

Nex Gen Stage Gate NPD Process in an Entrepreneurial Company

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Abstract—Using Nex Gen Stage Gate as reference, this article describes new product development (NPD) in an entrepreneurial company using indepth case studies. Entrepreneurial companies are not strictly process driven; a projectwise approach is taken for NPD. Steps are modified or skipped depending on the nature of the project or the market urgency. Their processes maybe flexible but not scalable; there is a limited portfolio approach and there is hardly any value stream analysis or open innovation undertaken. Recommendations to improve NPD productivity are discussed. In addition to practitioners and entrepreneurs, this study is expected to benefit Educational Institutions that teach courses on entrepreneurship and NPD.

Index Terms—Nex gen stage gate, new product development process, NPD, entrepreneurial company NPD.

I. INTRODUCTION

New product development (NPD) process is a critical factor that affects new product outcome [1]-[3]. Stage Gate is the most widely acknowledged NPD process and is used by 73 percent of companies in North America (Stage Gate Inc., 2007). The original Stage Gate process has evolved to accommodate the changing needs of the industry; the latest version-Next Gen Stage helps companies to reinvent themselves [4], [5]. These are more adaptable, flexible and scalable systems. Reference [6] has recommended that more researches are required to understand the modifications of Stage Gate in various contexts. Most of the studies on Stage Gate modifications have been in the context of non-entrepreneurial companies. [5]-[7]. There is no study on how Stage Gate could get modified in the context of an entrepreneurial organization, which is founded and run by the owner himself. The personal involvement of an entrepreneur in the NPD activity makes the activity of NPD unique in these companies. The definition of entrepreneur considered here is the one who is the major owner and manager of a business venture, not employed elsewhere but is involved in the day to day operations. Ref. [8] has argued that there is very little literature availability of models linking NPD and entrepreneurship. Ref. [4] has highlighted the need for companies to continuously evaluate their NPD processes in detail compared to Stage Gate, in order to derive maximum benefit out of it.

Manuscript received March 28, 2016; revised June 11, 2016. This article aims to understand NPD process in an entrepreneurial company, using Nex Gen Stage Gate as reference.

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II. RESEARCH METHODOLOGY

Entrepreneurial companies are best studied through an indepth case methodology [7], [9]. Availability of raw data from these companies provides rich analyses and there is a trend towards theory driven research that is contextual and process oriented for an entrepreneurial set up. There is growing popularity of qualitative research in a marketing/entrepreneurial interface.

A. Case Research

Two cases were studied in this research. The cases studies were a combination of a Theoretical/ Configurative one and a Heuristics one. As mentioned before, Stage Gate process was chosen as reference. Identifying a theoretical framework facilitates navigation through the case study. Post this, a case study protocol document was developed [12] and a pilot study executed. The protocol document comprised an over view of case study, the field procedures involved including the data sources and respondents' schedules, the case study questions (and the questionnaire) and a guide for writing the case study report. Pilot study was carried out as the final step of preparation in the case study research to learn about research design and field procedures. It was conducted across a set of respondents from a company that was similar in profile to the main participating company. The learnings from the pilot were used to edit the case protocol and then the final case research was conducted. The process was repeated for both the companies that led to a final set of findings. Depending on the level of support that the findings got from the second case, the propositions were arrived at and the Stage Gate modified for the entrepreneurial companies.

B. Quality of Research Design

The four tests to assess design quality [13] were undertaken. For the purpose of construct validity, data collection was done from many different sources. Audio recording of interviews alongwith notes taking resulted in documentation- and this helped to form a chain of evidence. Conclusions of the previous steps were shared with experts and key informants. For internal validity that seeks to establish a causal relationship- linking data evidence tightly to emerging relationships between constructs was done repeatedly. Replication logic i.e. ascertaining a relationship in multiple areas within one single case also helped build internal validity. External validity defines the domain to which the study's findings can be generalised beyond the immediate case study and for this purpose a second case was chosen. Finally reliability was demonstrated by using a case study protocol document and a database of respondents so the results can be repeated.

C. Sample Selection

For the purpose of this study, we have looked at an *Entrepreneur* as someone who has founded the organization and is involved in its day to day functioning. Since Stage Gate is most popular for products' companies, an organization in the consumer packaged goods (CPG) sector was chosen. Given its size and importance, CPG has very little representation in literature in terms of NPD process. The other criteria for selecting the entrepreneurial organization was its years of existence (at least two decades as this has a bearing on new product activity levels), the level of new product activity (reflected by the number of new products launched in the previous few years) and a minimum turnover size (as new product activity is related to this).

A total of seven organizations qualified and two chosen (one for the primary case study and the second for cross analysis)-as these were willing to share data. [10], [11] This being a qualitative research methodology, the second organization had sufficient variance from the first, from the angles of category presence in CPG, geographies and nature of ownership (single versus multiple).

The first company is considered a pioneer in the CPG sector in the field of NPD. The entrepreneur has been singularly responsible for its new products record. Starting off in a modest manner, with hardly any sophisticated technical expertise, it was his vision that helped the organization grow to its current size. The existing challenges faced by the company were formalizing the NPD process and increasing the new products success rates in the market place. The second organization is owned and run by two brothers (unlike the first that is run by the entrepreneur himself). While new product launches are frequent, this organization faces the challenge of being unable to develop products successfully for markets beyond its current strong geographies. Both the organisations hoped that the renewed understanding of their own NPD process will help improve their new product productivity.

There were embedded cases (new products) chosen with the organisations. There was one success and one failure each, in terms of two new products that served as the spectrum through which the NPD process was studied. The age of these new products was similar to ensure comparability.

D. Questionnaire Design

The research question was developed into a semi-structured questionnaire guide. Aspects from literature that could become constructs for proposition building were also included. The questionnaire underwent a few changes as the research proceeded

E. Data Collection

A preliminary phone call to the Managing Director (in this case, also the entrepreneur) of the participating organization, followed by a mail (describing why the company should participate), formed the first steps. A reply mail from him (which was also marked to the employees participating in this research) was obtained and a schedule of meeting appointments was prepared. Apart from company employees, visits to the consumers/traders'

distributors' offices were done in order to add a market perspective to the study. A total of 32 respondents per company were studied. These were arrived through 'Theoretical sampling' i.e. meeting with each respondent gave indications on who should we meet next. This was done till the understanding obtained was considered sufficient for analysis. Each of them was met a minimum of two times and a duration of 45-60 minutes was spent each time.

Other means of data collection were also adopted. These were:

- 1) Documents-Brand plan documents, newspaper articles, journals, briefings to agencies, market performance data and research documents.
- 2) Archival records-Previous few years of advertising, product packaging evolution, job specification sheet for a brand manager over the years.
- 3) Discussions-With cross-functional stakeholders from sales, marketing, R and D, Packaging, Advertising agency, Research agency, Human Resources and Finance. Findings from one function could be cross validated with another.
- 4) Direct observation and field visits- Sitting through NPD Agency briefings, research presentations .visiting trade and retail- all these helped in constructing a more holistic perspective of the NPD process.
- 5) Participant observation- Observing the participants involved in NPD during meetings-how they respond, take decisions, what is the role and frequency of top management interaction- all these helped understand the NPD process better.
- 6) Physical artifacts- Product samples, Pack labels, website, brand and consumer videos.

With meticulous planning, the process of data collection was completed over a period of ten months.

F. Data Analysis

The data collected was carefully classified and organized. Field notes were taken to ensure that there was simultaneous progress across data analysis and data collection. Formatting through indexing, cross referrals, abstracting and pagination was done.

Analyzing data is the heart of building theory from case studies, but it is both the most difficult and the least codified part [14]. Pattern matching was done as an analytic technique [14]. The entire process was done keeping in mind the unit of analysis-new product development and was grounded in the data found. The researcher bias was reduced by having multiple data sources. The analysis process consisted of the following steps- data reduction, data classification, shaping hypotheses and reaching closure. *Data reduction* involved transcribing the data collected onto a word document. This involved listening carefully to the audio-tapes and writing the document clearly and precisely.

Transcribing was done by an unbiased source that was not exposed to the research process. A total of around 300 pages of transcript per company were prepared from the interviews. Based on the emerging themes from this data, codes were formed and this comprised the next step of *data classification*. The third step of arriving at propositions involved two steps- defining the constructs clearly and

verifying the emerging relationships between construct variables with the evidence in the case. The various ways of summarizing the evidence on constructs included personality descriptions, quotes and observations. Searching for the reasons behind the relationships among constructs was the next step. Replication logic (to check for evidence of the same finding in other parts of the same case) was used to improve internal validity. Triangulation was also done across different data sources i.e. interviews, websites, secondary sources and archives. These relationships between constructs were then compared with unfolding literature to arrive at a set of final propositions regarding that aspect of NPD.

Reaching closure was the last step of conducting the case analysis. There were two decisions regarding this- when to stop adding data and when to stop iterating between theory and data. Arriving at a theoretical saturation, i.e. any further effort resulting only in incremental results – determined both of these. Cross case analysis with analytic generalization technique was used across the second case, in order to finalize the propositions.

III. FINDINGS

A. Overall Process

There are two streams of new products developed in an entrepreneurial company. These are regular and gut feel. The former is where the ideas are generated from both internal or external sources (barring the entrepreneur) whereas gut feel projects are those where the ideas come from the entrepreneur himself- based on his market visits and competition observation. While the regular projects follow the 5 Stage 5 gate model (as advocated by Nex Gen Stage Gate), the gut feel projects follow a modified 5 Stage 4 Gate model. The gate of product testing gets modified for the gut feel projects. In a regular project, the various product tests conducted are- laboratory test, storage test, in home stability test, retail shelf simulation test and transportation test. However for gut feel projects, only the laboratory tests are conducted and the others skipped. This is because of competition urgencies requiring a faster market launch. Given that these project ideas are originally from the entrepreneur himself, this deviation is permitted by him/her.

B. Post Launch Reviews

Although Nex Gen Stage advocates tough post launch reviews, the entrepreneurial companies do the same only for successful new products, that too only informally as a part of the NPD review meeting. And for failed new products, this is not done at all.

C. Flexibility of NPD Process

According to Nex Gen Stage, flexibility is evident through two aspects- does the project team have discretion over which NPD activities can be pursued and which ones skipped; and does simultaneous execution of certain activities take place. The entrepreneurial organizations did not exhibit any project team discretion. Whenever a NPD step had to be skipped, it had to be aligned with Senior Management or with the entrepreneur himself. This showed

dependency of the project team on the organization to carry out any task regarding NPD. As regards simultaneous execution of certain NPD activities, it was done for certain steps like idea generation and idea screening; product and concept development. Wherever the organization felt they had sufficient information to start work on the next step, they carried out simultaneous execution.

D. Adaptability of NPD Process

Nex Gen Stage Gate talks about spiral or agile development process built in to finalize product design. In these scenarios, complete prior product definition may not be required. This also enables voice of the customer (VOC) to be incorporated continuously to feedback and make changes into the product. However, in these entrepreneurial companies, though iterative product development took place, each iteration was still formally tested before moving to the next step, resulting in a longer time for completion. Therefore the entrepreneurial organizations were found to be less adaptable in this aspect.

E. Scalability of NPD Process

In order to make the NPD process scalable, Nex Gen Stage Gate advocates Stage Gate Express and Stage Gate Lite for varying levels of risks associated with projects. The first Gate is a clearing house to decide which kind of Stage Gate should be adopted for which kind of project. However, in these companies, there was no risk classification carried out (probably because CPG sector contains mostly incremental innovations where the risks are fairly similar across projects). There was no prior thinking regarding different types of Stage Gate process to be followed for different projects. In fact there were no cases where Stage Gate express or Stage Gate lite were adopted, revealing the fact that the NPD process in these entrepreneurial organizations are not scalable.

F. Portfolio Approach to NPD Process

According to Nex Gen Stage Gate, a portfolio approach for new product selection will manage risk better. Typically there are 2-4 reviews of portfolio done in a year and the tools used range from bubble diagrams, pie charts etc. There was absolutely no evidence of these companies having a portfolio view on NPD. There was no planning across time horizons. No visuals or diagrams were used to analyze the different projects in the portfolio. Every project was treated on its own merit and not in the context of a bigger picture of contribution to the company's portfolio.

G. Value Stream Analysis

Value stream mapping is a means to reduce waste in terms of slack time or resources in the NPD process. It requires detailed mapping of activities along with time and resource parameters- both planned and actual. The deviations from the plan are then analyzed and conclusions sought on whether the activity should be modified to make it more efficient. The entrepreneurial companies did not even have a perspective on this kind of analysis and hence did not practice this. There were no documentation or templates in this regard. Specific wasteful minor activities got cut occasionally, not due to proactive value mapping exercises, but due to market urgencies.

H. Open Innovation of Stage Gate

The aspect of sourcing ideas externally from Intellectual Property Patents or even from fully developed internal ideas inside is called Stage Gate with Open Innovation. The entrepreneurial companies followed a combination of idea sourcing methodologies. They had good relationships with vendors that formed an external source of ideas, though this was not a very frequent occurrence. The internal source was mostly from the entrepreneur himself and occasionally from the R and D department. The Open innovation, while it existed, could definitely be improved upon.

IV. DISCUSSION

Overall it seems that the entrepreneurial organizations have not embraced the spirit of Nex Gen Stage Gate fully. While there is orientation to the traditional Stage Gate process, the principles and thinking behind the Stages and Gates have not been adequately assimilated. This is evidenced in the improper implementation of the Stages (some steps of product testing skipped; no portfolio approach, value stream mapping not carried out and Post Launch Reviews not done for all projects). These result in the NPD process not being scalable or adaptable or even serve as a source of learning for future projects. The expected NPD strategy out of such a company will be one that is shortsighted, not balanced in terms of portfolio, fairly reactive (not proactive to market needs) and not being able to churn out stable output in terms of successful new products. This has indeed been the case with these companies- the new product output in the past has been erratic; while there have been big wins, there have also been huge losses. The biggest issue seems to be the question who really 'owns the NPD process 'in an entrepreneurial company? Given the findings here, it seems like while the managers in the organization carry out the NPD process, they do not take responsibility for doing it in the most desired manner. There are project wise deliverables, but as far as improving the efficiency or effectiveness of the process itself, there seems to be very little work done. The overall NPD output of the organization still seems to be the Entrepreneur's problem!

V. MANAGERIAL IMPLICATIONS

Firstly, the Gate clearing house- It may be useful for these organizations to classify projects across varying risk levels at the first Gate at the beginning of the NPD process itself, to understand which one should follow which kind of Stage Gate (Stage Gate Express, Lite). This will help them cut down on unnecessary activities where not required and hence increase speed of output and make the process more scalable. *Secondly*, portfolio tools such as benefit mapping, economical models can be used to arrive at time horizon planning of NPD output as well as ensuring they have steady revenue output from new products. *Thirdly*, post launch reviews, if done regularly, can benefit the organizations in terms of learning from failures; the team focus will increase for subsequent projects. *Fourthly*, more open innovation can be adopted by way of technology tools

and external interface reducing the dependency on the entrepreneur for idea generation and in the process building more accountability into the NPD teams. *Finally and most importantly*, the entrepreneur needs to display more seriousness of NPD process implementation. As far as idea generation and resource commitments go, the entrepreneur is still the prime responsibility holder. This needs to change and sufficient authority has to be given to other people in the organization to take decisions and exert discretion where required. By reviewing the details of the process more closely, the efficiency of the steps will go up for e.g. Voice of Customer being built into product development; score-cards employed at every Stage; Gate reports being prepared regularly and root cause analysis being done for PLRs. There should be no deviation from the process followed (product testing modified) for gut feel projects as this sends a wrong signal into the system regarding process adherence.

New products are an increasingly important contributor to the revenues of any company and entrepreneurs will do well to recognize that. It is time for them to rethink their NPD processes and their effective implementation in order to derive maximum benefit out of it, if they have to succeed consistently in the market place.

VI. CONCLUSIONS

Entrepreneurship and particularly new product development are very important drivers in any economy and this study is central to both. This article has highlighted the unique challenges associated with the entrepreneurial companies in embracing the NPD process. The value that this study brings through the rich empirical evidence regarding NPD process in an entrepreneurial company is original and pioneering. Entrepreneurial companies can get a detailed understanding of NPD process and use it to improve their NPD productivity. Government organizations can now refer to this entrepreneurial Stage Gate NPD process for their advocacies on driving entrepreneurship and arrive at guidelines that will facilitate new product development. Educational Institutions that teach courses on entrepreneurship can benefit out of this study by sharing the findings available about the NPD process.

Future work may comprise validating these findings across different kinds of entrepreneurial companies- based on employee size, turnover and ownership. An overall modified Nex Stage Gate can be arrived at for entrepreneurial companies.

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