The Impact of Organizational Culture on the Success of New Product Development Projects: A Theoretical Framework of the Missing Link

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ABSTRACT

The failure rates of New Product Development (NPD) projects have been alarmingly high. Companies have tried a variety of approaches yet the failure rates have not improved. Researchers introduce a wealth of knowledge when dealing with the subject, in an attempt to define the problem and find solutions to it. Many of these studies focus on certain factors, such as buyer-supplier relationships, project structure,...etc. as ways of improving the implementation of NPD. This paper introduces culture as key factor in determining the success of NPD projects. Culture to organizations is personality to people. It determines how they do things and why they do them that way. Without adopting the right culture, trying to present micro changes might prove unuseful. This paper present a theoretical framework discussing the effects of organizational culture on project-related variables, and consequently on project success or failure. This study will be followed up with an empirical study testing our assumptions and empirically verify our model.

INTRODUCTION

The New Product Development (NPD) concept has been gaining an increasing attention in the last few decades. With domestic and global competition intensifying, the continuous development of new technologies which quickly render existing products obsolete, the constant change of customer needs and requirements, and the increasing costs of developing new products put organizations under a constant pressure to develop new products. With this in mind, organizations have to be fast and efficient in developing new products.

Companies have tried a variety of approaches for the successful introduction of the new products including (but not limited to) using cross-functional development teams, empowering employees, and reducing layers of management. Others have tried experimentation with reducing development times, and conducting field studies to determine the contributing factors for better implementation of NPD projects.

Despite all these efforts, the failure rate in developing new products is alarmingly high. Recent studies indicated failure rates as high as 49% (Suwannaporn, 2010 and Adams, 2004), and as high as 70 to 80 percent in the food industry (Gresham et al., 2006; Winger and Wall, 2006). It has been estimated that for every 4 projects that enter development, only one makes it to the market, at launch, at least one third of the products fail despite research and planning, an estimated 46% of all resources allocated to product development by U.S. firms are spent of products that are cancelled or failed to yield adequate returns (Stevens and Burley, 1997).

Despite the enormous attention from research (see for instance Suwannaporn and Speece, 2010; Zahidul Islam and Jason, 2009; Nadeem et al. 2011), these rates are not better (lower) than a couple of decades ago. Studies in the ear nineties have reported that new consumer packaged goods fail to live up
to management's expectations eighty percent of the time (Lynn et. al, 1990), and industrial product launches fail thirty three percent of the time (Clancy and Shulman, 1991; Cooper, 1992; Strauss, 1992). As indicated by Jensen et al. (2001), despite the fact that NPD literature points out a fairly consistent list of success factors, it seems that only a few companies have implemented these identified success factors - indicated by the fact that they make the same mistakes they did 30 years ago.

These statistics impel organizations to manage every stage of their NPD projects efficiently and effectively. And in most cases, the use of project management tools and techniques as optimal means of implementing NPD projects becomes necessary since NPD failure and even the ill implementation of NPD has been proved to increase organizational mortality (Freeman, 2001).

In an attempt to improve the implementation of NPD projects and make them more successful, this paper proposes an integrative model that sheds the light on several crucial factors that determines the success or failure of NPD projects. The study integrates three disciplines into one-organizational culture, new product development, and project management. It gives us a better understanding of why NPD projects succeed or fail by integrating the knowledge from organizational culture, NPD, and project management. It provides a comprehensive model that explains the effects of organizational culture on the implementation of NPD projects, and the relative importance of the factors affecting NPD projects. The study constitutes an initial effort to model and measure the relationships among project level variables and the organizations' degree of innovativeness, all of which are affected by the organizational culture.

LITERATURE REVIEW

When studying the success and failure of NPD some studies focus on investigating the best practices in order to conclude a list of key factors affecting success. For instance, Nicholas et al. (2011) investigate NPD “practitioners’ view of best practices by studying 70 Small and Medium size Enterprises (SMEs) and 74 large companies in Ireland and the UK. Their study concludes that practitioners rank strategy as the most important factor in NPD success. An unexpected result of the study is the low ranking of organizations’ culture (defined as the motivation of team members and the cultivation of a creative environment), especially by the large companies. In another study Ledwith (2000) suggests that company culture is more important for NPD success in SMEs than in large companies. The idea behind best practice studies is that, proactive organizations will aim to continually improve their NPD implementations by benchmarking their performance against those of other companies. NPD improvements can take place by understanding what best practices should be adopted for their product development processes, and subsequently adopting these practices to replicate the success of those best practice organizations (Paulk et al., 1993; Dooley et al. (2002). It is worth mentioning that, since the majority of these studies are not industry specific-an idea that contradicts the definition or projects, which are unique endeavors, these studies represent a framework for “accepted” practices, rather than best practices (Whitty and Maylor, 2007).

Other studies try to assess the determinants of NPD success by studying the effects of a particular variable, or a group of related variables, on NPD performance. Kosaroglu and Hunt (2009) for instance, focus their attention on the success of the NPD project manager as a determinant of NPD overall success. The study investigates the characteristics of the successful project manager in the Austrian telecommunication industry. Kosaroglu and Hunt (2009) conclude that the sets of skills project managers need to retain in order to be successful in successfully managing their NPD projects are technical skills, which does not need to be detailed, leadership skills,
managerial skills, and project manager competency standards.

In their study, Wong and Tong (2001) focus their attention on the cooperation between research and development and marketing. By studying 217 organizations they conclude that new product success is driven by cooperation between research and development and marketing. It was also found that customer and competitor orientations have a mediating effect on the association between research and development and marketing cooperation and new product success.

While the study by Wong and Tong (2001) focus on the cooperation between R&D and marketing, Jensen et al. (2001) focus their attention of the skills, values and norms of the employees, as the key success factor of NPD success.

Suwannaporn and Speece (2010) study the determinants of NPD success in the Thai food industry by studying 20 organizations. They conclude that supplier relationships with the organizations are also predictors of success rate, while strategy and planning plays a weak role in predicting the success or failure of NPD.

In a classic study that analyze the factors that influence NPD performance, Hart (1995) classify the factors as either strategic or operational, and grouped them into strategic level and project level variables. Strategic level variables represent factors relating to the way in which the innovating organization approaches the development of new products. Organizational culture, organizational strategy, organizational structure, and top management involvement and orientation are considered as the strategic level variables. Project level variables represent factors relating to the specific NPD project under consideration. They include the processes of NPD and how they are performed, the NPD structure, the cooperation between the R&D and the marketing departments, and the involvement of suppliers in NPD stages. Note that the factors commonly examined in the literature belong to this second group. According to Hart’s study, the cooperation between research and development and marketing in the study by Wong and Tong (2001) and the supplier relationship in the Suwannaporn and Speece (2010) study falls within the project level variables.

Jensen et al. (2001) investigate the missing link in NPD success. They suggest that-as indicated above- the literature is abundant with critical success factors and that the literature is consistent about those factors. Nevertheless, organizations have been lagging behind in implementing those factors and tend to make the same mistakes over and over again (see also Cooper, 1998; 1997; Cooper and Kleinschmidt, 1995; 1986; Craig and Hart, 1992; Page, 1993). Jensen et al. (2001) concludes that organizations have been unable to implement the normative advice. Studies such as those by Barclay, 1992 and Biemans and Harmen, 1994; 1995 refer such inability to the general barriers to change in companies.

Based on studying 166 Cooper and Kleinschmidt (2007 and 1996) suggest four key success factors. The factors they suggest are; a high-quality new product process, a defined new product strategy for the business unit, adequate resources of people and money, and R&D spending for new product development. Other factors that proved to show more modest effects are; high-quality new product project teams, an innovative climate and culture, the use of cross-functional project teams, and senior management accountability for new product results. Cooper and Kleinschmidt (2007 and 1996) suggested that the effects of innovative climate and culture was strong, but perhaps not as strong as one might have expected. Cooper Kleinschmidt (2007 and 1996) defined the innovative climate and culture by the existence of new product idea scheme within the business unit, which solicited ideas from all employees, Technical people were given free time, scouting time or time off to work on projects of their own choice, Skunk works or teams working on unofficial projects were encouraged.
As indicated by Jensen et al. (2001) the understanding values and norms is often limited to strategic orientation, risk taking and climate. It is worth mentioning that examples of other research on values and norms are Gupta and Wilemon (1988) (risk taking and top management support), McDonough (1986) (top management support), Voss (1985) (risk taking). In sum, few studies have touched upon the importance of values and norms with the consequence that the understanding is limited, rather general and not well understood.

In our opinion, one of the most important factors when studying the performance of NPD project is organizational culture. The unexpected results achieved when studying the effect of this factor (as indicated in previous studies) is the misunderstanding, miss-measurement, and inappropriate definition of organizational culture.

In the following section we will discuss, define and provide a measure of organizational culture. In the following section we will then discuss the expected effects of organizational culture on NPD performance.

ORGANIZATIONAL CULTURE

Numerous definitions of organizational culture have been suggested in the literature. Schein (2010 and 2004) defines organizational culture as a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems. Sathe (1985) defines it as the set of important assumptions, often unstated, that members of a community share in common. Drennan (1990) defines organizational culture as how things are done in an organization. Ouchi (1981) and Pascale and Athos (1982) view culture as the philosophy that guides an organization’s policies towards employees and/or customers. In general, it is clear that culture both prescribes and proscribes individual behaviour in organizations.

Organizational culture gives meaning to organizations through a collection of values and beliefs which are shared to varying degrees (Pettigrew 1979). It guides and shapes behaviours and attitudes of all employees (Hofstede, 1980; Handy, 1985; Schein, 1985; O’Reilly and Chatman, 1996; Burns et al., 2003). Organizational culture determines how individuals behave, what people pay attention to, how they respond to different situations, and how they socialize with new members and exclude those who do not fit in (Spataro, 2005). It is crucial to understand organizational dimensions because they help to explain many of our puzzling and frustrating experiences in social and organizational life (Schein, 2010). It has been reported that as many as three-quarters of reengineering, total quality management, strategic planning, and downsizing efforts have failed entirely or have created problems serious enough that the survival if the organization was threatened (Cameron, 1997). Several studies reported that the most frequently cited reason was the neglect of the organization’s culture. In other words, failure to change the organization’s culture doomed the other kinds of organizational changes that were initiated (Schein, 2010; Caldwell, 1994; Pascale and Athos, 1993; Kotter and Heskett, 1992).

It is then safe to conclude that organizational culture have a potential key effect on NPD performance.

Though researchers have offered various definitions of organizational culture, few suggest ways of measuring it. Measuring organizational culture is not easy, especially when it is approached as a variable consisting of shared values and beliefs that are taken for granted and not obvious even to an organization’s members (Belassi and Kondra, 2006). Among the researchers who have suggested
dimensions for organizational culture are Hofstede (2001, 1997; Hofstede et al., 1990). Hofstede (2001, 1997; Hofstede et al., 1990) not only introduce cultural dimensions, they also explain how these dimensions can be measured. Hofstede et al. (1990) introduce six dimensions to organizational culture. Due to the measurability of the dimensions suggested by Hofstede, this study will focus mainly on these dimensions. The following dimensions are used to represent organizational culture are presented in Table 1 below (for a detailed discussion of these dimensions we refer the reader to the work done by Hofsted and Hofsted et al.).

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<th>Table 1: The Dimensions of Organizational Culture Adopted in this Study</th>
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<td>Process oriented vs. results oriented</td>
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<td>Employee oriented vs. job oriented</td>
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<td>Open systems vs. closed systems</td>
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<td>Normative vs. pragmatic</td>
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<td>Power distance</td>
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<td>Uncertainty avoidance</td>
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<td>Collectivism vs. individualism</td>
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PROJECT-RELATED VARIABLES INFLUENCING NPD PERFORMANCE

Several project related factors have been discussed in the literature as key determinants of NPD success. Variables that are Project related variables were often considered as the cause of NPD projects success or failure. Among these factors are the project structure, the cooperation between the R&D and the marketing departments, and the involvement of suppliers in NPD stages. Note that the factors commonly examined in the literature belong to this second group.

In this section we review the literature on the following project-related variables; project structure, R&D budget, R&D and marketing integration, and buyer-supplier relationships.

The effect of project structure on NPD performance has always presented mixed conclusions (see for instance Stare, 2011 and Belassi, 2006). While Barczak (1995), Mancini (1993) Peter and Waterman (1982) and Kidder (1981) argue that project teams are the best structure for developing new services and products. On the other hand, Larson and Gobei (1988), Crawford (1986), Adams and Martin (1987), Duncan (1979), Davis Stanley and Lawrence (1977), and Youker (1977), suggest that there is no best way to organize projects. Nevertheless, project team, project matrix and balanced matrix, sharing roughly equal success rates, prove to be more successful in developing new products than the functional and functional matrix structures. In addition to project structure, R&D budget as well, also showed mixed results as a determinant of NPD performance (Belassi, 1999).

Among the most important factors in determining the success or failure of NPD projects is the integration between marketing and R&D. The role that marketing departments play in the development of new products is essential. Failure to integrate marketing early in the innovation process is among the most significant causes of NPD failures (Song and Parry, 1992; Calantone and Cooper, 1981; Gerstenfeld and Sumiyoshi, 1980; Cooper, 1979; Hopkins, 1977; Gruber, Otto, and Frits, 1973; Young, 1973; Rothwell, 1972). The importance of R&D/marketing integration stems from the fact that technology alone would not make successful new products, and that technological advances should be market driven. Souder (1988 and 1981) suggests that new product success rates would be the highest when R&D/marketing relationships reflect mutual respect, trust and commitment, as well as perceptions of competence and interdependence. Also any barriers to their integration would set NPD projects back.
Another key determinant of NPD performance is buyer-supplier relationship. The importance of a collaborative buyer-supplier relationship has been gaining increasing attention in the literature.

Over the past few decades there has been an increase in both the numerosness and importance of buyer-supplier relationships (Itzkowitz, 2009). Buyer-supplier relationship enhances firm valuation (Hertzel et al., 2008) and firm functioning (Cohen and Frazzini, 2008). A skilled and loyal supplier base can be a key source of competitive advantage (Cole and Yakushiji, 1984). As a result, firms today are aggressively reducing their total number of suppliers, increasing their reliance on the suppliers that remain (Bowerson, 2010, Lyons et al, 1990), and getting them involved earlier in their NPD process. Buyers and suppliers can observe each other’s inventory levels, inventory turnover, ability to pay, actual growth, and potential trouble. Regular interaction can provide insights into management and also result in direct access to each other’s employees (Itzkowitz, 2009).

The advantages manufacturers get from the early involvement of suppliers include more innovative products, faster product development, and lower development costs (Ragatz et al., 1997; Dyer, 1996; Helper and Sako, 1995). During the last decade Chrysler, for instance, has been able to reduce the time necessary for developing a new vehicle from 234 weeks to 160 weeks, and to drop the cost of development by 20% to 40%, by involving their suppliers at early stages of NPD. Clark (1989) suggests that the early supplier involvement in product design is a key to Japanese automakers’ edge in introducing new models both faster and with fewer total labor hours than their U.S. counterparts.

Despite the advantages of collaborative buyer-supplier relationships, forming such relationships constitutes a major challenge for organizations, necessitating a holistic and integrable approach to the required modification of organizational culture.

Despite the extreme importance of the project-related factors, it is our belief that the adoption of these factors constitutes a challenge and is a result of the existence of a more holistic variable - the right organizational culture (see also McIvor, 2000). Organizational culture determines how organizations act and whether or not they form collaborative relationship with their suppliers or resort to getting their suppliers to compete against each other for the lowest bid. Organizational culture is what determines if organizations work collaboratively and all department, such as marketing and R&D, integrate their efforts or work in isolation. Accordingly, we believe that organizational culture is the antecedent that determines all other project level variables, that in turn affects NPD performance. Figure 1 below represents our suggestion of how organizational culture affects NPD performance.
RESEARCH HYPOTHESES

As indicated in Figure 1, we expect organizational culture to affect the project related variables – project structure, R&D budget, marketing involvement, and buyer-supplier relationship- which in turn affect NPD performance. In particular we propose the following hypotheses, which we will test in a subsequent study:

We expect organizations with higher degrees of collectivism to be more inclined towards working in groups and getting everybody involved in teamwork. Accordingly, we expect organizations with higher degree of collectivism to have higher level of relationship with their first-tier suppliers. Hence,

H1: the level of relationship the organization maintains with its first-tier suppliers is positively associated with its degree of collectivism.

Similar to hypothesis one, we expect organizations with high degree of openness to have higher level of relationships with their first-tier suppliers. Hence

H2: the level of relationship the organization maintains with its first-tier suppliers is positively associated with its degree of openness.
Bowerson (2010) and Lyons, Kracbenberg and Henke (1990) indicate that the advantages of higher supplier involvement do not come without their own disadvantages. Buyers face the risk of increased dependence on the supplier. Accordingly, we expect less risk-averse organizations to have higher supplier involvement and to be more willing to support their suppliers when necessary. Hence, 

**H3:** The level of relationship the organization maintains with its first-tier suppliers is negatively associated with the degree of its uncertainty avoidance.

Similar to the effect of collectivism and openness on buyer-supplier relationships, we expect higher degrees of collectivism and higher degrees of openness to have positive effect on the degree of involvement of the marketing department in the NPD process. Hence, 

**H4:** The level of marketing department's involvement in NPD projects is positively associated with the degree of collectivism of the organization.

**H5:** The level of marketing department's involvement in NPD projects is positively associated with the degree of openness of the organization.

As for the effects of project related variables on NPD performance we expect the following relationships:

**H6:** NPD success is positively associated with the level of buyer-supplier relationships.

**H7:** NPD success is positively associated with the level of involvement of the marketing department in NPD projects.

We do expect project-related variables to interact and have effects on each other as well. Also, these project-related variables might have indirect effects on NPD performance through each other. For instance, buyer-supplier relationship might affect the percentage of sales budget allocated to R&D (see for instance Belassi, 1999). While some might expect higher level of supplier involvement to induce spending on R&D, others might expect a totally opposite relationship. After all, organizations that tend to get their suppliers more involved in their NPD processes might not need to invest as much in R&D as part of the spending is done by their suppliers. Due to the many possible relationships suggested in the model resented in Figure 1 we suggest a structural equation models to test those relationships and interactions. The testing of the structural equation model is the topic of a following paper that the author is working on.

**CONCLUSION**

Many studies focus on the effects of organizational culture on the performance of organizations. When studying the performance of NPD projects, studies focus more on the project-related variables as determinants of project success or failure. The role of organizational culture on NPD project performance, on the other hand, is a greatly overlooked area of research. In our opinion, the reason behind the high failure rate of NPD projects stems from the fact that organizations tend to maintain the same setup, same way of doing things, and same culture, yet expect a different outcome, they expect to be more successful, by changing a few project-related variables, or mimicking best practices in the industry.

We believe that to achieve drastically different results and success rates, drastic changes have to be made. With culture determining what organizations are and how they operate, trying to change results without reconsidering organizational culture seems futile.

In this study we propose a model that indicates how organizational culture interacts (and mostly affects) project-related factors, which in turn affect the success or failure of NPD projects. The model also indicates how project-related variables interact in order to determine in the end the success of failure of NPD projects. The structural equation model will be presented and tested in a subsequent paper.
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