Blending transformational leadership with strategic thinking to strengthen organizational NPD innovation process

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Abstract

The study presents an attempt to evaluate the significance of industrial new product development idea generation capability supported through the concepts of transformational leadership, strategic thinking, and organizational innovation to harness new product development stage and gate process, in a multinational scenario. The current research survey is conducted at three selected work locations; The UK, Norway and Finland, having obvious differences in terms of product scope, product's nature and size, manufacturing requirements, customer base as well as the involved stakeholders i.e. energy solutions, marine solutions, environmental sustainability solutions, respectively. The results of the study confirmed clear requirement to adopt more than one flexible stage gate models to offer focused NPD approach, focused and well defined industrial working processes, less wastage of resources (i.e. time, money, and expert skill potential etc.) as well as operational accuracy, control and accountability.

Keywords

New product development idea generation capability, Transformational leadership, Strategic thinking, Organizational innovation, new product development stage and gate process.

1. Introduction

Taking lead in introducing innovative products by crafting effective product development processes through combining the efforts of collecting new product ideas from external environment (i.e. customers, suppliers, competitors, policy formulators etc.) as well as internal resources (i.e. connecting designers, marketers, engineers, accountants auditors etc.) is today´s greatest challenge for industries while coping with tough global competition (Griffin 1997; Ozer 1997; Ottum, and Moore, 1997). Modern industries, engaged in product development, have adopted at least some form of stage-and-gate based new-product processes (Cooper, 1990) to develop and offer new products, that are innovative, can resolve major client related issues and promise value to the users by being top drivers of industrial success and profitability.

The quest for new ideas to create exceptional products originates with a deeper level of understanding about the customers' desires. In addition, the traditional NPD model, in which companies are exclusively responsible for coming up with new product ideas and deciding which products should ultimately be marketed, is increasingly being challenged by innovation management researchers and practitioners (Fuchs and Schreier, 2011; Cone, 2006; Lakhani, 2006; Pitt et al., 1996; Chesbrough, 2003; Von Hippel and Katz, 2002). This is anticipated that a new product or service must hold a "wow" factor or `aha moment` (Dorst, and Cross 2001) by offering something that is missing from the range of products already available in the market. However, conceiving such a new product idea seems beyond the reach of most of the companies today.

The above confirms that the entire new product development team (i.e. technical and marketing), in addition to the organization´s operational teams must tactfully collaborate, design and lead the new product development strategic plan internally while additionally interacting with the real customers/users, and learn their desires, problem areas, needs as well as challenges. The referred strategy is much different from merely depending on the sales and marketing teams to obtain market demands and requirements, which is often criticized for being filtered, biased, and incorrect

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(Cooper, 1994). This results in connecting the industry with its customers by making them an integral part in the entire NPD process; scoping, product definition, development, validation, and beyond.

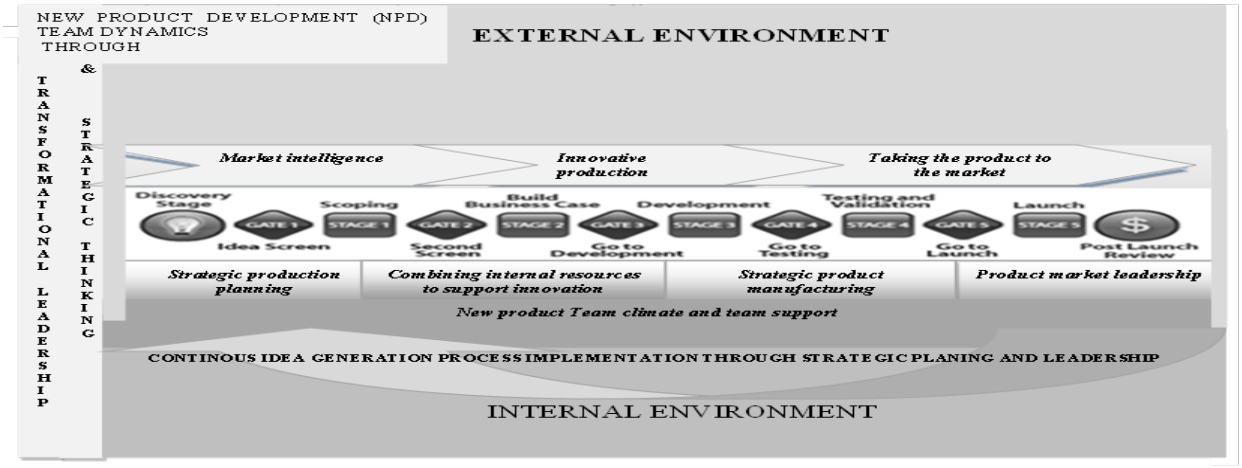

Figure 1. Proposed Stage gate process for new product development (Source; Kazmi, Naarananoja, & Kytola, 2015; Kazmi, 2016)

Figure 1 depicts target NPD process flow that on the one hand ensures the unification of organizational internal resources to guarantee strategic production planning through strategic product manufacturing for ultimately achieving product market leadership, while on the other hand, maintaining up-to-date market intelligence and innovative production capacity building (i.e. market needs, client´s tastes, related economic developments, new inventions and scientific trends (Kazmi, 2012; Kazmi, Naaranoja, 2014; Kazmi, Naaranoja, Kytola, 2015) in the field as well as related political or legal realities, etc.) to attain maximum and up-to-date potential throughout the life cycle of new product development (NPD) process (i.e. stage by stage). Hence, the proposed framework encourages organizational strategy to constantly align its new product development (NPD) team dynamics through transformational leadership to support new product innovation initiatives.
The above theoretical model is proposed with the aim of fusing the earlier frameworks formulated by theorists in the subject fields (i.e. transformation leadership (Bass, Avolio, 1990; 1992; 1993); NPD team climate and support (Sun et. al. 2012); organizational strategic thinking (Pisapia, et. al. 2006; 2011); pseudo transformational leadership (Barling, Christie, and Turner, 2008), to present a holistic theoretical vision. The logic here is that in natural settings (i.e. organizational operations management) controlling the situation to either evaluate human activity or to affect it, is not completely possible. In addition, different situational settings foster different behavior patterns and outcomes (Barnard, 1938). The author, while suggesting the above flow, based her logic on the process detailed in the following paragraphs;

Modern day hi-tech products are manufactured with the underlined targets of durability and sustainability. Most products of this type involve lengthy development timeframes due to involving multilevel, highly technical manufacturing processes (i.e. product solutions offered by the aero, marine industry, nuclear as well as civil engineering industries that usually consume years in manufacturing even a single product unit). Therefore, if an industry (i.e. especially the ones mentioned above) fails to have a flexible manufacturing process, where there is ample margin for constantly incorporating new inputs or new ideas (i.e. if not all then, at least the significant ones) then there are certain chances that at the product´s market launch phase, their product may be considered obsolete already.
The above is also true in the light of what John Wybrew cited from Robinson, (1999), `Today´s business world is in a turbulent process of constant transition from the traditional approach of steady-state mass production to one of the unceasing innovation on a global scale`. Additionally, it is important to understand that `there are people in the world who have to create to live – while there are others who live to create – and then there are people who are creative, but don't know what to do with it´ (Lenny Henry cited from Robinson, 1999). As, ´each (one) of us has a different mosaic of intelligences´ (Howard Gardner cited from Robinson, 1999). Therefore, ´it is breadth of vision, the ability to understand all the influences at work, to flex between them and not to be frightened of totally different experiences

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and viewpoints that hold the key´. (Sir John Harvey - Jones cited from Robinson, 1999). Therefore, ´we must enable young people to develop their creative potential to meet the fundamental challenges´ (Robinson, 1999).
In today´s fast growing and vibrant businesses, across the globe, the highest demand is to introduce new products and services by keeping pace with rapidly changing market conditions (Robinson, 1999) to ensure efficiency and profitability. The above justifies the need of the current research study. The subject study holds specialized focus on exploring the possibility of NPD idea generation capability enhancement engulfing the whole beyond the fuzzy front end stage and the logic behind proposing a stage gate process with a maximized opportunity to add or incorporate new knowledge (i.e. in the form of new idea – extracted either from the external or the internal environment) into the new product while being produced, thus exploring the options to maximize flexibility in the manufacturing process by taking control over each production process stage. In the light of above, the current paper starts with the introduction of the core concepts i.e., transformational leadership, strategic thinking, and organizational innovation and new product development stage and gate process. The current research then touches briefly the literature review of the referred subject areas. Later, the paper defines the selected research methodology and proposed theoretical model. Finally, the study concludes with an in-depth analyses and discussion on the study results.

2. Literature Review and Research question

2.1. Transformational leadership, strategic thinking and Organizational innovation

To explain why transformational leadership style is preferred for the current study, it is important to start by exploring the concept in the light of theoretical support. Burns (1978) was the first to introduce the concept of transformational leadership and highlighted the difference between transactional and transformational leadership. Transformational leadership (Bass, 1985; Kazmi and Naaranoja, 2013; Taylor, 2014) is considered most suitable by organizational management theorists and researchers, who truly encourage (Judge and Piccolo, 2004) and develop their employees to perform beyond expectations. This leadership style stimulates (Bass 1985; Bass, Avolio, 1993) the process of thought (i.e. beliefs and values) and cognitive behavior (i.e. attitudes and attributes) of the followers (Kazmi, & Naaranoja, 2015; Kazmi, Takala, & Naaranoja, 2015; Kazmi, Naarananoja, Kytola, 2015). Explicitly, research studies (Bass, Avolio, 1994) have shown that transformational leadership is positively linked to: subordinate's work attitudes (e.g. loyalty and commitment, job satisfaction); subordinate's work performance (e.g. sales); employee creativity; employee well-being (mental and physical health, occupational safety); and financial performance.
According to (Bass and Avolio, 1990; Kazmi, & Takala, 2011; Kazmi, & Takala, 2012; Kazmi, & Naaranoja, 2015; Kazmi, 2012; Kazmi, Naaranoja, Takala, 2013; Kazmi, , & Naaranoja, 2013; Kazmi, Naarananoja, & Kytola, 2015), transformational leadership is considered a potential source of team performance enhancement through several factors, namely intellectual stimulation, individualized consideration, inspirational motivation and idealized influence. This style of leadership requires spending one's own capabilities (De Cremer, and Van Knippenberg, 2004; Van Knippenberg and Van Knippenberg, 2005) to foster leadership potential in others (Judge and Piccolo, 2004). This leadership style has emerged as a central model for understanding how leaders achieve effective and desired behavioral responses from their followers, namely due to the followers being highly satisfied with and respectful of their leaders (Bycio et al., 1995; Conger et al., 2000; Thompson, 2012; Kazmi, & Kinnunen, 2012; Kazmi, & Naarananoja, 2014; Kazmi, & Naaranoja, 2015; Kazmi, Naarananoja, Kytola, &, Kantola 2016). It combines four sub-categories commonly known as the four-I's, to constitute a whole. The four I's are detailed below;
The first `I` is for idealized influence. It refers to the leader's capacity to lead his or her followers by setting an example (Bono and Judge, 2003) based on high moral and ethical grounds (Podsakoff, Mackenzie and Bommer, 1996; Whitener, 1997; Bass and Steidlmeier, 1999; Dirks and Ferrin 2002). The second `I` refers individualized consideration. It elucidates that a leader must achieve his or her followers' maximum potential through coaching or mentoring, during a process of helping and refining their skill potential. The third `I` is for inspirational motivation. It refers to the leader´s ability to install a desire in their followers for a cause. The fourth ´I` is for intellectual stimulation. It refers to the leader's capacity to encourage his or her team members or followers to think out of the box and generate new ideas (Bono and Judge, 2003; Jung and Avolio, 1999; Kirkpatrick and Locke, 1996).
Professional inadequacies, namely poor planning and financial judgement greatly hamper the process of organizational new product idea generation capability (Barber et al., 1989). Nooteboom (1994) suggests that the factors of insufficient delegation and high turnover of managerial staff are considered as managerial deficiencies.
The leadership style (Howell and Avolio, 1992; O'Connor et al., 1995; Judge and Piccolo, 2004; Gardner, and Avolio, 1998; Conger and Kanungo, 1998; Conger et, al., 2000) can identify, develop, engage and effectively utilize cross

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functional teams; create manage and then sustain a balance among the various conflicting factors being created while the innovation process passes through strategic controls to ensure process success. In addition, as long as there remains a balance between the key factors, the performances of the organization remain high.

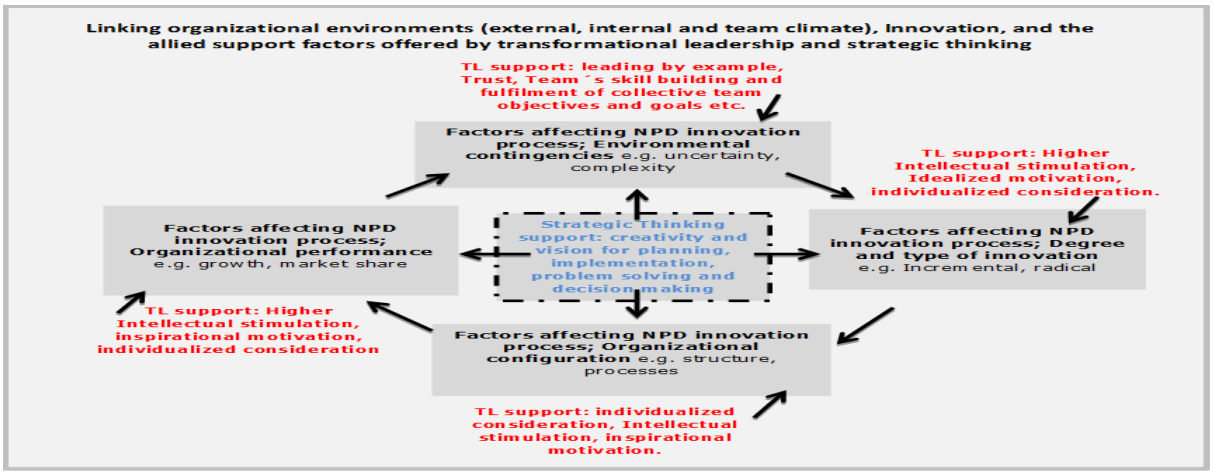

Figure 2. Linkage transformational leadership and strategic thinking to organizational support factors (source, Kazmi, 2016)

Figure 2 represents the cyclic flow of interconnected realities impacting the process of an organization´s new product development process (i.e. environmental contingencies, degree and type of innovation, organizational configuration and organizational performance (Van looy, Debackere and Bouwen., 2002; Cooper and Kleinschmidt, 1995; Brockhoff, 1994; Tidd, 2001) and the support elements offered by transformational leadership (Bass and Avolio, 1993; Howell and Avolio, 1992; O'Connor et al., 1995; Judge and Piccolo, 2004; Gardner, and Avolio, 1998; Conger and Kanungo, 1998; Conger et, al., 2000) as well as strategic thinking potential (Bonn, 2005; Goldman, 2007; Goldman and Casey 2010; Essery, 2002).

2.2 New product development stage and gate process

New product development is defined as a vital function for the success, survival and renewal of organizations (Brown and Eisenhardt, 1995). According to several independent research studies (Jaruzelski, Kevin, and Rakesh, 2005) i.e. Product Development and Management Association, AMR Research, Booz-Allen and Hamilton (1982) around 70-85% of leading companies in the United States follow the stage-gate model to drive their new products to the market and there is almost the same trend in the rest of the world. Stage-gate system is a cutting-edge operational road map for the implementation of a new-product project from idea to launch stage (Shahid and Nabeshima, 2007).

Figure 3. New product development Stage gate process (Source; Kazmi, Naarananoja, Kytola, &, Kantola 2016, Kazmi, 2016)

The stage-gate process bifurcates new product development activities into stages, separated through management decision gates (Booz-Allen and Hamilton, 1982). As figure 3 depicts the usual sequence of new product development (NPD) process that starts with the product or service idea discovery stage. After passing the idea screening gate and entering the next stage, the product idea enters the scoping stage, and if cleared, it crosses the second gate to be established as a `business case`. After becoming a viable business case, the product idea passes the third gate for product `development´. A product development process, as being a prototype, goes through `testing and validation` stage. After passing the test and going through the required validation, if considered acceptable, it crosses the final gate for `product launching´. The final stage is the `post launch review` stage that records the overall success or failure of the company through the market feedback on its new launched product (Jaruzelski, Kevin, and Rakesh, 2005;

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Shahid and Nabeshima, 2007). The NPD stage gate process, defined above, highlights its interconnectivity with the various organizational segments (i.e. though scattered operationally, geographical and hierarchically). Hence, in the next section the author discusses the concepts of organizational internal and external connectivity with reference to product innovation, in the light of theoretical support.

2.3 Research question

Research Question: *How effectively the components of transformation leadership and strategic thinking is applied in the target organization to strengthen NPD stage gate processes?*

3. Methodology

3.1. Sample and Data Collection

The scope of this study takes into account specialized groups of total 30 professionals (i.e. representing new product development related work operations and roles) from three international locations of a European multinational company : Finland, the UK and Norway on the basis of their professional expertise and operational relevance. A specialized feature of the selected work locations is that each one of the unit is engaged in different types of product manufacturing i.e., Finland – Power engines, The United Kingdom – Green energy solutions, Norway- Marine products and service solutions. The selected quantitative approach is the survey methodology which is performed through an email based questionnaire having 50 fixed ended items. Evaluation of the subject company´s new product development culture is carried out by combining quantitative and qualitative research methodologies. The qualitative approach, on the other hand, is involved with putting together an organizational case study through in person and email based interview questionnaire. Feedback obtained from those 30 respondents were analyzed by using statistical analyses.

3.2. Results and analysis

As stressed by Beyer (1999), a "transformational leader is gifted with the abilities to resolve a crisis and offer radical innovative solutions to problems. Accordingly, the qualitative and quantitative data analysis revealed possible room for improvement related suggestions in the area of new product development stage gate process upgrade. According to the respondent's feedback, the current situation is reported as "case to case basis" with no formal new product stage and gate process being adopted. Hence, the following three sets of new product development activities with reference to each one of the studied location is formulized:

Site office: Finland

Product/ Service -	***`New Idea` sources for products and services –***	**NPD Processes stage and gate –**	**Desired Aims**
Power Engine	*i. CORL- Customer feedback through Sales and Services Departments,* *ii. V2- From Factory, Labs and Rigs,* *iii. Discussions with Patent Engineers* *iv. Competitor´s Analysis,* *v. Product Performance and life cycle analysis,* *vi. Market Intelligence,* vii. *Gap Analysis.*	**Idea Generation-Brain Storming** I - GATE Idea Refinement (Preliminary investigation I - Gate Second Screening) I-GATE **Instructions for manufacturing** (Detailed investigation I - Gate Decision on Business case) **I**-GATE **Product Manufacturing** I - GATE **Testing** I -GATE **Feedback**	i. Reliable Product ii. Cheaper Fuel Options ii. Resolve Engine break downs v. To match social regulations (Emission regulations etc.) v. Worth to customers, /i. Easy to manufacture, ii. Tailor made facility- Non Standard Engine requests, ii. Value based pricing x. To gain competitive edge

Figure 4. Summary of NPD process at the targeted site office in Finland (Source; Kazmi, Naarananoja, Kytola, &, Kantola 2016; Kazmi, 2016)

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Figure 4 above reflects the product associated with the Finland site office along with its allied processes and operational motives. The details displayed in columns 1 to 4 are in accordance with the respondents' feedback. The product category linked to the mentioned work site is energy or power related. The facts included in figure 4 reflect the site´s reactive approach towards the new product development process since the major sources of the product ideas are customer´s feedback and the V2 notifications from the factory. The site office is dependent on certain regulations and standards (i.e. emission standards) that reconfirm the reactive product development approach.
The reflection of the stage and gate process, as reported by a study representative, includes the stages which are highlighted in bold format while those which are not highlighted are parts of the recommended set as well but usually get overlapped in the overall new product development process keeping in view the nature or category of the product.

Site office: Norway

Product/ Service -	***New Idea` sources for roducts and services –***	**NPD Processes stage and gate –**	**Desired Aims**
Marine- **Shipyard support and solutions**	*i. Customers' claims and general feedback analysis,* *ii. Sales and service departments input,* *iii. ISO 9000 standard compliance* *iv. Future Regulatory requirements* *v. Regular quality assurance (QA)meetings,* *vi. Degree of compliance analysis* *vii. Cost factors (Cost vs. customer benefit analysis).* *viii. Close client follow ups* *ix. Performance vs. deliveries analysis*	**Idea Generation-** I - GATE **Idea Refinement** (Preliminary investigation- I-GATE Second Screening) I-GATE **Instructions for manufacturing** (Detailed investigation on Business case– I-GATE **Decision on Business case (Client's NPD agreements)** **I**-GATE **Product Manufacturing** I - GATE **Testing** I –GATE **Feedback**	i. Efficient trouble shooting ii. Shipyard solutions iii. Product or sub- supplier´s equipment modifications iv. Long term relationships v. Worth to customer, vi. Non conformity system to log efficiently any mis-happening? vii. New agreements for product development viii. To gain competitive edge

Figure 5. Summary of NPD process at the targeted site office in Norway (Source; Kazmi, Naarananoja, Kytola, &, Kantola 2016; Kazmi, 2016)

Figure 5 displays the information related to the product associated with the Norway site office. The information further highlights the product's current baseline processes as well as its operational objectives. Here again, the details displayed in columns 1 to 4 are linked to the product category (i.e. marine - shipyard solutions) of the mentioned work site. The reflection of the actual stages and gates process includes the ones highlighted in bold format while the ones which are not highlighted are those which are part of the recommended NPD process set but usually get overlapped in the entire new product development process, keeping in view the nature or the product category

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Site office: UK

Product/ Service -	**`New Idea` sources for products and services –**	**NPD Processes stage and gate –**	**Desired Aims**
Environment sustainability solutions -	*i. Customers' feedback,* *ii. Marine regulations IMO, BWT standards, USGC Acceptance,* *iii. Future regulatory requirements* *iv. CORL questionnaires* *v. Warranty reporting* *vi. Feedback by the service engineers* *vii. Quality investigation reports,* *viii. Feedback through project teams* *ix. NPI processes* *x. Publications through research journals and conferences,* *xi. New market search* *xii. Cost factors.*	**Idea Generation- (Regulations and cost specific)** I - GATE **Idea refinement - Knowledge gaining through international seminars, conferences or workshops and international scientific journals.** Preliminary investigation- I-Gate Second Screening) I-GATE **Instructions for manufacturing** (Detailed investigation on Business case– I-Gate Decision on Business case) **I**-GATE **Product manufacturing** I - GATE **Testing** I –GATE **Feedback**	i. To offer environment sustainability solutions ii. To support membrane bioreactors ii. Pumps and pipes v. Scrubbers v. Reliable product vi. Offer sustainable solutions ii. To match regulations and standards, etc.) ii. Worth to customer, x. Easy to manufacture, x. Value based pricing xi. To gain competitive edge ii. Quality, ii. cost effectiveness, reliable, v. long lasting products and solutions, v. Value added features, vi. Global service support.

Figure 6. Summary of NPD process at the targeted site office in the UK (Source; Kazmi, Naarananoja, Kytola, &, Kantola 2016; Kazmi, 2016)

Figure 6 displays the product associated with the site office in the UK along with its linked processes and operational objectives. Here, the details displayed in columns 1 to 4 are linked to the product category (i.e. environment sustainability solution) related to the mentioned work site. Figure 6 above is formulated on the basis of actual data reflecting in 'bold' the stages and gates in placed at the referred site. However, the stages that are not highlighted are those that are the part of the recommended NPD set of processes but are usually overlapped in the overall new product development process due to the nature or category of the product.

New product development process remains central and very critical to any industry. It reflects a company´s approach towards the new product opportunity. Through leadership and strategic thinking capabilities, a company's management and its work teams can sharpen their potential to react to the market opportunities by carving out smart, suitable and product category specific NPD processes.

Having a close look at Figures 4, 5 and 6 reflecting the three targeted work locations (Finland, Norway and the UK), it is recommended to implement separate stage gate processes implementations, keeping in view the differences in the product categories (i.e. energy, marine and environmental sustainability), its nature and production process requirements, to support innovation initiatives while taking care of the issues associated with NPD team dynamics (i.e. effective communication, team empowerment, effective control over resources, etc.). For instance, the products (i.e. environmental sustainability solutions- scrubbers, pumps and valves, etc.) of the site office in the UK are innovative solutions newly introduced globally. It is a global directive and highly cost driven as well. Such products and services require more global market attention or dissemination at the initial production stages than the regular products and solutions related to power and energy or marine and shipyard issues. The difference can also be understood in terms of the nature of the stakeholders associated with each of the product categories. Environmental sustainability solutions and products are directly associated with global policies, standards and regulations, while energy solutions or marine solutions are mainly linked to social regulations and local standards and requirements. Similarly, power or energy solutions and products have more margins of manufacturing freedom and production based on innovative features (i.e. power engines, light machines or heavy and smart power plants, etc.). In all the three product categories associated

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with the three targeted sites, there are obvious differences in terms of product scope, manufacturing requirements, customer base and other stakeholders. This supports a clear requirement, based on the concepts of leadership and strategic thinking, to suggest designing three different sets of new product development stage gate process to support each product category. It is anticipated that once the discrepancies highlighted through the study´s quantitative and qualitative data analysis are rectified and the targeted locations are supported through the product category specific stage gate processes, there will be an obvious positive change in the productivity and efficiency levels of the said target locations.

The above recommendation is in line with Rockart's (1979) suggestion that organizations are required to recognize elements that are significant to their success to formulate targeted goals, as failure to achieve goals associated with those specific factors would result in organizational failure. In the context of the above, extended investigation is recommended to analyse the feasibility of distributing the products and services on the basis of three broad categories (i.e. energy solutions, marine solutions and environmental sustainability solutions) supported through three separate stage gate options to establish generalized systems within the subject company's environment.

While exploring suitable measures to propose or formulate product nature specific separate stage gate models, the company's research teams can follow the examples of other manufacturing concerns as guidance: (e.g. Xerox; for Xerography, and Black and Decker for power tools) following Corning's Five-Stage, Stage- Gate process; i.e. Stage 0: Discovery; Stage 1: Scoping; Stage 2: Building a Business Case; Stage 3: Development; Stage 4: Testing and Validation; and Stage 5: Launch (Thakur, 2011; Crawford, and Di Benedetto, 2010) and an innovative approach (Henderson, and Reavis, 2008) to gain market lead through corporate product innovation strategies supported by the concept of strategic leadership (Koen, 2004). In addition, the companies could modify the basic new product development stage and gate processes according to their requirements and resources, the customers' needs and the nature of the products they are offering; e.g. United Technologies Corporation used variants of the stage gate processes to design helicopters and jet engines while ITT Industries, used to follow a staged process with progressive freezes to design military radios and satellites (Unger and Eppinger, 2011).The stage gate process is an effective tool for accelerating incremental product development process. Furthermore, it cannot be directly used for fuzzy front end (FFE) in case of platform or breakthrough products. Platform products (i.e. following a multi-market, multi-product strategy) need to begin with a strategic vision which will lead to a family of products based on an in-depth understanding of the market and how the company's core competencies and capabilities may be used to build competitive advantage (Koen, 2004).

4. Conclusion

The subject study holds specialized focus on exploring the possibility of NPD idea generation capability enhancement engulfing the whole NPD process; beyond the fuzzy front end stage and the logic behind proposing a stage gate process with a maximized opportunity to add or incorporate new knowledge (i.e. in the form of new idea – extracted either from the external or the internal environment). Thus exploring the options to maximize flexibility in the overall manufacturing process by taking control over individual production process stage. In all, the three product categories associated with the three targeted work locations i.e., The UK, Norway and Finland, have obvious differences in terms of product scope, product's nature and size, manufacturing requirements, customer base as well as the involved stakeholders i.e. energy solutions, marine solutions, environmental sustainability solutions, respectively. The study results supports the clear requirement, based on the concepts of leadership and strategic thinking, to adopt more than one stage gate model. This will ensure a more focused approach, focused organizational working, less wastage of resources (i.e. time, money, and expert skill potential etc.) and more importantly, accuracy, control and accountability.

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