day and Wensley (1988); Deshpandé, Farley, and Webster (1993); Jaworski and Kohli (1993); Kohli and Jaworski (1990); Narver and Slater (1990); Noble, Sinha, and Kumar (2002); Pelham and Wilson (1996); Pelham (1997a, 1997b); Ruekert (1992); Slater and Narver (1994); Siguaw, Simpson, and Baker (1998); and Steinman, Deshpandé, and Farley (2000). International MO studies include those from continental Europe (Hooley *et al*., 2003; Pitt, Caruana, & Berthon 1996), the United Kingdom (Appiah-Adu, 1997; Appiah-Adu & Ranchhod, 1998; Greenley 1995), Australia (Atuahene-Gima, 1995, 1996; Farrelly & Pascale, 2003; Pulendran, Speed, & Widing, 2003), New Zealand (Gray e*t al*., 1998; Matear *et al*., 2002), the Netherlands (Langerak, 2001), Taiwan (Chang & Chen, 1998; Horng & Chen, 1998), Thailand (Grewal & Tansuhaj, 2001), China and Hong Kong (Sin *et al*., 2003, 2005; Wei & Morgan, 2004), and Saudi Arabia (Bhuian, 1997). More recently, nonprofit organizations (Gainer & Padanyi, 2002; Siu & Wilson, 1998; Vazquez, Alvarez, & Santos, 2002), public organizations (Cervera, Molla, & Sanchez, 2001), and political parties (Lees-Marshment 2001; O’Cass 2001a, 2001b) have also been a focus of IMO research.

The existing experiential evidence regarding the effects of IMO on performance is mixed. Some previous studies have linked IMO to appropriate performance (e.g., Appiah-Adu 1997; Atuahene-Gima, 1995, 1996; Aziz & Yassin, 2010; Egeren & O’Conner, 1998; Homburg & Pflesser, 2000; Homburg & Pflesser, 2000; Jaworski & Kohli, 1993; Jaworski & Kohli, 1993; Mahmoud, 2011; Narver & Slater, 1990; Ruekert, 1992; Pitt, Caruana, & Berthon, 1996; Slater & Narver, 1994, 2000; Wei & Morgan, 2004; Zhou, Le, & Su, 2008,). Some studies have linked IMO to unfavorable performance (e.g., Bhuian, 1997; Gray *et al*., 1998; Grewal & Tansuhaj, 2001). Still others have found that IMO has no effect on firm performance (e.g., Greenley, 1995; Han, Kim, & Sirvastava, 1998; Langerak, Hultink, & Robben, 2004; Perry & Shao, 2002; Siguaw, Simpson, & Baker, 1998). The relationship between IMO and performance is surprisingly more complex than has been previously thought. The following section briefly reviews the most influential studies about the relationship between IMO and firm performance published in the *Journal of Marketing* and *Journal of Marketing Research*.

Narver and Slater (1990) used a sample of 140 business units (both commodity and non-commodity) to study the MO–firm performance relationship. They used subjective return on assets (ROA) to measure firm performance. Result showed a substantial positive effect of IMO on the profitability of both types of business. Kohli and Jaworski (1993) used two national samples to study the antecedents and consequences. Their findings suggested that IMO was related to top management’s emphasis on the orientation, risk reluctance of top leaders, interdepartmental discrepancy and interconnection, centralization, and reward system orientation. It was also positively linked to organizational commitment, esprit de corps, and overall business subjective performance. But IMO was not positively related to objective market share.

Slater and Narver (1994) investigated the moderating role of the competitive environment in the IMO–firm performance relationship. They demonstrated that IMO was positively related to subjective ROA, sales outgrowth, and successful of new product, and suggested that it is better for companies to invest in becoming market oriented while the environment is comparatively generous than to wait until the environment has grown hostile. Along the same line, Homburg and Pflesser (2000) created a multilayer scale for the measurement of various layers of market-oriented organizational culture. They carried out an analysis of relationships among the varying components of market-oriented culture. The findings revealed a positive impact of market-oriented culture upon the subjective market performance and more significant relationships in increasingly dynamic markets.

Matsuno and Mentzer (2000), and Grinstein (2008) empirically examined the role of business types as a moderator in the IMO–firm performance relationship. The findings supported the moderating effect of business strategy types on the intensity of the relationship between IMO and business performance. They measured business performance by subjective market-share growth, relative sales outgrowth, new product sales as a compared with total sales, and return on investment (ROI).

Grewal and Tansuhaj (2001) investigated the role of IMO and strategic flexibility in helping Thai firms manage the Asian economic crises. They found that after the crisis, market orientation had an adverse impact on orginazation performance, which they measured by subjective satisfaction with the goals of ROI, sales, profits, and growth. Demand and technological uncertainty moderated the IMO–performance relationship. In contrast, strategic flexibility had a positive impact on organization performance after the crisis, which was also moderated by environmental variables, including competitive intensity, demand, and technological uncertainty. Therefore, IMO and strategic flexibility complement each other in their ability to help firms manage various environmental conditions.

Matsuno, Mentzer, and Özsomer (2002) studied the different structural influences of entrepreneurial proclivity and IMO on business performance. They demonstrated that entrepreneurial proclivity not only had a positive, direct relationship with IMO but also had an indirect positive effect on IMO by reducing departmentalization. Entrepreneurial proclivity's performance influence was positive when mediated by IMO but was negative or insignificant when unmediated by IMO.

Noble, Sinha, and Kumar (2002) explored the relative performance effects of IMO by using a longitudinal approach based on letters to shareholders in corporate annual reports. At the same time, the relative effects of alternative strategic orientations, such as production and selling orientation, reflected different managerial priorities for the firm. The findings suggested that competition orientation and national brand focus were positively related to objective ROA and return on sales (ROS).

The unclear relationship between IMO and performance has led many scholars to search for potential mediators and moderators in order to explain the unstable relationship.

2.4.5 Implementation of Internal Market Orientation

This section addresses how to implement or configure internal market orientation in complex management practices. Theoretically, firms should implement IMO to fit with the external and internal environments in order to achieve superior firm performance. Fit between the marketing strategy and external environment means that firms should design the marketing strategy or a set of marketing activities to match with the general, industry, and firm environments (e.g., Appiah-Adu 1997; Cadogan, Diamantopoulos, & Siguaw, 2002; De Luca *et al*., 2010; Jaworski & Kohli, 1993; Lukas & Ferrell, 2000; Pelham 1997b; Perry & Shao, 2002; Zhou, 2006).

Fit between MO and internal environment means that marketing strategy and market activities should be congruent with business strategy (e.g., Mavondo 1999); corporate strategy type (Matsuno & Mentzer, 2000; Noble, Sinha, & Kumar, 2002); organizational strategy (Ruekert, 1992); strategy flexibility (Grewal & Tansuhaj, 2001); strategy formulation (Arnould & Wallendorf, 1994); marketing strategy process (Tadepalli & Avila, 1999); implementation strategies (Cravens, 1998); market and firm structure (Pelham & Wilson, 1996); and functional strategies, such as human resource management strategy (Harris & Ogbonna, 2001), technology strategy, administration strategy, manufacture strategy, and distribution channel (Baker, Simpson, & Siguaw, 1999; Langerak, 2001; Siguaw, Simpson, & Baker, 1998).

2.4.6 Internal Market Orientation and Employees

Internal marketing employs a marketing perspective to human resource management (Gounaris, 2008; Geourge & Gronroos, 1991). This perspective has its basis on the premise of considering jobs in organizations as internal products and employees as internal customers (Sasser & Arbeit, 1976). This enables organizations to manage the employee-management exchange by changing the present marketing tools and methods to the firm's internal environment (Green *et al*., 1994). This has resulted in operationalizations of internal marketing that directly presents those in external marketing.

According to recent research in the area of internal marketing, internal market orientation is a more suitable operationalization of marketing compared to marketing mix (Kohli & Jaworski, 1990). Moreover, market orientation has been reported to be robust in various contexts (Gounaris, 2008; Cadogan, Diamantopoulos, & de Mortanges, 1999; Vorhies *et al*., 1999; Wrenn, LaTour, & Calder, 1994). In internal marketing operationalization, we propose that market orientation to be modified into the employer-employee exchanges context in the internal market after which an internal market orientation (IMO) can be developed. The IMO development is expected to positively influence the firm and its employees and similarly the external market orientation is expected to positively influence the firm and its external customers.

Internal market orientation has been shown to be related to the attitudes and behaviors of employees (Jaworski & Kohli, 1993; Jones *et al*., 2003; Piercy, Harris, & Lane, 2002; Ruekert, 1992; Siguaw *et al*., 1994). Although there is solid proof to suggest that employee behiviors and attitudes may impact internal market orientation, the causal direction of this relationship remains unspecified. Many researchers argued that market orientation has positive consequences on employee behaviors such as job satisfaction, organizational adherence, and role tensity (Jaworski & Kohli, 1993; Jones *et al*., 2003; Ruekert, 1992; Siguaw *et al*., 1994; Piercy *et al*., 2002;). However, others argued that effective market oriented activities require the participation of employees at all levels and in all functions of the firm (Gummesson, 1991; Gounaris, 2008; Harris, 1998; Harris & Ogbonna, 2000; Kelley, 1992; Martin *et al*., 1998).

A firm cannot develop a market orientation if it is lacking employees' active understanding, inclination and ability to involve in market oriented-behavior (Schlosser and McNaughton, 2007). In order to engage employees in the adoption of market orientation, their understanding of the firm's strategic objectives, adopting the directives within their work roles, and performing in a market-oriented way are all required (Harris, 2003). Because of the market orientation's organization-wide nature, where all employees act in a marketing capacity to produce and spread information and react in a customer-focused way, it is possible that employees adopting market orientation in their roles will be more likely to carry out positive behaviors and act in the firm's best interests. This indicates that the more they display in-role behaviors aligned with organizational strategic directives, the greater will be the market orientation level in the firm.

2.4.7 Internal Market Orientation and NPD Cycle Time

Being the first company to present the market with new innovative products has become an increasingly high priority for most businesses in technological driven industries. To achieve a better position in the market and better business performance, companies take great strides in their attempt to be more successful. In doing so, they understand it is imperative to meet the needs of their consumers (Osuagwa, 2006). They also realize that they must achieve this goal faster than their competitors. Determining whether to introduce to the market moderately modified products or to introduce new inventive products is based upon the desires of the consumer and the strategies of their contenders.

It has been advocated that the unequivocal way to achieve competitive advantage over the opponent is by speeding up the new product development process (Buganza & Verganti, 2006; Karagozoglu & Brown, 1993; Langerak *et al*., 2008; Lynn *et al*., 1999; McGrath, 2009; Mokhtar *et al*., 2009; Parry *et al*., 2009). On the other hand, others argued that the association between performance and cycle time is nott as resilient as other researchers have indicated (Cooper, 1995; Griffin, 1997; Ittner & Larcker, 1997; McGrath, 2009). Take Cooper (1995) for example. He concluded that being timely was not significantly associated with sales or market shares. He alleged it was associated with profitability, however, to a moderate degree. Both Inner and Larcker (1997) agreed that higher sales, returns, growth, as well as the overall performance cannot be achieved by faster development cycles solely. Griffin (1997) stated that firms following the best practices do not develop new products faster than other ordinary firms.

On the contrary, continually trying to find ways to decrease the cycle time is one of the highest priorities for most senior managers. Inspired by the study of Griffin (1997), 50% of firms have already managed to find ways to reduce their cycle time in manufacturing diverse novel merchandise. Since 1990, developmental phases have dropped nearly 15 to 20% (Griffin, 1997). Scott (2000) predicted greater percentages of reduction in years to come. Success factors that aid the steadily declining cycle time include increased competitive pressures, market demand, rapid technological changes, shorter product life cycles, and a need to meet the company's growth objectives. Growth objectives include goals such as ensuring that a greater percentage of products being introduced are fresh, new, idealistic merchandise (Gupta & Wilemon, 1990; Johnson & Luo, 2008; Langerak *et al*., 2008; Mohd Mokhtar, & Yusoff, 2007; Parry *et al*., 2009). In sum, external and internal pressure to perform faster, motivation, and the knowledge that time is money, are all vital factors that have enhanced the development process (Kessler and Chakrabarti, 1996).

Literature concerning product development stresses on the significance of market orientation. Cooper (1979) concluded that a strong market orientation has a great influence on the separation of successful versus unsuccessful industrial products.

Many product development studies view market orientation as the engine behind product development performance and among the controllable factors that impact new product success (Atuahene-Gima, 1995; Barclay, 1992; Carbonell & Rodriguez, 2006; Cooper, 1983; Cooper & Kleinschmidt, 1993; Cooper & Kleinschmidt, 1994; Cooper & Kleinschmidt, 1995; Li & Calantone, 1998; McGrath, 2009; Montoya-Weiss & Calantone, 1994; Mohd Mokhtar, & Yusoff, 2007; Sulaiman *et al*., 2013; Swink & Song, 2007; Wren *et al*., 2000). In addition, in their meta-analysis, Montoya-Weiss and Calantone (1994) concluded that majority of studies stated that factors linked to market orientation primarily determines new product performance. These factors may be a part of market orientation like proficiency to pre-develop activities, marketing activities and protocol or they may be the result of market orientation (e.g., product advantage).

Despite the acknowledgement of both marketing and product development literature of the significance of internal market orientation, studies concerning the conceptualization, ideation and operationalization of internal market orientation in the managerial context of crucial processes (e.g., process of product development) are few and far between (Brown *et al*., 2002; Barclay, 1992; Day, 1994b; Gounaris, 2005, 2006; Kennedy *et al*., 2002; Lings, 2004; Lings & Greenley, 2010; Poolton & Barclay, 1998). Studies regarding the concerned topic are important because the ideation, conceptualization and operationalization of market orientation at the level of crucial processes will lead to the stimulation of academic research upon the implementation and enhancement of market orientation. Moreover, because managers are not aware of what to change, they perceive a dearth of guidelines regarding the enforcement of internal market orientation in their orginasations. According to some arguments, their ignorance of the guidelines lies in the lack of provision of the same in academic research (Day, 1994; Kahn & Mentzer, 1994; Narver *et al*., 1998; Ruekert, 1992).

The pervious research concentrates on new product development to become market-oriented for two reasons. It can be concluded from the studies above that adopting market orientation in product development can be highly critical for new product success (Biemans & Harmsen, 1995; Carbonell & Rodriguez, 2006). The new product development is among the most critical business processes. New products are the driver behind the organization which ensures future sales and development. Hence, the question arises of what product development looks like in the context of a market oriented organization. An internal market orientation should be created by considering that innovativeness and innovations (product and administrative) are the drivers behind organizational performance in an attempt to achieve competitive advantage (Han *et al*., 1998; Hurley & Hult, 1998).

Second, authors claim that product development can be utilized as an initiation of the transformation of the organization into a market-oriented organization (Barabba, 1995; Day, 1994; Deschamps & Nayak, 1995) where it aims at developing customer value. To achieve market orientation, specific values, functional structures and processes need to be modified. In other words, product development is the main process for the creation of customer value through superior product owing to its inter-functional nature which is linked to many other critical business processes.

2.5 Environmental Moderator

Research concerning moderators of the market orientation-new product development has primarily concentrated on the moderating role of environmental conditions (Aziz & Yassin, 2010; Lichtenthaler, 2009; Schweitzer & Gaubinger, 2011; Subramaniam

& Gopalakrishnan, 2001). Three widely acknowledged factors that comprise environmental conditions are market turbulence, technological turbulence and competitive intensity (e.g., Aziz & Yassin, 2010; Caldart & Ricart, 2006; Jaworski & Kohli, 1993; Lichtenthaler, 2009; Ottesen & Gronhaug, 2004; Quiantana & Benavides, 2008; March,1991; Shoham *et al*., 2005; Schweitzer & Gaubinger, 2011). Previous studies showed that environmental conditions influence the internal market orientation and performance link (Kirca, Jayachandra, & Bearden, 2005). These three environmental factors have an important roles in determining the strategic orientation of a firm within the high tech division (Buganza *et al*., 2009; Calantone *et al*., 2003, Brown & Eisenhardt, 1997; Su *et al*., 2010). This study concentrate on effect of technological turbulence, competition turbulence, as well as market turbulence.

2.5.1 Technological Turbulence

According to Mason (2007), environment turbulence stems from the changes in and interaction between different environmental factors, particularly owing to the technological advances and the convergence of the computer, media industries and telecommunications (p. 11). The initial environmental factor that was theorized as a moderator in the responsive MO-new product cycle time relationship is technological turbulence. Technological turbulence refers to the level the rate of change that the product and process technologies undergo to make inputs into outputs (Jaworski & Kohli, 1993; Kohli & Jaworski, 1990; Su *et al*., 2012). Moorman and Miner (1997) confined their definition to change related to new product technologies. Changes characterizing technology lead to various windows of opportunity (Danneels & Sethi, 2011; Melville, 1987).

Literature dedicated to studying the role of technological turbulence in new product development performance is still limited. Extant literature of the subject tends to be focused only on the direct impact. For instance, in the context of China, Zhou (2006) reported that both technological turbulence and demand uncertainty (market turbulence) failed to influence new product development performance over innovative products versus imitation products. However, this is not surprising as all the companies in the industry exist in the same environment. It appears logical to claim that it is the utilization of environmental turbulence in monitoring technological turbulence that would influence the performance of new product development. The relationship between NPD and technological turbulence investigated and revealed that a significant level of technological turbulence may improve NPD in companies attempting to keep abreast of changes, as their employees' diverse knowledge and skills increase the potential of exploring new opportunities (Acur *et al.*, 2010; Moorman & Miner, 1997; Su, Peng, Shen, & Xiao, 2012).

In a more turbulent environment, organizations are provided with alternative ways to obtain a competitive advantage through technological advances and this lessens the importance of a new product development cycle time. First, attempting to satisfy current customer needs may fall into a trap which bars the consideration of alternative ways that are not so attractive and gratifying (Ahuja & Lampert, 2001; Atuahene-Gima *et al.*, 2005; Danneels, 2007). Consequently, the avenue to comprehend customer needs or resolve customer issues through the provision of highly optimal solution is eliminated. Contrarily, organizations working with stable technologies are in a poor position to impact technology and achieve success and hence their product revolution must highly depend on NPD cycle time. Veering off from a trap indicates ease of learning and problem solving when it comes to serving the needs of existing market domains. Environments characterized by less levels of technological turbulence are unlikely to tamper down their experience-based positive effects of responsive MO of new product performance. In other words, in a highly technological environment, the effective relationship between responsive IMO and new product success may be fragile (Acur *et al*., 2010; Danneels, 2007).

Some studies examined the relationship between technological turbulence and market orientation, a similar issue to what is examined in the present study. Market orientation in fact is the knowledge of customers and market conditions which entails gathering of information. The relationship between the two is such that technological turbulence can be a moderator in the market orientation-performance relationship (Appiah-Adu, 1997; García-Zamora *et al*., 2013; Jaworski & Kohli, 1993). Even though export market orientation is crucial in situations when characterized by high-technological turbulence (Cadogan *et al*., 2003). But Lin and Germain (2004) found an insignificant association between technological turbulence and the level of customer orientation in the context of the U.S. and China.

A proactive IMO concentrates on the examination of new and diverse data challenging current knowledge and experience. It is characterized by exploratory learning behavior which includes discovering a realm of knowledge that is formerly unexplored which is positively related to new breakthrough NPD advances (March, 1991; Ahuja & Lampert, 2001). Innovation researches conducted imply that finding knowledge and breaking away from the status quo is important to developing product advancements (Bonner & Walker, 2004; Bower & Christensen, 1995; Chandy & Tellis, 2000; Handerson & Clark, 1990). Those who achieve far-reaching innovations along with unique advantages are generally firms possessing a high level of proactive IMO.

A rapidly changing technological environment may ease the negative impacts allied with proactive IMO toward new product development. Hence, revolutionary opportunities will continue to take form. Through the penetration of a confined number of ideas and new technological ideas, along with a slowly changing technological period, proactive market-oriented organizations may only improve their product advances. On the other hand, proactive IMO may be harmful to new product success owing to the uncertainty and inefficiency related with it (Atuahene-Gima *et al*., 2005; Danneels & Sethi, 2011; Ulwick, 2002).

Some research works have examined the way technological turbulence impacts the strategy formulation of the firm and its strategy implementation. This includes its intention to remain in a joint alliance, maximized information sharing and communication and including customers in the process of NPD (e.g., Auh & Menguc, 2005; Jeong *et al*., 2006; Lin & Germain, 2004; Morgan, 1999). Studies have also examined how firms use economic system (ES) to monitor technological turbulence (e.g., Borjesson *et al*., 2006; Halal *et al*., 1998). Nevertheless, research examining whether or not the perceptions of technological turbulence boosts extensive ES use is still ambiguous. Moreover, according to Suh *et al*. (2004), the findings of the examination of the association between strategic uncertainty and ES behavior have been inconsistent and this calls for additional uncertainty measurement. However, a consensus is reached concerning the fact that management that operates in uncertain environments would be inclined to extensively use scanning. This is because companies require information for strategic decision making and maintaining information concerning technological advancements is crucial to promote competition in many industries (SubbaNarismha *et al*., 2003).

2.5.2 Competition Turbulence

The second environmental factor claimed to moderate the relationship amongst teamwork quality and the new product cycle time is competition turbulence. The competitive capabilities are important success factors that have to be considered and developed functionally to maintain the consistency between a business unit's strategic behavior and environmental turbulence. Developing success factor capabilities should counteract the development of other capabilities as trade-offs arise owing to limited resources and a budget appropriated for capabilities development (Augusto & Coelho, 2009; Gaur, Vasudevan, & Gaur, 2011; Kumar *et al*., 2011; Porter, 1980; Weerawardena & O'Cass, 2004).

A basic question in competitive and operations management is how firms manage to achieve and maintain competitive advantage. It can be argued that critical success factors drive competitive advantage as the consistency between critical success factors and firm capabilities are commonly acknowledged to enhance the performance of the firm (Jaiyeoba, 2013; Sabherwal & Kirs, 1994). Prior research works suggest that organizations fit their capabilities to their critical success factors (e.g., Boynton & Zmud, 1984; Leidecker & Bruno, 1984). However, these research works failed to shed light into the importance of the match between external environment and critical success factors. When there is a lack of competitive turbulent, customers have constricted another resources to satisfy their necessities and desires, therefore, the need for high internal market orientation (both responsive and proactive IMO). A firm with highly responsive IMO can make its customers remain loyal to its services and products. This is due to the fact that highly responsive internal market orientation can increase a firm's specialized competence in meeting customer expectations and needs. The positive influence of responsive IMO on new services and products performance should not be downcast if it falls into a familiarity trap combined with responsive internal market orientation (Augusto & Coelho, 2009; Kumar *et al*., 2011; Slater & Narver, 1994; Tortosa, Moliner & Sanchez, 2009).

On the contrary, customers can satisfy their wants and needs through various different resources under highly viable conditions. When it comes to being faced with aggressive competitors, a quick reaction to the voiced customer needs is more likely to become more of a priority to firms (Appiah-Adu, 1998; Chen *et al*., 2010; Harris, 2001; Jaworski & Kohli, 1993; Kumar *et al*., 2011; Lenox *et al*., 2007; Slater & Narver, 1994). This hazard often goes hand in hand with highly responsive IMO. Highly responsive IMO organisations may be unable to differentiate themselves from their competitors on new product developments. This is namely due to consumer's minor interest in new technology, knowledge and alternative development advices. A firm of this sort may fare poorly, in turn, losing customers to the rivals. This is an example of a familiarity trap that may lessen the positive responsive MO effects on product performance (Chen *et al*., 2010; Harris, 2001; Jaworski & Kohli, 1993; Kumar *et al*., 2011; Lenox *et al*., 2007).

Moreover, highly proactive market-oriented firm can cause adverse effects. These effects can lead the consumer to high ambiguity, resulting in resistance of new product developments. Effectively combing diverse knowledge and closely working with prime users commonly results in dramatically ground-breaking product development (Chen *et al*., 2010; Bower & Christensen, 1995; Chandy & Tellis, 2000). This advance creates a higher product benefit in competitive business to business markets (Bonner & Walker, 2004). The benefits of proactive MO may largely contradict its disadvantages under highly competitive circumstances. This is due to the fact that the requirement of proactive MO is to be contingent on competitive intensity.

We believe that a highly competitive situation may abate the damaging effect of excessive proactive IMO on performance of new product.

2.5.3 Market Turbulence

Market turbulence is defined as the attractiveness of a target market, which reflects market characteristics such as size and growth (Song & Parry, 1997). Song and Parry also referred to market potential as the potential demand for the new product in the target market. Market turbulence indicates to the rate of changes in the customers' composition, their needs and their predilections (Hanvanich, Sivakumar, & Hult, 2006). Moreover, greater degrees of market turbulence indicate the inability to predict future customer needs accurately. A high level of market potential promotes a new product's potential sales, share, and profit by reducing market uncertainty (Cooper, 1979; Cooper & Kleinschmidt 1987; Lichtenthaler, 2009; Quiantana & Benavides, 2008). In general, market growth facilitates a firm's performance (Narver & Slater, 1990).

Brown and Eisenhardt (1995) supported a position that new products introduced into a substantial and potentially growing market are more likely to perform better. They categorized their samples into two: first, a low incidence of market turbulence, and, second, a relatively high incidence of market turbulence. They regressed business performance on market orientation and the control variables in the full sample while at the same time enabling regression coefficients to take different values within sub-groups. They employed the Chow test (1960) in their assessment of the statistical significance of the difference in regression coefficients of the market orientation variables throughout the two categories of sample.

In a related study, Menon, Jaworski, and Ajay (1997) investigated the moderating impact of market turbulence and technological turbulence on the departmental interactions-product quality relationship. They hypothesized that market turbulence would impact the interdepartmental connectedness/conflict and product quality relationship. They found that under high-market turbulence, organizations were required to monitor market shifts, and businesses operating under turbulent markets are more inclined to have higher need for positive interdepartmental interactions.

Gatignon and Xuereb (1997) examined the moderating effect of market turbulence on the relationship between market orientation and new product performance. They found a positive moderating effect of market potential, such that a stronger market orientation was required in a fast growing market to achieve the desired level of performance. Han *et al*. (1998) proposed the positive moderating effect of market growth on the link between market orientation and organizational creativity. They argued that in fast-growing market conditions, a firm with superior market intelligence and information tends to respond to market trends through organizational creativity, which in turn results in enhanced organizational performance. In addition, Song and Parry (1997) supported the view that high market potential strengthens the relationship between product differentiation and new product performance. Market potential is expected to have a positive moderating effect on the relationship between new product and marketing program creativity with new product performance since high levels of market potential helps creative ideas to be successfully implemented in the market.

Firms operating in a dynamic market environment are more likely to co-develop with external partners (either their suppliers or customers) in order to effectively perform (Fuller, Hutter, & Faullant, 2011). High market potential provides a strong demand for creative products and marketing programs. In a growing market, novel and meaningful ideas for new products and marketing programs have a greater potential to be successfully implemented in the market since they are more likely to satisfy customers' changing desires for novel and meaningful stimuli. Thus, efforts that fulfill the needs of customers are more likely to increase sales and be profitable in conditions of high market potential. In a growing market, a firm that tends to provide creative ideas for new products and marketing programs is more likely to respond to the changing needs of customers, thus enhancing new product performance (Carbonell, & Rodriguez, 2006; O'Cass, 2001b; Tortosa, Moliner & Sanchez, 2009).

2.5.4 Environmental Turbulence and Teamwork

In the past several years, telecommunication workers have been tackling changes in the environment (Garrett & McDaniel, 2001). Complex work environments call for worker flexibility in adapting various client needs and adapting to the environment particularly in telecommunication organizations. According to Bosco (2004), environmental turbulence (ET) refers to the individuals' interaction with their environment in reaction to instability and dynamic changes in their internal or external environment or both that are influenced by the individuals/groups or organization's attributes, and that has the potential to eventually influence patient and nursing outcomes.

A case that established the impact of environmental turbulence on individual teamwork took place in the 1980s when ET was integrated into healthcare environment as part of the restructuring of patient care delivery system that came with a decrease in hospital funding (Anderson & McDaniel, 1992; Green, Rockmore, &

Zimmerer, 1995; Sayler, 1995; Tillman, Sayler, Colyer, & Mark, 1997). Internal and external environmental factors in healthcare may be characterized by instantaneous and unpredictable changes that alter the patients, units and the resources' characteristics (e.g., equipment, money and number of nurses). The internal environment refers to the forces operating external to the organization to which it is susceptible to (i.e., regulatory groups, personal issues, customers, suppliers and market and resource competition). Some environmental issues that complicate nurses' work include missing information, lack of resources, missing medications and equipment, defective equipment, and lack of communication and team work ingrained in the culture.

Furthermore, the internal environment was revealed to influence job satisfaction, which in turn was related to patient outcomes. Specifically, emotional exhaustion, which is a component of burnout (Garrett & McDaniel, 2001) has been linked to unsafe work environments. This condition is often an outcome of long-term involvement in emotionally draining situations and the ineffective handling of long-term stress. Nurses that have been in profession for a long time were found to be more susceptible to burnout and were at a greater risk of quitting (Benner, 1984; Ebright *et al*., 2004; Foley, Kee, Minick, & Jennings, 2002).

The external environment may develop turbulence in the form of the creation of countless rules, unrealistic mandates, or decreasing reimbursement or the combination of all. This turbulence may adversely affect the internal environment, which in turn may develop changes in the external environment. Additionally, the internal environment may also change and thus create perceived environmental uncertainty and add to the turbulence (Aiken *et al*., 2002; Curtin, 1997; Fiesta, 1998; Garrett & McDaniel, 2001; Verran *et al*., 2001, 2003).

2.6 Theoretical Underpinnings

It has been hypothesized that teamwork quality affects the new product development cycle time which itself has been linked to better organizational performance. In this context, such connection between the variables shown in Figure 3.1 is best understood through a number of theories. The first theory upon which the framework is grounded is resource-based view founded by Wernerfelt (1984) and popularized by Barney (1991). The second theory is contingency theory, which explains the moderator variable in the framework. Based on this theory, it is proposed that performance is a condition to the relationship of an organization and its external environment (Duncan, 1972; Gresov, 1989; Weiss, 1993). The third one is internal market orientation theory founded by Lings and Greenley (2005), which explains the mediating influence of internal market orientation. The following section addresses these theories.

2.6.1 Resource - Based View Theory

Resource-based view (RBV) of business management focuses on how an organization can utilize assets and resources within the organization to gain a competitive advantage in the global market (Barney, 1991; Wernerfelt, 1984). This theory argues that organizations have multiple resources that allow for competitive advantage and many of those resources can sustain the organization in the long-term ultimately leading to advanced performance and sustainability (Barney, 1991). In many respects, RBV theory is akin to sustainability theory where a firm can use its resources to sustain long-term competitive advantage and growth.

RBV fits reasonably in the previous theoretical framework where the four antecedents of the teamwork factor, namely, communication, coordination, balance of member contribution, cohesion, effort and mutual support are viewed as the resources owned by the firm. In this context, a firm that utilizes these factors in a dynamic and intelligent way and more importantly in a way that responds accordingly to the market is more likely to perform better as this utilization will have an effect on the NPD cycle time through its direct effect on market orientation.

There is empirical evidence supporting resource-based view as noted by the consistent significant positive correlation between firms' resources and certain measures of firm performance (Newbert, 2007). Many researchers echo this sentiment believing that a firm's greatest strength lies in its ability to identify and utilize resources correctly in a way that promotes competitive advantage and long-term sustainability (Powell, 2001).

2.6.2 Contingency Theory

In contingency theory literature, most researchers conclude that performance is a condition to the relationship of an organization and its external environment (Duncan, 1972; Gresov, 1989; Weiss, 1993). Contingency theory dominates research in various disciplines focusing on the relationships among environment, strategy, organizational structure and performance. Generally speaking, the contingency perspective focuses on the need of flexible reactions at a strategic level. There are two basic assumptions that underlie the perspective: (i) there is no suitable strategy or structure, and (ii) a given strategy/structure will not possess the same effectiveness under various environment or firm-specific conditions (Galbraith, 1973). Hence, it is the fit among the environment, strategy, and structure that is the determinant of performance.

As far as contingency theory is concerned, three main types of turbulence have been hypothesized to influence performance or even to influence other variables that have a relationship with organizational performance. In the current research, three main environmental turbulences are examined, namely, market turbulence, competition turbulence, and technological turbulence (Jaworski & Kohli, 1993).

Another theory upon which the framework is grounded is market orientation theory (MOT) which was developed by Narver and Slater (1990) and later developed by Jaworski and Kohli (1990, 1993). The following section deals with this theory and the way it fits in the theoretical framework.

2.6.3 Internal Market Orientation Theory

Internal market orientation theory was created on the basis of two marketing theories, namely, internal marketing and market orientation. Both theories may be considered as major contributors to internal market orientation theory. It is therefore crucial to examine the beginnings and developments of market orientation and internal marketing. Market orientation comprise of two fields – organizational culture focus and managerial focus, explained as the initial portion of the theoretical support for the development of internal market orientation. Meanwhile, internal market is explained as the second crucial part of the internal market orientation theory development.

Recent conceptual and empirical research embarked on operationalizing internal market orientation (Gounaris, 2006; Lings, 2004; Lings & Greenley, 2005). In this context, Lings (2004) argued that internal market orientation is neglected and that the "marketing concept recognizes the need for an element of marketing focus on the internal environment of the firm. However, subsequent operationalization of the marketing concept appears to ignore this internal focus (p. 407). This highlights the gap between theory and practical implementation of the concept of marketing and shows the usage of internal market orientation as a viable solution. Through the application of the internal marketing theories (Lings, 2004) and market orientation

(Berry, 1987; Jaworski&Kohli, 1993), then focusing on the implementation from customers to employees, internal market orientation took shape (Lings, 2004). This means that employees in an organization are considered as the real assets that the organization possess and for achieving market orientation policies it is important to create a market orientation culture by which employees operate.

The internal market orientation constructs, to date, are based on the original market orientation construct which was developed by Kohli & Jaworski (1990). The construct consists of the dimensions of organization-wide gathering of marketing intelligence, dissemination of intelligence, and responsiveness to the use of this information. These dimensions are applied to the "internal customer", the employee. A conceptualized internal market orientation construct (Lings, 2004) was developed and later empirically tested using the five dimensions of formal face-to-face information generation, formal written information generation, informal information generation, information dissemination, and responsiveness to information (Lings & Greenley, 2005). The measure developed by Lings and Greenley (2005) was found to be valid and reliable in assessing internal market orientation in a business setting. Thus, internal market orientation theory was adopted to explain the mediating impact of internal market orientation on the relationship between teamwork quality (concerned with employees) and NPD cycle time.

2.7 Summary of the Chapter

The chapter has reviewed the literature on the different variables of the current study, namely, teamwork quality, NPD cycle time, environmental factors, and internal market orientation. The chapter began with an overview about team work quality and its six dimensions being the independent variable of the study. The chapter proceeded with introducing the dependent variable of the study, namely, NPD cycle time. The mediating variable of internal market orientation was then introduced followed by the moderating variable of environmental turbulence. The chapter concluded with the theoretical underpinnings upon which the study is grounded. The following chapter (Chapter 3) introduces the theoretical framework upon which the study is grounded.

CHAPTER THREE

THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

3.1 Introduction

In this chapter, we develop a model that examines the impact of teamwork quality on new product development (NPD) cycle time through the mediating variable of internal market orientation. The moderating influence of environmental turbulence factors on the relationship between teamwork quality and NPD cycle time is also considered. Based on previous literatures, we then develop relevant hypotheses of the relationships among the variables specified in the model.

3.2 Theoretical Framework

The theoretical framework of the current study is grounded on the inter-relationships among a number of variables, namely, teamwork quality as the independent variable, NPD cycle time as the dependent variable, internal market-orientation as the mediating variable, and environmental turbulence factors as the moderating variable that affects the relationship between teamwork quality and NPD cycle time. Figure 3.1 shows the theoretical framework.

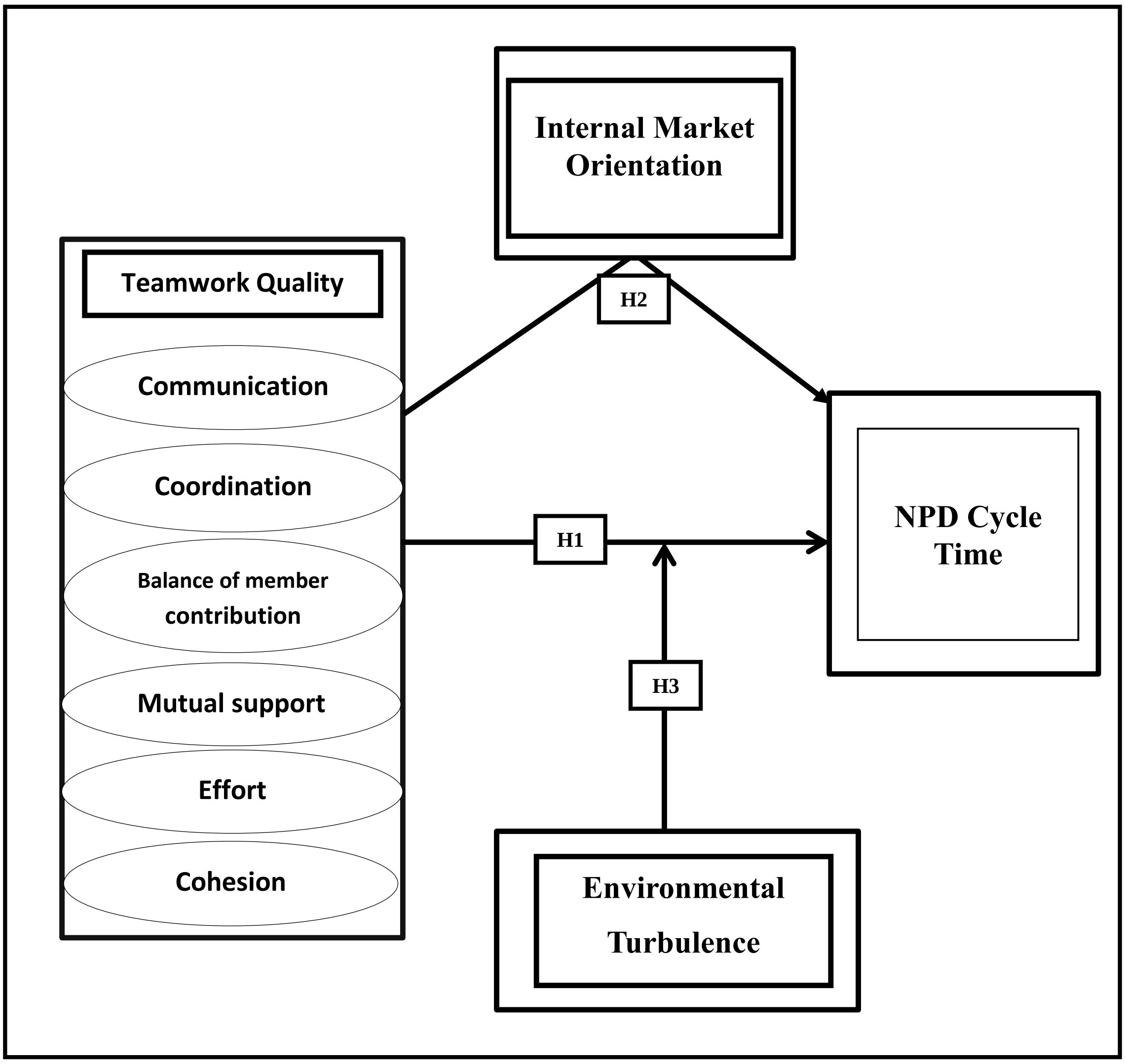

Figure 3.1
The Theoretical Framework of Study

As shown in Figure 3.1, a new product development (NPD) cycle time is directly influenced by teamwork quality of the organization. Second, the internal market orientation is proposed to mediate the relationship between teamwork quality and new product development cycle time. Third, environmental turbulence factors are postulated to moderate the relationship between teamwork quality and the NPD cycle time. The importance of NPD cycle time is stressed in this model as success of new products depends on their being first to be available in the market (Cooper, 1994;

Gresham, 2006; Griffin, 1993; Griffin, 2005; Langerak *et al*., 2008; Little, 1991; Parry *et al*., 2009).

In the present research, teamwork quality is conceptualized as a six dimensional construct, which is consistent with past research that tends to cluster teamwork into two categories: tasks and interpersonal processes (Bales, 1958; Hoegl & Gemuenden, 2001). Specifically, task processes include three dimensions: effort, balance of member contribution, and coordination dimension. These dimensions are related to the accomplishment of team goals and functions that allow teams to “solve the objective problem to which the group is committed” (Gladstein, 1984, p. 500). Interpersonal processes include other three dimensions: mutual support, cohesion, and communication. These dimensions perform maintenance functions (Gladstein, 1984) that are designed to “build, strengthen, and regulate group life” (p. 500).

On the other hand, the mediating variable of internal market orientation policy is conceptualized by five main dimensions of informal information generation, formal face-to-face information generation, formal written information generation, information dissemination, and response (Carbonell & Rodriguez, 2006; Jaworski & Kohli, 1993; Langerak *et al*., 2008; Lings & Greenley, 2005; 2010; McGrath, 2009; Pattikawa *et al*., 2006; Swink & Song, 2007). The dependent variable of NPD cycle time is operationalized by four items adapted from Lynn *et al*. (2000) and Kessler and Chakrabarti (1999). Finally, the moderating influence of environmental factors is represented by factors of technological turbulence, competition turbulence, and market turbulence (Jaworski & Kohli, 1993).

Based on this literature, a number of hypotheses are generated to propose the nature of the relationships between the four variables of the study, namely, teamwork quality, internal market orientation, NPD cycle time, and environmental turbulence, as follows.

3.3 Hypotheses Development

In this section, a number of links are proposed to constitute the relationship among the four variables. The first link is the one that connects the dimensions of teamwork quality with new product development (NPD) cycle time and this link is reflected by H1 in the framework. The second link is the one that connects the dimensions of teamwork quality with the firm's NPD cycle time through the mediating influence of internal market orientation and this link is referred to as H2. The third is the moderating influence of environmental turbulence factors on the relationship between teamwork quality and the NPD cycle time and this link is referred to as H3. The following section lists the hypotheses together with their supporting arguments from the available literature.

3.3.1 Direct Relationship between Teamwork Quality and NPD Cycle Time

Given that teamwork quality is a higher-order construct represented by six dimensions, it is proposed that a link exists between factors of teamwork quality and new product development cycle time. It is proposed that teamwork quality has a positive influence on the performance of tasks and thus the performance of organizations, represented as NPD cycle time.

Over the past decades, multiple studies on teamwork have been executed. In their literature review, Salas, Stagl, Burke, and Goodwin (2007) reviewed more than 130 models and frameworks of teamwork or a component of it. These include models at different levels of teamwork. Some of the teamwork models in the field are more general models (e.g., Salas *et al*., 2005), some are more context-specific (e.g., Jeffcott & Mackenzie, 2008, some focus more on specific team processes (e.g., Chow & Cao, 2008), and there are models that focus more on the individual level of teams (e.g., Siau, Tan, & Sheng, 2010).

Teamwork is the activity of multiple interdependent individuals (Salas, Cooke, & Roosen, 2008). It is a set of interrelated components of performance that are needed to efficiently and successfully facilitate coordinated and adaptive performance (Baker, Gustafson, Beaubien, Salas, & Barach, 2003; Cannon-Bowers Tannenbaum, Salas, & Volpe, 1995; Salas *et al*., 2008; Salas, Bowers, & Cannon-Bowers, 1995). Both task work and teamwork, even though they are distinct components, are important for teams to be effective in complex situations (Morgan, Glickman, Woodward, Blaiwes, & Salas, 1986). The multilevel process, which arises when team members are involved in managing their individual task- and teamwork and the teamwork processes, is defined as team performance (Kozlowski & Klein, 2000).

Nakata and Im (2010) validated a model developed from group effectiveness theory on 206 NPD teams from U.S. high-technology companies. They found that cross-functional integration brought the skills, efforts, and knowledge of differing functions in an NPD team that resulted in producing high-performing new products. e, Delarue, Hootegem, Proctor, and Burridge (2008) examined the operational and financial teamwork, which were direct measures of organizational outcomes performance. They showed that teamwork had a positive impact on all four dimensions of performance. They further observed that when teamwork was combined with structural change, performance was further enhanced.

In addition, Katzenbach and Smith (2003) stressed that teams are a curical part of a three part cycle that leads to optimum performance of the organization. These parts include shareholders providing opportunities, employees delivering value, and finally, customers generating returns. In high-performance firms, performance targets have several dimensions that affect all three contributors. The authors demonstrated a team performance curve that relates the effectiveness of the team against their performance impact that results in the organizational path that begins from the working group to pseudo team, potential team, real team and culminates in high-performance team.

Prior studies also reached to the conclusion that teamwork quality impacts new product development cycle time. According to Dayan and Benedetto (2010), the team members' proximity and team longevity positively associated with the NPD teams' interpersonal trust, while the latter impacts team learning and new product success, but marketing expediency. Similarly, Hoegl, Ernst and Proserpio (2007) claimed that teamwork quality is more challenging to achieve and more important to team performance with the increase of team dispersion.

Ambiguity lies as to the tasks to be achieved and issues that require addressing (Sicotte and Langley, 2000). Even though combined domain-relevant skills may be sufficient in normal project, highly innovative scenarios call for intensive team members' collaboration to make complete use of domain-relevant skills in dealing with an unstable environment (Ford, 1996; Okhuysen & Eisenhardt, 2002; Taggar, 2002). Additionally, it is not very often that specific individuals have the complex skills set to successfully achieve tasks related with innovative projects. Project success therefore requires collaboration among multiple specialists to integrate their skills in a coherent way (Sicotte and Langley, 2000) and to reach ideas convergence within the team while sticking to the allocated budget and schedule.

At a fundamental level, teamwork quality elements like communication, cohesion, sub-tasks coordination, and stress on the team members' contributions to the project enable team members to acknowledge domain-relevant skills possessed by teammates. The awareness of these skills is invaluable as the team will be in a better position to identify the expertise needed in facing uncertain issues. For example, open communication of relevant information (Hauptman and Hirji, 1996; Katz and Allen, 1988), and coordination of individual activities (Adler, 1995; Faraj and Sproull, 2000) enable teams to ensure that every member can contribute their knowledge to their best ability (Seers, 1989). Accordingly, highly communicative teams emphasize every member's contribution and sufficiently coordinate tasks to facilitate team awareness of product information. This makes the teams ready to evaluate problems from various facets and provide an optimum solution (Thompson, 2003; Watson *et al*., 1991). This collaboration with other teams helps apply the teams' domain-relevant skills in the united project and creates synergy.

H1: Teamwork Quality positively affects new product development cycle time where more Teamwork Quality leads to shorter NPD cycle time.

3.3.1.1 Direct Relationship between Communication and NPD Cycle Time

Communication as a first dimension of teamwork quality is crucial to a team's success because it provides the channel through which information and knowledge can be exchanged and evaluated, and activities can be coordinated (Burgoon, 1977; Cragan & Wright, 1990; Hoegl & Gemuenden, 2001) among team members, which may provide the basis for decision making within the team (Hirokawa & Rost, 1992). Indeed, communication has been described as heart of team process (Shaw, 1981).

Chou, Wang, Wang, Huang and Cheng (2008) examined 72 corporate teams and showed that shared work values among the teams positively impacted team member performance and cooperation satisfaction. Criticism can be easily expressed as it is less likely to be misunderstood and more likely to result in firm performance and product quality enhancements. Meanwhile, Linlin and Haifa (2011) studied the impact of the characteristics of researchers on R&D teams performance and concluded that knowledge communication sharing, and integration of play have key roles in the process of the R&D team's knowledge creation, and it positively affects R&D team's performance.

Communication is also needed to coordinate team member's efforts and knowledge (Han, Lee, & Seo, 2008). Lu, Xiang, Wang, and Xiaopeng (2010), for example, found that a lack of communication or the existence of misunderstanding between team members and stakeholders of a project are two main causes of project failure. Also other studies recognized the importance of communication for project success (e.g., Griffin & Hauzer, 1992; Katz & Allen, 1998). Therefore the following sub-hypothesis is offered:

H1a: Communication among team members positively affects new product development cycle time where more communication leads to shorter NPD cycle time.

3.3.1.2 Direct Relationship between Coordination and NPD Cycle Time

Coordination is defined as "the management of synchronous and/or simultaneous activities and involves information exchange and mutual adjustment of action to align the pace and sequencing of team members' contribution with goal accomplishment"

(Marks, Sabella, Burke, & Zaccaro, 2002, p. 5-6). Coordination is vital to a team that requires the contribution from all team members and the effectiveness of one member's action hinges upon the action of another team member (Dayan & Benedetto, 2009; Kabanoff & O'Brien, 1979). In contrast, an ill-coordinated team tends to produce poor outcomes because it prevents members from performing at a logical sequence, hinders them from performing at the best of their potential, and may result in duplicated or wasted effort. Again, the argument here is that the complicated processes of new product development do need a highly cooperative team as separate individuals' to improve firm's performance.

It was argued by Loch and Terwiesch (1998) and Kazanjian *et al*. (2000) that the absence of effective coordination between the teams or the team members' interdependencies may lead to mistakes, which would lead to further rework and crises. The coordination needs provided by the project architecture from the onset of the project can be calculated for teams, and the innovative products development is often riddled with changes that frequently impact the multiple teams' work. The development processes high complexity and uncertainty, aggravated by the significant interdependencies between teams and frequent changes, can only be handled if information flows between the teams or when effective coordination is employed (Souder and Moenaert, 1992). So lack of coordination of teams could lead to the reworking of certain work products. Such rework can lead to issues particularly in the later phase of development as it often leads to delays and additional costs of development (Dutoit and Bruegge, 1998; Hegazy and Khalifa, 1996).

The positive impact of coordination among interdependent groups/departments on the projects success has been often evidenced in literature (Dayan & Benedetto, 2009; Hise *et al*., 1990; Moenaert& Souder 1990; Roger *et al*., 2012; Ruekert& Walker 1987; Souder 1988). Specifically, Roger *et al*. (2012) revealed that great degrees of external interaction were needed to achieve complex tasks. Similarly, this result was supported by Ancona and Caldwell (1992) who stated that the integrative boundary that spans ambassador and task coordinator were positively associated with the performance of the team.

Team coordination positively impacts the quality of each team's output and provides the change for exchanges with experts in other teams, as new perspectives and ideas flow through the teams (Barczak &Wilemon, 1991; Sethi 2000a). Issues of design and possible solutions can be discussed among the teams and such an exchange of coordinative knowledge concerning qualitative aspects of modules guarantees that the output of the team is aligned with the critical qualitative dimensions like weight, size, durability, visual attractiveness, tactile attractiveness, among others.

It is assumed that prior studies' results are also applicable to the context of multi-team projects while coordination with other teams can have positive outcome in several respects, such as in the case of the Saudi Telecommunication Industry where in different teams work in different coordinating processes to guarantee full cooperation. Despite the fact that teams' coordination may expend time and resources, it is argued that there exists a positive impact on the ability of the team to stick to project schedules. Moreover, the greater the prior task-relevant information flows throughout the teams, the more likely the modules of different teams will be consistent to each other. Therefore the following sub-hypothesis is offered:

H1b: Coordination among team members positively affects new product development cycle time where more coordination leads to shorter NPD cycle time.

3.3.1.3 Direct Relationship between Balance of Member Contribution and NPD Cycle Time

Balance of member contribution refers to the process whereby an organization balances the roles of an activity by assigning these roles to the members who are able to perform them (Hackman, 1987). This is particularly important when team members come from different functional backgrounds and possess complementary expertise which leads to improved firms performance (Lovelace, Shapiro, & Weingart, 2001; Randel & Jaussi, 2003).

To be successful in developing products within a shorter period, it is essential that every team member use their expertise and if discussions and decision making are led by some team members, while others are not able to clarify their ideas, this will lead to adverse outcomes on the performance of the team (quality costs, time) as mistakes that are avoidable are likely to be committed. As such, it is important for team members to use their expertise while handling tasks (De Dreu and West, 2001) and they contribute to solving the problem to their optimum potential (Zachary and Krone, 1984). It is notable that the balance of the contributions of members does not translate to the input equality to the project (Hoegl and Gemuenden, 2001). Furthermore, Seer's (1989) empirical study showed that the balance of the contributions of members was significantly associated to task performance as well as the members' satisfaction. The following sub-hypothesis is formulated:

H1c: Balance of member contribution positively affects new product development cycle time where more balance of member contribution leads to shorter NPD cycle time.

3.3.1.4 Direct Relationship between Mutual Support and NPD Cycle Time

Mutual support is defined as the extent of the team members' handling of conflict (cooperatively or competitively), how they assist one another and how they develop and respect each other's ideas. Tjosvold and colleagues (Alper *et al*., 1998, 2000; Chen, Liu, & Tjosvold, 2005; Tjosvold, 1998; Tjosvold, Hui, & Yu, 2003) introduced the notion of competitive versus cooperative conflict within the team. In a cooperative conflict, team members recognize that they all share a common goal. Conflict, while inevitable, may be resolved by sharing information, taking each other's perspective, communicating feelings directly, and providing support to each other (Alper *et al*., 1998, 2000; Tjosvold, 1998). Our argument here is unless team members support each other to carry out the whole task, the targeted task will not be fulfilled in the way it should be to improve new product development cycle time. Furthermore, great mutual support indicates that team members respect one another's ideas and facilitates a cooperative as opposed to a competitive work environment.

Competition between people can exert a positive influence on the motivation and performance of individual tasks. For interdependent tasks such as telecom products, cooperation or mutual support amongst team members is more important. Team members working on a shared goal should try to support instead of trying to outdo each other. They should show respect, give help and support when needed, and stimulate ideas of other team members and develop them further. If, on the other hand, team members demonstrate competitive behaviors, this can lead to distrust and frustration within the team (Tjosvold, 1995). Both quality and acceptance of ideas generated by members of the team increase when members cooperate (Cooke & Szumal, 1994). Mutual support, therefore, is an important element of teamwork and needed to be able to reach team goals. The better team members support each other, the more effective and efficient these goals can be reached.

It is essential for team members not to compete for resources and prestige but instead cooperate to reach a united goal (Tjosvold, 1984, 1995). Cooke and Szumal's (1994) laboratory study that involved 64 student groups showed that contructive-cooperative behaviors among team members, maximized the quality and acceptance of developed solutions. Therefore, it is logical to assume that the level of mutual support affects team performance via its impact on communication and coordination among team members. Such an environment may stop the effective application of creative-thinking skills. Teams may be more willing to acknowledge sub-optimal ideas and steer clear of conflict. High team mutual support indicates that team members value team membership, show commitment to their project, and sustains the social entity of the team (Gully *et al*., 1995; Mullen and Copper, 1994). Given the above argument, the researcher proposes the following sub-hypothesis;

H1d: Mutual support within the team positively affects new product development cycle time where more mutual support leads to shorter NPD cycle time.

3.3.1.5 Direct Relationship between Effort and NPD Cycle Time

Effort component suggests that a team's success hinges upon team members' willingness to exert effort on behalf of the team. In teams whose success depends on the effort of all members, performance deficit may occur when one or more members make little effort towards goal attainment (Kidwell & Bennett, 1993; Liden, Wayne, Jaworski, & Bennett, 2004). Research on social loafing suggests a number of reasons why team members may fail to perform at their full potential. First, since individual effort may not be identifiable in a team context, individuals may be able to "hide in the crowd." The tendency to withhold effort increases when the task is highly interdependent, which renders it difficult to identify individual contribution (Williams, Harkins, & Latane, 1981). Second, team members may also fail to exert sufficient effort because they believe that others also fail to do so. As a result, the notion of being taken advantage of (because others are putting in less effort while receiving the same amount of reward) is aversive, which may motivate one to reduce effort for the team (Schnake, 1991).

Team members exert effort to achieve their common tasks and this effort impacts the project's success (Hackman, 1987). Such a proposition reveals the basic assumption that independence of other factors like task-relevant knowledge and skills, effort level brought towards the task influences performance. Weingart's (1992) study supports the proposition at the level of team analysis. The results of the analysis of data collected from 56 student groups shows that effort, along with other variables like task planning and coordination significantly impacted term performance. Therefore, given the above argument, the following sub-hypothesis is generated:

H1e: Efforts within the team affect new product development cycle time where more efforts within the team leads to shorter NPD cycle time.

3.3.1.6 Direct Relationship between Cohesion and NPD Cycle Time

Cohesion refers to the level of attachment of members to each other and their willingness to stay with the team (Beal, Cohen, Burke, & McLendon, 2003).

Researchers have found that cohesion is an important property of a team, predicting team outcomes such as performance, perceived team utility, communications among team members, and conflict (Beal *et al*., 2003; Mullen & Copper, 1994). Following previous research (Mullen & Copper, 1994), Hoegl and Gemuenden (2001) suggested that cohesion includes three dimensions. These are the extent to which team members are attracted to each other, the extent to which they are committed to the task, and the extent to which they identify themselves with the team. The argument here is that cohesion among the team members help fulfil needed results. This because when there is cohesion between the team members, better cooperation will take place and this will in turn result in better achievement.

Several studies have examined the relationship between cohesion and team performance on the basis of the notion that members who are inclined to the team and who have one single goal will display better performance (Brockman *et al*. 2010; Miesing & Preble, 1985; Wofe & Box, 1988). In the context of health care setting, research dedicated to the cohesion-performance relationship also indicate showed that the care quality will impact the cohesion level among the members of the team. Team members who are cohesive are more inclined to communicate among each other with positively oriented intra-team (Lott & Lott, 1961; Shaw, 1981; Van Egeren & O'Connor, 1998). And due to the fact that less energy is needed for intra-team relationship maintenance, more time can be utilized caring for patients (Wolfe & Box, 1988). In addition, members of cohesive team who are goal committed (serving patients) may freely challenge each other and generate novel reactions and solutions that lead to patient care enhancement (Hackman & Morris, 1975; Leanna, 1985; Longley & Pruitt, 1980).

Beal, Cohen, Burke, and McLendon, (2003) investigated the role of the group cohesion's components. Stronger correlations were found between cohesion and performance than in previous studies when performance, defined as behavior, was assessed through efficiency measures and as team workflow patterns. Chiocchio (2009) conducted the meta-analysis of 33 correlations of cohesion and performance on psychosocial determinants of performance. The study suggests that project team type, comprised of project, production/service teams in the context of organizations/academics, is a determinant of performance. In these settings, project teams displayed significant effect sizes and vary from other teams.

On the basis of these arguments, the following sub-hypothesis is offered:

H1f: Cohesion among team members positively affects new product development cycle tine where more cohesion among team members leads to shorter NPD cycle time.

3.3.2 The Mediating Effect of Internal Market Orientation

In an attempt to examine the influence of a number of organizational factors that are related to teamwork on the performance of some of the large banks, Lancaster and Velden (2004) examined this impact through the mediating influence of internal market orientation. The findings of their study revealed that the market orientation polices mediated the relationship between teamwork characteristics and the performance of the banks.

Deshpande and Farley (1998) described market orientation as identical to customer orientation. This is consistent with the contentions of Deshpande and

Webster (1989) and Payne (1988) that marketing orientation is aligned with the market. Wren, Souder, and Berkowitz (2000) argued that products provided by highly market-oriented firms may fit existing customer needs best. As far as NPD cycle time is concerned, Griffin (1997) introduced three components for NPD speed. These components are time to market, concept to customers, and development time. Organizations that have high levels of internal market orientation are expected to have shorter cycle time for their new product development (Saryeddine, 2005). This because these organizations want to reach out to their customers and respond to their needs as fast as possible. In this way, organizations will not lose their customers to other organizations in a highly competitive market.

Some prior researches showed a direct/indirect association between internal market orientation and NPD cycle time. In this context, Subramanian and Gopalakrishna (2001) showed an impact of internal market orientation on new product performance through its direct impact on NPD cycle time. The argument is that the competencies of the market of sensing and responding, indicated by the great degrees of market orientation, lead to high market-oriented firms knowing the wants of their customers and the market offerings. As a result, they react with services/products that satisfy the needs and add value to customers compared to their rivals' offerings.

Internal communication is an important key in the process of IMO according to Gronroos (1990). The proximal distance between the employees and management creates opportunities for this type of communication, and opens up opportunities for the collection of information concerning the employee's wants and needs, as previously explained, and also for information dissemination. The communication process is also crucial in encouraging the identification of organizations (Smidts, Pruyn and Van Riel, 2001) and the employee subordinate's job outcomes (Keller, 1994), which in turn lead to better organisational performance. Specifically, bi-directional informal communication between management and staff positively impacts front-line staff (Johlke & Duhan, 2001). This is certainly significant in IMO as the relationship between staff and management shows a bi-directional communication that forms a part of workplace behavior. Dissemination of information is, hence, brought forward as the fourth IMO dimension.

A workplace where members of the organization are inclined and have the ability to communicate increases the information exchange frequency. In the context of open workplace, people readily provide suggestions without having to worry about being taken seriously. Criticisms are expressed freely as it is likely to be accepted and to lead to enhancements. The level of accurate information flow through an organization is imperative as it not only helps steer clear of mistakes but also develops among the many organizational members. On the other hand, communication that is ineffective blocks market-oriented activities and results in conflict due to misunderstandings, erroneous methods and frustrations (Etgar, 1979). Such conflicts and misunderstanding between members could have a negative impact on organisational performance.

Based on the above reasons, the dimensions of information accuracy and general openness influence employee perception of communication as such that employees experience the internal market orientation of the firm (Mokhtar *et al.*, 2009; O'Reilly & Roberts, 1976; Price & Mueller, 1986). Workers who feel that their workplace is not conducive to effective communication are more inclined to provide a lower score in the assessment of their company's market orientation which would negatively influence organisational performance.

Responses as an IMO's fifth dimension mentioned in literature entails the reacting to the information produced concerning the employee's wants and needs. In marketing literature, among the top widely recommended uses of IMO information is the development of job products meeting the requirements of employees and satisfying and motivating them (Berry & Parasuraman 1991; Sasser & Arbeit 1976; Stauss & Schultze 1990). According to Sasser and Arbeit (1976), employees often exchange their time, energy and values for money and this is similar to external market exchange where customers primarily provide cash to obtain goods or services. On the basis of prior internal market orientation literature, action taken is catered to gather favorable customer reaction (Kohli & Jaworski, 1990). However, it is not the action itself that is significant, it is the action drivers. Accordingly, the firm's customer-oriented actions are driven by the expectation of present and potential customers' needs and wants in an attempt to create customer value. An in-depth understanding of customer intelligence and action according to the relevant intelligence is important in using customer orientation approach.

Jaworski and Kholi (1993) conducted a study that attempted to examine the mediating impact of market orientation on the relationships the independent variables of top management, inter-departmental dynamics and organisational system and the dependent variable of business performance. The findings of their study revealed that the construct of market orientation did have a mediating influence on the relationships between the independent variables and the dependent variable.

Thus based on these arguments, the following hypothesis is generated:

H2: Internal market orientation mediates the relationship between teamwork quality and NPD cycle time.

And the following sub-hypotheses is generated:

H2a: Internal market orientation mediates the relationship between communication among the teamwork and NPD cycle time.

H2b: Internal market orientation mediates the relationship between coordination among the teamwork members and NPD cycle time.

H2c: Internal market orientation mediates the relationship between balance of member contribution among the teamwork and NPD cycle time.

H2d: Internal market orientation mediates the relationship between mutual support within the teamwork and NPD cycle time.

H2e: Internal market orientation mediates the relationship between efforts within the teamwork and NPD cycle time.

H2f: Internal market orientation mediates the relationship between cohesion among the teamwork and NPD cycle time.

3.3.3 The Moderating Effect of Environmental Turbulence

The highly turbulent environment has become core to the business management studies, which leads to the creation of various critical business issues (Bourgeois & Eisenhardt, 1988; Eisenhardt & Martin, 2000; Fine, 1998; Mendelson & Pillai, 1999; Nadkarni & Narayanan, 2007b). Environmental turbulence has multiple dimensions, and each dimension has unique characteristics. This study concentrates on three types of turbulence. They are technological turbulence, competition turbulence, and market turbulence.

Technological turbulence refers to the ability of the firm to make use of technological knowledge effectively and to learn to develop and enhance products and processes (Kim, 1997; McEvily *et al*., 2004). Urged by the learning orientation literature, prior studies stated that technological consistency should precipitate the firms' information processing (Noble *et al*., 2002; Zhou *et al*., 2005). In other words, firms having a good technological alignment level constantly gather information concerning the up-to-date technological developments and they perceive technological changes in their environment. In doing so, they can easily incorporate new technological solutions into their process of product development.

Technological alignment allows firms to have a clear picture of the technological areas to drive their product development activities to and the direction to take. This precipitates the activities of product development that ranges from initial development efforts to commercialization. According to this premise, Eisenhardt (1989) stated that real-time information concerning the firm's environment should contribute to expedient decision making. He highlighted the difference between real time information and planning information, and added that planning information may negatively impact the speed of decision making as it tries to predict the future. On the basis of this argument, it is expected that firms stress technological alignment to obtain information regarding future trends in technology and development. Technological alignment is expected to slow the NPD process.

Technological competence can be developed by firms by refining technological knowledge or obtaining new ones (Atuahene-gima, 2005; March, 1991). Hence, development of competence entails additions and changes to the exsiting technological knowledge of the firm, its skills and its routines (bond and Houston, 2003; Day, 1994; and Kogut and Zander, 1992).

Developing upon the notion of valuable resources, a knowledge-based view posits a positive relationship between development of competence and the performance of the firm (Grant, 1991). It is expected that a firm having distinct capabilities to develop and take advantage of technological competence is capable of achieving greater NPD speed and performance. This is supported by studies that acknowledged the positive impact of experiential learning/process knowledge on NPD speed (Ganesan, Malter, and Rindfleisch, 2005; Hult *et al*., 2000; Miner, Bassoff and Moorman, 2001). Furthermore, development of technological competence may result in superior NPD program performance by allowing a firm to come up with a product advantage that cannot be estimated by competitors (Cooper, 1985; Gatignon and Xuereb, 1997; Sayegh *et al*., 2004).

Competition turbulence is the second environmental factor claimed to moderate the relationship amongst factors teamwork quality and the new product cycle time is competition turbulence. When there is a lack of competition, customers tend to constrict alternative resources to satisfy their necessities and desires, therefore, the need for high market orientation. When it comes to being faced with aggressive competitors, a quick reaction to the voiced customer needs is more likely to become more of a priority to firms so it could work on the skills and capacities of its team members (Appiah-Adu, 1998; Bian & Moutinho, 2009; Chen *et al*., 2010; Harris, 2001; Jaworski & Kohli, 1993; Kumar *et al*., 2011; Lenox *et al*., 2007; Slater & Narver, 1994).

Effectively combing diverse knowledge and closely working with prime users commonly results in dramatically ground-breaking product development (Bower & Christensen, 1995; Chen *et al*., 2010; Chandy & Tellis, 2000). This advance creates a higher product benefit in competitive business to business markets (Bonner & Walker, 2004). The benefits of improved production processes may largely contradict their disadvantages under highly competitive circumstances. This is because the requirement of teamwork quality is contingent on competitive intensity. This interpretation is supported by the literature in turbulent market, which argues that technologies firms provide digital options or functions that enable organizations to successfully sense and respond to market opportunities and threats, and eventually achieve competitive performance (Pavlou & El Sawy 2006; Sambamurthy *et al*., 2003).

The nature of competitive environments may play a significant role in the innovation frequency and success. Prior studies (Kwon & Hu, 2000; and Rose & Shoham, 2002) examined the relationships and interactions between measures of market orientation, intensity of competition and optimum performance of export. Cadogan *et al*. (2003) also revealed a moderating impact of competitive intensity on the exporters' level of market oriented behavior-performance of export relationship. Under low competitive intensity, export market oriented behavior negatively affected export sales efficiency performance and positively affected export sales efficiency performance under dynamic competitiveness.

Market turbulence is the third environmental factor purported to moderate the relationship between dimensions of teamwork quality and new product cycle time. Song and Parry (1997) referred to market potential as the potential demand for the new product in the target market. A high level of market potential promotes a new product's potential sales, share, and profit by reducing market uncertainty (Cooper, 1979; Cooper & Kleinschmidt, 1987; Lichtenthaler, 2009; Quiantana & Benavides, 2008). In general, market growth facilitates a firm's performance (Narver & Slater, 1990). Brown and Eisenhardt (1995) supported the position that new products introduced into a substantial and potentially growing market are more likely to perform better.

Market growth indicates the evolution of industry and the attractiveness of market (Bowman and Gatignon, 1995). A fast developing market that frequently seems to appear in emerging markets entails newly re-formed industries undergoing growth and ample opportunities (Porter, 1980).

These markets may occur following the initial phase of a major technological development, customer reaction develops more following the first trials. A crucial strategy selection focuses on whether or not to create a similar product fast to satisfy market demand and take advantage of potential opportunities (Porter, 1980). For example, through the introduction of the iPad, Apple formed a rapidly developing market for tablets. Several companies followed suit with varying versions to partake of the share. Nevertheless, launching of products with radical innovations in a quickly developing market may also backfire in cases where customers are confused by its features and technical variations and remain loyal to the first entrant (Porter, 1980; Zhou & Nakamoto, 2007). Hsieh, Tsai and Hultink (2006) supported this logic as they showed that companies displayed lower willingness to use innovative NPD strategies when market growth is high. When market growth slowed down, the market reaches a mature phase. In other words, slow growth results in dynamic competition for market share as firms may no longer maintain their growth by just holding their share (Porter, 1980). Thus, the status of the market influences the strategies adopted by organisations to meet the new status in which companies direct their team members to innovate and introduce new products to the market before other rival companies do.

Gatignon and Xuereb (1997) examined the moderating effect of market turbulence on the relationship between market orientation and new product performance. They found a positive moderating effect of market potential such that a stronger market orientation was required in a fast growing market to achieve the desired level of performance. Han *et al*. (1998) proposed the positive moderating effect of market growth on the link between market orientation and organizational creativity. They argued that in fast-growing market conditions, a firm with superior market intelligence and information tends to respond to market trends through organizational creativity, which in turn results in enhanced organizational performance. Song and Parry (1997) also supported the view that high market potential strengthens the relationship between product differentiation and new product performance. To them, market potential is expected to have a positive moderating effect on the relationship between new product and marketing program creativity with new product performance since high levels of market potential helps creative ideas to be successfully implemented in the market.

High market potential provides a strong demand for creative products and marketing programs. In a growing market, novel and meaningful ideas for new products and marketing programs have a greater potential to be successfully implemented in the market since they are more likely to satisfy customers' changing desires for novel and meaningful stimuli. Thus, efforts that fulfill the needs of customers are more likely to increase sales and be profitable in conditions of high market potential. In a growing market, a firm that tends to provide creative ideas for new products and marketing programs is more likely to respond to the changing needs of customers, enhancing new product performance (Fuller, Hutter and Faullant, 2011).

Based on the study by Jaworski and Kohli (1993), the relationship between the market orientation level and business performance differs on the level of environmental aspects of the organizations. They proposed three environmental factors that may influence the relationship.

The change speed denotes the rate in which new opportunities arise (Davis *et al*., 2009; Eisenhardt 1989) or the new products and services rate of introduction (Fine, 1998; Mendelson& Pillai, 1999; Nadkarni& Narayanan, 2007b).Carbonell and Rodriguez-Escudero (2009) examined uncertainty on the relationships between support of top management, goals clarity and speed-based rewards, and speed of innovation. They revealed that top management support positively impact speed of innovation under new high technology and turbulence of high technology. Goals clarity was more significant to innovation speed under novelty of medium technology and turbulence of low technology. The findings indicated a curvilinear, positive association between speed-based rewards and speed of innovation.

In a related study Dayan and Basarir (2010) examined the team empowerment and contextual antecedents' impact on reflexivity in new product development teams that are cross-functional. They reached to the conclusion that a transactive memory system, goal clarity, team empowerment, and interactional justice significantly associated with reflexivity of teams. Furthermore, the findings revealed such team reflexivity significantly associated with product success under turbulent conditions.

Prior research contended that the effective use of intuition in specific situations, like turbulent times, while there may be lack of extensive information, hinges on the expertise level. Specifically, Sadler-Smith and Shefy (2004) demonstrated that expertise allows executives to use their intuition to make judgments that assisted them in moving to a logical solution during times of turbulence. Similar to executive managers, NPD teams encounter similar challenges in NPD processes during times of uncertainty. Owing to the rapidly changing customer's needs and wants and the changes in the technological advancement, NPD teams working under such times, face expedient technological and market knowledge depreciation. In this regard, during times of turbulent markets and technology, NPD teams are often under-equipped of enough information for rational decisions. Similarly, Dayan and Benedetto (2011) stated that environmental turbulence moderate the relations between the team members' past experience and intuition under turbulent conditions. Also, environmental turbulence moderates successful intuition-product and intuition speed-to-market associations under turbulent times.

Based on the above arguments, the following hypothesis is generated:

H3: Environmental turbulence moderates the relationship between teamwork quality and NPD cycle time.

And the following sub-hypotheses is generated:

H3a: Environmental turbulence moderates the relationship between communication among the teamwork and NPD cycle time.

H3b: Environmental turbulence moderates the relationship between coordination among the teamwork members and NPD cycle time.

H3c: Environmental turbulence moderates the relationship between balance of member contribution among the teamwork and NPD cycle time.

H3d: Environmental turbulence moderates the relationship between mutual support within the teamwork and NPD cycle time.

H3e: Environmental turbulence moderates the relationship between efforts within the teamwork and NPD cycle time.

H3f: Environmental turbulence moderates the relationship between cohesion among the teamwork and NPD cycle time.

3.4 Summary of the Chapter

This chapter addressed the theoretical framework upon which the study is grounded. The chapter then presented several hypotheses developed based on past literatures on the four variables of teamwork quality, internal market orientation, NPD cycle time, and environmental turbulence. The next chapter deals with the methodology of the study.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

This chapter describes the methodology employed in collecting data for hypotheses testing. Frist, this chapter discusses the research design upon which the study is grounded followed by measurements and instrumentation. Then, the chapter proceeds with an explanation of the population and sampling followed by data collection procedures. Next the chapter concludes with a detailed explanation about data analysis techniques and some ethical considerations.

4.2 Research Design

A research design refers to a research structure that comprises of the major parts of the research like measures, samples, data collection method and data analysis method. A research design is described as a set of initial decision to develop a master plan and detail approaches and procedures for the purpose of data collection and analysis (Burns & Bush, 2002). A suitable research design is important as it justifies the data type, data collection, method of sampling, schedule, and budget determination (Hair *et al*., 2003). A research strategy or design is selected based on the research questions in a specific situation (Yin, 1994).

For every strategy, there are both advantages and disadvantages owing to its specific method of collecting and analyzing empirical data. It basically assists in aligning the proposed methodology with the research issues (Churchill & Iacobucci, 2004; Malhotra, 1999). There are several research design frameworks and they can be divided into three categories, which are exploratory, correlational, and causal (Aaker *et al*., 2000; Burns & Bush, 2002; Churchill & Iacobucci, 2004; Hair *et al*., 2003; Malhotra, 1999). The present study employs a descriptive correlational method to fulfill the research objectives. The aim of a correlational research is to examine the existence, type and level of relationship among two or more quantitative variables. If two or more variables are highly correlated, the first variable scores could be utilized for the prediction of the second variable (Robson, 1993).

Correlation studies are ideal with variable that cannot be distinguished easily or the presence of the situation that does not lead to the experimental method employment (Robson, 1993). In addition, with the correlation design, we can employ two methods with the most commonly among them seen in relationship studies. In the context of relationship studies, scores are often taken from two correlated variables to determine the association between them. Another type of method is utilized in prediction studies where the scores of the first variable are used to determine the second one's result. Specifically, if an association with significant magnitude is present between any two variables, the score of either variable can be determined if the score of one is known (Fraenkel &Wallen, 2003, p.340). The present study examined the association between teamwork quality, internal market orientation and environmental turbulence toward new product development cycle time. Therefore, a correlational relation was suitable to develop the kind of relations between the variables of the study.

Additionally, rather than a longitudinal study, a cross-sectional one was suitable to be utilized in the present study because of the time limitations. The quantitative approach along with the survey questionnaire method was appropriate for a study in which a significant population number was examined after which general conclusions would be made for the whole population. For the collection of data, the survey method was used and statistical techniques were utilized for data analysis.

A descriptive study is characterized by its rigidity, pre-planned element and its structure along with the fact that it is generally catered to a large sample (Churchill & Iacobucci, 2004; Hair *et al.*, 2003; Malhotra, 1999). Several researchers stated that descriptive research designs are mainly quantitative in nature (Burns & Bush, 2002; Churchill & Iacobucci, 2004; Hair *et al.*, 2003; Parasuraman, 1991). A quantitative approach is based on hypothesis and theory development, which can be generalized across settings. This type of investigation is mainly used to determine the measurement of frequency and quantity and allows the generalization of conclusions and the flexibility of data treatment in light of comparative analysis, statistical analysis and repetitive data collection to verify reliability (Amaratunga *et al*., 2002). Keeping in mind the description of quantitative method and its enabling of statistical analysis on data, the researcher selected the approach in the present study for the purpose of data collection.

Descriptive research is carried out through two main methods, namely, cross sectional and longitudinal. The former collects data from the sample population at one point in time, whereas the latter collects data over some period (Burns and Bush, 2002; Malhotra, 1999). Additionally, the cross-sectional design also refers to a sample survey where individuals chosen were requested to reply to certain standardized and structured questions concerning the way they think and what they feel and do (Hair *et al*., 2003).

4.3 Unit of Analysis

In a research project, one of the single most crucial research components is the unit of analysis. According to Trochim (2006), it is the main entity to be analyzed. Any of the following could be considered as a unit of analysis; individuals, groups, artifacts in the form of books, photos, or newspapers, geographical units in the form of town, census tract, or state, and social interactions in the form of arrests, divorces, and dyadic relations (Yurdusev, 1993).

In the present study, because the sample includes teams in a number of firms in the telecommunication industry in Saudi Arabia, the unit of analysis was teams working in different developments of new products or services in the telecom firms. A number of studies on teamwork quality, internal market orientation and NPD cycle time have utilized teams as their unit of analysis. In each of these teams, they formed five to fifteen person teams and worked interdependently on several departments in the firms (Marketing, Management, Accounting, Design, R&D, Implementation, Operation and Business Communication). More specifically, each team was responsible for the development of new product or service into the market. Their responsibilities included setting up the internal structure of the product, determining the product that they would like to launch and organizing a marketing campaign to promote the product, streamlining the financial, pricing and accounting aspects of the product, design and implement the product, and finally delivering a comprehensive presentation in front of a panel of judges and so on.

Specifically, since this study focused on the NPD team as a unit of analysis, expert member of team are likely to assess our variables more accurately due to their "bigger-picture view" of the project in general and operations, behaviors, and actions of the NPD team members in particular. Moreover, they have a broader view of each member’s behavior than other team members, and they were expected to provide more reliable and objective data. Also, the sample of respondents (i.e. product or project expert member) in this study is similar to samples used in prior studies on NPD in the several industries were included: telecommunications, food, material, software, machinery, chemical and service technologies (e.g. Ettlie and Rubenstein, 1987; Larson and Gobeli, 1988).

4.4 Sampling Procedure

The principal idea of sampling is to demonstrate that by selecting some of the elements in a defined target population, a conclusion about the entire population can be drawn (Hair *et al*., 2000). Figure 4.1 shows the four stages of the sampling procedure which was adopted from Cooper and Schindler (2006). First, a defined target population for investigation was identified. Second, the sampling frame which lists all eligible population elements from which the sample was drawn was determined. Third, the sampling method was identified. Last, the appropriate sample size was decided upon. The following details each step.

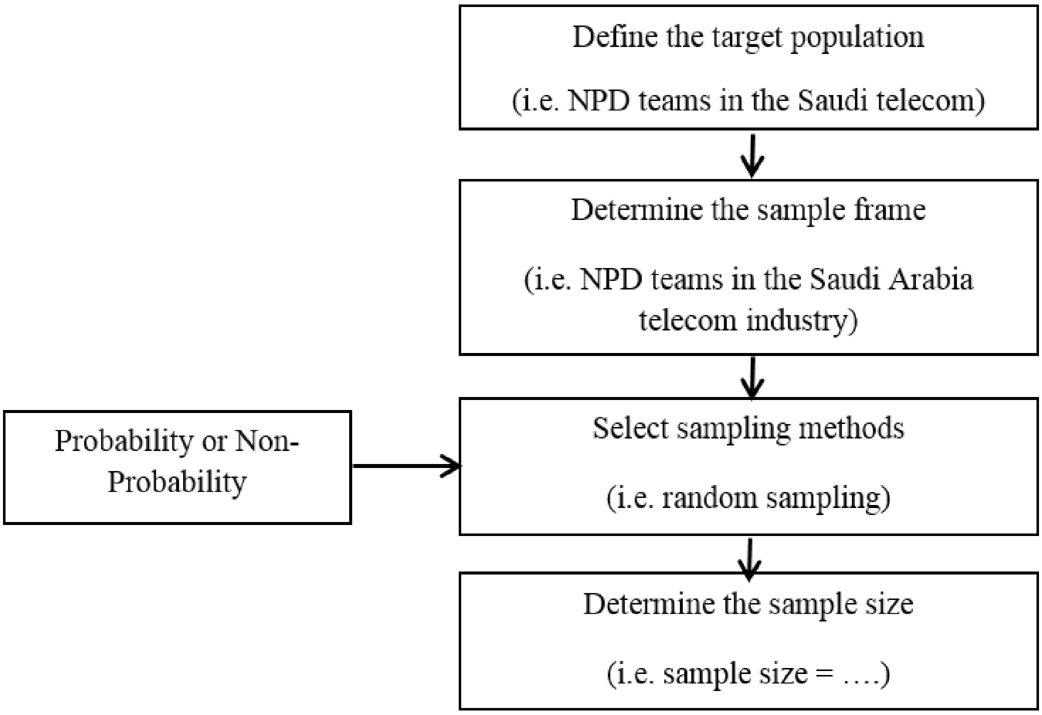

Figure 4.1
Sampling Design Process

4.4.1 Target Population

The population for this study was the teams working in new product development in telecommunication industry in Saudi Arabia. The selected team from all production stages of production cycle in the May 2013. In the context of the present study, the total population of the study includes 312 teams working in new product development departments in all the telecommunication companies in Saudi Arabia. The list of these teams was taken from three companies licensed by the Communication and Information Technology Commission in Saudi Arabia (CITC).

4.4.2 Sampling Method

Sampling refers to the selection of units like individuals/organizations from the broader population. By studying the sample, the findings can be generalized to a larger population. To select a sample, various sampling techniques can be used. However, two main methods of sampling are comprehensively utilized in literature – non-probability and probability sampling. The ideal sampling method is required to guarantee that the sample really reflects the general population for the purpose of generalization of context and time. Specifically, non-probability sampling refers to a sampling method, in which not every person has the opportunity to get chosen – some have a higher chance while others do not. Contrastingly, probability sampling is one where every individual has the same level of chance to be chosen as a sample (Sekaran & Bougie, 2010).

In the present study, the researcher decided that probability sampling method was more appropriate as opposed to the non-probability sampling. This sampling method was chosen to examine the effect of teamwork quality on the new product development cycle in the context of Saudi Arabian telecommunication industry. Aker *et al*. (2004) enumerated several advantages of probability sampling over its counterpart. For example, it enables the demonstration of the representativeness of the sample and the explicit statements as to the degree of variation presented because a sample rather than a census of the population is used and this allows explicit identification of possible biases that may arise. Additionally, probability sampling has often been employed in previous studies that are similar to the present study's context. This focus on probability sampling feasibility was also stressed by Babbie (2004), who stated that probability sampling is the main method of selecting large, representative samples in social research. Therefore, probability sampling was employed in the present study.

Probability sampling is a method that makes use of random selection. For this method, some procedure is established to make sure that the various units in the population have equal possibilities to be selected. Four main kinds of methods are primarily utilized to carry out probability samples and they are simple random, stratified, cluster and systematic sampling. The complex sampling methods are all based on simple random sampling. In probability sampling, the sampling units are selected through chance. It is mostly attributed to survey-based research and it is the type of sampling where inferences or projections can be made concerning the target population from which the sample is selected.

On the other hand, non-probability sampling is largely dependent on the personal judgment of the researcher rather than on the opportunity of selecting sample elements. This type of sampling may result in good estimates of the characteristics of the population despite the fact that it prevents the objective evaluation of the sample outcome accuracy (Malhotra & Briks, 1999). Researchers are still able to generalize from this type of sampling aside from a statistical standpoint. Non-probability sampling is frequently used in case studies (Churchill & Iacobucci, 2005; Saunders *et al*., 2007).

In this study, the researcher chose randomly teams working in development new products in the telecommunication industry in the Saudi Arabia from a sample frame that listed all teams' works in this field which already specified through coordination with telecom companies. The list of team representatives nominated by companies as expert one in his team and their contacts was obtained with the assistance of the heads of the telecom companies in Saudi Arabia. To increase the diversity of the survey respondents, teams were randomly selected from different departments and different companies. teams were chosen based on random numbers selected using the Random Integer Generator software (Random.org, Dublin, Ireland, http://www.random.org/integers), this web site has been used in many researches to generate random samples (Guyenet *et al*., 2013; Abboud *et al*., 2013; Ketchum *et al*., 2009) In a nutshell, probability sampling was used to identify the area while random sampling was used to select the respondents.

4.4.3 Sample Size

A sample is considered as a group of individuals under study. Sampling refers to the selection process of units like individuals or organizations from a general population, and by studying the selected sample, the researcher is able to generalize the findings to the whole population. A sampling frame is a complete set of sample units, a sub-set of the target population, from which the future selected sample is derived (Burns *et al*., 2008). In addition, Neuman (2006) defined a sample frame as a list of cases within a population or the optimum approximation of a specific population. A sampling frame is also referred to as the working population as these units will consequently provide units for the analysis. The sampling frame comprises an actual list of people in the population (Nesbary, 2000).

For high validity of results, 155 respondents were selected for this study. The sample size chosen was partially based on the suggestions by Ozok (2009), who recommended that a sample size should always be larger than the number of survey questions, and that for measuring general topics or opinions a sample size of at least double the number of survey questions should be used. In addition, this sample size met Hair, Tatham, Anderson, and Black's (1998) suggestion. They suggested that the minimum sample size of 100 to 150 ensures suitable use of likelihood estimation in structural equation modeling. Moreover, this sample met Kline's (2002) suggestion that the least sample size for path analysis is set at 100 with the cases 10 times the number of parameters.

Many authors recommended different ways to determine sample size. Nunnally and Bernstein (1978) suggested the rule of thumb ratio, by which the number of subjects-to item ratio should be at least 10:1, and Gorsuch (1983), Thatcher and George (2004) recommended a 5:1 ratio. Harlow (1995) suggested that a dataset with a sample size of 100 - 400 could be analyzed by Maximum Likelihood Estimation.

Sample must represents the population. Sekaran (2003) stated a rule that "the sample size should be several times (preferably 10 times or more) as large as the number of variables in the study" (p. 296). Therefore, the sample size was determined keeping in view the number of variables, which are five variables. Also, the sample size larger than 30 and less than 500 is appropriate for most research (Sekaran, 2003). Moreover, Thomas (2004) recommends that a sample size of around 200 cases usually is adequate to do analysis. In addition, Roscoe (1975) proposed a rule of thumb for the sample size determination he stated that: "if the sample size is larger than 30 and less than 500, it is therefore appropriate for most research" (Roscoe, 1975).

The study sample was derived from telecom industry in Saudi Arabia. There are many sub-industries included in this study: (1) mobile services; (2) fixed line services; (3) data services; (4) internet services; (5) personal services; (6) home services; and (7) business services. This relatively broad range of sub-industries helps improve generalizability in the sample. Teams from firms within the telecom industry were selected to constitute the sample in the current study. The firms that constitute the frame of our sample were chosen from the telecom industry because these firms were highly likely to have active NPD activities. The selection criteria were the same for all selected firms. They were as follows: (1) the firm produces new products; (2) the firm has an R&D department or special engineers to develop new products; (3) the new product has been sold in the market; (4) the competitors have developed the same product and published it early; and (5) their products are related to telecom industry.

To ensure all respondents were expert members in the teams of new product development the researcher selected key persons in every product team in every company to be the leader in the distribution of questionnaire. The firms selected for the sample frame are licensed from the Communications and Information Technology Commission (CITC) in Saudi Arabia. Contact with each firm was made prior to data collection to ascertain whether or not they were willing to participate in the research.

The members were chosen as a representative his team based on the following; 1) they are the most likely individuals to have a general view of the NPD projects compared to others who do not work close to the production process; (2) they have a more general overview of the behavior of every member and their performance which have direct effect on the NPD cycle time; and (3) they are more likely to provide valid and reliable information.

The present study's population comprise of the teams works in different production stages in the of products developments determents in telecommunication companies in Saudi Arabia. The initial sample consisted of 155 out of 312 teams working in the telecom companies in Saudi Arabia. These teams were selected since they develop new products; they were identified by the companies after communicate with them through Saudi cultural mission in kuala-lumpur as per letters shown in Appendix B.

4.5 Measurements of Variables

There are four main variables in the present research. The dependent variable is new product development (NPD) cycle time. The independent variable the study is teamwork quality. The moderating variable is environmental factors. Finally, internal market orientation represents the mediating factor. This section provides a detailed measurement about each of these constructs.

4.5.1 Dependent Variable

As indicated earlier, the dependent variable in the present study is cycle time of new product development (NPD) in the telecommunication industry in Saudi Arabia. New product development cycle time is operationally defined as the time between initial development efforts and the introduction of a new product in the marketplace (Kessler & Chakrabarti, 1996, 1999).

New product development cycle time can be susceptible to the impact of many factors such as the type of industry, innovation, project complexity and size of the project. Since in this study used a multi-company sample, and tried to control for NPD cycle time differences in the nature of projects by using relative speed measures. That's mean relative NPD cycle time measurement is more meaningful for the team characteristics while absolute NPD cycle time measurement is more meaningful for the project characteristics (Chen *et al*., 2010). As such, NPD cycle time measurement can possibly explain why some studies (e.g., Ittner and Larcker, 1997) have found that supplier involvement is not significantly related to cycle time (absolute cycle time), while most studies have reported a significant relationship between supplier involvement and NPD cycle time. The approach and item content we used were similar to that of Kessler and Chakrabarti (1999) to measure new product cycle time. NPD cycle time was assessed against the initial schedule, main rivals and industry's normal level, and measured by four items adapted from Kessler and Chakrabarti (1999).

The instrument used to measure new product cycle time in this study was adopted from Kessler and Chakrabarti (1999). This instrument was reported to have a high validity and reliability scores in thier study. This instrument was widely used in many types of industry and it is felt that it has no problem to be used in the context of Saudi telecommunication study. Kessler and Chakrabarti (1999) conducted study in the large firms and chosen companies which provided access to a range of task and institutional environments where speedy product innovation is pursued and hence allowed the study to more broadly examine the methods of increasing innovation speed.

Respondents were asked about the time reduction they achieved throughout the process of developing a new product from the time the product was an idea until the time the product was launched in the market. Each item used a seven-point Likert scale, ranging from '1' "Strongly disagree" to '7' "Strongly agree." Table 4.1 shows a complete list of items to measure the construct.

Table 4.1
Items to Measure NPD Cycle Time

No.	Items
1.	This product was completed in less time than what was considered normal and customary for our industry.
2.	This product was launched on or ahead of the original schedule developed at initial project go-ahead.
3.	Top management was pleased with the time it took us from specs to full commercialization.
4.	This product was developed and launched (fielded) faster than the major competitor for a similar product.

4.5.2 Independent Variable

In the present study, the independent variable is teamwork quality. Teamwork quality (TWQ) operationally refers to the degree and quality of team members' interaction which focuses on how teammates collaborate with each other in the pursuit of team goals, but it includes neither task work behavior nor human sentiments. This research is solely on the quality of interactions within teams rather than team members' activities. The quality of interactions with external parties (e.g., management, other teams, etc.) is not part of the TWQ construct which have an effect of new product development cycle time. Based on this understanding of interaction in teams, our review of the relevant literature and various exploratory empirical case studies conducted on this subject resulted in six concepts that are descriptive of the quality of collaborative working in teams. Hoegl and Gemuenden (2001) proposed a high level construct to capture the quality of collaboration within teams and empirically validate teamwork quality based on six indicators: communication, coordination, balance of member contributions, mutual support, effort, and cohesion. These six facets are indicators of the collaborative work process in teams and are combined to the TWQ construct.

The instrument used to measure teamwork quality in this study was adopted from Hoegl and Gemunden (2001) where it was reported to have a high validity and reliability scores. This instrument was widely used in many types of industry and it is felt that it has no problem to be used in the context of Saudi telecommunication study

The items regarding these constructs as mentioned above were adopted from Hoegl and Gemunden (2001) where 10 items constitute the measurement scale for communication, 4 items for coordination, 3 items for balance of member contribution, 6 items for mutual support, 4 items for effort and finally 10 items for cohesion. All items were scored on a seven-point scale, ranging from ‘1’ “Strongly disagree” to ‘7’ “Strongly agree.” *Communication* was measured with a 10-item scale, reflecting the frequency and manner of exchange among team members. A sample item was “Team members communicate mostly directly and personally with each other”. *Coordination* was measured with a four-item scale intended to assess the extent to which team members synchronize their activities. A sample item was “The work within the project is closely harmonized”. *Balance of contribution* was measured with a three-item scale. This scale measured the extent to which team members bring their expertise to the team. A sample item was “Team members contribute to the achievement of the team’s goals in accordance with their specific potentials”. *Mutual support* was measured with a six-item scale. This scale measured the manner in which team members resolve the conflict in the team. A sample item was “If conflicts come up, they are easily and quickly resolved”. *Effort* was measured with a four-item scale intended to assess the extent to which team members exert effort towards the accomplishment of team goals. A sample item was “Every team member makes the projects their highest priority”. *Cohesion* was measured with a ten-item scale. This scale measured team members’ identification with the team and interpersonal attraction. A sample item was “Members of our team feel proud to be part of the team.” A complete scale of items used to assess teamwork quality is presented in Table 4.2.

Table 4.2
Items to Measure Teamwork Quality

No.	Items
Communication:	
1.	There is frequent communication within the team.
2.	Team members communicate often in spontaneous meetings or phone conversations.
3.	Team members communicate mostly directly and personally with each other.
4.	There are mediators through whom much communication among team members is conducted.
5.	Project-relevant information is shared openly by all team members.
6.	Important information is kept away from some team members in certain situations.
7.	In our team there are conflicts regarding the openness of the information flow.
8.	Team members are happy with the timeliness in which they receive information from other members.
9.	Team members are happy with the precision of the information received from other team members.
10.	Team members are happy with the usefulness of the information received from other team members.
Coordination:	
1.	The work within the project is closely harmonized.
2.	There are clear and fully comprehended goals for subtasks within our team.
3.	The goals for subtasks are accepted by all team members.
4.	There are conflicting goals in our team regarding subtasks.
Balance of Member Contribution:	
1.	Our team recognizes the specific potentials (strengths and weakness) of individual members.
2.	Team members contribute to the achievement of the team's goals in accordance with their specific potentials.
3.	Imbalance of member contributions causes conflicts in our team.
Mutual Support:	
1.	Team members help and support each other as best as they can.
2.	If conflicts come up, they are easily and quickly resolved.
3.	Discussions and controversies are conducted constructively.
4.	Suggestions and contributions of team members are respected.
5.	Suggestions and contributions of team members are discussed and further developed.
6.	Our team is able to reach consensus regarding important issues.

Table 4.2 *(continued)*

No.	Items
	Effort:
1.	Every team member fully pushes the projects.
2.	Every team member makes the projects their highest priority.
3.	Our team put much effort into the projects.
4.	There are conflicts regarding the effort that team members put into the projects.
	Cohesion:
1.	It is important for the members of our team to be part of these projects.
2.	Our team does not see anything special about these projects.
3.	Team members are strongly attached to these projects.
4.	These projects are important to our team.
5.	All members are fully integrated in our team.
6.	There are many personal conflicts in our team.
7.	There is personal attraction between members of our team.
8.	Our team is sticking together.
9.	Members of our team feel proud to be part of the team.
10.	Every team member feel responsible for maintain the success of the team.

4.5.3 Moderating Variable

Environmental factors is the moderator variable in the present study. Environmental turbulence is operationally defined by three dimensions: technological, competitive, and market turbulence. The instrument used to measure environmental turbulence was adopted from Jaworski and Kohli (1993) and it was reported to have a high validity score ehen used in previous related studies. This instrument was widely used in many types of industry and it is felt that it has no problem to be used in the context of Saudi telecommunication study

The scale comprises five items. The technological turbulence scale items assess the extent to which a firm perceives that technology in an industry was in a state of flux. All items were scored on a seven-point scale, ranging from ‘1’ “Strongly disagree” to ‘7’ “Strongly agree”. *Competitive turbulence* was measured using a six-item scale developed by Jaworski and Kohli (1993). The competitive turbulence scale items assess the extent to which a firm perceives competition in its industry. All items were scored on a seven-point scale, ranging from '1' "Strongly disagree" to '7' "Strongly agree." Finally, the *market turbulence* construct was measured using a six-item scale developed by Jaworski and Kohli (1993). The market turbulence scale items assess the extent to which a firm perceives its customers' changing desires and habits in the market. All items were scored on a seven-point scale ranging from '1' "Strongly disagree" to '7' "Strongly agree." A complete scale of items used to assess environmental turbulence is presented in Table 4.3.

Table 4.3
Items to Measure Environmental Turbulence

No.	Items
Market turbulence:	
1.	In our kind of business, customers' product preferences change quite a bit over time.
2.	Our customers tend to look for new product all the time.
3.	Sometimes our customers are very price-sensitive, but on other occasions, price is relatively unimportant.
4.	We are witnessing demand for our products and services from customers who never bought them before.
5.	New customers tend to have product-related needs that are different from those of our existing customers.
6.	We cater to many of the same customers that we used to in the past.
Competition turbulence:	
1.	Competition in our industry is cutthroat.
2.	There are many "promotion wars" in our industry.
3.	Anything that one competitor can offer, others can match readily.
4.	Price competition is a hallmark of our industry.
5.	One hears of a new competitive move almost every day.
6.	Our competitors are relatively weak.
Technological turbulence:	
1.	The technology in our industry is changing rapidly.
2.	Technological changes provide big opportunities in our industry.
3.	It is very difficult to forecast where the technology in our industry will be in the next 2 to 3 years.
4.	A large number of new product ideas have been made possible through technological breakthroughs in our industry.
5.	Technological developments in our industry are rather minor.

4.5.4 Mediating Variable

Internal market orientation (IMO) is the mediating variable. Internal market orientation (IMO) operationally refers to the multidimensional marketing concept that recognizes the need for an element of marketing focus on the internal environment of the firm. Internal market orientation was measured using the scale developed by Lings and Greenley (2005). The instrument used to measure internal market orientation was adopted from Lings and Greenley (2005) and it was reported to have a high validity score. This instrument was widely used in many types of industry and it is felt that it has no problem to be used in the context of Saudi telecommunication study

The scale consists of 16 items covering the five dimensions of the construct. Four items represent informal information generation, three items represent formal face-to-face information generation, three items formal written information generation, three items information dissemination, and three items capture responsiveness. Each item was scored on a seven-point Likert scale, ranging from '1' "Strongly disagree" to '7' "Strongly agree". A complete scale of items used to assess internal market orientation is presented in Table 4.4.

Table 4.4
Items to Measure Internal Market Orientation

No.	Items
Informal information generation:	
1.	When at work I try to find out what employees want from the company.
2.	When at work if I notice one of my employees is acting differently to normal I will try to find out if there is a problem which is causing a change in behavior.
3.	When at work I try to find out my employees' real feelings about their jobs.
4.	When at work I regularly talk to my staff to find out about their work.
5.	When at work I try to find out what employees want from the company.
6.	When at work if I notice one of my employees is acting differently to normal I will try to find out if there is a problem which is causing a change in behavior.

Table 4.4 *(continued)*

No.	Items
Formal face-to-face information generation:	
1.	In our company we have regular staff appraisals in which we discuss what employees want.
2.	In our company management meet with our employees at least once a year to find out what expectations they have of their jobs for the future.
3.	In our company management interact directly with our employees to find out how to make them more satisfied.
4.	In our company we have regular staff appraisals in which we discuss what employees want.
5.	In our company management meet with our employees at least once a year to find out what expectations they have of their jobs for the future.
6.	In our company management interact directly with our employees to find out how to make them more satisfied.
Formal written information generation:	
1.	In our company we do a lot of internal market research.
2.	In our company we survey our employees at least once a year to assess the quality of employment.
3.	In our company we often talk with or survey people to identify influences on our employees' behavior (e.g. Unions, sales representatives, customers).
4.	In our company we do a lot of internal market research.
5.	In our company we survey our employees at least once a year to assess the quality of employment.
Information dissemination:	
1.	In our company I regularly meet with all my staff to report about issues relating to the whole organization.
2.	In our company I regularly report back to my staff about issues, that affect their working environment.
3.	In our company we have regular staff meetings with employees at all levels attending.
Response:	
1.	In our company when we find out that employees are unhappy with our supervision or management, we take corrective action.
2.	In our company when we find that employees would like us to modify their conditions of employment, the departments make concerted efforts to do so.
3.	In our company we make changes to what we do when employee feedback indicates that they are dissatisfied with the status quo.
4.	In our company when we find out that employees are unhappy with our supervision or management, we take corrective action.
5.	In our company when we find that employees would like us to modify their conditions of employment, the departments make concerted efforts to do so.
6.	In our company we make changes to what we do when employee feedback indicates that they are dissatisfied with the status quo.

4.6 Questionnaire Design

The present study adopted a survey research where a set of questionnaires was used as the main data collection technique. A questionnaire is a research instrument defined by De Vaus (2002) as all techniques of data collection in which each person is asked to respond to the same set of questions in a predetermined order. The questionnaire used in the present study consists of well-established items in the literature but were amended to reflect the Saudi telecom industry. In the context of the present study, there were two practical reasons to use a questionnaire survey. First, a questionnaire survey can efficiently generate large amounts of data that can be subjected to statistical analysis (Snow & Thomas 1994). Second, it is necessary to allow respondents maximum discretion in answering the questionnaire since many organizations consider sensitive a discussion of the "dark-side" effects of any strategies, teamwork behavior, competency traps, new product development or compensation strategies.

The following procedures were followed to develop the questionnaire. First, previous studies related to each variable in the framework were reviewed. Most measures in the questionnaire were chosen from those that had been employed in previous research. If the variables had met quality in previous literature variables, they were adopted. Second, in questionnaire design, the researcher made sure to avoid developing leading, complex and sensitive questions (particularly in the beginning of the questionnaire) that could adversely affect the respondents (Churchill, 1991; Tull & Hawkins, 1987). Third, in order to enhance the content validity of each scale, a panel with three researchers conducted an evaluation of the issues that may be present in the instrument concerning content and wording of items before the actual administration. If a single judge had an issue with an item, the researcher handled it by rewording or deleting from the final instrument. Fourth, one experienced and qualified translation office on the subject in Saudi Arabia was hired to translate the original English questionnaire into Arabic. Another experienced translator was hired to back-translate from Arabic to English. Back-translation enables the enhanced validity of the cross-cultural setting. The original questionnaire and back-translated questionnaire was compared in order to detect any misunderstanding due to translation. In case there are any errors, these errors was detected and corrected.

Closed-ended answers were selected as a form used in questionnaires for several reasons. First, this approach reduces the possibility that questions will be misinterpreted (Huber & Power 1985). Second, closed-ended answers are especially appropriate when responses must be compared across multiple respondents and when the questionnaire is administered by mail (Churchill, 1999: Huber & Power, 1985). Third, a closed-ended response format reduces the time taken to complete the questionnaire hence minimizing respondent fatigue. Finally, it enables faster and less expensive data collection technique over open-ended responses (Malhotra & Birks 2000).

To avoid incomplete questionnaires, mandatory questions were added to the web-form and they could move to the next step before answering prior questions.

4.7 Data Collection Procedure

There are many survey methods used including mail survey and self-administered survey. Both types of survey have their advantages and disadvantages. In the context of the present study, the researcher utilized both types of survey, namely online survey technique and the self-administered survey technique.

All organizations involved in the study were contacted in order to seek permission to distribute the survey questionnaires to their teams within their NPD departments. The process of data collection by contacted selected team representative to ask him to fill he questionnaire and keep following until the selected sample is achieved. The following details for each method.

4.7.1 Self-administered Questionnaire

Following the selection of respondents, the researcher clarified the anonymity of their responses and the absence of linking them to a specific company or product name. This would motivate their cooperation without fear of being criticized. As mentioned earlier, at the beginning of the research the consent of the HQ was sought and the researcher would then approach individual firms (or companies) and discussed personally with the manager or the person in charge in these departments and explained about the whole idea of research and objectives. The managers would then be asked to distribute the questionnaires to their identified team representatives. The questionnaires were collected immediately after being filled by the staff. This is geared towards the prevention of delaying the questionnaire answering as the local culture is characterized to be polychromic where deferring matters is quite acceptable.

4.7.2 Online Questionnaire

Another way of collecting the questionnaires through webpage and communicate with respondents to provide them access link to the webpage through emails by getting e-mail address directory from selected company and get support from coworkers to send the questionnaire to other selected team representatives. If the managers and their staff chose to receive the questionnaires on their emails, direct links were sent and all respondents were asked to fill them and send them accordingly. In other words, the respondents were not asked to download the questionnaire onto their computers and then upload them again and send them back. All they had to do was to click on the link, fill in online and click to submit. To ensure that all questions were answered, an option in the web-application was added in which the respondents could not submit the questionnaire if they failed to complete all questions. Also, cookies in the web-browser were used to avoid duplicated form and to make sure no respondent fill more than one questionnaire.

4.7.3 Ethical Considerations

Research participants included 155 team representatives from three main firms in the telecommunication industry in Saudi Arabia. The participants had no formal power over the researcher. Their consent was obtained, and personal freedom respected during the research. They were also informed of their rights and their prerogative to withdraw from the project anytime and were assured that personal information would be kept confidential. Contact details of the researcher and the assistants were provided to the participants and they were encouraged to raise any issues about the project at their free will.

Prior to conducting the present research, the researcher received support from the Saudi Cultural Mission in Malaysia by writing a letter to three main telecom companies in Saudi to cooperate with researcher to conduct the present study (Appendix B). In the letter, team representatives of the selected companies was encouraged to give whatever assistance needed to facilitate conducting the research. Furthermore, prior to the commencement of the study, each participant signed a Prescribed Consent Form (Attached together with the questionnaire or in the body of email) about taking part in the research. Therefore it is believed that each participant was well informed of the nature of the research and that confidentiality was retained when presenting the information collected in the process of the research.

As for the dissemination of research results, participants were informed that the results obtained from the analysis would become part of the researcher's thesis and might be presented at conferences or might be published. To ensure confidentiality, participants were assured that their identities would be excluded in the final thesis, presentation and publications. More importantly, since the study attempts to examine the NPD cycle time in a number of competing companies in the Saudi telecommunication market, the participants were all assured that their companies' procedures, responses to the market and their internal polices will not be revealed to any other competitive company and all the names of these companies will appear anonymous in the findings.

4.7.4 Reliability of the Instrument

In the context of the present study, there are two practical reasons to use a questionnaire survey. First, a questionnaire survey can efficiently generate large amounts of data that can be subjected to statistical analysis (Snow and Thomas 1994). Second, it is necessary to allow respondents maximum discretion in answering the questionnaire, since many organizations consider sensitive a discussion of the "dark-side" effects of any strategies, teamwork behavior, competency traps, new product development or compensation strategies.

The following procedures were followed to develop the questionnaire. First, previous studies related to each variable in the framework were reviewed. Most measures in the questionnaire were chosen from those that had been employed in previous research. If the variables had met quality in previous literature variables, they were adopted. Second, during the questionnaire design, the researcher stressed on steering clear of leading questions, complex questions and sensitive questions (particularly at the onset), which could adversely affect the respondent's perceptions (Tull and Hawkins, 1987; Churchill, 1991). Third, in order to enhance the content validity of each scale, a panel with three researchers conducted an evaluation of the instrument to highlight issues concerning to content and wording before its actual administration. If one of the researchers had any objections to an item, it was tackled through rewording or deletion from the final instrument.

Fourth, one experienced and qualified Translation Office on the subject in Saudi Arabia was hired to translate the original English questionnaire into Arabic. Another experienced translator was hired to back-translate from Arabic to English. Back-translation enables the enhanced validity of the cross-cultural setting. The original questionnaire and back-translated questionnaire was compared in order to detect any misunderstanding due to translation. In case there are any errors, these errors was detected and corrected.

4.8 Pilot Study

In the hopes of establishing the instrument's internal consistency reliability, the researcher carried out a pilot study a month before conducting the present study. A pilot test is way to predetermine the condition of the questionnaire and to guarantee that the questions are clear to the respondents in light of how it is worded and its measurement (Sekaran, 2003). It is advisable to resolve issues including bias prior to the administration of the questionnaire to the actual respondents. Here, the pilot study was conducted not to get data per se, but to learn about the research process, questionnaire, to test the language and substance of questions and statements. The pilot study would also inform the researcher about the research topic itself (Glesne, 1999). The justification of the questionnaire prior to data collection can be ensured through a pilot test to reduce errors.

Ascertaining the research instrument's reliability and validity are imperative when carrying out any research. Validity refers to the degree to which a study is not controlled by any interference, ambiguity, control or variable manipulation (Sarantakos, 1997). The instrument's reliability is defined as the level to which the instrument produces the same outcome every time the trial is repeated (Carmines & Zeller, 1979). The reliability and validity of the instruments are ensured through various ways. Among them was the choice of data collection and analysis methods. According to Fraenkel and Wallen (2000), the quality of the instrument utilized in any study is imperative as the data acquired through them are used to draw conclusions. When the researcher knows of any potential errors through a pilot study, a solution can be employed instead of wasting any resources by conducting data collection characterized by lack of reliability and validity.

A pilot study entails the involvement of a small number of individuals and the aim behind it is to develop, adapt and ensure that the selected methods are feasible. In this research, the pilot study comprised 35 team representatives working in the telecom company in Saudi Arabia. These representatives worked as a part of new product development teams. The participants of the pilot study were chosen from the same companies selected for the main study and not from any other companies so that any modifications on the instruments would be practical and valid. Efforts were also made to make sure that the pilot study was done under conditions similar to those that exist during the real study. It is also important to mention that the selected participants in the pilot study were excluded from the random sampling of the main study. This step would ensure that no participant was chosen twice to reduce biases.

In this pilot study, all respondents completed the online questionnaire. Although the response rate came to 70 %, it is within the reasonable sample size for pilot studies (Johanson & Brooks, 2010).

Reliability is described as the precision of the measurement. In the present study, the questionnaire's reliability was tested through Cronbach's alpha commonly known as alpha coefficient to determine the instrument's internal consistency. Based on Sekaran (2003), reliability coefficient is better if it is closer to 1.00. Generally, the acceptable alpha coefficient should be higher than 0.7. She added that a Cronbach's alpha of 0.6 is low but it is still considered acceptable. It was found that the reliability of the instruments used was acceptable as indicated by the Cronbach's alpha values. A Cronbach's alpha value for teamwork quality came out to be 0.912. The dimension of internal market orientation had a Cronbach's alpha value of 0.927, the dimension of environmental turbulence 0.824, and the dimension of new product development cycle time 0.671, implying that all instruments were reliable.

4.9 Data Analysis

Consistent with the literature review, the dependent variable and independent variable constructs are multi-dimensional. According to Hair *et al*. (1995), using multi-item scales rather than single-item ones in the measurement of research constructs frequently results in valid outcomes and systematic errors are not likely to occur. Additionally, every indicator in the same set may assess a dissimilar construct element, and this enhances validity (Klein, 1998).

Structural equation modeling with measurement models and path models was used to test the hypotheses and framework. All constructs were measured by multi-items and all the measures used were assessed by seven-point Likert-type scales as indicated earlier. PLS path modeling was chosen for the data analysis. Compared with other covariance based structural equation modeling (SEM) approaches, PLS is a variance-based SEM technique, suitable for reflective and formative measurement models and complex models with many latent variables (Hair, Sarstedt, Ringle, and Mena 2011b; Henseler, Ringle, and Sinkovics 2009). PLS is a prediction-oriented multivariate approach, but is also suitable for testing exploratory theories (Henseler et al. 2009; Hulland 1999). Furthermore, PLS has less stringent assumptions than covariance-based SEM in that PLS does not require a normal distribution of observations or a large-sized sample (Fornell and Bookstein 1982). Thus, Hair, Ringle, and Sarstedt (2011a, p.144) recommend the use of PLS path modeling: "if the goal is predicting key target constructs or identifying key “driver” constructs, select PLS-SEM… if the research is exploratory or an extension of an existing structural theory, select PLS-SEM". Indeed, academics in business and management have recently adopted PLS path modeling as a key analytical method in such areas (e.g. Lages, Silva, and Styles 2009; Tsang 2002), strategic management (e.g. Gruber, Heinemann, Brettel, and Hungeling 2010; Swoboda, Meierer, Foscht, and Morschett 2011), and innovation management (e.g. Brettel et al. 2011; Spanjol, Qualls, and Rosa 2011).

Partial Least Square (PLS) involved a two-step approach to data analysis. First, the *measurement model* was used to evaluate and develop the reliability and validity of the research instrument. In particular, as suggested by Barclay, Higgins, and Thompson (1995) and Chin (1998a) the measurement model was evaluated by examining:

1) Convergent validity

Convergent validity is exhibited when all the measures of a certain construct correlate and 'stick' together in terms of the concept they reflect (Hair *et al*., 2006). In this research, three evaluation criteria used to assess convergent validity by examining:

a) The reliabilities of items scale
b) The composite reliability (CR) of each construct
c) The average variance extracted (AVE)

2) Discriminant validity

Discriminant validity is concerned with the discrimination or differentiation among measures of different constructs (Duarte & Raposo, 2010). In this research, discriminant validity was assessed by examining two evaluation criteria as below:

a) Item cross-loadings on various constructs
b) Interrelations between first order constructs and square roots of AVEs.

Second, after the adjustment of items and acceptance of the measurement model, the *structural model* was evaluated to assess the hypothesized relationships among constructs in the conceptual model. More specifically, the structural model was evaluated by analyzing the correlations between the different constructs based on the significance of their path loadings. This two-step process helped ensure that the scale items are statistically consistent and the constructs measure what they intended to measure before any attempts were taken at drawing conclusions regarding the structural model.

4.10 Chapter Summary

This chapter has provided a detailed description of the method employed in this study. Specifically, an online questionnaire and e-mail survey of team of new product development in the telecommunication firms were employed to collect research data. A measuring instrument utilized in the study was adopted from previous research. The questionnaires were sent to randomaly selected NPD teams in the telecom companies, achieving 155 returned questionnaires. The next chapter presents the findings.

CHAPTER FIVE

ANALYSIS AND RESULTS

5.1 Introduction

This chapter is the first of two chapters which present the analysis and findings of the data obtained from the main study. It highlights two important sections: descriptive analysis of the sample, and measures development and assessment. The descriptive component examines the patterns exhibited by the responding firms in this study. The descriptive analysis is necessary for several important reasons. First, the analysis for model testing in this research requires the use of multivariate analysis. Therefore, the identification of distinct patterns and characteristics of variables under investigations is needed. This process is deemed necessary prior to taking on more rigorous analysis in order to identify any violation of test assumptions (e.g., multicollinearity) and help in the interpretation of the results. Second, the analysis helps to provide general understanding of the measures and the pattern of the responses, thus providing further insights into the model testing components in this study.

The measure development and assessment section of this chapter describes the development of summated rating scales of all measures used in this study. Measures were first subjected to purification and then assessed for their unidimensionality, reliability and validity using established procedures from the measure development literature (e.g., Churchill, 1979; DeVellis, 1991; Gerbing & Anderson, 1988; Spector, 1992).

The first section of this chapter describes the respondents' profile and other characteristics of the firms. This is followed by a discussion on the measure development and assessment using established procedures. The development of teamwork quality, internal market orientation environmental turbulence, and new product development cycle time measures was first discussed. This is followed by the construction of other scales used in this study. Finally, the last section describes the characteristics of the scale developed from the procedures used in this study.

5.2 Demographic Profile of Participants

The descriptive analysis involves an examination of several patterns exhibited by the variables of interest in the data set which include characteristics, company background, nationality, age, educational level, job position and experience.

5.2.1 Company Background

The descriptive statistics of the respondents is illustrated in Table 5.1 based on the respondents' description. Majority of the sample comprised STC teams (55.7%) while MOBILY teams made up 30.2% and ZAIN teams 14.1% of the total respondents.

5.2.2 Nationality

In terms of nationality, Table 5.1 shows that the sample was dominated by Saudi citizens (85.2%) while non-Saudi citizens made up of 14.8% of the total respondents

Table 5.1
Respondents' Demographic Statistics

	Frequency	**Percentage**
Company Name		
STC	83	55.7
MOBILY	45	30.2
ZAIN	21	14.1
Nationality		
Saudi Citizen	127	85.2
Non-Saudi Citizen	22	14.8
Age		
25-30 years	7	4.7
31-35 years	30	20.1
36-40 years	45	30.2
41-45 years	41	27.5
46-50 years	20	13.4
Above 51 years	6	4.0
Educational Level		
Secondary School	4	2.7
High School Diploma	42	28.2
Bachelors' Degree	80	53.7
Master Degree	20	13.4
PhD Degree	3	2.0
Job Position		
Director or higher level	5	3.4
Division Manager	28	18.8
Head section	25	16.8
Expert Employee (Consultant)	36	24.2
Employee	55	36.9
Experience		
Below 5 years	4	2.7
5-10 years	25	16.8
11-15 years	47	31.5
16-20 years	38	25.5
21-25 years	26	17.4
Above 25 years	9	6.0

5.2.3 Age

With regards to age, Table 5.1 shows that 30.2% of the study sample were between the age of 36 and 40 years old, 27.5% were between 41 and 45 years old, 20.1% 31 and 35, 13.4% 46 and 50, 4.7% 25 and 30, and 4.0%were above 51 years old.

5.2.4 Education Level

As illustrated in Table 5.1, 53.7% of the study sample held a bachelors' degree, 28.2% had a high school diploma, 13.4% had a master's degree, 2.7% completed secondary school, and 2.0% finished their doctoral studies.

5.2.5 Job Position

Table 5.1 shows that, 36.9% of the study sample were ordinary employees, 24.2% were consultants, 18.8% were division managers, 16.8% were heads of section, and 3.4% were directors or holding higher level positions.

5.2.6 Work Experience

With regards to work experience, Table 5.1 indicates that 31.5% of the study sample had between 11 and15 years of work experience, 25.5% had between 16 and 20 years, 17.4% 21 and 25 years, 16.8% 5 and 10 years, 6.0% had more than 25 years of work experience, and 2.7% had work experience less than 5 years.

5.3 Survey Pre-tests and Validation

Among the fundamental steps in any study is to assess the study items prior to evaluating their effects on the study phenomenon. This section illustrates the processes from collection of data to preparation of data for the proposed model testing. Before data was analyzed, it was screened in terms of sample size, missing data, normality, linearity, outliers, validity, reliability, and factorability of the constructs. These are the primary assessment methods utilized in the field of social sciences to gauge data accuracy in quantitative research. Prior to data analysis and results interpretation, it is important to provide conceptual ideas concerning the measures to be used in the study.

5.3.1 Adequacy of Sample Size

Researchers have generally agreed that determining an adequate sample size can minimize sampling error (Burns & Burns, 2008; Hair *et al*., 2010; Tabachnick & Fidell, 2007). This is because the larger the sample size, the smaller the sampling error, and vice versa (Grossnickle & Raskin, 2001). Kelloway (1998) recommended that a sample size of at least 150 observations is considered most appropriate for structural equation modeling. Hence in the present study, 149 observations met the requirement proposed by Kelloway (1998) though the use of Partial Least Squares Structural Equation Modeling (PLS-SEM) does not require a large sample size to run (Hair, Sarstedt, Ringle & Mena, 2012).

5.3.2 Response Rate

A total of 155 completed surveys were submitted by participants, producing a return rate of 88.67%. The total number of questionnaires distributed and the return rate achieved was sufficient to run the main statistical tests (Cohen, 1969; Dean, Sullivan, & Soe, 2009; Krejcie & Morgan, 1970; McMillan, 2004).

To maximize the response rate, many sequential steps were followed, as recommended by Kalman (1988). Participants were briefed about the research objectives and aims, and they were informed that ethical considerations regarding privacy and confidentiality in data collection, analysis, and publication would be taken into account.

Response rate is calculated by dividing the total number of questionnaires sent out with the number of completed and returned questionnaires (Rada, 2005).According to McMillan (2004), the rate of return of distributed questionnaire should be at least 60% of the total questionnaires. Response rate is considered one of the main survey elements of concern to researchers; it is vital that they receive a suitable number of responses to fit the both sample size and analysis methods.

5.3.3 Missing Values

Many descriptive analyses begin by defining missing data, which is one of the main analytical issues in management studies that need to be dealt with. To deal with missing values, missing value calculation module in SPSS was used. Missing data occurs when participants fail to answer any question, either by accident or because they do not want to answer such questions (Bryman & Bell, 2007). In the present study, all missing values were checked against the frequencies of each question within each construct. Responses that had missing values were removed from data analysis. Overall, missing values were not a major threat to the accuracy of the study because missing values were few because of the online survey was designed in such a way that the respondents could not proceed to the next stage before all previous questions were completed. In other words, the software features were modified to force all respondent to complete all questions before submitting them to the system I for record purposes.

5.3.4 Normality

Normality is the most fundamental assumption in multivariate analysis (Hair *et al.*, 2010). It measures the differences revealed between the obtained and predicted scores of dependent variables (Stewart, 1981). Because the study sample was taken from the population, it is crucial to compare the sample normal distribution to one of the basic social science measurements, namely, the normal distribution of the population. According to Bhisham *et al*. (2005), normal distribution is the most commonly utilized probability in social science. The normal density function is described as a bell-shaped distribution that is symmetric to the values surrounding the mean. Although PLS-SEM does not require that data has to be normally distributed (Cassel. *et al*., 1999; Reinartz, Haenlein, & Henseler, 2009), normality test was still conducted for good science.

To check for normality, four measures were used in this study to measure and assess the spread of data distribution: standard deviation, mean, skewness and kurtosis. Standard deviation is described as a measure of the way the data are spread; it is the average distance of the data distribution from the mean. It presents the degree of variation from the mean, with a low standard deviation indicating data that is close to the mean and high standard deviation indicating the data's distribution over a range of values. It is a common measure used to test and appraise the data dispersion by calculating the square root of the variance (Bell & Bryman, 2003).

Dancey and Reidy (2008) indicated that the degree of variability can be utilized to delineate the boundaries of normal distribution. Thus, it is important to assess the standard deviation because it explains some statistical rules for the normal distribution. For instance, 68% probability score will be within -1 standard deviation, and +1 deviation of the mean. The area on the curve between -1 and +1 deviation of the mean is called the normal zone of the curve. This means that the standard deviation for a score set can be utilized to delineate the boundaries of normal distribution. Between 90% and 95% of cases fall within two standard deviations, and all observations fall within three standard deviations (Burns & Bush, 2008). Figure 5.1 present the histogram and normal probability plots. As shown, all bars were closed to normal curve, meaning that normality assumptions were not violated (Field, 2009).

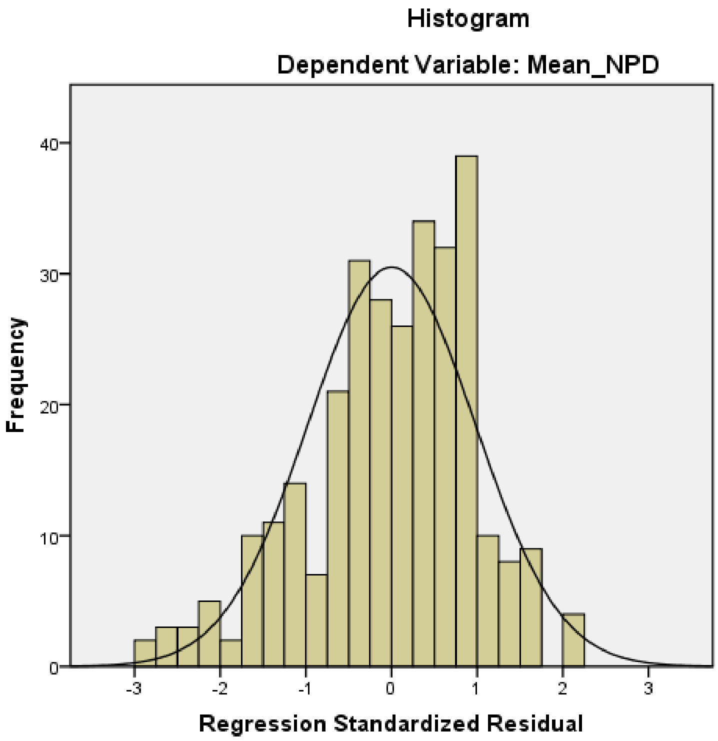

Figure 5.1
Histogram and Normal Probability

Skewness and kurtosis are two statistical measures that can be used to describe the shape and symmetry of the sample distribution. Skewness, according to

Tabachnick and Fidell (2007), can be described as the distribution symmetry and a variable whose mean is not in the middle of the distribution is considered as a skewed variable. A distribution is considered normal when the skewness value is zero (Tabachnick & Fidell, 2007). A positive skewness sample distribution should have a right tail (scores leaning to the left at low values) while a distribution characterized by a negative skewness value should have a left tail (to the right of the graph) (Myers & Well, 2003).

Kurtosis, on the other hand, relates to the distribution peakedness (Johansson, 2000). It is defined as the measure that shows the extent to which the study observations are clustered around the mean. A normal distribution is said to exist when the kurtosis value is zero (Tabachnick & Fidell, 2007). In addition, kurtosis is said to be positive if the distribution is peaked in the center with long thin tails and it is a negative when the observations cluster less and have shorter tail (too many cases in the extremes). "Kurtosis may lead to the underestimation of variance but the risk is reduced when the samples are large 200+ cases" (Tabachnick & Fidell, 2007, p. 80).

Several authors stated that absolute values of univariate skewness higher than 3.0 indicate extremely skewed data sets (Chou & Bentler, 1995; Hu *et al*., 1992; West *et al*., 1995). As for kurtosis, absolute values of index higher than 10.0 are deemed to be problematic and those higher than 20.0 serious (Hoyle, 1995; Kassim, 2001; Kline, 1998). Hair *et al*. (1998) contended that a critical value of less than -2.58 or greater than +2.58 indicates the rejection on assumption of normality at the 0.01 level of probability. In contrast, a value less than -1.96 or greater than +1.96 indicates the rejection on assumption of normality at the probability level of 0.05.

In this study, the researcher set the maximum acceptable limit of observation values up to ±3 for the skewness and up to ±7 for the kurtosis. As shown in Table 5.2, skewness and kurtosis were checked and results were within the acceptable range.

Table 5.2
Descriptive Statistics (Means, Std. Deviation, Skewness, and Kurtosis) for Study Variables (n = 149)

Item	**Mean**	**Std. Deviation**	**Skewness**		**Kurtosis**	
	Statistic	**Statistic**	**Statistic**	**Std. Error**	**Statistic**	**Std. Error**
TWQ_Coord1	5.01	1.200	-.775	.199	.533	.395
TWQ_Coord2	5.22	1.213	-1.126	.199	1.506	.395
TWQ_Coord3	5.03	1.317	-1.087	.199	1.041	.395
TWQ_Coord4	4.28	1.465	-.266	.199	-.981	.395
TWQ_BOC1	2.70	.934	.674	.199	.606	.395
TWQ_BOC2	2.38	.990	1.790	.199	4.890	.395
TWQ_BOC3	3.52	1.659	.722	.199	-.640	.395
TWQ_EF1	5.31	1.114	-.993	.199	1.442	.395
TWQ_EF2	5.14	1.263	-.637	.199	.203	.395
TWQ_EF3	5.40	1.114	-.983	.199	1.092	.395
TWQ_EF4	4.47	1.540	-.533	.199	-.494	.395
TWQ_Comm1	5.79	1.094	-1.195	.199	1.706	.395
TWQ_Comm2	5.26	1.291	-1.245	.199	1.373	.395
TWQ_Comm3	5.40	1.132	-.942	.199	.997	.395
TWQ_Comm4	4.36	1.616	-.616	.199	-.596	.395
TWQ_Comm5	5.22	1.294	-1.010	.199	.848	.395
TWQ_Comm6	4.83	1.517	-.970	.199	.207	.395
TWQ_Comm7	4.23	1.583	-.601	.199	-.632	.395
TWQ_Comm8	4.82	1.310	-.682	.199	-.316	.395
TWQ_Comm9	4.58	1.264	-.604	.199	-.072	.395
TWQ_Comm10	4.93	1.217	-.941	.199	.910	.395
TWQ_MS1	2.54	1.118	1.007	.199	.746	.395
TWQ_MS2	2.79	1.200	1.517	.199	2.834	.395
TWQ_MS3	2.93	1.298	1.028	.199	.675	.395
TWQ_MS4	2.66	1.329	1.287	.199	1.779	.395
TWQ_MS5	2.71	1.181	1.351	.199	1.873	.395
TWQ_MS6	2.76	1.261	1.143	.199	1.460	.395
TWQ_COH1	5.87	.998	-1.547	.199	5.046	.395
TWQ_COH2	4.15	1.667	-.151	.199	-1.052	.395
TWQ_COH3	5.24	1.256	-1.070	.199	1.329	.395
TWQ_COH4	5.43	1.141	-1.126	.199	2.581	.395
TWQ_COH5	5.08	1.271	-1.134	.199	1.319	.395
TWQ_COH6	3.99	1.726	-.101	.199	-1.192	.395

Table 5.2 *(continued)*

Item	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
TWQ_COH7	4.86	1.072	-.282	.199	-.034	.395
TWQ_COH8	5.30	1.130	-1.259	.199	2.302	.395
TWQ_COH9	5.20	1.168	-.916	.199	.907	.395
TWQ_COH10	5.32	1.274	-1.229	.199	1.850	.395
IMO_IIG1	5.52	1.031	-1.040	.199	1.508	.395
IMO_IIG2	5.51	1.063	-1.002	.199	1.332	.395
IMO_IIG3	5.45	1.036	-.880	.199	1.012	.395
IMO_IIG4	5.57	.887	-.922	.199	1.484	.395
IMO_FFIG1	4.44	1.621	-.611	.199	-.709	.395
IMO_FFIG2	4.12	1.856	-.352	.199	-1.146	.395
IMO_FFIG3	4.02	1.784	-.299	.199	-.979	.395
IMO_FWIG1	4.52	1.398	-.787	.199	.233	.395
IMO_FWIG2	4.64	1.538	-.841	.199	.173	.395
IMO_FWIG3	4.36	1.516	-.434	.199	-.275	.395
IMO_ID1	4.82	1.336	-.697	.199	.476	.395
IMO_ID2	4.89	1.343	-.908	.199	.892	.395
IMO_ID3	4.65	1.433	-.860	.199	.387	.395
IMO_RESP1	4.72	1.543	-.748	.199	.019	.395
IMO_RESP2	4.67	1.686	-.600	.199	-.499	.395
IMO_RESP3	4.45	1.500	-.474	.199	-.423	.395
ET_MT1	5.30	1.049	-.795	.199	.396	.395
ET_MT2	5.89	.960	-.666	.199	-.011	.395
ET_MT3	5.59	1.040	-.903	.199	1.014	.395
ET_MT4	5.36	1.054	-.736	.199	1.079	.395
ET_MT5	5.33	1.068	-.455	.199	-.597	.395
ET_MT6	5.07	1.228	-.684	.199	.250	.395
ET_CT1	5.40	1.283	-1.186	.199	1.740	.395
ET_CT2	5.79	.934	-.415	.199	-.644	.395
ET_CT3	5.72	.965	-.658	.199	.081	.395
ET_CT4	5.78	1.096	-1.267	.199	2.565	.395
ET_CT5	5.68	1.103	-1.182	.199	2.452	.395
ET_CT6	3.70	1.715	.203	.199	-.989	.395
ET_TT1	6.33	.739	-1.019	.199	.939	.395
ET_TT2	6.17	.865	-1.411	.199	2.735	.395
ET_TT3	5.87	1.070	-.904	.199	.459	.395
ET_TT4	6.01	.735	-.642	.199	.647	.395
ET_TT5	4.11	1.822	-.103	.199	-1.195	.395
NPDCT_ELB1	4.77	1.216	-.796	.199	.860	.395
NPDCT_ELB2	4.76	1.212	-.795	.199	.261	.395
NPDCT_ELB3	4.77	1.269	-.487	.199	.106	.395
NPDCT_ELB4	4.68	1.452	-.279	.199	-.757	.395

5.3.5 Linearity

The scatterplot analysis was used to examine non-linearity of certain variables, as recommended by Tabachnick and Fidell (2001). In the initial assumption, linearity was evaluated by analyzing the residuals and plots of partial regression. The linearity results displayed via scatter plot diagrams are presented in Figure 5.2. It can be inferred that non-linearity was not an issue in the research data.

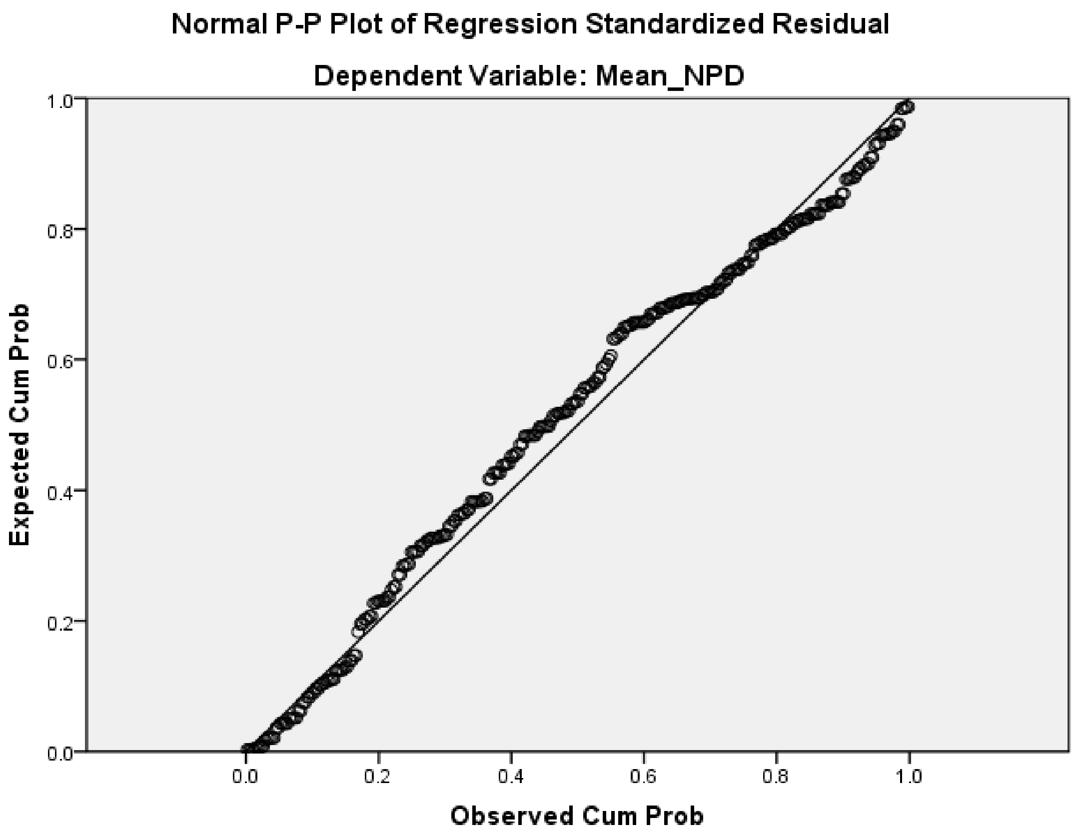

Figure 5.2
Linearity Test for Affective Commitment to Change

5.3.6 Multicollinearity

Multicollinearity is “the degree to which any variable’s effect can be predicted or accounted for by the other variables in the analysis” (Hair *et al*., 2006). While this is desirable to some extent in factor analysis, where the researcher wants to identify interrelated variables, it can be troublesome in other multivariate techniques (e.g., multiple regression) as it becomes difficult to ascertain the real impact of each variable. In structural equation models, problems with multicollinearity can be detected through offending estimates, such as standardized regression weights around 1 or negative variance estimates (Garson, 2007).

In addition to controlling for such estimates during model specification and testing, multicollinearity also was checked at the measure validation stage by examining the variance inflation factor (VIF) and tolerance values of all variables in the model (Hair *et al*., 2006). The threshold values recommended by Hair *et al*. (2011) were suggested that multicollinearity is acceptable if VIF value is less than 5 and tolerance value less than 0.2. Table 5.3 shows that the values of VIF and tolerance for all items were within the acceptable range, suggesting that multicollinearity was not an issue in the present study.

Table 5.3
Multicollinearity Statistics

Construct	**Tolerance**	**VIF**
Coordination	.40	2.50
Balance of member contribution	.55	1.81
Efforts	.28	3.54
Communication	.34	2.94
Mutual support	.31	3.19
Cohesion	.23	4.44
Informal information generation	.56	1.78
Formal face-to-face information generation	.29	3.43
Formal written information generation	.40	2.53
Information dissemination	.32	3.10
Response	.32	3.13
Market turbulence	.59	1.69
Competition turbulence	.57	1.76
Technological turbulence	.63	1.59

5.3.7 Outliers

Outliers are observations or measures that are suspicious because they are much smaller or much larger than the vast majority of the observations (Cousineau, 2010). Outliers can arise by chance in a distribution based on four reasons (Hawkins, 1980). The first one stems from incorrect data entry and the second type is attributed to the inclusion of missing values in calculations. The third type results from sampling error where cases do not represent the intended population. The final type includes observations within the focused population but is extreme in the combination of variables values.

Byrne (2009) indicated that an outlier is any observation that is numerically distant one compared with the rest of the dataset. There are of number of studies on the different methods of detecting outliers, including classifying data points based on an observed distance (Mahalanobis) from the expected values (Hair *et al.*, 2006; Hau & Marsh, 2004). This can be an effective way to detect outliers in some predetermined threshold parameters, which helps define whether a point can be considered an outlier or not.

For this study, chi-square was employed as the boundary to identify the study's optimal values. This is consistent with the contention of Hair *et al*. (2010) that calls for the creation of a novel variable in SPSS known as "Response ID" by allocating the variables with numbers. Moreover, the Mahalanobis may be obtained using a simple linear regression through the selection of the number of newly created responses as the dependent variable and selecting all the measuring out of the demographic variables as the independent variables. This procedure helped create a new release called Mah on which a comparison was made. Under this Mah, the researcher identified six cases out of the 155 respondents as outliers because their Mah values exceeded the recommended threshold of chi-square of 116.08, which was linked to 74 items measuring all the variables in this study and was subsequently removed from the dataset. Thus, the final regression in this study was conducted using the 149 remaining samples in the data.

5.3.8 Non-Response Bias

Lambert and Harrington (1990) defined non-response bias as "the differences in the answers between non-respondents and respondents" (p. 5). In order to estimate the possibility of on- response bias, Armstrong and Overton (1977) suggested a time-trend extrapolation approach, which entails comparing the early and late respondents (i.e., non-respondents). They argued that late respondents share similar characteristics with non-respondents. Meanwhile, to further minimize the issue of non-response bias, Lindner and Wingenbach (2002) recommended that a minimum response rate of 50% should be achieved. Following Armstrong and Overton's (1977) approach, the present study divided the respondents into two main groups: those who responded within 30 days (i.e., early respondents) and those who responded after 30 days (i.e., late respondents) (c.f., Vink & Boomsma, 2008). One hundred and twenty of the respondents, representing 80.54% responded to the questionnaire within the first 30 days of data collection period, while the remaining 29, representing 19.46% responded after 30 days (Table 5.4).

In particular, an independent samples t-test was conducted to detect any possible non-response bias on the main study variables including, coordination, balance of member contribution, effort, communication, mutual support, cohesion, informal information generation, formal face-to-face information generation, information dissemination, market turbulence, competition turbulence, technological turbulence and new product development cycle time. Table 5.4 presents the results of independent-samples t-test obtained.

As presented in Table 5.4, the results of independent-samples t-test revealed that the equal variance significance values for each of the seven main study variables were greater than the 0.05 significance level of Levene's test for equality of variances as suggested by Pallant (2010) and Field (2009). Hence, this suggests that the assumption of equal the variances between early and late respondents has not been violated. As such, it can be concluded that non-response bias was not a major concern in the present study.

Table 5.4
Results of Independent-Samples T-test for Non-Response Bias

Variables	Group	N	Mean	Std. Deviation	Levene's Test for Equality of Variances	
					F	Sig.
Cord	Early response	120	4.83	.95	1.07	.30
	Late response	29	5.10	.77		
BOC	Early response	120	2.88	.73	.02	.90
	Late response	29	2.82	.70		
EFFT	Early response	120	5.08	.90	.88	.35
	Late response	29	5.06	.73		
Comm	Early response	120	4.92	.77	.31	.58
	Late response	29	5.02	.64		
MS	Early response	120	2.74	1.10	.15	.70
	Late response	29	2.69	1.08		
COH	Early response	120	5.02	.73	.44	.51
	Late response	29	5.13	.62		
IIG	Early response	120	5.50	.83	.28	.60
	Late response	29	5.57	.91		
FFIG	Early response	120	4.18	1.64	.03	.85
	Late response	29	4.28	1.63		
FWIG	Early response	120	4.56	1.35	.27	.60
	Late response	29	4.30	1.28		
ID	Early response	120	4.82	1.24	3.59	.06
	Late response	29	4.64	.96		
RESP	Early response	120	4.66	1.46	.01	.92
	Late response	29	4.43	1.48		
MT	Early response	120	5.44	.78	.55	.46
	Late response	29	5.36	.89		
CT	Early response	120	5.32	.75	.52	.47
	Late response	29	5.43	.82		
TT	Early response	120	5.69	.66	.03	.87
	Late response	29	5.74	.65		
NPDCT	Early response	120	4.75	1.08	1.37	.24
	Late response	29	4.74	1.23		

5.4 Study Variable Descriptive

In the following section a detailed description, means and standard deviation (STD) was calculated for each construct and overall factors for the study variable (teamwork quality, internal market orientation environmental turbulence, new product development cycle time).

Table 5.5
Descriptive Statistics of Latent Construct

Construct	Mean	Std. Deviation
NPD cycle time	4.74	1.10
Coordination	4.88	.92
Balance of member contribution	2.87	.72
Efforts	5.08	.87
Communication	4.94	.75
Mutual support	2.73	1.09
Cohesion	5.04	.71
Informal information generation	5.51	.84
Formal face-to-face information generation	4.19	1.64
Formal written information generation	4.51	1.34
Information dissemination	4.79	1.19
Response	4.61	1.46
Market turbulence	5.42	.80
Competition turbulence	5.34	.76
Technological turbulence	5.70	.66

Descriptive analysis of the means and standard deviations of constructs are shown in Table 5.5. Among the constructs, technological turbulence had the highest mean (M = 5.70, SD = 0.66), followed by informal information generation (M = 5.51, SD = 0.84), market turbulence (M = 5.42, SD = 0.80), competition turbulence (M = 5.34, SD = 0.76), cohesion (M = 5.04, SD = 0.71) and communication (M = 4.94, SD = 0.75). Likewise, mutual support had the lowest mean (M = 2.73, SD = 1. 09) among the constructs. However, formal face-to-face information generation has the highest standard deviation (SD = 1.64) among the constructs. All items were measured on a seven-point scale.

5.5 Assessment of PLS-SEM Path Model Results

SEM has currently become a partial-standard in researches dedicated to marketing (see Babin *et al*., 2008; Bagozzi, 1994; and Hulland, 1999), as it offers authors the opportunity to examine theories and concepts (Rigdon, 1998). In particular, researchers praise its ability to analyze latent variable at the level of observation and examine relationships between variables on the level of theory. Nevertheless, previous studies justified the employment of PLS-SEM by elaborating on its suitability in testing complex theories. Its use is further justified through its coping ability when it comes to complex models and categorical variables.

Next two sections explain two steps process to evaluate and report the results of this study using PLS-SEM path, which according to Henseler, Ringle and Sinkovics (2009) contain assessment of measurement model and assessment of structural model.

5.6 Measurement Model

Prior to any model examination or hypotheses testing it is important to ensure the validity of the measurement model. This involves establishing whether the instrument measures that are used to gather the data actually measure what they are intended to measure. One of the important validities that need to be established in empirical studies, such as this research, is construct validity. This section will first discuss in detail the techniques used to validate this study using established procedures as described by, among others, Anderson and Gerbing (1988), Churchill (1999), DeVellis (1991), Hair *et al*. (2011), Peter and Churchill (1993), and Spector (1992).

The major aspect of construct validity that needs to be established is the assessment of whether the measured variables behave in a way that is consistent with the way they were theoretically expected to behave. This aspect of construct validity is usually established by testing for convergent and discriminant validities by ensuring "that, once cross-loading items are dropped, items load cleanly and exclusively on the constructs (factors) upon which they are posited to load" (Straub *et al*., 2004, p. 393). The following sections discuss and assess both convergent validity and discriminant validity for the research model in this study.

5.6.1 Convergent Validity

Convergent validity is exhibited when all the measures of a certain construct correlate and 'stick' together in terms of the concept they reflect (Hair *et al*., 2006). Establishing convergent validity assures the researcher that all the measures of the construct are actually measuring the same construct or concept and move in the same conceptual direction. The pervious study conducted evaluations on the basis of convergent validity analysis conditions proposed by Anderson and Gerbing (1988), the CFA proposed by Bagozzi and Yi (1988), and the GoF brought forward by Gefen, Straub, and Boudreau (2000). There are many ways to establish convergent validity. In this research, three evaluation criteria used to assess convergent validity by examining:

1. The reliabilities of items scale
2. The composite reliability (CR) of each construct
3. The average variance extracted (AVE)

Each of these analyses is described in the following sections.

5.6.1.1 Reliabilities of Items Scale

One way to demonstrate convergent validity in a construct is by evaluating the reliability of each measurement item in the scale that is used to measure the construct. In Table 5.6 individual item reliability presents the factor loading of each measurement item on its respective construct. As shown, all the items used in this study highly and significantly loaded on their corresponding construct and they all exceeded the 0.70 recommended thresholds for exploratory research (Hair *et al*., 2011; Hulland, 1999). Cronbach's alpha coefficient is the most commonly used to examined the internal reliability (McCrae, Kurtz, Yamagata, & Terracciano, 2011; Peterson & Kim, 2013). All constructs had alpha values above 0.7 (see Table 5.6). This suggested a high level of internal consistency reliability.

5.6.1.2 Composite Reliability of Constructs

Another measure to support the existence of convergent validity is the composite reliability of each construct in the research model. The composite reliability of each construct assesses its internal consistency (McCrae, Kurtz, Yamagata, & Terracciano, 2011). This means that the construct is internally consistent due to the consistency (the measuring of the same concept) among the construct measures. Therefore, compared to the individual item reliability scores reported above, composite reliability is a measure of the 'overall' reliability of the collection of all measures under a certain construct (Hair *et al*., 2011; Hulland, 1999). As a rule of thumb, 0.70 is suggested as a minimum benchmark for acceptable construct reliability (Hair *et al*., 1998; Segars, 1997). As shown in Table 5.6, the composite reliability of every construct in this study was well above the suggested 0.70 threshold.

Table 5.6

Psychometric Properties for First Order Constructs

Constructs	Items	Loadings	Alpha	CR	AVE
BOC	TWQ_BOC1	.86	.74	.86	.76
	TWQ_BOC2	.91			
COH	TWQ_COH10	.88	.93	.95	.77
	TWQ_COH3	.91			
	TWQ_COH4	.81			
	TWQ_COH5	.88			
	TWQ_COH8	.90			
	TWQ_COH9	.87			
COMM	TWQ_Comm1	.74	.88	.91	.67
	TWQ_Comm10	.90			
	TWQ_Comm5	.76			
	TWQ_Comm8	.88			
	TWQ_Comm9	.87			
CORD	TWQ_Coord1	.88	.86	.92	.80
	TWQ_Coord2	.90			
	TWQ_Coord3	.89			
EFFT	TWQ_EF1	.92	.90	.95	.85
	TWQ_EF2	.93			
	TWQ_EF3	.92			
MS	TWQ_MS1	.88	.94	.96	.79
	TWQ_MS2	.85			
	TWQ_MS3	.87			
	TWQ_MS4	.92			
	TWQ_MS5	.91			
	TWQ_MS6	.88			
CT	ET_CT1	.77	.71	.84	.57
	ET_CT2	.72			
	ET_CT4	.77			
	ET_CT5	.75			
MT	ET_MT2	.79	.79	.88	.65
	ET_MT3	.81			
	ET_MT4	.80			
	ET_MT5	.83			
TT	ET_TT1	.78	.81	.87	.64
	ET_TT2	.82			
	ET_TT3	.70			
	ET_TT4	.88			
FFIG	IMO_FFIG1	.90	.91	.95	.87
	IMO_FFIG2	.94			
	IMO_FFIG3	.95			
FWIG	IMO_FWIG1	.88	.88	.93	.81
	IMO_FWIG2	.90			
	IMO_FWIG3	.92			

Table 5.6 *(continued)*

Constructs	**Items**	**Loadings**	**Alpha**	**CR**	**AVE**
ID	IMO_ID1	.90			
	IMO_ID2	.85	.84	.90	.75
	IMO_ID3	.85			
IIG	IMO_IIG1	.85			
	IMO_IIG2	.85	.84	.90	.70
	IMO_IIG3	.88			
	IMO_IIG4	.76			
RESP	IMO_RESP1	.91			
	IMO_RESP2	.94	.92	.95	.86
	IMO_RESP3	.93			
NPD	NPDCT_ELB1	.86			
	NPDCT_ELB2	.85	.87	.92	.73
	NPDCT_ELB3	.87			
	NPDCT_ELB4	.85			

Notes: BOC = Balance of Member Contribution; COH = Cohesion; COMM = Communication; CORD = Coordination; EFFT = Effort; MS = Mutual Support; FFIG = Formal Face-To-Face Information Generation; FWIG = Formal Written Information Generation; ID = Information Dissemination; IIG = Informal Information Generation; RESP = Response; CT = Competition Turbulence; MT = Market Turbulence; TT = Technological Turbulence; NPD = New Product Development Cycle Time.

5.6.1.3 Average Variance Extracted (AVE)

Average Variance Extracted (AVE) assesses the magnitude of variance that a variable captures from its indicators compared to the amount that results from measurement error (Chin, 1998a). A high construct AVE indicates that the indicators (or measure) under it are capturing the same underlying construct, which leads to the exhibition of convergent validity of the construct. In order to support a satisfactory convergent validity, it is recommended that the AVE of each construct in the model exceeds 0.50 (Fornell, 1982; Fornell & Larcker, 1981). As Table 5.6 shows, all constructs exceeded this threshold.

In sum, as suggested by the findings, the measurement model used in this study met and exceeded the requirements for establishing convergent validity. The following sections assess discriminant validity, which is the second criterion for establishing the adequacy of measurement model in this study.

5.6.2 Discriminant Validity

Unlike convergent validity, which assures the unity or relatedness of the measures of each construct, discriminant validity is concerned with the discrimination or differentiation among measures of different constructs (Duarte & Raposo, 2010). Discriminant validity is therefore exhibited when there is a low correlation between the measures of each construct in the research model. This is very important to assess since the measures of each construct are supposed to measure a different concept.

There are many ways to establish discriminant validity. In this research, discriminant validity was assessed by examining two evaluation criteria as below:

1. Item cross-loadings on various constructs
2. Interrelations between first order constructs and square roots of AVEs.

Each of these analyses is described in the following sections.

5.6.2.1 Cross-Loadings

To show satisfactory discriminant validity, the loading of each measurement item on its corresponding construct should be higher than its loading on other constructs (Chin, 1998a; Gefen *et al*., 2000; Straub *et al*., 2004). This shows that the measurement items of a construct are measuring their construct and their construct only. Table 5.7 demonstrates the satisfaction of this criterion. Validity of the model was achieved by comparing the loading values of every individual indicator with the reflective indicators' cross-loadings as proposed by Chin (1988), where the indicator loadings were all greater compared to the cross-loadings, satisfactory discriminant validity in the model was met.

5.6.2.2 Interrelations between First Order Constructs and Square Roots of AVEs

A second criterion for establishing discriminant validity is when the square root of the average variance extracted (AVE) of each construct is higher than its correlation score with all other constructs (Fornell *et al*., 1981). This comparison shows that more variance is shared between a construct and its measures than with other constructs. As shown in Table 5.8, the square root of the AVE of each (shown diagonally) was greater than its correlation with other constructs (the off-diagonal numbers), which satisfied this test of discriminant validity.

Table 5.7

Loadings and Cross Loadings

	CT	MT	TT	FFIG	FWIG	ID	IIG	RESP	NPD	BOC	COH	COMM	CORD	EFFT	MS
ET_CT1	**.77**	.34	.28	.32	.35	.28	.32	.34	.22	-.34	.23	.17	.25	.21	-.24
ET_CT2	**.72**	.35	.40	.15	.21	.20	.14	.23	.06	-.18	.20	.17	.21	.12	-.25
ET_CT4	**.77**	.24	.32	.20	.06	.04	.18	.15	.15	-.10	.09	.10	.08	.05	-.07
ET_CT5	**.75**	.32	.39	.25	.11	.11	.23	.13	.25	-.15	.19	.22	.21	.17	-.18
ET_MT2	.31	**.79**	.38	.07	.09	-.01	.18	-.08	.05	-.11	-.05	-.09	.03	.00	.00
ET_MT3	.43	**.81**	.29	.14	.18	-.01	.18	.06	.14	-.15	.04	-.06	.02	.05	-.06
ET_MT4	.34	**.80**	.32	.23	.29	.20	.40	.13	.30	-.45	.32	.21	.36	.34	-.28
ET_MT5	.26	**.83**	.37	.28	.21	.07	.25	.20	.26	-.27	.11	-.01	.11	.18	-.10
ET_TT1	.33	.30	**.78**	.02	-.02	.09	.15	.03	.01	-.14	.13	.11	.10	.08	-.12
ET_TT2	.44	.40	**.82**	.15	.06	.19	.18	.12	.04	-.14	.06	.08	.12	.11	-.12
ET_TT3	.31	.23	**.70**	.08	-.04	.04	.12	.11	.15	-.07	.03	.00	.03	.08	-.07
ET_TT4	.39	.39	**.88**	-.01	-.10	-.04	.11	-.08	.05	-.07	-.03	.01	.01	.05	-.04
IMO_FFIG1	.36	.29	.14	**.90**	.63	.62	.43	.65	.52	-.44	.51	.45	.53	.51	-.59
IMO_FFIG2	.25	.16	.03	**.94**	.66	.57	.37	.73	.51	-.26	.39	.37	.37	.35	-.42
IMO_FFIG3	.25	.16	.04	**.95**	.69	.59	.37	.72	.52	-.27	.43	.41	.44	.42	-.49
IMO_FWIG1	.26	.11	.01	.60	**.88**	.60	.30	.53	.46	-.25	.43	.36	.37	.41	-.40
IMO_FWIG2	.21	.25	-.04	.62	**.90**	.51	.35	.51	.43	-.37	.46	.37	.32	.42	-.45
IMO_FWIG3	.18	.27	-.06	.68	**.92**	.57	.36	.55	.49	-.34	.41	.37	.39	.43	-.42
IMO_ID1	.26	.09	.11	.54	.51	**.90**	.44	.56	.34	-.44	.60	.56	.45	.53	-.55
IMO_ID2	.09	.00	.05	.52	.48	**.85**	.38	.55	.40	-.43	.50	.47	.43	.52	-.46
IMO_ID3	.20	.10	.07	.59	.63	**.85**	.33	.69	.39	-.40	.55	.48	.39	.48	-.55

Table 5.7 *(continued)*

	CT	MT	TT	FFIG	FWIG	ID	IIG	RESP	NPD	BOC	COH	COMM	CORD	EFFT	MS
IMO_IIG1	.26	.27	.15	.45	.41	.41	**.85**	.44	.30	-.51	.56	.36	.44	.57	-.50
IMO_IIG2	.30	.28	.13	.27	.28	.39	**.85**	.31	.26	-.61	.59	.34	.37	.51	-.46
IMO_IIG3	.20	.18	.12	.32	.25	.37	**.88**	.32	.31	-.47	.48	.28	.32	.45	-.39
IMO_IIG4	.19	.31	.20	.35	.29	.31	**.77**	.32	.29	-.37	.46	.17	.36	.40	-.29
IMO_RESP1	.27	.03	.09	.66	.53	.66	.34	**.91**	.32	-.38	.43	.29	.29	.39	-.44
IMO_RESP2	.28	.08	.02	.70	.53	.63	.40	**.94**	.39	-.35	.50	.39	.37	.42	-.48
IMO_RESP3	.23	.15	.04	.72	.57	.65	.43	**.93**	.39	-.43	.56	.44	.44	.49	-.51
NPDCT_ELB1	.18	.25	.06	.54	.48	.42	.38	.42	**.86**	-.28	.46	.32	.36	.43	-.32
NPDCT_ELB2	.17	.15	.05	.42	.43	.34	.33	.35	**.85**	-.33	.51	.35	.35	.46	-.37
NPDCT_ELB3	.22	.18	.05	.48	.47	.34	.25	.34	**.87**	-.17	.36	.27	.31	.38	-.24
NPDCT_ELB4	.20	.21	.09	.44	.38	.38	.22	.26	**.85**	-.22	.38	.39	.36	.41	-.27
TWQ_BOC1	-.17	-.30	-.13	-.28	-.21	-.38	-.46	-.32	-.20	**.83**	-.49	-.33	-.53	-.56	.49
TWQ_BOC2	-.26	-.25	-.10	-.32	-.39	-.46	-.55	-.40	-.30	**.91**	-.63	-.51	-.61	-.71	.66
TWQ_COH10	.25	.10	.05	.51	.46	.57	.57	.55	.46	-.57	**.88**	.60	.64	.74	-.76
TWQ_COH3	.17	.09	.03	.39	.45	.56	.54	.45	.44	-.56	**.91**	.60	.59	.77	-.67
TWQ_COH4	.17	.12	.08	.27	.33	.48	.58	.30	.36	-.54	**.81**	.52	.51	.70	-.57
TWQ_COH5	.20	.12	-.01	.47	.39	.60	.53	.55	.44	-.56	**.88**	.65	.59	.74	-.71
TWQ_COH8	.23	.12	.11	.46	.47	.56	.57	.51	.45	-.59	**.90**	.61	.59	.73	-.73
TWQ_COH9	.21	.13	.03	.37	.39	.55	.50	.43	.46	-.61	**.87**	.68	.73	.75	-.71
TWQ_Comm1	.19	.06	.19	.27	.22	.41	.29	.17	.23	-.41	.51	**.74**	.62	.48	-.59
TWQ_Comm10	.24	-.01	.03	.38	.38	.50	.31	.35	.29	-.42	.59	**.90**	.62	.51	-.67
TWQ_Comm5	.28	.06	.07	.35	.30	.42	.29	.30	.18	-.39	.49	**.76**	.63	.47	-.60
TWQ_Comm8	.15	.00	.05	.42	.41	.56	.30	.44	.49	-.43	.67	**.88**	.55	.56	-.62
TWQ_Comm9	.11	-.03	-.02	.36	.34	.50	.26	.36	.34	-.42	.61	**.87**	.59	.50	-.63

Table 5.7 *(continued)*

	CT	**MT**	**TT**	**FFIG**	**FWIG**	**ID**	**IIG**	**RESP**	**NPD**	**BOC**	**COH**	**COMM**	**CORD**	**EFFT**	**MS**
TWQ_Coord1	.30	.20	.16	.44	.36	.43	.38	.32	.40	-.53	.59	.67	**.88**	.58	-.64
TWQ_Coord2	.18	.12	.02	.43	.38	.42	.44	.35	.34	-.65	.62	.61	**.90**	.70	-.69
TWQ_Coord3	.18	.10	.03	.41	.33	.45	.39	.39	.34	-.59	.66	.62	**.89**	.63	-.73
TWQ_EF1	.20	.20	.14	.46	.42	.51	.53	.44	.49	-.70	.70	.55	.68	**.92**	-.69
TWQ_EF2	.17	.18	.06	.41	.48	.53	.52	.39	.42	-.65	.77	.57	.66	**.93**	-.73
TWQ_EF3	.14	.11	.08	.40	.41	.60	.56	.47	.44	-.70	.86	.57	.64	**.92**	-.77
TWQ_MS1	-.21	-.11	-.06	-.41	-.42	-.50	-.47	-.42	-.26	.66	-.73	-.65	-.68	-.75	**.88**
TWQ_MS2	-.17	-.10	-.09	-.41	-.43	-.55	-.49	-.43	-.38	.68	-.77	-.63	-.66	-.76	**.85**
TWQ_MS3	-.18	-.16	-.07	-.48	-.50	-.53	-.41	-.49	-.29	.57	-.67	-.59	-.63	-.68	**.87**
TWQ_MS4	-.32	-.12	-.10	-.52	-.42	-.52	-.42	-.46	-.31	.51	-.68	-.71	-.69	-.65	**.92**
TWQ_MS5	-.22	-.08	-.08	-.51	-.37	-.55	-.38	-.45	-.30	.59	-.68	-.72	-.71	-.68	**.91**
TWQ_MS6	-.22	-.14	-.16	-.53	-.36	-.55	-.48	-.47	-.30	.54	-.69	-.66	-.72	-.68	**.88**

Notes: BOC = Balance of Member Contribution; COH = Cohesion; COMM = Communication; CORD = Coordination; EFFT = Effort; MS = Mutual Support ; FFIG = Formal Face-To-Face Information Generation; FWIG = Formal Written Information Generation; ID = Information Dissemination; IIG = Informal Information Generation; RESP = Response; CT = Competition Turbulence; MT = Market Turbulence; TT = Technological Turbulence ; NPD = New Product Development Cycle Time. All factor loadings were statistically significant at $p < 0.05$.

Table 5.8

Latent Variable Correlations with Square Roots of AVE

	Constructs	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	BOC	**.87**														
2	COH	-.65	**.88**													
3	COMM	-.50	.70	**.83**												
4	CORD	-.66	.70	.71	**.89**											
5	CT	-.25	.24	.22	.25	**.76**										
6	EFFT	-.74	.84	.61	.71	.18	**.92**									
7	FFIG	-.34	.48	.44	.48	.31	.46	**.93**								
8	FWIG	-.36	.48	.41	.40	.24	.47	.71	**.90**							
9	ID	-.49	.64	.58	.49	.21	.59	.64	.62	**.87**						
10	IIG	-.58	.62	.35	.45	.29	.58	.42	.37	.44	**.84**					
11	MS	.67	-.79	-.74	-.77	-.25	-.79	-.54	-.47	-.60	-.50	**.89**				
12	MT	-.31	.13	.01	.16	.42	.17	.22	.24	.07	.31	-.13	**.81**			
13	NPD	-.29	.50	.39	.40	.23	.49	.55	.51	.44	.34	-.35	.23	**.86**		
14	RESP	-.42	.54	.40	.40	.28	.47	.75	.59	.70	.42	-.51	.09	.40	**.93**	
15	TT	-.13	.05	.06	.08	.46	.10	.07	-.03	.09	.18	-.11	.42	.07	.05	**.80**

Note: Square roots of average variances extracted (AVEs) shown on diagonal. BOC = Balance of Member Contribution; COH = Cohesion; COMM = Communication; CORD = Coordination; EFFT = Effort; MS = Mutual Support; ET = Environmental Turbulence; IMO = Internal Market Orientation; NPD = New Product Development Cycle Time.

In sum, it is demonstrated that the measurement model used in this study met and exceeded the requirements for establishing convergent and discriminant validities. The following section examines the structural model and tests the proposed hypothesis.

5.7 Structural Model

Following the assessment of the measurement model, the researcher evaluated the structural model in order to examine the constructs' relationships as provided in the theoretical framework in another chapter. Examining the structural model enables the assessment of its explanatory power. In other words, how much variance in the dependent variable(s) of interest can the independent variables explain or account for is the main objective of this analysis. This section presents the results of the hypothesis testing based on the hypothesis developed in the earlier chapter. To test the hypotheses, a two pronged analysis which comprises conventional statistical analysis using SPSS and Structural Equation Modelling (SEM) using Partial Least Squares (PLS) was employed.

Smart PLS 2.0 (Ringle *et al.*, 2005) yielded two critical pieces of information, which indicates how well the structural model predicts the hypothesized relationships. The first piece of information was the coefficient of determination (R^2) for each endogenous construct in the theoretical framework. This value measures the percentage variation explained by the model (Wixom & Watson, 2001). The PLS structural model and hypotheses were assessed by examining path coefficients (similar to standardized beta weights in a regression analysis) and their significance levels.

5.7.1 The Predictive Power of the Model

The predictive power of the model was measured by three analyzing approach as below:

5.7.1.1 Variance Explained (R^2)

The values for variance explained (R^2) for new product development cycle time and internal market orientation were 0.43, and 0.49, respectively (see Figure 5.3). These values indicated that balance of member contribution, coordination, efforts, communication, cohesion and mutual support contributed 43.5% of the variance in NPD cycle time, while the same six factors contributed 49.2% of the variance in internal market orientation. The remaining 56.5% and 50.8% were explained by other factors beyond the scope of this study. Additionally, the R^2 values of 0.43 and 0.49 were above the recommended value of 0.10, as suggested by Falk and Miller (1992).

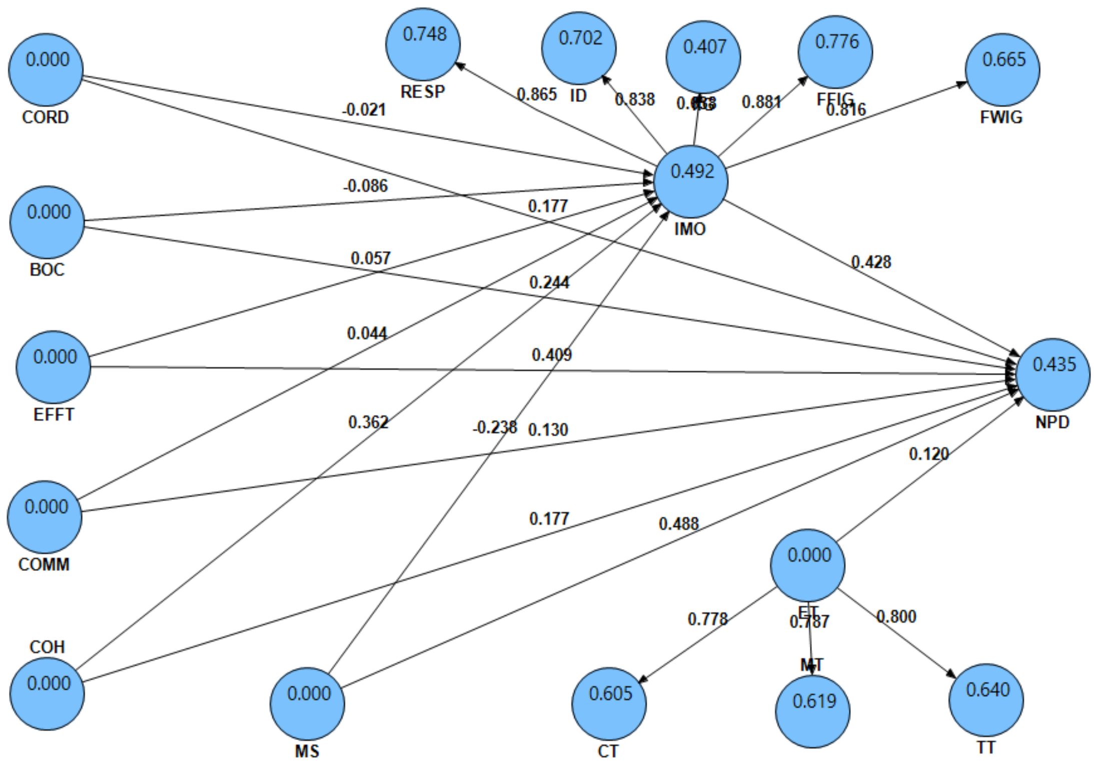

Figure 5.3
Measurement Model

5.7.1.2 Effect Size (f^2)

In this section, the effect size of f^2 was computed using the following formula (Cohen 1988; Wilson, Callaghan, Ringle, & Henseler 2001): $f^2 = (R^2_{included} - R^2_{excluded}) / (1 - R^2_{included})$. f^2 analysis complements R^2 in that the effect sizes of the impacts of specific latent variables on the dependent latent variables can be examined (Chin, 2010). f^2 values of 0.02, 0.15, and 0.35, respectively, were used as the guidelines for small, medium, and large effect sizes of the predictive variables (Cohen, 1988). Table 5.9 summarizes the respective effect sizes of the latent variables of the structural model.

Table 5.9
Effect Size

Exogenous	**Endogenous**	**R^2 Included**	**R^2 Excluded**	**f-squared**	**Effect size**
CORD	NPD	0.44	0.42	0.02	Small
BOC	NPD	0.44	0.41	0.04	Small
EFFT	NPD	0.44	0.40	0.06	Small
COMM	NPD	0.44	0.43	0.01	None
COH	NPD	0.44	0.43	0.01	None
ET	NPD	0.44	0.42	0.02	Small
IMO	NPD	0.44	0.35	0.16	Medium
CORD	IMO	0.49	0.49	0.00	None
BOC	IMO	0.49	0.49	0.01	None
EFFT	IMO	0.49	0.49	0.00	None
COMM	IMO	0.49	0.49	0.00	None
COH	IMO	0.49	0.44	0.10	Small

The effect sizes of communication, cohesion on new product development cycle time were 0.1 for both and the effect size of coordination, balance of member contribution, effort and communication on internal market orientation were 0.1 or 0.0. Following Cohen's (1988) recommendation, the effect size of these variables can be considered as none since the values were almost zero. In addition, coordination, balance of member contribution, effort and environmental turbulence had a small size effect in new product development since the f^2 values ranged between 0.2 and 0.06. Furthermore, cohesion can be considered to have a small effect in internal market orientation since the f^2 values was 0.1. However, internal market orientation had a medium effect on new product development cycle time (f^2 = 0.16).

Chin, Marcolin and Newsted (2003) state that a low effect size f^2 does not necessarily imply that the underlying effect size is very small; as such it can still be considered as good effect size.

5.7.1.3 Stone-Geisser's (Q^2)

In this section, the three endogenous constructs predictive relevance were assessed with the help of Stone-Geisser's Q^2 statistic proposed by Geisser (1975) and Stone 1974) on the basis that the entire endogenous latent constructs were presented in the measurement model. Through blindfolding and jack-knife re-sampling methods, the model's predictive power of the model was examined via Stone-Geisser's Q^2, cross-validated index (Chin 1988; Tenenhausa, Vinzi, Chatelinc, & Laurob 2005; Wold 1975) was examined. The jackknife resampling procedure deletes or blindfolds one case from the original sample at a time, thereby producing a sub-sample comprising cases (Tenenhausa *et al.*, 2005).

As shown in Table 5.10, the Q^2 analysis complements R^2 in that 'Q^2 represents a measure of how well observed values are reconstructed by the model and its parameter estimates (Chin 2010, p.680). By using SmartPLS 2.0, two types of cross-validated redundancy Q^2 and crossvalidated communality Q^2 (Fornell & Cha 1994) were computed. As shown in Table 5.10, the Q^2 values of all latent constructs were greater than zero, suggesting the predictive relevance of the model (Chin, 1988; Henseler *et al.*, 2009).

Table 5.10
Construct Crossvalidated Redundancy

Total	SSO	SSE	1-SSE/SSO (Q^2)
CT	596.00	392.03	0.34
FFIG	447.00	147.92	0.67
FWIG	447.00	209.64	0.53
ID	447.00	209.05	0.53
IIG	596.00	431.56	0.28
IMO	2384.00	1789.26	0.25
MT	596.00	355.48	0.40
NPD	596.00	411.69	0.31
RESP	447.00	163.53	0.63
TT	596.00	354.13	0.41

5.7.2 Direct Effect in the Main Model

For hypotheses testing, the researcher investigated the significance of path coefficient estimates of the entire model paths with the help of PLS-based bootstrap method that generates reasonable estimates of standard error (Tenenhausa *et al*., 2005). As proposed by Hair *et al*. (2011a), this research carried out 5,000 re-sampling (bootstrapping) so as to generate standard errors and obtain t-statistics.

The following sections are dedicated to explaining the structural hypotheses. The proposed model first examined the impact the direct relationship in the structural model. Second, the proposed model examines the effect of the mediating relationship in the structural model. Third, the proposed model examines the effect of the moderating relationship in the structural model. The data was run through two software packages of PLS[40]. This path modeling encapsulates the relationship effect size and the overall ability to predict (Fornell and Cha, 1994) BPS on BRQ. The examination of the structural model also allows the inspection of various paths (arrows moving from one construct to another) in the research model. Each structural path in the research model represents a proposed hypothesis. The analysis of the structural model results in the acceptance (supported) or rejection (not supported) of each hypothesis as well as the comparisons of the impact of various independent constructs on the dependent one(s).

Paths are considered as standardized beta (β) weights that are identical to the analysis of simple regression (Agarwal and Krahanna, 2000). According to Chin (1998a), the standardized paths have to be at least 0.20 but ideally, they have to be above 0.30 to be deemed as meaningful. On the other hand, Cohen (1988) categorized standard path coefficients having absolute values of lower than 0.10 as possessing "small" effect, values of 0.30 as having a "medium" effect, and values greater than 0.50 as having "large" effects.

The path coefficient from communication to new product development cycle time was 0.13 ($t = 1.09$, $p > 0.05$). Thus, H1a was not supported. H1b was accepted because the path coefficient from coordination to new product development cycle time was significant with a value of 0.18 ($t = 1.63$, $p < 0.05$). The path coefficient from balance of member contribution to new product development cycle time was 0.24 ($t = 2.51$, $p < 0.05$). Thus, H1c was supported. H1d was supported because the path coefficient from mutual support to new product development cycle time was significant with a value of 0.49 ($t = 3.82$, $p < 0.05$). The path coefficient from efforts to new product development cycle time support was 0.41 ($t = 3.14$, $p < 0.05$). Thus, H1e was supported. H1f was supported because the path coefficient from cohesion to new product development cycle time was significant with a value of 0.18 ($t = 1.38$, $p < 0.05$).

The assessed structural model is presented in Figure 5.4 and the results of the hypotheses tests are listed in Table 5.11.

Table 5.11
Path Coefficients of the Structural Model

Hypotheses	Relations	Beta	SE	t-value	p-value	Findings
**	BOC -> IMO	-0.09	0.10	0.86	0.20	Not supported
**	COH -> IMO	0.36	0.14	2.63	0.00	Supported
**	COMM -> IMO	0.04	0.09	0.49	0.31	Not supported
**	CORD -> IMO	-0.02	0.12	0.18	0.43	Not supported
**	EFFT -> IMO	0.06	0.16	0.37	0.36	Not supported
**	MS -> IMO	-0.24	0.13	1.84	0.03	Supported
H1a	COMM -> NPD	0.13	0.12	1.09	0.14	Not supported
H1b	CORD -> NPD	0.18	0.11	1.63	0.05	Supported
H1c	BOC -> NPD	0.24	0.10	2.51	0.01	Supported
H1d	MS -> NPD	0.49	0.13	3.82	0.00	Supported
H1e	EFFT -> NPD	0.41	0.13	3.14	0.00	Supported
H1f	COH -> NPD	0.18	0.13	1.38	0.08	Supported
**	ET -> NPD	0.12	0.06	1.87	0.03	Supported
**	IMO -> NPD	0.43	0.09	4.65	0.00	Supported

Notes: * p < 0.10, ** p < 0.05, *** p < 0.01 (one-tailed test). BOC = Balance of Member Contribution; COH = Cohesion; COMM = Communication; CORD = Coordination; EFFT = Effort; MS = Mutual Support; ET = Environmental Turbulence; IMO = Internal Market Orientation; NPD = New Product Development Cycle Time.

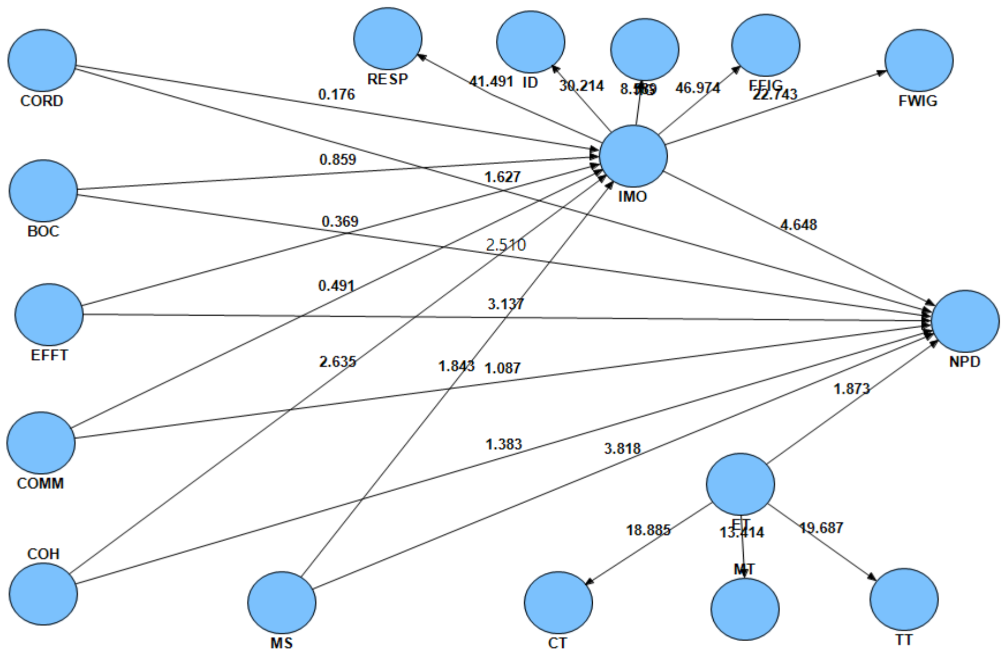

Figure 5.4
Assessment of the Structural Model

5.7.3 Mediating Effect

In this section, the impact of internal market orientation as mediators of relationship between dimensions of teamwork quality and new product development cycle time was separately assessed. Figure 5.5 shows the estimated path models, every one of which covers one of the mediator constructs (for instance, balance of member contribution, cohesion, communication, coordination, efforts and mutual support).

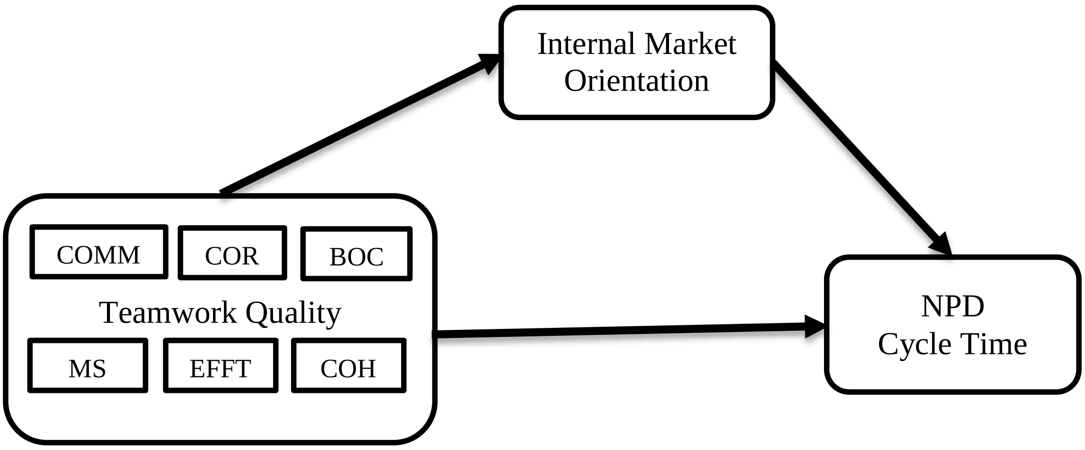

Figure 5.5
Mediator Model

Following Shrout and Bolger's (2002) recommendation on Variance Accounted For (VAF), VAF > 80% can be considered as full mediation, VAF greater than 20% but less than 80% can be considered as partial mediation, while VAF less than 20% indicates no mediation. As shown in Table 5.12, internal market orientation worked as a full mediator to the relationship between balance of member contribution and mutual support with new product development since VAF had values of 101% and 105%, respectively. Furthermore, internal market orientation worked as a partial mediator in the relationship between four dimensions of teamwork quality and new product development cycle time. These four dimensions were communication, coordination, effort and cohesion, and coordination. They showed VAF values of 70%, 64%, 52% and 54%, respectively.

Table 5.12

Indirect Effects of Teamwork Quality Dimensions on NPD Cycle Time through Internal Market Orientation (5,000 Bootstrap Samples)

Hypotheses	**Exogenous**	**Mediated**	**Endogenous**	**Direct Effects**	**Indirect Effect**	**Total Effects**	**VAF**	**Mediating Hypothesis**
H2a	COMM	IMO	NPD Cycle Time	0.12	0.28	0.40	70%	Partial Mediation
H2b	CORD	IMO	NPD Cycle Time	0.14	0.26	0.40	64%	Partial Mediation
H2c	BOC	IMO	NPD Cycle Time	0.00	-0.38	-0.38	101%	Full Mediation
H2d	MS	IMO	NPD Cycle Time	0.02	-0.37	-0.35	105%	Full Mediation
H2e	EFFT	IMO	NPD Cycle Time	0.24	0.26	0.50	52%	Partial Mediation
H2f	COH	IMO	NPD Cycle Time	0.24	0.28	0.52	54%	Partial Mediation

Note. Variance Accounted For (VAF) = Indirect Effect/Total Effect (Shrout & Bolger, 2002).

5.7.4 Moderating Effect

The potential heterogeneity of the observations along with their several contingencies, were handled through additional multi-group analyses were run by controlling for three variables (Baron & Kenny, 1986; Henseler & Fassott, 2010). This study used the second order control variables presented in early chapter as moderators.

The moderating role in each hypothesis was tested in the second model analysis. The moderating effects of ET on every construct of dimensions of teamwork quality (balance of member contribution, cohesion, communication, coordination, efforts and mutual support) on new product development cycle time are presented in Table 5.13. A model with path values and t-values is shown in Figure 5.6

Environmental turbulence was found not to moderate the relationship between balance of member contribution and new product development cycle time with a path coefficient of -0.32 (t value = 0.71, $p > 0.05$). This finding indicates that the relationship was rejected. Environmental turbulence was also found not to moderate the relationship between cohesion and new product development cycle time with a path coefficient of -1.85 ($t = 0.92$, $p > 0.05$). However, environmental turbulence moderated the relationship between communication and new product development cycle time with a path coefficient of 2.63 ($t = 2.08$, $p < 0.05$). Similarly, environmental turbulence moderated the relationship between coordination and new product development cycle time with a path coefficient of 1.74 ($t = 1.52$, $p < 0.05$). Environmental turbulence did not moderate the relationship between efforts and new product development cycle time with a path coefficient of -0.99 ($t = 0.80$, $p > 0.05$). Finally, environmental turbulence did not moderate the relationship between mutual support and new product development cycle time with a path coefficient of 1.16 (t = 1.17, p > 0.05).

Table 5.13
Path Coefficients (Moderation Effect)

Hypotheses	Relations	Beta	SE	t-value	p-value	Findings
H3a	COMM * ET -> NPD	2.63	1.27	2.08	0.02	Supported
H3b	CORD * ET -> NPD	1.74	1.15	1.52	0.05	Supported
H3c	BOC * ET -> NPD	-0.32	0.45	0.71	0.24	Not supported
H3d	MS * ET -> NPD	1.16	0.99	1.17	0.12	Not supported
H3e	EFFT * ET -> NPD	-0.99	1.24	0.80	0.21	Not supported
H3f	COH * ET -> NPD	-1.85	2.01	0.92	0.18	Not supported

Note: **p<0.05

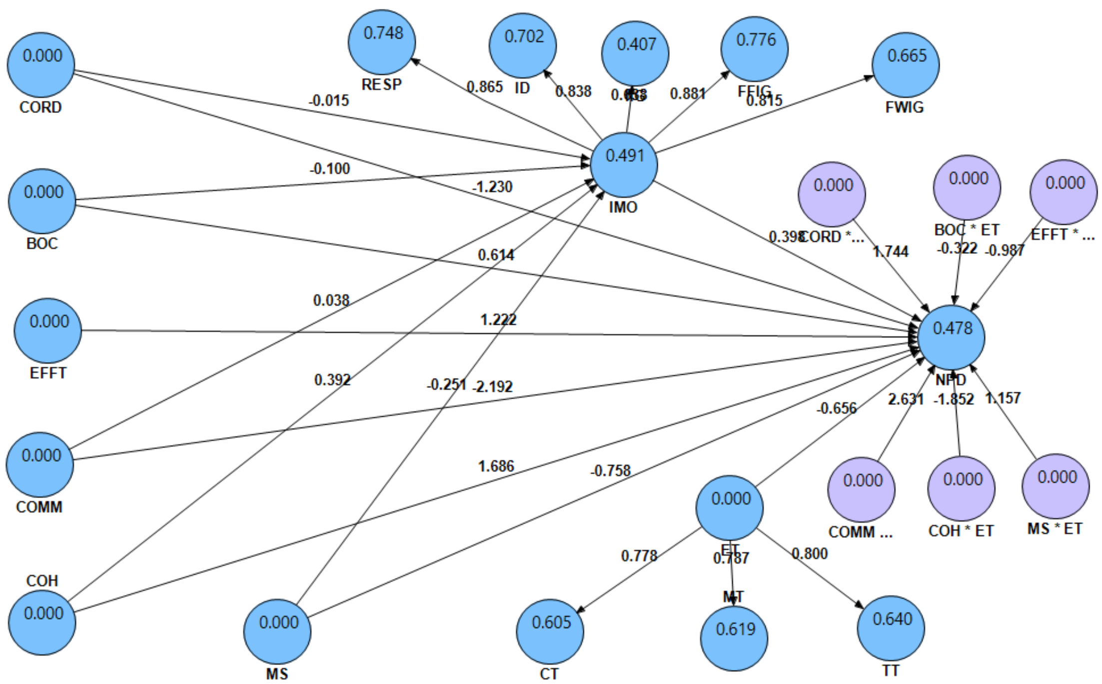

Figure 5.6
Moderated Model

Similarly, Figure 5.7 shows that the positive relationship between coordination and new product development cycle time was moderated by environmental turbulence, such that the relationship between coordination and new product development cycle time became stronger when environmental turbulence was high than when environmental turbulence was low.

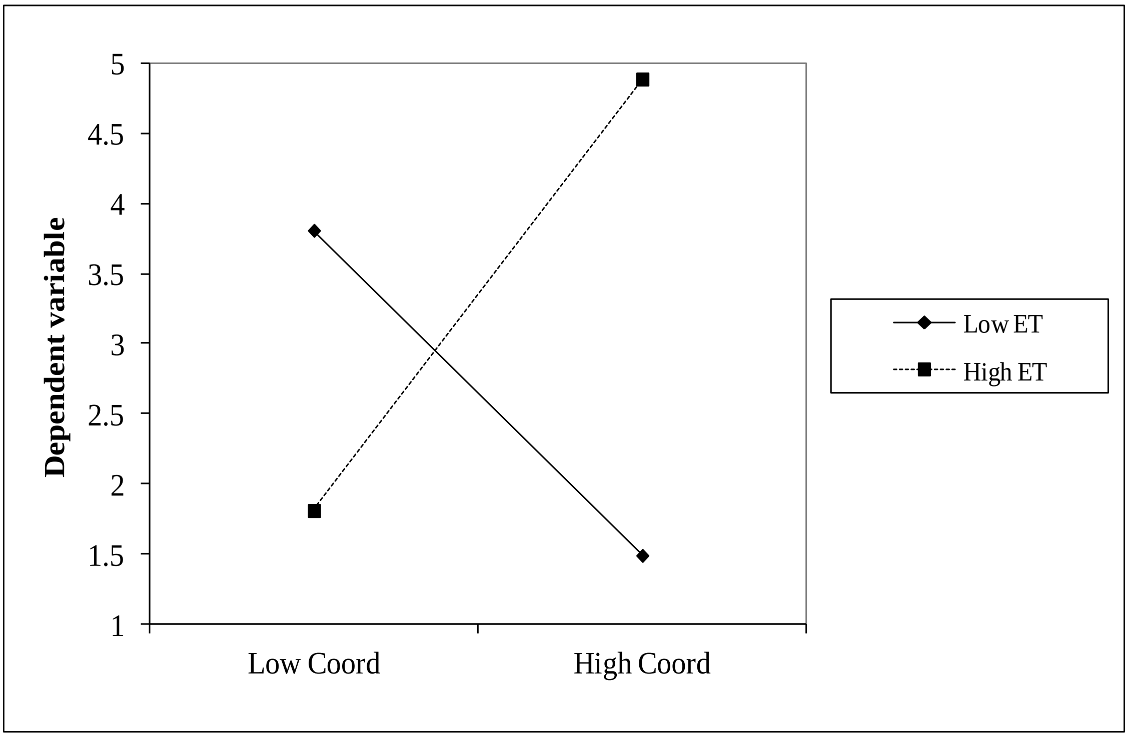

Figure 5.7
Interaction Effect of Environmental and Coordination on NPD Cycle Time

Finally, Figure 5.8 shows that the positive relationship between communication and new product development cycle time was moderated by environmental turbulence, such that the relationship between communication and new product development cycle time became stronger when environmental turbulence was high than when environmental turbulence was low.

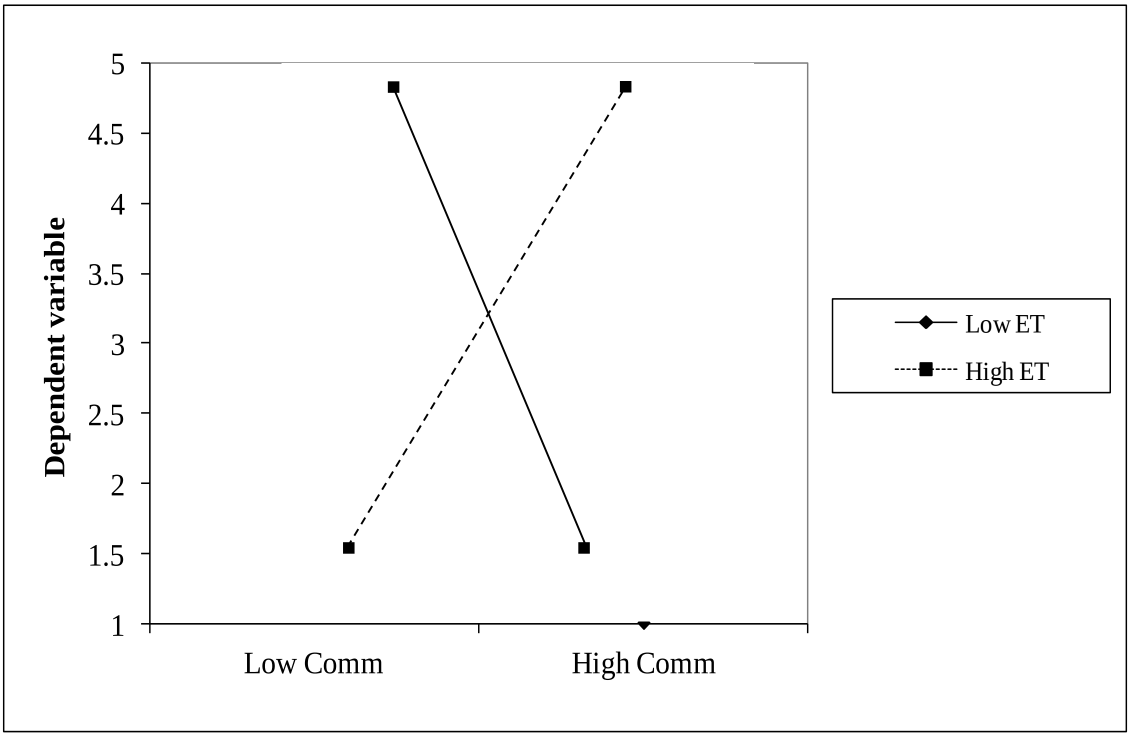

Figure 5.8
Interaction Effect of Environmental and Communication on NPD Cycle Time

5.7.5 Moderation of Effect Size

The strength of the moderating of environmental turbulence on the new product development cycle time was determined by calculating the effect size f^2 based on Cohen's (1988) recommendation in which the coefficient of determination (R^2) of the main effect with the coefficient (R^2) for total effect was xompared. As indicated in Table 5.14, the f^2 value of 0.08 can be considered a having a small effect. `

Table 5.14
Effect Size (Moderation Model)

	Included	Excluded	f-squared	Effect size
R-squared	0.49	0.43	0.08	Small

However, according to Chin *et al*. (2003), a small effect size does not necessarily mean that the underlying moderating effect is negligible. "Even a small interaction effect can be meaningful, then it is important to take these conditions into accounts" (Chin *et al*., 2003 p. 211).

5.8 Summary of the Hypotheses Testing

Table 5.15 below summarizes the hypotheses testing results of all direct relationships, mediating effect and moderating effect.

Table 5.15
Summary of Hypotheses Testing

Hypothesis	Statement	Finding
H1a.	Communication among the teamwork positively affects new product developments cycle time where more communication leads to shorter NPD cycle time.	Not supported
H1b.	Coordination among the teamwork members in an organization positively affects its new product development cycle time where more coordination leads to shorter NPD cycle time.	Supported
H1c.	Balance of member contribution among the teamwork in an organization positively affects its new product development cycle time where more balance of member contribution leads to shorter NPD cycle time.	Supported
H1d.	Mutual support within the teamwork positively affects the new product development cycle time where more mutual support leads to shorter NPD cycle time.	Supported
H1e.	Efforts within the teamwork in an organization positively affect its new product development cycle time where more efforts within the team leads to shorter NPD cycle time.	Supported
H1f.	Cohesion among the teamwork members in an organization positively affects its new product development cycle tine in which more cohesion among team members leads to shorter NPD cycle time.	Supported
H2a.	Internal market orientation mediates the relationship between communication among the teamwork and NPD cycle time.	Partial Mediation
H2b.	Internal market orientation mediates the relationship between coordination among the teamwork members and NPD cycle time.	Partial Mediation
H2c.	Internal market orientation mediates the relationship between balance of member contribution among the teamwork and NPD cycle time.	Full Mediation

Table 5.15 *(continued)*

Hypothesis	**Statement**	**Finding**
H2d.	Internal market orientation mediates the relationship between mutual support within the teamwork and NPD cycle time.	Full Mediation
H2e.	Internal market orientation mediates the relationship between efforts within the teamwork and NPD cycle time.	Partial Mediation
H2f.	Internal market orientation mediates the relationship between cohesion among the teamwork and NPD cycle time.	Partial Mediation
H3a.	Environmental turbulence moderates the relationship between communication among the teamwork and NPD cycle time.	Supported
H3b.	Environmental turbulence moderates the relationship between coordination among the teamwork members and NPD cycle time.	Supported
H3c.	Environmental turbulence moderates the relationship between balance of member contribution among the teamwork and NPD cycle time.	Not supported
H3d.	Environmental turbulence moderates the relationship between mutual support within the teamwork and NPD cycle time.	Not Supported
H3e.	Environmental turbulence moderates the relationship between efforts within the teamwork and NPD cycle time.	Not supported
H3f.	Environmental turbulence moderates the relationship between cohesion among the teamwork and NPD cycle time.	Not supported

5.9 Summary

The purpose of this chapter was to provide descriptive measures to the key variables of interest in the study. The data analysis to test the model comprised a descriptive analysis involving data screening the research data and exploratory factor analysis to validate the constructs. It was found that firms from all sizes and business background were represented in the sample. This is followed by the direct and indirect regression analysis and the quantitative analysis. The research model supported the impact of teamwork quality on new product development cycle time. In addition, the t-test and path coefficient of environmental turbulence moderating the relationship of teamwork quality on NPD cycle time. And by calculating Variance Accounted For (VAF) to implement mediator test.

All measures were subjected to thorough analysis and it was found that the measures were unidimensional, internally consistent, and demonstrated construct validity. Measures were also assessed for their discriminant validity and no problems were noted. Finally, a single measure of the scale was constructed and normality of the scale was assessed. The results showed that normality could be assumed for all measures. Therefore, the measures were found to have sufficient quality to be used for further analysis and used in hypothesis testing.

The proceeding next chapter synthesizes the major findings and the contribution of this study. Following this, managerial implications of the study findings are discussed. Finally, the limitations of the study are highlighted and several directions for future research are identified.

CHAPTER SIX

DISCUSSION AND CONCLUSIONS

6.1 Introduction

The present chapter discusses the results obtained from the data analysis, presented in the preceding chapter. This chapter begins with a summary of the findings reported earlier. Then it offers a thorough discussion on the results of each research hypothesis in relation to existing literature. Implications to theory and practice specifically to the Saudi telecommunication sector are then presented. Recommendations for future research are also provided.

6.2 Overview of Findings and Discussion

To reiterate, the primary goal of the present research is to investigate teamwork quality, internal market orientation and their relation to NPD cycle time in Saudi telecommunication industry. In this research, internal market orientation is considered as the mediating variable between teamwork quality and NPD cycle time. As the independent variable, teamwork quality consists of factors of coordination, balance of member contribution, effort, communication, mutual support, and cohesion. NPD cycle is the dependent variable while environmental turbulence, represented by market turbulence, competition turbulence and technological turbulence, is the moderating variable.

To achieve the objectives, a quantitative approach was employed that relied chiefly on survey instrument. The survey questionnaire consisted of 80 questions in five sections: demographic, teamwork quality, internal market orientation, environmental turbulence, and new product development cycle time. The survey was distributed to the research sample at three main telecommunication companies in Saudi Arabia. A total of 149 responses were received.

The following sections offer a summary of the results on 18 hypotheses developed for the study.

6.3 Summary of Findings

The study discovered several interesting findings. They are discussed in detail below.

6.3.1 Teamwork Quality and NPD Cycle Time

Table 5.11 shows that the relationship between communication in team and NPD cycle time was not significant. This means the communication did not show any direct impact on NPD cycle time in the telecommunication industry in Saudi Arabia. This result is consistent with that of Kahn (1998), who argued that formal and structured communication does not facilitate procedures between functions. While information is important, forcing communication does not appear to be a solution. It may be that interaction is a necessary but not a sufficient factor for implementing process. However, this result is not consistent with that reported by Hoegl and Gemuenden (2001) who found that teamwork quality correlated significantly with team performance evaluated by team members, team leaders, and project managers. Also, this result disagrees with Lu, Xiang, Wang and Xiaopeng's (2010), who found that a lack of communication and the existence of misunderstanding between team members and stakeholders of a project were the two main causes of project failure. Also, this result disagrees with Gatignon and Xuereb's (1997), who observed that communication between different functional areas could promote the extent of improvement in a new product process.

The non-significant result may be attributed to the fact that in Saudi telecommunication companies, communication between all stages in the production cycles depends on automated systems, which allow transformation to go from one stage to the next stage through the systems. One of the main reasons why communication is done through automated systems rather than personal face-to-face communication is because many employees in Saudi Arabia are foreigners particularly from Asian countries such as India and Pakistan. Due to language barrier, automated and systematic communication channels replace personal communication.

In this context, the result is different from Hoegl and Gemuenden's (2001), who found a discrepancy between the explanatory power of teamwork quality on team performance between different types of raters (team members and stakeholders). Several possible reasons can be given for these differences. One of the reasons could be that the raters had different properties or a different reference framework (Hauschildt, 1997). Team members have more knowledge about the details of the new product processes and the progress of the project, while stakeholders rely more on information given in controlling reports and information given in (progress) meetings. So team members have more 'micro knowledge', while stakeholders base their judgments on more 'macro knowledge' of the project. Hoegl and Gemuenden (2001) called this macro vision a "bird's-eye view". They suggested that team members may have been missing relevant details about some of processes details of the team in terms of quality, schedule or budget. Furthermore, stakeholders' ratings might be influenced by their perception of the overall performance of the larger development project or customer relationship to which a project team was contributing. Also, it is possible that team members assessed the performance of the team based on their overall impression of the expertise of the team leader or team members, instead of basing it merely on the actual performance of the team since they did not have better knowledge of the actual activities and communication within team members.

Literature has widely discussed the importance of communication within team on team performance and suggested that communication can be assessed in terms of frequency, formality, and openness. In this study, however, communication was treated in a general manner without giving consideration to the specific features. Past research suggests that teams that communicate informally tend to be more effective than those that have to rely on structured channels of communications. The reason is that informal communication is less time consuming and may allow team members to respond in a timely manner to market turbulence or customer demands (Pinto & Pinto, 1990).

With regards to coordination, result indicated a significant relationship between coordination and new product development cycle time. This means that coordination in a team affected the new product development cycle time in the telecommunication industry in Saudi Arabia. This result supports Hoegl and Gemuenden's (2001) contention that teamwork quality is significantly related with team performance from the perception of team members, leaders and managers. This result runs parallel with the argument of Gatignon and Xuereb (1997). They contended that the process of coordination between different functional areas could improve new product process. Additionally, this study confirms Li and Calantone's (1998) contention that a firm having optimum interface between R&D and marketing is capable of realizing its technological capability compared to its rivals and by determining its innovative features required by the market, new product advantage is generated. But the result is not in line with Augusto and Coelho's (2009). They examined the main effect of inter-functional coordination upon the capacity of the firm to launch new products and found insignificant effect. Other study also brought forward limited evidence for its effect on new product (Lukas &Ferrell, 2000).

Coordination in teams is high due to the functions of the team members. Teams engage in coordinating activities when they formulate action plans in relation to the team goals (McGrath, 1984; Hackman & Morris, 1975). Also, coordination provides the mechanism to integrate team members' skills and knowledge and minimize problems during developments of new product.

Narver and Slater (1990) maintained that inter-functional coordination is a key component of the general market orientation construct. Hence, a positive relationship between inter-functional coordination and business performance should exist. Inter-functional coordination itself should help to reduce duplication of efforts, thereby minimizing resource consumption, maximizing efficiencies and correspondingly, reduction of NPD cycle time.

Inter-functional coordination represents more of an effective construct. Specifically, collaboration between functions was found to be highly related to inter-functional coordination (Kahn, 1998; Suss & Thomson, 2010). This indicates that successful development of new products requires collective goals, teamwork, shared vision, mutual understanding, and shared information. Coordinating mechanisms, which are structural in nature, are important too. This means that there is a need for liaisons, committees and teams between functions.

With regards to balance of member contribution, it was found that this factor affected significantly new product development cycle time. This means that the balance of contribution in the team impacted the new product development cycle time in the telecommunication industry in Saudi Arabia. This result supports Hoegl and Gemuenden's (2001) finding. They revealed that teamwork quality was correlated significantly with team performance evaluated by team members, team leaders and project managers. The result also confirms Kahn's (1998) argument that a successful product and process requires collective goals, teamwork, shared vision, mutual understanding and shared information. It also supports Seers's (1989) who demonstrated that the balance of member contributions was significantly related to both task performance and team-member satisfaction. Balance of member contribution has a function to positively influence an organizational outcome. In a production processes, team members recognize that they all apply and share their expertise among the team and encourage team members to engage the activity to implement the procedure of production in proper way based on their experience and contributing to the achievement of the team's goals in accordance to their specific potentials which leads to reduction of NPD cycle.

In terms of mutual support, the result indicated a significant relationship with new product development cycle time. This means that mutual support in the team impacted the new product development cycle time in the telecommunication industry in Saudi Arabia. This result supports Hoegl and Gemuenden's (2001) observation. They revealed that teamwork quality was correlated significantly with team performance evaluated by team members, team leaders, and project managers. Also, this result agrees with Hoegl and Proserpio's (2004) finding on the significant effect of team member proximity and teamwork quality.

Mutual support has a function to influence an organizational outcome. Competition between people can exert a positive influence on the motivation and performance of individual tasks. For interdependent tasks such as telecommunications products and services, cooperation or mutual support amongst team members is more important. Team members working on a shared goal should try to support instead of trying to outdo each other. They should show respect, give help and support when needed, and stimulate ideas of other team members and develop them further. The better team members support each other, the more effective and efficient these goals can be reached (Tjosvold, 1995). In a cooperative conflict, team members recognize that they all share a common goal. Therefore, conflict, while inevitable, may be resolved by sharing information, taking each other's perspective, communicating feelings directly, and providing support to each other, thus contributing to reduced NPD cycle.

Efforts were also found to affect new product development cycle time in the telecommunication industry in Saudi Arabia. This result is consistent with that of Hoegl and Gemuenden (2001) who found that teamwork quality was correlated significantly with team performance evaluated by team members, team leaders, and project managers. Effort reflects the physical and mental energy that team members expend towards the completion of team tasks. When group members focus more attention on the task (intensity) and work longer (duration), NPD may become faster. However, new product development process may suffer when some members fail to contribute to the best of their effort (Shepperd, 1993). Supporting this argument, past research on social loafing has found that team performance and productivity declines when some team members do not expend sufficient effort (Hardy, 1990).

Cohesion was also found to impact on the new product development cycle time in the telecommunication industry in Saudi Arabia. This result is in agreement with Hoegl and Gemuenden's (2001) finding that teamwork quality was correlated significantly with team performance evaluated by team members, team leaders, and project managers. The result also confirms Auh and Menguc's (2005) contention that cohesiveness between different functional areas is able to improve new product process. Researchers have found that cohesion is an important property of a team, predicting team outcomes such as performance, perceived team utility, communications among team members, and conflict (Beal et al., 2003; Mullen & Copper, 1994). This result is consistent with Chang and Bordia's (2001) who studied the relationship between group cohesion and performance. A direct relationship between specific dimensions of group cohesiveness and performance was found.

In sum, the present result found significantly stronger support for the notion that better teamwork creates better NPD cycle time than previous research has found for performance. This shows how important teamwork quality is in achieving NPD cycle time reduction in the telecommunication industry.

6.3.2 The Mediating Effect of Internal Market Orientation on the Relationship between Teamwork Quality and NPD Cycle Time

Internal market orientation was examined as a mediator between all dimensions of teamwork quality and new product development cycle. Result suggested that IMO worked to mediate between all dimensions and NPD cycle time. In particular, internal market orientation fully mediated between balance of contribution and mutual support and NPD cycle time and partially mediated between communication, coordination, effort and cohesion and NPD cycle time.

The partial mediation between communication and new product development cycle time supports the argument of Smidts, Pruyn and van Riel (2001), who emphasized that a communication process is crucial in encouraging organizational identification which in turn lead to better organisational performance. Also, the result supports Johlke and Duhan's (2001) finding that bi-directional informal communication between management and staff positively impacted front-line staff and improve production process. This result indicates the importance of internal market orientation by improving communication among teamwork members which has a positive impact on new product development cycle time. In the telecommunication firms, communication among all departments is done via instant messaging such as electronic emails, automated systems and electronic tools to transfer tasks between all production stages. Hence, transferring activities between all departments become almost negligible. Information flow through an organization is imperative as it not only helps steer clear of mistakes but also develops processes and procedures among the many organizational members. On the other hand, ineffective communication prevents market-oriented activities and it results in conflict due to misunderstandings, erroneous strategies and feelings of frustration. Such conflicts and misunderstanding between members could have a negative impact on organizational performance.

The partial mediating effect of internal market orientation on the relationship between coordination among teamwork members and new product development cycle time in the telecommunication industry in Saudi Arabia confirms the argument of Etgar (1979). Coordination in the telecommunication firms is highly important between team members to minimize the process and transferring task through different production stage. It is also to avoid wrong submission of tasks to non-related teams that may leads to conflict in sequences of production stages. Moreover, it also used to specify the stages and the tasks to be implemented in parallel with different departments. As such, coordination has a high impact on reducing new product development cycle time.

Internal market orientation was also found to fully mediate the relationship between balance of members' contribution and new product development cycle time in the telecommunications firm in Saudi Arabia. This result is consistent with that of Lancaster and Velden (2004), who observed that internal market orientation polices affected the relationship between employees' characteristics and performance. In the telecommunication teams, the internal market orientation was shown to have a medium impact on the relationship between balance of members' contribution and NPD cycle time. This is because all tasks in most production stages are globalized and specified early and team members in general are to follow specific procedures.

Full mediation of internal market orientation on the relationship between mutual support among teamwork members and new product development cycle time was observed. This result supports previous studies (Berry & Parasuraman 1991; Sasser & Arbeit 1976; Stauss & Schultze, 1990). According to Sasser and Arbeit (1976), employees generally exchange time, energy and values for the firm's money and this is analogous to an external market exchange wherein customers primarily provide cash to obtain goods or services. In the telecommunication industry, mutual support among the team members positively improve of NPD cycle because it is related to the extent to which team members handle conflict cooperatively, assist each other when help is needed, and develop and respect others' ideas (Tjosvold, 2005).

Internal market orientation was also found to partially mediate the relationship between efforts and new product development cycle time. This result partially supports the findings of Deshpande and Farley (2000), Grinstein (2008), Kirca et al. (2005), Pattikawa et al. (2002), and Zhang and Duan (2010), who found that effort had a positive impact on new product performance. In telecommunication firms, internal market orientation is highly related to efforts among teamwork members. The team's success hinges upon team members' willingness to exert effort on behalf of the team (Kidwell & Bennett, 1993). In teams whose success depends on the effort of all members, performance deficit may occur when one or more members make little effort towards goal attainment (Kidwell & Bennett, 1993).

Finally, internal market orientation was found to partially mediate relationship between cohesion and new product development cycle time. This result is partially consistent with that of previous studies (Deshpande & Farley, 2000; Kirca et al., 2005; Pattikawa et al., 2002; Zhang & Duan, 2010). In telecommunication firms cohesion refers to the extent to which members feel a strong attachment to each other and a desire to remain as part of the team (Beal, Cohen, Burke, & McLendon, 2003).

The results concerning the mediating impact of internal market orientation reflects one of the primary contributions of the present research. An explanation regarding the effect of internal market orientation does not merely provide rewards for new product development cycle, but it also entails the production of information of teamwork quality, the advantages sought (met and unmet), and manager-employees communication. Such generation of information and communication may encourage a culture wherein employees perceive that the firm equally considers their needs with those of stakeholders. IMO may also assist in the development of a work climate comprised of psychological support, helpfulness, friendliness and mutual respect and trust (Johnston et al., 1990). This climate may motivate employees' adoption of internal market.

The various telecommunications companies in Saudi Arabia compete among each other in order to secure market share in a highly competitive Saudi telecommunication industry. All the Saudi telecommunications companies are governed and organised under the Saudi communication and information technology commission (CITC). This means that these companies are left with developing highly internal competitive policies in order to compete in such a market (CITC, 2004). From this comes the importance of the mediating factor of internal market orientation as it is considered as an internal organizational culture whose responsibility is to carry out policies related to the market and competition with rival service providers. This study emphasized the importance of internal market orientation as a full mediator for balance of contribution and mutual support of teamwork quality as it encourages team members to assist each other when help is needed, and develop and respect others' ideas which accelerated the NPD cycle time

Although a number of research studies revealed that the culture of the Saudi companies in general is not organized and well-structured or referred to as being 'traditionalist' (Idris, 2007), Abousaber (2011) revealed that the Saudi technology-oriented companies have a relatively different organizational culture in which it is more organized and more market-oriented due to the fierce competition in the Saudi telecommunication market. This shows how important internal market orientation is in reflecting the organizational culture of the Saudi telecommunication companies as to meet the requirements of the competitive market.

6.3.3 The Moderating Effect of Environmental Turbulence on the Relationship between Teamwork Quality and NPD Cycle Time

Result indicated that environmental turbulence moderated the relationship between the two dimensions of teamwork quality (communication and coordination) and new product development cycle time. This result is partially consistent with the argument that in turbulent environments, adopting a customer-focused vision is not as important owing to the many innovations that arise within a short period of time from R&D working external to the industry (Kohli and Jaworski, 1990). The result also supports

Dayen and Basarir's (2010) finding that showed a relationship between team reflexivity, a reflection of teamwork quality, and NPD cycle time, referred to as 'speed to market' in their study. The researchers reported a moderating influence of environmental turbulence on the team reflexivity and NPD speeds to market.

Jaworski and Kohli (1993) demonstrated that in technological turbulence, firms may obtain competitive innovations and products, and this weakens the relationship between market orientation and performance. In this regard, Day and Wensley (1988) contended that customer interaction directs efforts of product development while Narver and Slater (1990) noted that in these environments, higher opportunities for the creation of customer value exist and this could open the doors to innovative products in a short span of time. The relationship between competitor orientation and product innovation is also likely to lead to intensified environment as competitor intelligence provides information concerning whether or not competition can leverage opportunities brought about by the emerging technology to enhance new product development (Li & Calantone, 1998).

The moderating effect of competitor turbulence also indicates that this turbulence can be helpful for new product development, and this is consistent with several studies that found that competitor knowledge was associated and moderated by the new product advantage (Li & Calantone, 1998; Augusto & Coelho, 2009). In environments rife with competition, consumers are free to select from a greater range of market offers. As a result, monitoring customers' needs is a crucial issue to guarantee that customers refrain from choosing rival products (Kohli & Jaworski, 1990). This calls for stronger focus on competitors as this would lead to the identification of customer wants and needs, and the anticipation of changes in the product strategies of rivals. As for the coordination, intensity of competition is likely to weaken its relationship with product development cycle duration, owing to the competitive environments requirement of timely decision making and coordination, and owing to its consensus decision style's barrier to responses.

While the result showed a moderating effect of environmental turbulence on communication, coordination, it did not moderate the relationship between balance of contribution, efforts, mutual support and cohesion, and new product development cycle time in the telecommunication industry in Saudi Arabia. This result is not in line with that reported by Gatignon and Xuereb (1997) who revealed a positive moderating effect of environmental potential, such that a stronger market orientation was required in a fast growing market to achieve the desired level of performance. In addition, Han et al. (1998) revealed a positive moderating effect of high market growth on the link between team members and organizational creativity. In addition, this result is not consistent with Song and Parry's (1997) study that supports the view that high market potential strengthens the relationship between product differentiation and new product performance.

This result is valid because the market is highly organized and strongly controlled by communication and information technology commission (CITC) to ensure a fair competition in the market. In addition, some of the products are developed globally and local operators have the same chance to introduce this product in the local market. In addition, firms and their management must try to cope with turbulent conditions. To do so adequately requires the ability to adapt to changes. It also requires firms to continuously collect and analyze environmental data as emphasized in the market orientation construct (Kohli & Jaworski, 1990).

Furthermore, the result is consistent with Acur et al.'s (2010), who revealed that an innovative environment did not directly impact on NPD speed. This is because teamwork constitutes an internal environment while responding to the turbulence of the external environment is primarily the responsibility of a firm's leaders. In this context, the current finding differs from that of previous studies that showed that a strong orientation toward innovation allows employees to work together and give them the freedom to make their own work-related decisions as well as the time to enhance new product success (Calantone et al., 2003; Parry et al., 2009; Zhou et al., 2005).

Furthermore, the insignificant moderating effect may be explained by a methodological limitation of PLS. PLS analysis uses a cross-multiplying method to test a moderating effect (Chin et al.,2003). PLS multiplies all measures of each factor to create a new interaction variable. For example, if the relationship between X1 and Y is hypothesized to be moderated by X2, then PLS creates a new interaction variable (i.e., X1*X2) by cross-multiplying all measurement items of X1 and X2. This method has some benefits compared to other methods that measure moderating effects, but it still has some issues. It cannot clearly distinguish the between-group effect from the within-group effect. The effects from within-group and between-groups are fused into the new interaction variable, so the results cannot exactly show the pure moderating effects (Chin et al., 2003).

In sum, we found environmental turbulence to moderate the relationship between the two dimensions of communication and coordination on NPD cycle time but no moderating effect of environmental turbulence on the relationship between balance of contribution, effort, mutual support and cohesion and NPD cycle time was observed. One of the main reasons why the first set of dimensions were found to have a moderating influence is that this set is related to the competition in the market which is highly influenced by the environment. On the other hand, the latter set of dimensions is related to the internal processes between the employees which are not influenced by the environment outside the workplace (Wang & Xiaopeng, 2010).

6.4 Implications of Study

The present study aimed to contribute to theory and practice with regards to the impact of teamwork quality on new product development cycle time in telecommunication industry and to assist in addressing some gaps in the body of literature by expanding the research in this area. This expansion is possible by developing an extensive empirical model that determines the critical factors that have an impact of NPD cycle time. This study, thus, has a number of significant implications for managements and theorists.

6.4.1 Implications for Management

Since teamwork is essential to new product development (NPD) cycle time, managers need to be concerned about how to improve team effectiveness so that it reduces new product development cycle time. Managers vigilant about launching new products should facilitate an environment conducive to teamwork to realize superior course of reflective activities. This is possible in many ways.

First, management should ensure that team members are well-informed of their skills and knowledge. Prior studies revealed that to maximize the perception of teamwork members of their skills and knowledge, management should discourage turnover and facilitate a collective workplace environment (Dayan and Di Benedetto, 2008). Second, the present study emphasized the significance of the quality of interactions among NPD team members in order to achieve superior new product cycle time. According to the results, the promotion of effective teams interaction requires managers to sustain a degree of functional diversity and longevity of team at a moderate level and guarantee that the team members have the needed skills and knowledge. Managers should also discourage turnover to ensure successful and timely launching of products. It is also advisable to conduct some rotation to reinforce team stability and resolve issues faced by the team members that are not compatible.

Third, managers have to make sure that the team members understand the aims and goals of the NPD process by explaining and defining them at the onset. Attention should be directed to giving the team autonomy self-management and autonomous control. Prior studies showed that team empowerment can be increased if the teams are motivated to become involved in decision-making (Colquitt *et al*., 2001).

The study has also provided managers with some insight and understanding of some of the strategic behaviors that drive processes and procedures of new product development in organizations. Result indicated that firms that had a greater internal market orientation applied in process of new product development would be more creative and fast to introduce new products to the market. Therefore, it is recommended that firms develop appropriate internal market orientation to new product development process by understanding current customers' latent needs and current competitors' future strategies. Thus, this study supports the contention that, because of its proactive nature, a future-market focus leaves more space for creativity than a current-market focus by encouraging managers to broaden their horizons and think outside the box. Firms should then try to develop a market orientation that would drive smooth learning in the business concerning the various needs of customers, anticipating competitors' actions and using market information in a business-like way.

Internal market orientation leads to greater creativity within limited time and gives the firm the potential to design highly creative new products and be on the market before competitors. Consequently, before making any decision on the type of information to use, firms should evaluate and try to balance the degree of creativity desirable for new products and marketing programs with the costs associated with proactively gathering, analyzing, and using internal market orientation. Ideally, a current customer orientation should be coupled with a focus on future markets.

It is important for managers to consider that the pay-offs related with new product development are impacted by the turbulence in the environment, and this appreciation can be invaluable in managing allocation of teamwork. The rewards of market turbulence and competitive intensity seem to increase the degree of new product development cycle time. Therefore, high-tech firms should acknowledge the significance of team work quality and internal market orientation and exert effort to maintain their market ability to sense and facilitate cooperation to sustain their competitive edge.

Internal market orientation in the telecommunication industry is a necessary condition for marketing creativity and business performance but appears more crucial for the time of ability to publish the product or services in the market before others to maintain their market share and to keep their customers from moving to competitors. In all cases, technology orientation should be married with market orientation if the opportunities of creativity and performance are to be fully realized. It is recommended that businesses do not develop an either/or approach to a technology-push and a market-pull. Rather, they should try to find a balance between the two, as suggested in previous work (e.g., Cooper, 1979, 1984; Day, 1999; Gatignon & Xuereb, 1997).

In sum, this research is beneficial for managers as it provides insight into new product development and what should be stressed when designing new products and marketing programs since new product development cycle time was shown in previous studies to increase the firm's business performance. The study findings showed that the higher the turbulence in the environment, the higher will be the relationship between teamwork quality and improvement in new product development cycle time. It appears intuitive that in scenarios of great turbulence in the environment, the market and technological risks will make it challenging to come up with successful products sans optimum quality teamwork.

6.4.2 Implications to Theories

This study also has theoretical implications, as follows. First, it contributes to the understanding of a recent concept in marketing, namely internal market orientation, which has been identified as essential by many authors and was investigated here in the context of new product development cycle time. In addition, rather than being concerned with the impact of internal market orientation on the new product development cycle time only the study also acknowledges the important role of internal market orientation process in ensuring business success.

Second, this study's disaggregating variables lead to reduction of new product development cycle time. It thereby attempts to provide a more detailed understanding of the teamwork quality that drive new product development cycle time by showing that some strategic components are more important than others.

Third, it conceptually differs from most studies in the literature by investigating components of internal market orientation, teamwork quality in specific field which is telecommunication industry which faces environmental turbulence. The findings showed environment turbulence to moderate the relationship between teamwork quality and new product development cycle time, where teamwork quality predicted NPD cycle time in turbulent conditions – this is consistent with literature on innovation. The study results partially support prior studies by Hoegl and Gemuenden (2001), and Sethi and Nicholson (2001) that stressed on the collaboration of team members in turbulent times, as they perceive greater loads and trade-off decision accuracy relative to the decision-making time.

Finally, not only does this study stress the importance of acquiring new knowledge, but it also recognizes the role of specific aspects of the structure of an organization by indicating that teamwork quality may be particularly needed to foster the effectiveness of internal market oriented behaviors in more uncertain environments. Overall, the present research offers a more detailed model of the impact of teamwork quality on new product development cycle time including internal market orientation as a mediating variable and environmental turbulence as moderator variable.

However, the NPD teamwork quality's potential effect has largely been untouched in literature. The social interaction facets of teamwork quality including cohesion, mutual, and effort are all related to new product development cycle time. These relationships have a positive effect, which state that NPD cycle time is considered significant as it safeguards long-term outcomes and supports esteem and value perceptions, improves effort, unity and mutual support of the team members (Lind & Tyler, 1988; Tyler & Lind, 1992).

6.5 Study Limitations

This study may be different from prior works owing to its expanded scope but not without its limitations. These limitations might threaten the internal and external validity of the research, but they also provide opportunities for future research.

First, the study only involved new product development members in telecommunication. As such, it may not represent the general population of telecom industry because of the relatively few firms working in the selected industry used as evidence to the study. Second, the cross-sectional method may not result in valid conclusions of causality. Furthermore, because teamwork quality, internal market orientation, environmental turbulence and new product development cycle time are all dynamic factors, it is difficult to use the cross-sectional data to reflect ongoing transformations in relationships. Therefore, it is important to incorporate longitudinal research designs in the future to enable better capturing of the dynamism of the constructs and better understanding of the learning process in NPD. Third, another limitation of the study concerns the unexpected findings regarding the impact of teamwork quality on new product development cycle time. It may be the case that these findings are sample specific artifacts since a number of firms in our sample were high-tech companies and since previous research indicates that the effect of strategic orientations depends on the characteristics of the market. Future research should then replicate this study in other contexts to increase its generalizability. Finally, this study did not look at the effects of all environmental factors, such as government regulation, demographic forces, social and cultural forces, natural forces, on the hypothesized relationships. For this reason, further research should investigate whether and how other environmental factors act as moderators in the association between teamwork quality, internal market orientation, and new product development cycle time.

6.6 Recommendations for Future Research

This study is rife with several limitations that must be kept into consideration and tackled in future studies. First and foremost, the current research dwelt on specific tams on specific industry and the results obtained are for telecom industry in Saudi Arabia only. There is a need to replicate this study in other countries in different industries to validate the findings reported here.

Secondly, it is also recommended that a comparative analysis of telecommunication industry in Saudi Arabia with other industries be conducted. In addition, the teamwork quality factors need to be investigated more closely by emphasizing other functional units in this industry as well as restricting the sample to one level category of employees.

Thirdly, a more holistic construction of a questionnaire for future studies needs to be developed. The questionnaire should be comprehensive and relevant to the factor structure by adding more measurement items.

Fourthly, the impact of teamwork quality on internal market orientation and new product development cycle time was examined. To capture the entire NPD projects aspects and the dependent variables like NPD performance, success, cost and process proficiency, could be examined. In addition, different factors that moderate or mediate could be looked into by future studies as well.

Fifthly, other variables could moderate/mediate the association between teamwork quality and new product development cycle time, and this calls for consideration. Therefore, future research can include other moderators/mediators in the proposed research model.

Finally, further research is needed to explore the concept of improvisation within all production stages and the activities that can be delayed in order to move the project forward.

6.7 Conclusion

The primary aim of the study was to examine the factors of teamwork quality that affect the new product cycle time in telecommunication industry in Saudi Arabia. It also aimed to investigate the moderating impact of environmental turbulence and mediating factors which are internal market orientation. The findings revealed that factors of teamwork quality (except communication) were significant in impacting new product development cycle time in the telecommunication industry in Saudi Arabia. According to the results, coordination, balance of member contribution, mutual support, effort and cohesion were positively associated with the new product development cycle time.

This study also contributed to the internal market orientation in mediating the relationship between teamwork quality and new product development cycle time. Result suggested that IMO worked to mediate between all dimensions and NPD cycle time. In particular, internal market orientation fully mediated between balance of member contribution and mutual support and NPD cycle time and partially mediated between communication, coordination, effort and cohesion and NPD cycle time. In addition, this study indicated that environmental turbulence moderated the relationship between the two dimensions of teamwork quality (communication and coordination) and new product development cycle time. The results of the findings pave the way for future studies to be done in this area.

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