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Relationship between Teamwork Quality and New Product Development Cycle Time in Telecom Industry

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ABSTRACT

This study filled a gap in existing knowledge regarding the impact of teamwork quality on New Product Development (NPD) cycle in the telecommunication industry in Saudi Arabia. This study analyzed the direct and indirect relationships between teamwork qualities; 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. The aim of this study was to obtain the relationship between teamwork quality and new product development cycle time in telecom industry. Random sampling was used to select respondents for a survey for this study. Findings indicated 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. 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.

Key words: New product, development, cycle time, teamwork quality, telecom industry

INTRODUCTION

Teamwork is the activity of multiple interdependent individuals (Salas *et al*., 2007). It is a set of interrelated components of performance that are needed to efficiently and successfully facilitate coordinated and adaptive performance (Parumasur and Govender, 2013). Even though they are distinct components, both task work and teamwork are important for teams to be effective in complex situations (Gwynne, 2012). 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 and 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 *et al*., 1993) nor human sentiments (e.g., emotion, motivation). Hoegl and Gemuenden (2001) 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 Hsu *et al.* (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.

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 (Parry *et al.*, 2009). 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.

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 (Sun and Zhao, 2010). 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). 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 (2001), 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 and T, Hallmark and Chrysler. They all decreased their cycle time by half (Calantone *et al.*, 2003).

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).

Market Orientation (MO) is considered to be the very heart of modern marketing management and strategy to both academicians and practitioners (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 (Gray, 2008). Other alternative terms synonymously utilized for the concept include market oriented, marketing oriented and customer oriented.

Prior studies on market orientation proposed measurement scales of internal market orientation (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 *et al*. (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 (2008) defined it as the attempt at realizing business success as it offers a platform for both employees and customers to operate.

The consistent categorization of managerial behaviors with the current marketing thinking/market orientation (Kohli and 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 employee's wants and needs and the design and employment of suitable responses to satisfy these wants and needs.

In the past several years, telecommunication workers have been tackling changes in the environment (Garrett and McDaniel, 2001). Complex work environments call for worker flexibility in adapting various client needs and adapting to the environment particularly in telecommunication organizations.

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 (Tillman *et al*., 1997). Internal and external environmental factors in healthcare may be characterized by instantaneous and unpredictable changes that alter the patients, units and the resource's 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 nurse's 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 and 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 (Ebright *et al*., 2004).

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 (Verran *et al*., 2003).

Therefore, the aim of this study was to obtain the relationship between teamwork quality and new product development cycle time in telecom industry and 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.

MATERIALS AND METHODS

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 1 shows the theoretical framework.

As shown in Fig. 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 (Parry *et al*., 2009).

In the present study, 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 (Hoegl and 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

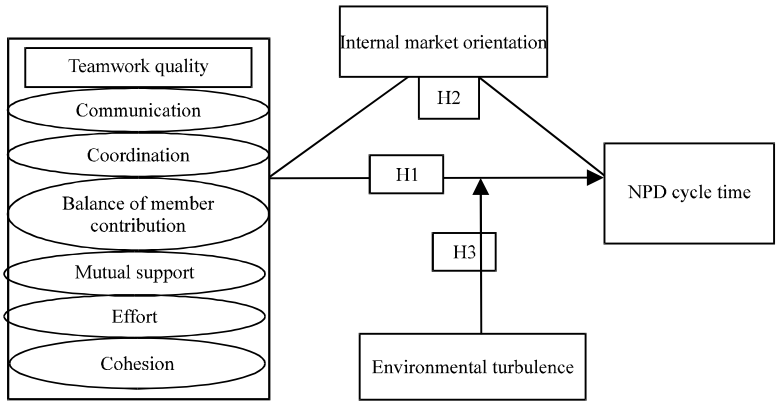

Fig. 1: Theoretical framework of study

objective problem to which the group is committed" (Gladstein, 1984). 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".

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 (Swink and 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 and 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.

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 hypotheses are as follows:

- **H1:** Teamwork quality positively affects new product development cycle time where more Teamwork quality leads to shorter NPD cycle time
- **H1a:** Communication among team members positively affects new product development cycle time where more communication leads to shorter NPD cycle time
- **H1b:** Coordination among team members positively affects new product development cycle time where more coordination leads to shorter NPD cycle time
- **H1c:** Balance of member contribution positively affects new product development cycle time where more balance of member contribution leads to shorter NPD cycle time
- **H1d:** Mutual support within the team positively affects new product development cycle time where more mutual support leads to shorter NPD cycle time
- **H1e:** Efforts within the team affect new product development cycle time where more efforts within the team leads to shorter NPD cycle time
- **H1f:** Cohesion among team members positively affects new product development cycle time where more cohesion among team members leads to shorter NPD cycle time

RESULTS

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.

Table 1: Respondents' demographic statistics

Parameters	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 (years)		
25-30	7	4.7
31-35	30	20.1
36-40	45	30.2
41-45	41	27.5
46-50	20	13.4
Above 51	6	4.0
Educational level		
Secondary school	4	2.7
High school diploma	42	28.2
Bachelor's degree	80	53.7
Master's 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 (years)		
Below 5	4	2.7
5-10	25	16.8
11-15	47	31.5
16-20	38	25.5
21-25	26	17.4
Above 25	9	6.0

Company background: The descriptive statistics of the respondents is illustrated in Table 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.

Nationality: In terms of nationality, Table 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.

Age: With regards to age, Table 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% were between 31 and 35, 13.4% were between 46 and 50, 4.7% 25 and 30 and 4.0% were above 51 years old.

Education level: As illustrated in Table 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.

Job position: Table 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.

Work experience: With regards to work experience, Table 1 indicates that 31.5% of the study sample had between 11 and 15 years of work experience, 25.5% had between 16 and 20 years, 17.4% had between 21 and 25 years, 16.8% had between 5 and 10 years, 6.0% had more than 25 years of work experience and 2.7% had work experience less than 5 years.

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 (Tenenhaus *et al*., 2005). As proposed by Hair *et al*. (2011), this study carried out 5,000 re-sampling (bootstrapping) so as to generate standard errors and obtain t-statistics.

Paths are considered as standardized beta (β) weights that are identical to the analysis of simple regression (Agarwal and Karahanna, 2000). According to Chin (1998), 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 ($t = 1.38$, $p<0.05$).

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 2 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).

Following Shrout and Bolger (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 2, 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.

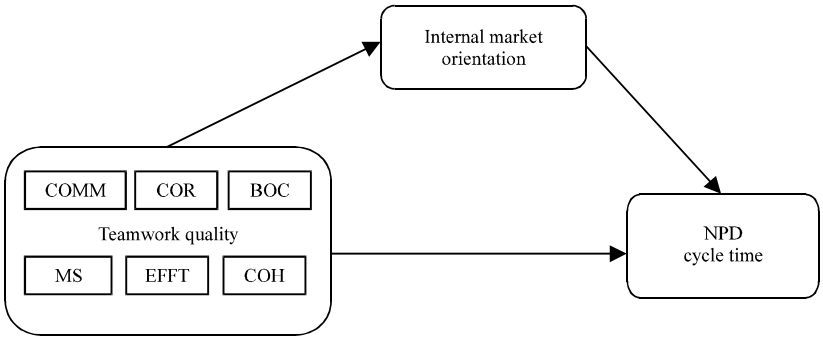

Fig. 2: Mediator model

Table 2: Path coefficients (mean, STDEV, t-values) main model

Parameters	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	Standard error (STERR)	T statistics (|O/STERR|)
BOC->IMO	0.088213	0.090328	0.078680	0.078680	1.121153
BOC->NPD	-0.286209	-0.284262	0.068183	0.068183	4.197649
COH->IMO	0.350293	0.353126	0.108058	0.108058	3.241717
COH->NPD	0.149349	0.152174	0.088605	0.088605	1.685558
COMM->IMO	0.026788	0.033843	0.078525	0.078525	0.341140
COMM->NPD	0.008858	0.006514	0.100788	0.100788	0.087891
CORD->IMO	0.080920	0.072860	0.093964	0.093964	0.861181
CORD->NPD	0.191603	0.188094	0.085304	0.085304	2.246110
EFFT->IMO	0.055326	0.048362	0.116175	0.116175	0.476233
EFFT->NPD	0.347445	0.348227	0.099014	0.099014	3.509038
ET->CT	0.758818	0.760746	0.031654	0.031654	23.972591
ET->MT	0.801240	0.802872	0.035160	0.035160	22.788512
ET->NPD	0.080725	0.081034	0.043190	0.043190	1.869068
ET->TT	0.830404	0.831132	0.023957	0.023957	34.661555
IMO->FFIG	0.884997	0.885087	0.013277	0.013277	66.655765
IMO->FWIG	0.811415	0.811353	0.025049	0.025049	32.393557
IMO->ID	0.849844	0.849448	0.018126	0.018126	46.885860
IMO->IIG	0.549160	0.547903	0.061573	0.061573	8.918875
IMO->NPD	0.513400	0.518081	0.060055	0.060055	8.548884
IMO->RESP	0.848749	0.848899	0.018209	0.018209	46.610588
MS->IMO	0.075346	0.079028	0.100665	0.100665	0.748485
MS->NPD	-0.375444	-0.374492	0.092402	0.092402	4.063153

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 (Henseler *et al.*, 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 3. A model with path values and t-values is shown in Table 3.

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

Table 3: Path coefficients (moderation effect)

Hypotheses	Relations	Beta	SE	t-value	p-value	Findings
H1a	COMM *ET->NPD	2.63	1.27	2.08	0.02	Supported
H1b	CORD *ET->NPD	1.74	1.15	1.52	0.05	Supported
H1c	BOC *ET->NPD	-0.32	0.45	0.71	0.24	Not supported
H1d	MS *ET->NPD	1.16	0.99	1.17	0.12	Not supported
H1e	EFFT *ET->NPD	-0.99	1.24	0.80	0.21	Not supported
H1f	COH *ET->NPD	-1.85	2.01	0.92	0.18	Not supported

**p<0.05

(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).

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 study, 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.

In this context, the result is different from Hoegl and Gemuenden (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 *et al.*, 1996). 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 stakeholder's 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, stakeholder's 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.

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. The result also confirms Auh and Menguc (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).

In sum, the present results 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.

CONCLUSION

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.

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 sampling 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.

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REFERENCES

Agarwal, R. and E. Karahanna, 2000. Time flies when you're having fun: Cognitive absorption and beliefs about information technology usage. MIS Q., 24: 665-694.

Auh, S. and B. Menguc, 2005. The influence of top management team functional diversity on strategic orientations: The moderating role of environmental turbulence and inter-functional coordination. Int. J. Res. Market., 22: 333-350.

Bales, R.F., 1958. Task Roles and Social Roles in Problem-Solving Groups. In: Social Psychology, Maccoby, E.E., T.M. Newcomb and E.L. Hartley (Eds.). 3rd Edn., Holt, Rinehart and Winston, New York, USA., pp: 437-447.

Beal, D.J., R.R. Cohen, M.J. Burke and C.L. McLendon, 2003. Cohesion and performance in groups: A meta-analytic clarification of construct relations. J. Applied Psychol., 88: 989-1004.

Calantone, R., R. Garcia and C. Droge, 2003. The effects of environmental turbulence on new product development strategy planning. J. Prod. Innov. Manage., 20: 90-103.

Chin, W.W., 1998. The Partial Least Squares Approach to Structural Equation Modelling. In: Modern Methods for Business Research, Markoulides, G.A. (Ed.). Lawrence Erlbaum, Mahwah, New Jersey, USA., pp: 295-336.

Cohen, J., 1988. Statistical Power Analysis for the Behavioral Sciences. Lawrence Erlbaum Associates, Hillsdale, NJ.

Ebright, P.R., L. Urden, E. Patterson and B. Chalko, 2004. Themes surrounding novice nurse near-miss and adverse-event situations. J. Nurs. Admin., 34: 531-538.

Garrett, D.K. and A.M. McDaniel, 2001. A new look at nurse burnout: The effects of environmental uncertainty and social climate. J. Nurs. Admin., 31: 91-96.

Gladstein, D.L., 1984. Groups in context: A model of task group effectiveness. Admin. Sci. Q., 29: 499-517.

Gray, D.M., 2008. Putting internal market orientation into behavioural patterns employed during marketing strategy implementation. Proceedings of the Australian and New Zealand Marketing Academy Conference, December 1-3, 2008, Sydney, Australia, pp: 1-10.

Griffin, A., 1993. Metrics for measuring product development cycle time. J. Prod. Innov. Manage., 10: 112-125.

Griffin, A., 1997. PDMA research on new product development practices: Updating trends and benchmarking best practices. J. Prod. Innov. Manage., 14: 429-458.

Gwynne, P., 2012. Group intelligence, teamwork and productivity. Res. Technol. Manage., 55: 7-8.

Hair, J.F., C.M. Ringle and M. Sarstedt, 2011. PLS-SEM: Indeed a silver bullet. J. Market. Theo. Pract., 18: 139-152.

Hardy, C.J., 1990. Social loafing: Motivational losses in collective performance. Int. J. Sport Psychol., 21: 305-327.

Hauschildt, P.H., S. Starrfield, E. Baron and F. Allard, 1996. The Hot Winds of Novae. In: Astrophysics in the Extreme Ultraviolet, Bowyer, S. and R.F. Malina (Eds.). Kluwer Acedemic Publishers, Dordrecht, ISBN 13: 9780792339083.

Henseler, J., C.M. Ringle and R.R. Sinkovics, 2010. The use of Partial Least Squares Path Modeling in International Marketing. In: Advances in International Marketing, Sinkovics, R.R. and P.N. Ghauri (Eds.). Vol. 20, JAI Press, Bingley, pp: 277-320.

Hoegl, M. and H.G. Gemuenden, 2001. Teamwork quality and the success of innovative projects: A theoretical concept and empirical evidence. Organiz. Sci., 12: 435-449.

Hsu, J.S.C., S.P. Shih, J.C. Chiang and J.Y.C. Liu, 2012. The impact of transactive memory systems on IS development teams' coordination, communication and performance. Int. J. Project Manage., 30: 329-340.

Jaworski, B.J. and A.K. Kohli, 1993. Market orientation: Antecedents and consequences. J. Market., 57: 53-70.

Kessler, E.H. and A.K. Chakrabarti, 1999. Speeding up the pace of new product development. J. Prod. Innov. Manage., 16: 231-247.

Kohli, A.K. and B.J. Jaworski, 1990. Market orientation: The construct, research propositions and managerial implications. J. Market., 54: 1-18.

Kozlowski, S.W.J. and K.J. Klein, 2000. A Multilevel Approach to Theory and Research in Organizations: Contextual, Temporal and Emergent Processes. In: Multilevel Theory, Research and Methods in Organizations: Foundations, Extensions and New Directions, Klein, K.J. and S.W.J. Kozlowski (Eds.). Jossey-Bass, San Francisco, CA., USA., ISBN-13: 978-0787952280, pp: 3-90.

Liu, Y., L.W. Wang, C.H. Yuan and Y. Li, 2012. The impact of institutional variables in new high-tech product development processes. J. Technol. Transfer, 37: 416-432.

Lynn, G.S., R.R. Reilly and A.E. Akgun, 2000. Knowledge management in new product teams: Practices and outcomes. IEEE Trans. Eng. Manage., 47: 221-231.

Morgan, Jr. B.B., E. Salas and A.S. Glickman, 1993. An analysis of team evolution and maturation. J. Gen. Psychol., 120: 277-291.

Parry, M.E., M. Song, P.C. de Weerd-Nederhof and K. Visscher, 2009. The impact of NPD strategy, product strategy and NPD processes on perceived cycle time. J. Prod. Innov. Manage., 26: 627-639.

Parumasur, S.B. and P. Govender, 2013. The importance of teamwork, continuous top management support and training in bringing about TQM. J. Econ. Behav. Stud., 5: 639-651.

Salas, E., K.C. Stagle, C.S. Burke and G.F. Goodwin, 2007. Fostering Team Effectiveness in Organizations: Toward an Integrative Theoretical Framework of Team Performance. In: Modeling Complex Systems: Motivation, Cognition and Social Processes, Dienstbier, R.A., J.W. Shuart, W. Spaulding and J. Poland (Eds.). Vol. 15, University of Nebraska Press, Lincoln, pp: 185-243.

Scott, G.M., 2001. Strategic planning for technology products. R&D Manage., 31: 15-26.

Shepperd, J.A., 1993. Productivity loss in performance groups: A motivation analysis. Psychol. Bull., 113: 67-81.

Shrout, P.E. and N. Bolger, 2002. Mediation in experimental and nonexperimental studies: New procedures and recommendations. Psychol. Methods, 7: 422-445.

Sulaiman, Y., A.R. Othman, S. Perumal and Z. Hussin, 2013. Escalating the employee organisational commitment through internal market orientation: Childcare centre's perspective. Int. J. Bus. Soc. Sci., 4: 257-262.

Sun, H. and Y. Zhao, 2010. The empirical relationship between quality management and the speed of new product development. Total Q. Manage. Bus. Excellence, 21: 351-361.

Swink, M. and M. Song, 2007. Effects of marketing-manufacturing integration on new product development time and competitive advantage. J. Oper. Manage., 25: 203-217.

Tenenhaus, M., V.E. Vinzi, Y.M. Chatelin and C. Lauro, 2005. PLS path modeling. Comput. Stat. Data Anal., 48: 159-205.

Tillman, H.J., J. Salyer, M.C. Corley and B.A. Mark, 1997. Environmental turbulence: Staff nurse perspectives. J. Nurs. Admin., 27: 15-22.

Tortosa, V., M.A. Moliner and J. Sanchez, 2009. Internal market orientation and its influence on organisational performance. Eur. J. Market., 43: 1435-1456.

Verran, J.A., J. Effken and G. Lamb, 2003. Impact of nursing unit characteristics on outcomes. R01HS11973, Agency for Health Research and Quality, USA.