

REDEFINED PHASES OF THE INNOVATION PROCESS MODELS - AN ISSUE FOR COMPANIES

KAJMAKOSKA, B[isera] & LEBER, M[arjan]

Abstract: The innovation process model is important for the overall outcome of the innovation. Even though researchers defined phases of the innovation process still little effort is given on definition of the early phase of the innovation process and even less by companies to identify real problems facing within this phase. In this paper an overview of the changes of the innovation process models are presented including a pre-phase called: "Phase 0", "Fuzzy Front End", "Front End of Innovation", etc. This paper has in its scope to contribute to the awareness of the importance of this phase presenting a theoretical research on this phenomenon.

Key words: Innovation, Process, Phase, Model

1. INTRODUCTION

Researchers and practitioners in innovation management have actively tried to find a suitable and unique innovation process model. Models are developed to describe the real innovation process in organizations so its management could be eased (Eversheim, 2009). In business and engineering new product development (NPD) is the term used to describe the complete process of bringing new product or service to the market. Companies typically see new product development as the first stage in generating and commercializing new products. Several researchers focused on better identification of the activities of the innovation process. They identified a pre-phase of the NPD. The process of identification of the phases especially of redefinition of each lasted more than 60 years opening new fields of researches and questions. Even though the different models are present in the literature, still best practices especially in the pre-phase are missing. This paper has in its scope to present the theoretical background of the models in order to increase the awareness and necessity of researches in this context.

This paper is organized in two sections. In the first section an overview of some old models: in section one some models that show the effort of researches to create a model suitable for new product development and the early trials for defining the pre-development phase known as: Phase 0, Front End of Innovation (FEI), Fuzzy Front End (Cooper, Kleinschmidt, 1994; Khurana, Rosenthal, 1998; Koen, 2001) are described; in section 2 the latest New Concept Development Model (NPCD) (Koen, 2001) and its changes are described appointing at identified activities important for the innovation process.

2. THE OLD NEW PRODUCT DEVELOPMENT PROCESS MODELS

Process models are important component of the innovation management (Cooper, Kleinschmidt, 1986; Ulrich, Eppinger, 2004) and "Having a process model in place is only half the battle" (Cooper, 1996). Through the years, it has been identified that the innovation process includes several stages, not only the new product development phase and commercialization as it was. This knowledge initiated further researches on formulating

the stages according to the observed common activities performed during changes made on the products and processes in companies. It has been confirmed by empirical analysis that some activities in the innovation and product development process determine the project outcomes.

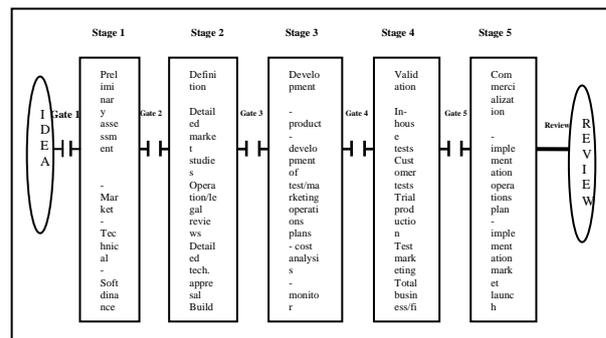


Fig. 1. Typical second generation stage-gate process (Cooper 1990)

Certain activities are found as key, such as: initial screening; preliminary market assessment; detailed market study/market research; business/financial analysis; product development; in-house product tests; market launch (Cooper and Kleinschmidt, 1986; 1988). Basing on these studies Dr. Robert G. Cooper developed the Stage-Gate new product development model. The model is based on the processes implemented in NASA in 1960's when the whole process has been divided into phases with inputs and outputs defined in advance. The following research, mainly within the framework of the Canadian NewProd project lead by R. Cooper in 1996, resulted with the second generation model (Figure 1).

The newer model divided the innovation process into five phases with gates, in which gatekeepers decide if to continue or stop the process. The model integrates both technological and market perspectives. The decision is based on the information available at the time, including e.g. business case, risk analysis, availability of necessary resources (money, people, etc). In this model activities which usually are performed ad hoc before the stage-gate process implementation are now standardized and the indicators of the process performance (process lead time, costs, etc.) are significantly improved. Other models stress out the interdisciplinary view – participation of functions in all process phases (Ulrich, Eppinger, 2004). The model includes also five phases where the process starts with Mission Statement in which are included all functions.

An idea and mission statement was just not enough to support the holistic view that the pre-development activities determine the innovation success. Cooper and Kleinschmidt (1990) identified two factors to play a major role in product success: the quality of execution of pre-development activities and a well defined product and project prior to the development phase. The new phase – Front End (FE) by Khurana and Rosenthal (1998) (Figure 2) was defined as a phase which

includes product strategy formulation and communication, opportunity identification and assessment, idea generation, product specification, and project planning. Project starts by preliminary phase zero (0), which should include market opportunity assessment. However, the idea or concept is often generated in technical department; close cooperation within the inter-functional team is therefore necessary.

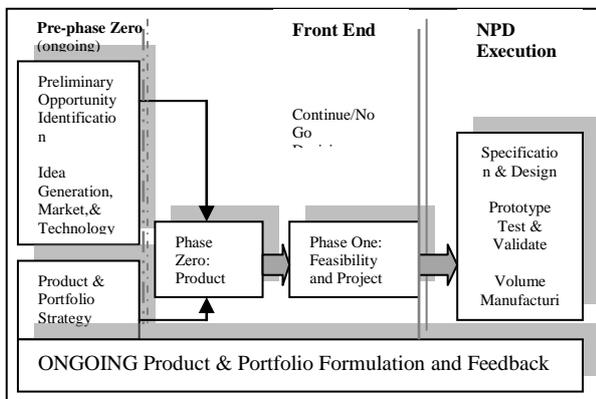


Fig. 2. Front End Model (Khurana, Rosenthal 1998)

The phase 0 results in product concept, including preliminary identification of customer requirements, market segments, competitive position, business opportunity and compliance with strategy. The first phase then includes the business and technical feasibility evaluation, development of product definition and project plan. After the continuation is agreed on, the proper new product development starts.

3. NEW CONCEPT DEVELOPMENT MODEL

Initial phases of the innovation process were analyzed by Koen and his team (Ajamian, Koen, 2002; Koen, 2001). They concluded that in those phases is not suitable to use same approaches as in the following more structured process phases. They state that many of the practices that aid the NPD portion do not apply the Fuzzy Front End (FFE). On the basis of the analysis of a number of works and their own research they developed two models suited for the initial, less structured phases of the innovation process: New Concept Development (NCD) and Technology Stage-Gate (TSG) processes. They saw that the innovation process may be divided into three parts: Front End of Innovation (FEI), New Product Development (NPD), and Commercialization (Figure 3). "Front End of Innovation" is defined by activities that come before the "formal and well structured" New Product Development (NPD) portion and it is synonymous to the FFE.

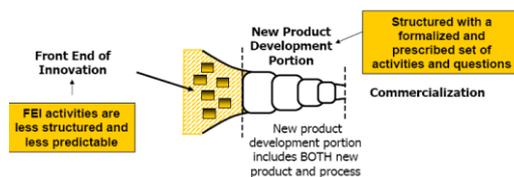


Fig. 3. New innovation process model (Koen, 2002)

The differences between the FFE and the NPD processes have been systemized by Koen et al. (2002). Applying to the FFE they based many of their studies on the New Concept Development Model. The NCD model consists of three key parts as defined by Koen: the engine is the leadership, culture and business strategy of the organization that drives the five key elements that are controllable by the corporation; the inner spoke area defines the five controllable activity elements: opportunity identification, opportunity analysis, idea generation and enrichment, idea selection, and concept definition; the influencing factors consist of organizational capabilities, the

outside world (distribution channels, law, government policy, customers, competitors, and political and economic climate), and the enabling sciences (internal and external) that may be involved.

Considering the Stage-Gate process from Cooper, Koen and his team redefined a new model called TechSG to manage high-risk projects within and at the transition between the fuzzy front end and the new product development making the new one with solid gates. The technology development team can only "see" to the next gate and understand that the deliverable may change as the technology is developed. Comparison of the two models can be found in Koen et al, (2002).

4. CONCLUSION

Innovation process models through years were changing from simple two-phase into three-phase and more complex. Newer models show non linearity of the phases and include new pre-development phase. Unfortunately it seems that after the latest models of Koen only few individual trials of new models appear. According to Koen (2002), systematic approaches using process models can be successful in the case of incremental innovations, where both business and technical uncertainty is rather low. Up till now it has been shown that activities in the pre-development phase define the overall innovation process, yet the literature lacks with best practices and empirical data of which other variables could change or impact innovation process. This issue is very important for the companies who would like to improve their innovation process and to implement new strategies.

5. REFERENCES

- Ajamian, G.M. & Koen, P.J. (2002) Technology Stage-Gate: A structured Process for Managing High-Risk New Technology Projects, in Belliveau, P., Griffin, A. & Sommermeyer, S.eds., *The PDMA ToolBook for New Product Development*, John Wiley & Sons, New York
- Cooper, R. G. (1996) Overhauling the New Product Process, *Industrial Marketing Management*, Vol.25, No.6, pp. 465-482
- Cooper, R. G. & Kleinschmidt E. J. (1986) An Investigation into the New Product Process: Steps, Deficiencies, and Impact, *Journal of Prod. Innov. Management*, Elsevier Science Publishing, No. 3, pp. 71-85
- Cooper, R. G. & Kleinschmidt, E. J. (1988) Resource Allocation in the New Product Process, *Industrial Marketing Management*, Vol.17, No.3, pp. 249-262
- Cooper, R. G. & Kleinschmidt E. J. (1990) New Products: The Key Factors in Success, *American Marketing Association*, United States
- Cooper, R.G. & Kleinschmidt, E.J. (1994) Determinants of Timeliness in Product Development, *Journal of Product Innovation Management*, No.11, pp.381-396.
- Eversheim, W. (Ed.) (2009) *Innovation Management for Technical Products*, Springer
- Koen, P.J. et al. (2001) New Concept Development Model: Providing Clarity and a Common Language to the Fuzzy Front End of Innovation, *Research Technology Management*, Vol.44 No.2, pp. 46-55
- Koen P.J. et al.(2002) Fuzzy Front End: Effective Methods, Tools, and Techniques, in Belliveau, P., Griffin, A. & Sommermeyer, S.eds., *The PDMA ToolBook for New Product Development*, John Wiley & Sons, New York, pp. 5-36
- Khurana, A., Rosenthal, S. R. (1998) Towards Holistic "Front Ends", in New Product Development, *The Journal of Product Innovation Management*, Vol. 15, No. 1, pp. 57-74
- Ulrich, K.T. & Eppinger, S.D. (2004) *Product Design and Development*, 3rd Edition, McGrawHill, New York, 2004