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Critical Success Factors of New Product Development: Evidence from Select Cases

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Abstract

Background: The unique, yet complex, new product development (NPD) process represents one of firms' most significant operations that impose high weightage onto its profitability margins and market reputation. **Objectives:** The object of the research is to identify critical success factors (CSFs) of a new product development in Dubai firms. **Methods/Approach:** The paper uses literature as a basis for identifying critical success factors for a new product development, which is supported by a semi-structured interview of senior management-level executives in Dubai. **Results:** To pinpoint a set of the most influential CSFs, 12 factors for the NPD process are highlighted, based on their reoccurrence patterns in the literature and semi-structured interviews. Impact levels of 12 CSFs on the NPD process are expressed through a presentation from the highest to the lowest recurrent factor. **Conclusions:** Each CSF's role in driving the NPD process to success has also been justified using real-time evidence, depicted throughout 4 case studies from different industries.

Keywords: new product development; critical success factors; business success and qualitative study
Paper type: Research article
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Introduction

A decade ago, the world witnessed the beginning of a rivalry amongst two tech giants: Apple and Samsung. History records that only one month after Samsung introduced its first-generation Galaxy S smartphone in June 2010, Apple backfired with the iPhone 4 (Bouwmeester, 2016). From that point onwards, competition between the two in terms of features, innovation, and market share has been fierce, with one company's launch strongly countering the other's (Bouwmeester, 2016). Hallstedt et al. (2020) justify that such competitive behavior represents an organization's eagerness to succeed and grow, which can only be possible through introducing attractive products into the marketplace. To do so profitably entails the organization to invest in the process of new product development (NPD).

Defined as a collection of related activities that begins with recognizing a market opportunity, and proceeds with converting it into a new product (Hallstedt et al., 2020), NPD is considered often as a source of competitive advantage (Owens, 2007). NPD is a process, whose inputs are idea generation, idea screening and feasibility studies (Kazimierska et al., 2017), while outputs are the manufacturing (Kazimierska et al., 2017), commercialization, and pricing of new product.

The significance of the NPD process emerges from a product's risk of failure (Owens, 2007). Realizing that all new products carry an inherent possibility of the loss of the new product fails, which urges organizations to spend maximum efforts to prevent this outcome (Owens, 2007). Due to the NPD complexity and ambiguity, organizations are usually drawn to dedicate huge resources to it (Lester, 1998). On the other hand, the success of a newly introduced product contributes heavily to the organization's reputation and direct sales. For example, Apple's positive market image is mainly driven by their business shrewdness in introducing a transformed telecommunications device that fulfils the customer needs. Their success is primarily driven by their innovative ideas, accurate market search, and timely market launch (Tariq et al., 2011). Hence, even with changing customer requirements, technological progressions, and challenges, the yearn for market domination tempts businesses to take upon the wavering risk of product failure (Hallstedt et al., 2020).

In the course of doing so, businesses ought to manage risks by ensuring the availability of certain factors that increase NPD success rates, namely, critical success factors (CSFs). Business Dictionary (2019) defines CSFs as a set of conditions that has a direct influence on the effectiveness, efficiency, and practicality of the subject matter (in this case, the process). According to Jeston (2018), some CSFs are common amongst organizations and play equal roles in driving all types of business processes to success. However, considering the elevated relevance of the NPD process to businesses, there emerges a rising need to define precise CSFs concerning this process specifically, considering its unique activities, developmental phases, and diversified outputs. As a response to this requirement, this paper is dedicated to studying the most reoccurring CSFs for the NPD process based on literature. To validate their role and express their criticality to the process, real examples from a set of industries will be presented.

Since the beginning of the industrial revolution, the global economy is continuously expanding and innovation, research &development, and new product development are buzz words. Nowadays, products are developed daily based on the information technology and smart technology. For example, Sony alone develops almost 11000 products every year and launch approximately 1100 in the market. How many products become successful? This is a big question. Even, out of 1100 products how many products become familiar to consumers? The success of the new product development process depends on various factors which are critical

in the success of the NPD process. Companies that can rapidly innovate need to understand the CSFs of NPD to gain and maintain market share and remain competitive.

Caught amid a struggle to effectively drive the complex NPD process and produce successful products, organizations must pinpoint the CFFs that can at least help ensure this success. Literature communicates a large set of CSFs for the NPD process, many of which are classified based on the process's phases and the industry it is applied within. After reviewing various industries, it was deduced that certain CSFs are given a higher value than others, due to their heftier role in influencing NPD success rates. The independent critical success factor for NPD,s can be top management support, cross-functional teamwork, NPD process, NPD strategies, and market research activities (Aziz et. al, 2014).

There have been multiple studies conducted on critical success factors of new product development but with limited scope and limited setting (e.g.; engineering equipment development). However, there is little or very limited research is available in the Middle East context. Therefore, this research becomes an important step in the direction. The objective of the paper is to explore and understand the concerns of the area in new product development, which raise the questions: (i) RQ1: What are the critical success factors for new product development?; (ii) RQ2: Are Critical success factors reflected in the real-world class organization?

After the introduction, methodology is presented in the second chapter, while findings and discussion are organized around the most relevant CSFs. Evidence based on the experience of leading markets and companies is presented in the fourth chapter. Final chapter provides the concluding remarks.

Methodology

The research is based on literature and supported in-depth semi-structured interviews with product/services/project development managers who played vital roles in the success of the products/services/project in their respected organizations. We have identified 15 such individuals based on convenience sampling where we have personal contacts from different organizations and they were interviewed as a part of this study. Characteristics of participants are presented in the Appendix 1.

We approached 15 organizations as per convenience sampling in the top 100 organizations in the United Arab Emirates (UAE). We gather the responses from each 15 of the organizations (Appendix). Out of 15 respondents, 9 of them were female managers level and 6 of them were male. Some of the designations were up to vice president-level people. The profile of respondents includes; vice president, chief information officer, general manager, project officer, head of sales and marketing, and head of the product and promotion. The average age of the respondents was 42 years and the average experience was approximately 16 years ranging from 13 to 21 years. The average experience in the related field of product management or new product development was approximately 8 years ranging from 6 years to 17. The respondents are having multi-industry experience that includes; manufacturing, oil, gas and energy, utilities, aviation, government, healthcare, and finance and banking. The study could be carried out with different industries and could cover many respondents but due to time and funding constraints, we limit our study to 15 respondents in UAE only.

With each participant the semi-structured interview was conducted with the goal to collect the information about their perceptions on the most relevant critical success factors.

Findings

Based on semi-structured interviews with the participating managers, the study findings have been summarized in 12 critical success factors. The critical success factors demonstrate the complete spectrum of the new product development process. The list of factors that came out prominently from the depth of semi-structured interviews are given below:

- Top Management Commitment
- Presence of Clear Goals & Milestone Measurement
- User/Customer Involvement (i.e. Market Research)
- Involvement of Cross-Functional Teams
- Placement of Structured NPD Process
- Talented Team Members with Relevant Experience to NPD Process & Activities
- Establishment of An Entrepreneurial Culture
- Effective Communication Amongst Team Members & With Management
- Alignment of NPD Process Activities with Strategy
- Focusing on Innovation & Out-Of-The-Box Ideas
- Availability of Financial Requirements
- NDP Process Speed

Top Management Commitment

As the highest-ranked CSF amongst all studied research works, senior management's commitment to the NPD process is represented in defining the organization's vision, mission, and strategy (Lester, 1998). These factors communicate a futuristic perception of the organization in the minds of its people, who in return drive organization-wide initiatives to pursue these goals. The NPD process is merely but one of these initiatives, that must be directed towards the business's target market, the products it wishes to manufacture, and its business orientation (Lester, 1998). Furthermore, senior managers must act as process sponsors to approve, allocate and drive the flow of the process (Holland, Gaston & Gomes, 2000). Besides, the severity of the NPD process occasionally pauses its team members towards a fork, where top management's intervention is required to make the decisions that the venture team is unauthorized to make (Cengiz et al., 2005).

Presence of Clear Goals & Milestone Measurement

Once the strategy of an organization is set, there emerges a need for an NPD process strategy (Cooper et al., 1995). Questions as "What are the goals of the process?" and "What kind of products is the organization expecting out of the NPD team?" must be clearly defined for the team upon establishing it. Lester (1998) clubs this CSF with the need for healthy project management, and denotes the importance of setting a tactical plan to follow, starting with feasibility studies to enable reaching the final product as soon as possible. As for milestone measurement, he proposes defining strategic constraints, identifying milestones, defining their requirements and the tasks they incorporate as well as setting a realistic timeline as to when each of them will be achieved (Lester, 1998).

User/Customer Involvement (i.e. Market Research)

One of the direct reasons behind NPD failure is producing the wrong product (Cengiz et al., 2005). Classified as a task of the organization's marketing team, the business must listen to its users' inputs (Cooper & Kleinschmidt, 1995). Furthermore, Cengiz et al. (2005) research indicates that paying special attention to the market's

new requirements can enable businesses of the 'first-mover' advantage, which carries high product success rates considering the weak competition.

Involvement of Cross-Functional Teams

Cooper et al. (1995) state the need of having team members from across different departments within the venture team. Holland, Gaston & Gomes (2000) warns of constituting teams that are either too large or too small for the scope of the process and its associated activities. Lester (1998) adds that cross-sectional venture teams seem to operate as an organization on their own simply because they possess a combination of entrepreneurial traits that complement one another to boost the process's performance and results. Cengiz et al. (2005) believes that the diversity within cross-sectional teams produces innovation.

Placement of Structured NPD Process

Determining the NPD process structure, policies and guidelines fall under management's responsibilities towards the venture team. Such activity enables team members of understanding what is expected out of them and how to approach the NDP process in the first place (Lester, 1998). Cooper et al. (1995) add that NPD processes ought to highlight quality throughout the deployment. Processes also must exhibit flexibility in combining steps, performing them in parallel, or skipping them after careful consideration (Cooper et al., 1995, Holland et al., 2000).

Talented Team Members with Relevant Experience To NPD Process & Activities

In general, all team members must have experience in project management, player roles, and responsibilities (Florén et. al., 2018). The appointed team leader must be task-aware and emotionally intelligent in understanding the team members' work mannerisms, strengths, and weaknesses. This factor allows him or her to create synergy amongst all members and influence them to unveil their best collaborative efforts. (Holland et al., 2000). Most importantly, the leader must not be burdened with more than one project at a time, to strengthen focus and enable efficiency in one direction (Cooper et al., 1995).

Establishment of an Entrepreneurial Culture

Both Lester (1998) and Cooper et al. (1995) emphasize the need for an innovation-fostering culture within the host organization, only because worthy-of-investment ideas mainly generate in the minds of creative, unstressed employees. Both studies believe that to establish this culture, organizations must allow their employees enough time to get creative. Cooper et al. (1995) adds that firms must even allocate budgets to build unofficial prototypes in teams. Moreover, acts of rewarding creative thinking efforts represent tokens of appreciation and further encouragement to all (Lester 1998, Cooper et al., 1995).

Effective Communication Amongst Team Members & With Management

Holland et al. (2000) research on 289 projects concluded that healthy communication amongst team members exhibits a strong correlation with success. Transparency established as a result of sharing all types of information through weekly meetings, phone calls, or any other communication method, is crucial to ensuring that all members stand on the same page (Holland et al., 2000).

Communication with management must include project progress, critical issues faced, possible solutions, and lessons learned (Lester, 1998). Communicating with the organization's staff external to the venture team can also help in promoting the new product, receiving feedback, and evaluating progress from a peripheral point of view (Lester, 1998).

Alignment of NPD Process Activities with Strategy

Before approving the launch of the NPD process, top management much ensure strategic alignment between the process's outcomes with the organization's short and long-term goals (Florén et. al., 2018). Cooper et al. (1995) emphasizes this alignment by indicating that the NPD process's goals must fit into the organization's, considering that driving the process to success translates into the partial (or total) achievement of the organization's objectives. Hence, top management must always be able to validate how achieving process success would contribute to the organization's ambitions (Cooper et al., 1995).

Focusing on Innovation & Out-Of-The-Box Ideas

According to Cengiz et al. (2005), technological evolvements introduce fresh product potentials to NPD. However, the generation of new-to-the-organization ideas, as a result of this evolvement proves difficult. Nevertheless, tapping into technology's latest developments represents a very important factor in the successful development of a noble product (Lester, 1998). Not only should ideas introduce new paradigms, but to sell, product depictions of these ideas must genuinely add value to customers (Lester, 1998).

Availability of Financial Requirements

Budget allocation to any project at the organization represents empowerment. Hence, if an organization wishes to introduce successful products, it needs to boost the confidence of its venture team by financially investing in the purpose (Holland et al., 2000). Senior management must view the financial allocation of resources for an NPD process as the budget allocated for achieving the organization's strategic objectives, which is precisely what the venture team aims to accomplish (Cooper et al., 1995), considering synergy between the organization's and NPD process's strategy.

NDP Process Speed

The faster an NDP process is, the quicker its organization would be able to introduce new products into the market and win a competitive advantage (Cengiz et al,, 2005). Moreover, with rapid technology transformations dominating the current marketplace, speed has become an economic requirement of the NDP process. Profit figures prove that delaying a product introduction can affect the sales of the product up to 35%, which justifies why most managers are more willing to increase resources by 50% than delay a new product launch (Cengiz et al., 2005).

Discussion

The Table 1 exhibits the reoccurrence count of the above factors based supported by author credentials, organized from most to least reoccurring.

Table 1
Distribution of CFSs across relevant research papers

CSF	Lester (1998)	Cengiz et al. (2005)	Florén et. al. (2018)	Cooper et al. (1995)	Fernandes et al. (2017)	Sun et al. (2004)	Suwannaporn et al. (2010)	Holland et al. (2000)	Connell et. al. (2001)	Total
Top Management Commitment	✓	✓	✓	✓	✓	✓	✓	✓	✓	9
Presence of Clear Goals & Milestone Measurement	✓	✓	✓	✓	✓	✓	✓	✓		8
User/Customer Involvement (i.e. Market Research)	✓	✓	✓		✓	✓	✓	✓		7
Involvement of Cross-Functional Teams	✓	✓	✓	✓	✓			✓	✓	7
Placement of Structured NPD Process	✓	✓		✓		✓	✓	✓		6
Talented Team Members with Relevant Experience to NPD Process & Activities			✓	✓		✓	✓	✓	✓	6
Establishment of an Entrepreneurial Culture	✓		✓	✓				✓	✓	5
Effective Communication Amongst Team Members & Management	✓			✓			✓	✓	✓	5
Alignment of NPD Process Activities with Strategy			✓	✓				✓	✓	4
Focusing on Innovation & Out-Of-The-Box Ideas	✓	✓				✓			✓	3
Availability of Financial Requirements				✓		✓		✓		3
NDP Process Speed		✓				✓				2

Note: Critical Success Factors have been identified in the literature

Having listed a set of CSFs for the NPD process based on reoccurrence in literature is not enough to prove their role in driving the process to success. The latter can only be justified through real examples emerging from various industries to validate the

mentioned CSF's real potentials in ensuring the universal win. Below are a series of case studies captured from real-time situations that exhibit the contribution of each factor in the undertaken NPD process. Generally, cases exhibit more than one factor simultaneously, depending on the industry and local conditions.

In their article on Apple's NPD process, Tariq et al. (2011) reveals the company's secret behind the phenomenal success of its iPod and iPhone products. It all begins with an innovative culture and exploration of an innovative technology that the market can readily absorb. User involvement and external research would then determine if the proposed product (still an idea) will be accepted by potential buyers, considering the perception that it should fit into customers' current use patterns. In other words, the device must smoothly renovate the way people operate their daily affairs without reinforcing too much change over a short period. Bringing the devices to reality with a flexible workflow, the organization was able to exploit the 'first-mover advantage' of introducing noble, unparalleled products (Tariq et al., 2011).

AT&T is an American telecommunications company. According to Connell et. al. (2001), its College Market sector announced a strategic partnership with Student Advantage to launch a calling student card clubbed with a loyalty card. The product's strategy was closely aligned with the organization's objective of increasing phone call usage by directly billed cardholders, as well as expanding the organization's student market share (Connell et. al., 2001). The product enjoyed huge success mainly because it was developed by an effective leader and diligent, cross-sectional team members, who had the right expertise, knowledge, and know-how of implementing the project (Connell et. al., 2001). The result was a huge market jump for the organization in terms of sales margins and reputation (Connell et. al., 2001).

The Hong Kong toy industry was examined by Sun et al. (2004) due to potential takeover threats imposed by its neighbouring Chinese competitors. CSFs were studied relative to the NPD process phases (4 phases) and identified key success factors were classified into 4 categories, based on implementation and relevance (i.e. biblical model). It was realized that top management commitment and availability of financial resources represented two of the highly implemented (but not important) CSFs in phase I of the new toy development process (Sun et al., 2004). Top management commitment continues as one of the highly implemented CSFs in the product's development phase II as well. Factors as the speed of the NPD process, timely launch, and on-time delivery appear as high importance – high implementation in the final stage of the NPD process, emphasizing how they directly influence the sales of the product once launched (Sun et al., 2004).

After studying a set of management groups working in medium to large Thai food companies, Suwannaporn et al. (2010) concluded that success rates of NDP processes in the food industry mainly rely on user involvement, effective communication with parties internal and external to the organization as well as the necessity of having a clear NPD process strategy and tactical planning. Although these factors do not match with what respondents perceive are food industry NPD's CSFs, they have nevertheless been deduced as a result of qualitative research carried out by the scholars with the return of 114 questionnaires from the targeted industry (Suwannaporn et al., 2010).

Innovation and entrepreneurship are in Sony's culture. Sony corporation thrives on innovation and entrepreneurship over 7 decades. Sony innovates almost 10,000 products every year and launches successfully around 10% of it every year. This cannot be possible without the commitment of top leadership and support from

senior management (Fortune et al., 2006). Sony retains its market position and the main reason for this is the continuous new product development.

Concluding Remarks

Recognizing the direct and indirect presence of all 12 denoted CSFs in universal NPD projects from diverse industries justifies the validity of each of them, highlighting their importance to the process in general, and its success in specific. It is important to note that different industries require a varied mix of CSFs, depending on region, nature of the product, top management practices, and culture. Moreover, it can also be concluded that certain CSFs gain rising importance throughout a limited phase of the NPD process. In reality, the scopes of CSFs seem to overlap one another, where the availability of one indirectly leads to the presence of another (i.e. cross-sectional teams often present different experiences in terms of project management, which enables constructive progress towards end products). Realistically, ensuring the application of crucial-to-phase CSFs throughout the tedious NPD process advances the project's rate of success substantially.

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Appendix 1

Table A1
Respondents Profiles

No.	Organization	Gender	Experience	NPD Experience	Industry/Product
1	Etisalat	Female	16	8	Telecom
2	Du	Male	15	7	Telecom
3	Julphar	Female	16	8	Healthcare/Pharmaceutical
4	Nakeel Property	Male	14	7	Real State
5	Dubal	Female	14	6	Aluminium (manufacturing)
6	Souq.com	Female	15	7	E-Commerce
7	Liwa chemicals	Male	16	6	Chemicals and Petroleum
8	Jumairah Group	Male	19	8	Hospitality
9	Al Dahra Agriculture company	Male	13	6.9	Farming, Dairy, and Agriculture
10	Noor takaful	Male	20	13	Insurance
11	EMIRATES NBD Bank	Female	21	17	Banking and Finance
12	EMIRATES	Female	16	8	Aviation
13	Dubai Govt	Female	18	8	Government
14	Adnoc	Female	13	6	Oil Gas and Energy
15	Dewa	Female	15	6	Utilities

Source: Authors' work