DEVELOPMENT OF A BEST PRACTICES FRAMEWORK FOR NEW PRODUCT DEVELOPMENT IN SMALL TO MEDIUM ENTERPRISES

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Abstract

The successful development of new products and services is crucial to the long-term survival of business enterprises. With increased competition to the market place and shortening product life cycles pressure has been imposed on all enterprises to innovate more efficiently. This paper presents the development of an initial best practice framework for new product development (NPD) within Small to Medium Enterprises (SME’s). The initial framework was developed based on Kahn’s model (Kahn, Barczak et al. 2004; Kahn, Barczak et al. 2006) and an extensive review of currently recognised NPD Best Practises. The model was refined using the Delphi method with a panel of experts including academic personnel within the University of Limerick and various other professionals. In addition to refinement of the model the question of whether or not large and small companies can be examined using the same framework was posed to the panel of experts.

1.0 Introduction

Current research and literature on best practises within New Product Development (NPD) almost exclusively focuses on the processes and practises used within large firms (Cooper and Kleinschmidt, 1995; Kahn, Barczak et al., 2006). However, according to the European Commission, within the enlarged European Union of 25 countries, 23 million SME’s provide 75 million jobs and represent 99% of all enterprises. (Commission 2003). A best practises framework for New Product Development tailored for SME’s would therefore prove invaluable.

The initial framework was developed using Kahn’s model (Kahn, Barczak et al. 2004) and a broad review of the management of SME’s (Welsh and White 1981; Ghobadian and Gallear 1997; Voss, Blackmon et al. 1998) as well as research into currently recognised NPD Best Practises (Cooper and Kleinschmidt 1995; Griffen 1997; Loch 2000). The model was refined using the Delphi method; a technique, based on a structured process used for collecting and distilling knowledge from a group of experts by means of a series of questionnaires(Adler and Ziglio 1996). For this research the panel of experts included academic personnel within the University of Limerick and professionals working on the Champions of Innovation programme, which, is funded by the Irish state-sponsored body Enterprise Ireland to encourage innovation in SME’s in Ireland. Each professional has been involved for many years in innovation management and is recognised as an expert in their field.

The Why and How of Benchmarking

Companies develop many types of new products ranging from radically new projects to minor extensions of existing products. A company’s potential to successfully develop new products depends on the type of products they wish to introduce, the processes they use and their relationships with parties outside the company including competitors, customers, distributors and suppliers. Various factors have an impact on firms NPD potential. Some of the factors, identified in the literature, which potentially impacts the NPD of a firm, include:

- Rapidly changing market environment (Carlson 1994; Slattery and Nellis 2005).
- Shorter Product lifecycles (Baynus 1994; Judge 1997).
In response to the dynamic environment in which firms operate various methods are employed to improve process efficiency and overall NPD effectiveness. Benchmarking which is defined as “the process of identifying, understanding and adapting outstanding practices from within the same organisation or from other businesses to help improve performance” (Cook 1995) is one method used. The use of Capability Maturity Models (CMM) to benchmark a company’s performance is of huge benefit (Camp 1998; Paulk 1998) as it evaluates performance and suggests direction for process improvement.

**Maturity Models**

A Capability Maturity Model (CMM) is an organisational model, which describes using a number of levels or stages, the way in which an organisation manages its processes. Each maturity level is a well-defined plateau, which provides a foundation for the next level resulting in continuous improvement. A maturity model usually encompasses:

- A number of levels.
- A label for each level, e.g. initial level, optimising level etc.
- A broad description of each level.
- A number of Key Process Areas (KPA) for each level.
- A description of how each KPA should be performed at each maturity level.

CMM’s have been proposed for a range of activities including Quality Management (Quality Management Maturity Grid, (QMMG), Software Development Capability Maturity Model (SW-CMM) and Project Planning Maturity Model (PP-MM).

**2.0 Best Practices within NPD Key Process Areas (KPA)**

The first step to improving a firm’s development process is an understanding of the critical success factors, which influence the success rate of new product development. A clearer understanding of these factors, which drives product success, allows a firm to focus their valuable R&D resources to the essential stages of NPD.

This section discusses these critical success factors as recognised in the literature. NPD best practices are discussed across 6 Key Process Areas (KPA) as defined in Kahn’s model (Kahn, Barczak et al. 2006): strategy, portfolio management, process, market research, people and metrics & performance evaluation. Each Key Process Area (KPA) is described across 5 levels of sophistication with each level corresponding to a particular set of characteristics describing: poor practice, (Level 1-Initial), improved practice (Level 2-Under Development), good practice (Level 3-Defined), excellent practices (Level 4-Managed) and best practices (Level 5-Optimized).

**Strategy**

A firm’s NPD strategy defines the role new product development plays in the firm and must be closely aligned to the overall organisational strategy. A clear product development strategy allows management plan and allocate the necessary resources required to achieve the goals within the plan. A clearly communicated new product development strategy has been cited by various researchers as vital to excellence in new product development (Booz, Allen et al. 1968; Booz, Allen et al. 1982; Cooper and Kleinschmidt 1995; Pittiglio, Rabin et al. 1995; Martensen and Dahlgaard 2000). A benchmarking study by Cooper and Kleinschmidt
(1995) found several differences in the strategic plans between the “best” NPD performers and the “worst” NPD performers. The best performers were found to have; a clearly communicated strategy with long-term focus, well defined goals and clearly defined areas of strategic focus. The worst performers in comparison had a weak, poorly communicated, short-term strategic plan with no defined goals or specified arenas of strategic thrust.

Process

Using a formal NPD process has long been cited as a differentiating factor between success and failure with in NPD (Booz, Allen et al. 1968; Booz, Allen et al. 1982; Cooper 1990; Zirger and Maidique 1990; Page 1993; Brown and Eisenhardt 1995; Griffen 1997a; Voss, Blackmon et al. 1998; Ayyagari, Beck et al. 2003). Zirger and Maidique (1990) found that new product success was greater when R&D was efficiently planned and well executed and when there was interaction and co-ordination between R&D, production, marketing and other functional groups. Voss, Blackmon et al. (1998) found the best performing firms were those who “developed more formal planning” while Brown and Eisenhardt (1995) concluded that successful product development is a result of “careful planning”.

Implementing a stage-gate® type process may also lead to improved product success rates and the product being faster to market (Cooper 1994; Mercer Management Consulting Inc 1994). Cooper et al. (2002b) also found that progressive firms use the stage gate® process as a risk management model. A company may use a fast track process with fewer gates for low risk projects and utilised the full stage-gate® model to remain in control of larger high-risk projects.

Quality of execution of the process is also viewed as critical to project success (Zirger and Maidique 1990; Cooper and Kleinschmidt 1995; Cooper and Kleinschmidt 1996; Griffen 1997a). Zirger and Maidique (1990) concluded that product development is more successful if processes are planned and implement fully and project planning should include: “all phases of the development process; research, development, engineering, manufacturing, and market introduction”. Cooper and Kleinschmidt’s (1995) extensive benchmarking study revealed that the best NPD performers had a “high quality new product process” where there was a focus on quality of execution and the process was complete.

Pre-development work is viewed as crucial to the success of a NPD project. Researchers concur that the completion of “upfront homework” has a positive impact on product development (Booz, Allen et al. 1968; Booz, Allen et al. 1982; Kuczmarski & Associates 1994; Cooper and Kleinschmidt 1995; Cooper 1996; Langerak, Hultink et al. 2004).

Metrics and Performance Evaluation

Unless a firm measures their NPD performance it is difficult to assess whether they are improving or declining in NPD performance. Measurement of NPD performance leads to improved product success (Cooper and Kleinschmidt 1987; Pittiglio, Rabin et al. 1995; Griffen 1997a; Voss, Blackmon et al. 1998; Martensen and Dahlgaard 2000; Godener and Soderquist 2004). Griffin (1997) found that the best practice firms set formal financial objectives against which actual performance can be evaluated. This leads to higher expectations regarding NPD and thus an increase in NPD performance. Voss Blackmon et al. (1998) established that the best small firm performers in NPD were the firms, which were “systematically keeping performance data”. Godener and Soderquist (2004) concluded that measurement of NPD performance resulted in “better coherence and relevance of product
Portfolios, reorienting projects before failure, deciding on corrective actions, supporting the launching decision, enhancing staff motivation, and facilitating well-balanced decision-making”. Performance measurement is not something, which is done as a once during the development cycle but as continuous occurrence. The processes and performance need to be regularly and formally monitored throughout the life of the project (Cooper and Kleinschmidt 1987).

**People**

The manner in which the personnel charged with the task of NPD are organised can influence the success of NPD. The idea of using cross-functional teams to develop new products as opposed to a department silo method has been supported by the majority of researchers (Little 1991; Page 1993; Brown and Eisenhardt 1995; Cooper and Kleinschmidt 1995; Pittiglio, Rabin et al. 1995; Cooper 1996; Griffen 1997a). Brown and Eisenhardt (1995) found that successful product development depends on the processes being implemented by “a competent and well co-ordinated cross functional team”. Griffin’s (1997) best practice investigation concluded that the best practice firm’s use multi-functional teams more “extensively” than the poorer performers. Cooper and Kleinschmidt’s (1995) in-depth analysis of best practises utilised by the “best” and “worst” NPD performers yielded valid and clear results regarding the use of cross-functional team players. Their findings demonstrate that the use of cross-functional team’s in NPD result in a better performance especially if; every project has an assigned team of players, the team is cross functional, all projects have an identifiable and accountable team leader, the leader and the team are accountable for all facets of the NPD project — from beginning to end.

Visible top-level management is recognised as vital to success of any project, (Kuczmarski & Associates 1994; Brown and Eisenhardt 1995; Cooper and Kleinschmidt 1995). Brown and Eisenhardt (1995) state that success is possible only “with the blessing of senior management”. Cooper and Kleinschmidt (1995) conclude that product success will improve if senior management is strongly and visibly committed to the development of new products, devote the necessary resources, are intimately involved in key go/kill decisions.

Communication between the people and departments involved in NPD also effects product success (Keller 1986; Cooper and Kleinschmidt 1995; Voss, Blackmon et al. 1998). Voss, Blackmon et al. (1998) found the best small NPD performers were the ones who were “more open internally, paying attention to employee communication”. Cooper and Kleinschmidt (1995) identify that high quality development teams require frequent meetings for efficient decisions and co-ordination.

The presence of a champion on a project team has been identified as a asset and important factor leading to project success (Chakrabarti 1974; Cooper and Kleinschmidt 1987; Markhan and Griffen 1998; Lee, Lee et al. 1999)”.

**Portfolio Management**

Portfolio management represents the screening out of product concepts to identify preferable concepts with which to proceed. Effective portfolio management is vital to successful product innovation (Griffen 1997a; Cooper, Edgett et al. 1999; Cooper and Edgett 2001a; Cooper, Edgett et al. 2004b). Several practices has been associated with good portfolio management by Cooper, Edgett et al (1999, 2004b) including maximising the value of the portfolio, prioritization of certain projects, seeking balance in the portfolio in terms of a number of
parameters e.g. long-term projects vs. short-term projects, strategically aligning your portfolio with the overall organisational strategy and having a formal systematic management system in place to select the correct projects and allocate necessary resources.

Market Research

A firm's effectiveness in market information gathering, processing, sharing and use of market information plays a pivotal role in determining the success or failure of its new products. According to Zirger and Maidique (1990) it is critical that the firm “Understands user needs and effectively translates these needs into solutions for the customer”. A strong market and customer orientation, where the firm focuses on the needs and wants of the customer will result in more successful projects (Cooper and Kleinschmidt 1995; Martensen and Dahlgaard 2000). Effective market research particularly in the early stages of development results in sharp product definition (Cooper and Kleinschmidt 1995). There are two key stages to the early stages of market research prior to the beginning of development. The “scoping stage” which entails a preliminary market, technical and business assessment followed by “building the business case which involves a deeper study includes a user wants study, competitive analysis along with technical and manufacturing assessments. Incorporating these two key stages to the NPD process will result in sharper product definition, which is a critical success driver (Cooper and Edgett 2001a).

While it has been necessary to divide the each of the best practices in the six separate KPA this does not mean that the practices apply to that section explicitly. Senior management for example is categorised in the people KPA however for NPD to be successful senior management support is required in every aspect of the process. Support is required for an effective strategy to be developed, for good portfolio management as well as in-depth market research.

3.0 Methodology

The Delphi methodology is described as “a systematic method of collecting opinions from a group of experts through a series of questionnaires in which the feedback of the group’s opinion distribution is provided between question rounds” (Helmer 1972).

A questionnaire was developed containing exploratory questions regarding the framework and distributed with a copy of the proposed NPD Maturity Model to each member of the panel. Each KPA was allocated one page in the questionnaire. The characteristics were listed and a column entitled “PDR”. Which allowed the respondent “Promote…Demote. …or Remove” the characteristic from that level. Space was also provided for additions to each level and general comments.

Open-ended questions were added at the end of the questionnaire to explore the following issues:

1. Can large and small companies be examined using the same framework?

2. If both large and small firms can be analysed using the same framework then does there exist a point on that framework that represents the optimal level for an SME or should the company be continually striving to reach the highest maturity level?
4.0 Development of the Model

Strategy

Figure 4.1 presents the five levels of sophistication for strategy. Companies at Level 1 do not define any NPD strategy and have a short-term view of NPD. As a company matures to Level 3 the NPD strategy has been defined although it may still be vague in parts. The defined strategy is aligned with the companies overall strategy. Once they reach level five an SME has a clearly defined long-term strategy and organization wide awareness of the strategy and a company is continually reviewing and updating its NPD strategy to ensure it is in line with the organizations strategy and to reflect changes to the market place. A complete description of the characteristics from Level 1 to 5 can be viewed in figure 4.1.

<table>
<thead>
<tr>
<th>Initial</th>
<th>Under Development</th>
<th>Defined</th>
<th>Managed</th>
<th>Optimised</th>
</tr>
</thead>
<tbody>
<tr>
<td>No NPD strategy</td>
<td>Unclear NPD strategy</td>
<td>NPD strategy has been defined but may be vague in parts</td>
<td>Clearly defined NPD strategy</td>
<td>Clearly defined strategy with organisational awareness of the strategy</td>
</tr>
<tr>
<td>Short-term view of NPD</td>
<td>Some NPD projects are aligned with NPD strategy but in general do not fit</td>
<td>NPD strategy mostly aligned with organisations mission statement</td>
<td>NPD strategy clearly aligned with organisations mission statement</td>
<td>Mission and strategic statement define strategic arenas for new opportunities</td>
</tr>
<tr>
<td>NPD not recognised as being crucial to long-term survival of organisation</td>
<td>NPD strategy not in line with overall organisational mission statement</td>
<td>Most NPD projects are aligned with NPD strategy allowing a certain amount of flexibility</td>
<td>All NPD projects are aligned with NPD strategy unless they were approved by senior management</td>
<td>NPD strategy is continually being reviewed and updated to be kept in line with the organisations strategy and to reflect changes to the market place</td>
</tr>
<tr>
<td>Availability of funding drives project selection</td>
<td>NPD projects are identified during budget process and resources allocated accordingly</td>
<td>NPD strategy can be redirected in real time to respond to market forces</td>
<td>Quantitative goals for NPD</td>
<td>Long-term strategic view of NPD</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Organisational mission and NPD strategy drive NPD project selection</td>
<td>Strategic plan identifies arenas of opportunity</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Market study is undertaken to guide strategic plan</td>
<td></td>
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</tbody>
</table>

Figure 4.1 Key Process Area: Strategy

Process

Figure 4.2 shows how a company develops its processes to move from Level 1 up to Level 5 on the maturity model. A Level 1 company does not have any process in place for NPD. As a company improves it processes it moves through level 2 and 3 to a position where formal processes have been installed. If further improvement occurs the company were to reach level five of the maturity model they are in the situation where one formal stage-gate® process is utilised across the entire organisation for the NPD process and the company is continually striving to improve it NPD process. A complete list of the characteristics from Level 1 to 5 can be viewed in figure 4.2.

<table>
<thead>
<tr>
<th>Initial</th>
<th>Under Development</th>
<th>Defined</th>
<th>Managed</th>
<th>Optimised</th>
</tr>
</thead>
<tbody>
<tr>
<td>No NPD Process exists</td>
<td>Formal process exist for NPD and are utilised for most projects</td>
<td>Formal process exist for NPD and are utilised for every project</td>
<td>One formal stage-gate® process is utilised across the entire organisation</td>
<td>Go No-Go criteria are clearly pre-defined before each gate</td>
</tr>
<tr>
<td>NPD is unorganised and ad-hoc</td>
<td>NPD Process documentation is available</td>
<td>Stage-gate® process may be employed however the process or gates may not be clearly defined and may vary across the organisation</td>
<td>Personnel are well disciplined in using to process to develop ideas</td>
<td>Personnel are well disciplined in using to process to develop ideas</td>
</tr>
<tr>
<td>No NPD process owner</td>
<td>Champions may play a role but are not critical to success</td>
<td>The NPD process is also flexible and adaptable to meet needs of individual projects</td>
<td>Organisation is striving to continually improve its NPD performance</td>
<td></td>
</tr>
<tr>
<td>No project champion</td>
<td>Idea generation is structured and formal</td>
<td>Time critical projects may skip stages of process</td>
<td>Improvement of the process is the responsibility of management as well as the project teams</td>
<td></td>
</tr>
<tr>
<td></td>
<td>One individual can be clearly identified as the process owner</td>
<td>The NPD process is visible and well documented</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The development process addresses the whole the complete product cycle</td>
<td>There is an apparent NPD discipline</td>
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</table>

Figure 4.2 Key Process Area: Process
Metrics and Performance Evaluation

Figure 4.3 portrays a continuum that ranges from a company having no standard criteria or metrics (Level 1) to a position where there are formal processes in place for evaluating projects and are used in most cases (Level 3) to a situation where there is a company-wide set of metrics used for every project (Level 5). Again the most mature level is when a formal stage-gate® process is utilized to evaluate the projects as they move from one stage of development to another. A more detailed breakdown of the characteristics can be viewed in figure 4.3.

<table>
<thead>
<tr>
<th>Initial</th>
<th>Under Development</th>
<th>Defined</th>
<th>Managed</th>
<th>Optimised</th>
</tr>
</thead>
<tbody>
<tr>
<td>No standard criteria for evaluating projects</td>
<td>There are some general principals for evaluating projects however most are informal in nature</td>
<td>There are formal processes in place for evaluating projects and are used in most projects</td>
<td>Quantitative goals have been set for the company NPD performance</td>
<td>There is a standard set of criteria for evaluation individual projects</td>
</tr>
<tr>
<td>No criteria for evaluating overall NPD effort</td>
<td>Revenue is predominant metric for NPD success</td>
<td>Team approach is used to evaluate and make final decisions</td>
<td>Scoring models checklists are used to evaluate projects</td>
<td>There is a standard set of criteria for evaluation of overall NPD effort</td>
</tr>
<tr>
<td>Projects never killed</td>
<td>Performance may only be measured at the end of the project</td>
<td>Projects can be killed at any stage of development</td>
<td>Senior management and project team responsible for projects evaluation</td>
<td>A formal stage-gate® process is utilised to evaluate the projects as they move from one stage of development to another</td>
</tr>
<tr>
<td></td>
<td>One person does all the evaluations</td>
<td>Performance measured at various stages of the project</td>
<td>Management must approve really new ideas or big projects</td>
<td>There is a group charged with the task of evaluation</td>
</tr>
<tr>
<td></td>
<td>Some projects may be killed</td>
<td>Variables such as lead time, project schedule slippage are tracked for projects</td>
<td>Multiple review points exist</td>
<td>Metrics are used to continually improve the NPD process</td>
</tr>
</tbody>
</table>

Figure 4.3 Key Process Area: Metrics and Performance Evaluation

People.

The people KPA shows the transition from Level 1 on the model where there is departmental silo organisation and NPD is performed by individuals to a point where NPD teams have been formed (Level 3) and finally to the situation the existence of cross-functional teams is the factor, which drives project success. Figure 4.4 shows a complete list of the characteristics.

<table>
<thead>
<tr>
<th>Initial</th>
<th>Under Development</th>
<th>Defined</th>
<th>Managed</th>
<th>Optimised</th>
</tr>
</thead>
<tbody>
<tr>
<td>NPD is performed by individuals</td>
<td>NPD is decentralized within each department</td>
<td>Departmental liaisons lead to established NPD teams (multifunctional team)</td>
<td>Cross functional teams under lie the NPD process and are vital for project success</td>
<td>Each project has a core team which remains on the project from beginning to end</td>
</tr>
<tr>
<td>Individuals are unorganised</td>
<td>A champion may shepherd projects and are essential for project success</td>
<td>Teams have regular meetings to discuss progress to discuss NPD project</td>
<td>NPD is team-focused</td>
<td>A NPD group exists and is purely dedicated to NPD work</td>
</tr>
<tr>
<td>No Project leaders</td>
<td>Some people are employed full-time for NPD</td>
<td>Each NPD project has a project leader</td>
<td>Identifiable new product managers within business department</td>
<td>Project management software and techniques used to manage Projects</td>
</tr>
<tr>
<td>Personnel take on too many projects</td>
<td>No NPD teams but personnel are employed from a range of different departments</td>
<td>Champions may exist but they are not necessary for project success</td>
<td>Clearly identifiable project leader who accept ownership of the project</td>
<td>Ongoing NPD training provided</td>
</tr>
<tr>
<td>No identifiable NPD team</td>
<td>Little or no training given</td>
<td>Training given to people employed fulltime in NPD</td>
<td>Not all projects required to go through project group: some may be handled by department manager</td>
<td></td>
</tr>
<tr>
<td>No training given to people involved in NPD</td>
<td>Creativity by people not directly involved with NPD may be stifled</td>
<td>Personnel limit number of projects they work on</td>
<td>Training given to people involved in NPD</td>
<td></td>
</tr>
<tr>
<td>Prevalent departmental silos</td>
<td>Management become aware that structure amongst the personal is important for project success</td>
<td>Creatively within the organisation encouraged</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“Over the wall” technique is used between department where one department completes their section of a project and passes it on without any consultation with other departments</td>
<td>Team accomplishments recognised and rewarded when performance is exceptional</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4.4 Key Process Area: People

Portfolio management

Level 1 companies have no processes in place for portfolio management as seen in figure 2.5. As a company matures it reaches a point where Formal portfolio management processes are
in place and are utilized for most projects (Level 3). Finally once a firm has reached level five there is a formal and systematic portfolio management process in place with organizational awareness of the system. A company at Level 5 is continually reviewing their portfolio management process in effort to improve its success. A more detailed breakdown of the characteristics can be viewed in figure 4.5.

### Figure 4.5 Key Process Area: Portfolio Management

#### Market Research

Figure 4.6 presents a situation where an immature company at Level 1 does not undertake any type market research. By Level 3 formal organised market research of some form is undertaken for most projects. Once a company has reached Level Five they are optimising their research as they attempt to anticipate its customer’s future needs through continuous market research. Figure 4.6 shows a complete list of the characteristics from Level 1 to 5.
5.0 Results and Discussion

While a full analysis of the questionnaire results is beyond the scope of this paper. The respondent’s comments and suggestions to improve each KPA of the model are discussed aswell as their opinions on the examination of large and small firms using the same model.

Strategy

NPD strategy represents defining and planning a focus for the NPD efforts of the company. One comment made by a respondent was the words “goals” and “strategy” were used and interchanged throughout the KPA. As these represent the same thing the model should utilise only one to avoid confusion and ensure clarity. It was also pointed put that in the lower levels it is not the availability of funding which drives project selection rather “pet projects drive project selection”. The setting of quantitative goals for NPD is another issue raised which the respondent’s felt could be expanded across the levels into what type of quantitative goals are being set at each level.

Process

Process represents the processes the company uses to move a project through for idea generation to launch. One respondent felt the role of “documentation” is hugely important to the success of a project and this was conveyed strongly though the process KPA but was lacking in the other KPA. They felt a documented process for performance evaluation and portfolio management in particular is vital. A contradiction within Level 4 was also noted by several consultants. The characteristics included that a stage-gate® type process may be employed but gates may not be clearly defined and may vary across the organisation. However also stated is that the NPD process is visible and well documented resulting in disagreement between the characteristics.

Metrics and Performance Evaluation

Metrics and performance evaluation correspond to how NPD performance data is measured, reported and stored. The respondent’s agreed that communication of the data is important for current and future project success. The theme of communication of the data is relatively weak across the 5 levels and needs to be addressed. Also having evaluations and multiple review points is important but the quality of these reviews is more important to ensure that weaker projects are killed. Another respondent pointed out that having data measured, stored and accessible for future projects does not mean that the data will actually be accessed and used by the team members so a discipline needs to exist at more mature levels to ensure employees are aware the data exists for use and draw on the available information.

People

Several issues were raised by the respondent’s regarding the people KPA. Firstly is the issue of co-location. One respondent through their research had found that if the people involved in NPD were located close together it had impact on project success. Being located close together resulted in more meeting and increased communication and awareness of the issues surrounding the project. They also raised the issue “generalist vs. the specialist”. They had found that generalist was on to many project teams and did not devote their time evenly between the projects but only to the project they prefer to work on or been seen to be working on. However the majority of the consultants agreed that it rarely happens that an individual
limit the number of teams they are a part of. It was also cited by several of the experts that senior management support across this the KPA and in several other KPA’s was not strong enough considering its huge role in NPD success.

**Portfolio Management**

Portfolio management represents how a company screens its product concept to decide which concepts to proceed with. One respondent noted that their was slight variation between the portfolio management KPA and the strategy KPA regarding senior managements level of control of projects existing which are not aligned with the company’s strategy showing a slight inconsistency between the KPA’s. Several of the respondent’s were also confused with regard to the treating of NPD projects are treated as one portfolio. This was intended to signify that when a project was being chosen the overall portfolio was consulted to ensure that balance would be maintained with regard to high risk vs. low risk projects, radically new vs. incremental projects etc. One respondent also had a general opinion regarding this KPA and whole model. Some items appear at lower levels and then skip a level and reappear at a more mature level. They suggested a “continuum of improvement across each KPA” e.g. the prioritization of projects is not mentioned in Level 4.

**Market Research**

The main issue raised regarding market research by the respondent’s was the customer’s involvement. Customer involvement appeared at level 1 then skipped two levels and reappeared at a more mature level. It may be argued that during those levels market research is being carried out and market research usually captures the voice of the customer however for clarity and consistency in the model a continuum should be seen across all levels. Another respondent questioned that the model does not take into the consideration how radical products can evolve without market research. Finally one respondent suggested the possibility to allow time for research after product has been launch. This gives time for research into technologies, which evolved during the development of the product and their applicability to the current product. The team is also held together for a period of time allowing in case there is an engineering change order (ECO).

**Applicability of Model to Large and Small firms**

Whether or not both large and small companies can be assessed using the same framework was a key issue explored in the questionnaire. Out of the 6 returned questionnaires 3 respondent’s thought it was possible and 3 respondent’s thought separate models were required. Of those who thought it was not possible there was various reasons. One consultant stated “small companies are not large companies shrunk down; they need separate and distinct models and analysis”. The same consultant even saw within the thresholds of the SME definition (Commission 2003) a need for two models as through their research companies with approximately less than 80 employees often has no defined departments. They thus saw the need for separate models to analyse small companies and medium sized companies. Another respondent saw “context as a crucial limiting which drives/challenges NPD. This context includes resources (financial, skill, time) which handicaps SME’s”. The fact that organisational structure is dependant on organisational size was raised by another 3 respondent e.g. “the decision cycle is much faster in small companies”.

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Those who thought it were possible they had various arguments. One respondent concluded that the NPD processes for a large and small firm “are the same even if the implementation is different”. Another respondent raised an interesting perspective. They thought the same levels and characteristics in principal would apply e.g. in a small company there may only be 1-2 people in an NPD team yet these could bring multi-functional thinking e.g. a technical person with marketing skills (Level 5- optimised) or they could be silo-thinking (Level 1-initial).

With regard to whether an SME should be continually striving to reach the highest maturity level or should they aim lower than level 5 all respondents except for one agreed that all companies large and small, should aim for optimisation”. The respondent who disagreed concluded, “going to level 5 would not give a return proportional to the effort required to attain it”.

6.0 Conclusion

The proposed framework is an initial attempt at organising existing benchmarking data from published studies into a maturity model for NPD in small to medium enterprises. It was designed to initiate discussion amongst experts as to what represents “a best practice” to small firm. Initial findings have presented a wealth of information to refine and tailor the model for an SME. The consultants are divided as to whether or not the same model can be used to assess large and small firms. Kahn’s model is designed with large companies in mind and the fact that this model needs changing to suit a small company would suggest they cannot be assessed on the same model. Further investigation and an expansion of the Delphi panel should yield additional results allowing the completion of the framework.

7.0 Notes

Stage-Gate® process is a conceptual and operational road map for moving a new-product project from idea to launch. Stage-Gate® is a widely employed product development process that divides the effort into distinct time-sequenced stages separated by management decision gates (Product Development Institute Inc 2006)

8.0 References

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