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Methods for Pre-Project Innovation Processes
-Developing Propositions for their Selection and Application in Different Company
Situations

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Methods for Pre-Project Innovation Processes

-Developing Propositions for their Selection and Application in Different Company Situations

Innovation is of high importance to companies in competitive environments (Hill and Jones, 1998; Tidd, Bessant and Pavitt, 1997). The process of innovating is risky and very often plans to innovate fail (Trott, 1998). Since the work of Burns and Stalker (1961) there has been a tradition of research on innovation processes in companies, so that processes can be better designed and specialists have tools and methods they can use and apply to support their work. Nevertheless, innovation processes are still ambiguous and go/no go decisions are still hard to make because the availability of reliable information is limited (Cooper, Edgett and Kleinschmidt, 2001; Schrader, Riggs and Smith, 1993). The process from an initial idea for a new or modified product, service or process to a business plan that can act as a basis for decisions in the later phases of the project is called the pre-project innovation or early stage innovation process (O'Connor and Rice, 2001; Kelly and Littmann, 2001). These early phases are very important for the innovation process since they form the basis for future company success. As a result, reducing ambiguity within the pre-project innovation processes is a challenging and rewarding research topic. Addressing the pre-project innovation processes will also benefit companies, as more effective application of tools and methods in the early phases could improve their overall innovation output.

Looking at the current state of the art in the relevant research fields of organisation theory, innovation process theory, strategy development and business planning, no clear recommendations can be derived of how to organise pre-project processes and which methods should be applied. Existing theory is either too specialised or too general so that contradictory conclusions are the result if a company's situation is not properly analysed. For example, high market maturity (as described by Abernathy and Utterback 1978) combined with a high organisational maturity (as described by Greiner, 1998) could lead to process and cost focused innovation activity; even though a product differentiation (Porter, 1980) or disruptive technologies strategy (Christensen, 1997) would be more rewarding. The consequence is, that both recommendations would lead to different methods applied in the early innovation process.

The question for this research project is: *is it possible to develop applicable and consistent recommendations for the use of methods in pre-project innovation processes for generic company situations?*

This paper explains the key concepts in the research question. The four research propositions are then defined and these will be used to guide the subsequent data collection and analysis activities within this project. By August 2004, some initial data will be available and can be presented at the conference.

The nature of pre-project innovation processes

The innovation problem, from the innovator's perspective, is renewing the solution to a customer's needs by adding or changing a product, service or process in order to optimise the company's profit function. The pre-project process is a conceptual process with the objective of defining innovation projects for the company. The result of the process is a basis for a go-no go decision. Therefore, we can describe the early-stage innovation process as a complex problem solving or a decision-making process. (March and Simon, 1993; Schrader et al, 1993)

Tools and Methods within the pre-project innovation process

As developing a concept for an innovation project is an analytical, conceptual and creative process, methods play a major role for collecting, processing and communicating information and setting up an environment for this process (Kelly and Littmann, 2001).

The selection and application of tools and methods is influenced by three types of factors: objective/analytical factors (defined by the problem itself), personal factors (like qualifications, preferences etc.) and social/political factors (like group acceptance, etc.) In this research, we will focus on the objective/analytical factors guiding selection and application of tools and methods.

Activities in the pre-project innovation process

Literature about innovation process design and business planning was analysed and industrial workshops and interviews have been conducted to establish which activities are considered to be part of the pre-project innovation process. To avoid confusion about which part of the process comes first in a strictly analytic description of processes, working modules have been developed to describe groups of activities within the process. There are three main modules (problem definition, customer need description and market potential, and technology development and evaluation), two feasibility modules (overall feasibility and organisational fit) and two realisation modules (competition and co-operation). Activities in these modules run in parallel. The three main modules define the product, service or process idea, whilst the feasibility and realisation modules act to constrain the project.

Defining Generic Company Situations

As described previously, innovation is concerned with renewing a solution to a customer's problem by adding or changing a product, service or process to optimise the company's profit function. From a strict economic point of view, the profit of a company is defined as following:

$$profit = sales * price - cost$$

If an organisation has a portfolio of products, the total profit is defined as the sum of all profits:

$$profit = \sum_1^n sales_n * price_n - cost_n$$

Depending on the focus of innovation, a company can try to either provide a better solution to a customer's problem in order to raise the product of sales and price or to provide a cheaper solution to lower costs. Both approaches can result in a product or a process innovation. In the following table, examples illustrate the innovation focus.

Focus on sales*price	Focus on lowering costs
Product innovation <ul style="list-style-type: none"> ▪ add a new product to the portfolio ▪ change product features to reach more customers ▪ improve an existing product to raise price 	Product Innovation <ul style="list-style-type: none"> ▪ change product quality to allow price adjustment ▪ change product as a result of changed processes
Process innovation <ul style="list-style-type: none"> ▪ introduce new procedures to improve product quality and raise price ▪ apply “green” technology for ecological and image reasons to raise price and attract more customers 	Process innovation <ul style="list-style-type: none"> ▪ improve production of goods and services to lower costs ▪ improve co-operation to lower costs ▪ improve basic technology or materials to lower costs

Table 1: Innovation focus and product vs. process innovation

Based on this, two dimensions can be used to define a company situation: the degree of focus on a customer problem (which enables an increase in sales*price) and the degree of complexity of production of goods and services (which drives costs). The following table labels the four boxes in the matrix and identifies what the focus of innovation is predicted to be in each situation.

Degree of Focus on a Customer Problem	high	Close-to-the-customer organisation <ul style="list-style-type: none"> ▪ problem solution oriented 	Integrator <ul style="list-style-type: none"> ▪ co-operation and competition oriented
	low	Commodity producer <ul style="list-style-type: none"> ▪ production oriented 	Mass product organisation <ul style="list-style-type: none"> ▪ competition and production oriented
		low	high
Complexity of production of goods and services			

Table 2: innovation focus and company situations

From this perspective, the objective of innovation on a company level is to increase profit by adding a new product to the portfolio or increasing sales or raising prices of existing products or lowering costs in a new way with technological advancements.

Research Propositions

The focus of this research is on identifying the tools and methods used in the pre-project innovation process, by considering the activities and modules that comprise this phase and by focusing on the analytical/objective factors that influence the selection of methods. The

prediction is that for different company situations, as defined by degree of focus on a customer problem and degree of complexity of production of goods and services, the focus of innovation will be different, affecting the activities to be conducted in the pre-project innovation process and the selection of tools and methods to support these activities. This prediction is broken down into four research propositions that will be tested in subsequent data collection and analysis.

Proposition for the close-to-the-customer organisation situation

As the name suggests, close-to-the customer organisations work very closely with their customers. They offer a high degree of focus on a customer's problem and in consequence every customer project is somewhat different. Examples are hairdressers, architects, business consultants or lawyers. The problem solution is not necessarily a service, any good of a one-off nature is also possible. Consequently, the customer is the centre of all innovation activities. The complexity of production of goods and services is limited, but not necessarily trivial.

As a result, the focus of innovation should lie in raising sales*price. As the product is of a one-off nature, raising sales levels is limited to the company size. Thus, understanding the customer needs and solving their problems jointly is necessary to increase profit. The activity focus lies in the customer need/market potential module in combination with the problem definition module. Therefore, we draw the proposition that methods and tools that support face-to-face communication will be most important, to ensure close co-operation between project team members and the customer.

Proposition for the commodity producer situation

Depending on the market structure and maturity, competition in a commodity market will vary. Furthermore, companies in this market type are positioned at the bottom of the supply chain. Customers normally buy the product or service to use as a raw material for their products and services or as a key input to their processes. Production of the product or service is largely standardised. Examples of commodity products are sugar, coal, data and voice transmission, banking, or carbon nano fibre material.

In this situation, it is not clear, where the focus of innovation should lie, either in sales*price or in reducing costs. In both cases, process technology lies in the foreground. We assume that production technology is both a driver and constraint for innovation processes. What products can be produced with existing units is an important consideration for these types of companies. As a result, technology development and evaluation is assumed to be the most important module, and the customer needs are a constraining factor. Depending on the level of integration into the customer's processes, product requirements are clearly communicated. Thus, the proposition is that methods and tools that support the internal teamwork of engineers are important in this situation as information comes predominantly from within the company or from technology specialists.

Proposition for the mass product organisation situation

Depending on the market structure and maturity, competition is assumed to be high. Nevertheless, mass market organisations are normally close to the end customer or they deliver the same products to more than one business customer. The product or service consists of more than one physical or non-physical component, so that co-operation partners gain

importance for the production of goods and services. Further, the customer needs have to be described on more than one level. Examples are fashion, electronic components, hi-fi, and sports equipment.

We assume that mass market players have no clear focus of innovation. Depending on competition and market maturity, either costs or customer problems are in the foreground. Based on the fact that products are designed, produced and sold in high amounts, we assume that innovation activities will be spread over the whole organisation and responsibilities are very specialised. The proposition is that statistical methods and tools and classic information processing methods are most suitable for organisations of this type.

Proposition for the integrator situation

Integrators are in a two-fold situation: on the one hand, they are the link to the customer, on the other hand they cannot deliver the whole product themselves. Thus, collaboration is of critical importance in this situation. The product consists of more than two different and dependent components bundled by the integrator. Examples are mobile network operators, retailers like Dell[®], integrated financial service providers, car manufacturers, and airlines.

As integrators cannot solve customers' problems without help from third parties, we assume that a high amount of information is gained by staying in touch with co-operation partners. As mass market players do, integrators also produce for a high number of customers, so in consequence a highly specialised and divided innovation process takes place. We assume that integrators focus their business and innovation activities in keeping the integrator role. Thus, the proposition is that method and organisational innovation focus lies on standardisation and market potential evaluation. In consequence, quick and rich face-to face communication and methods for market and technology analysis are most important for the pre-project process.

Summary and Outlook

By dividing companies into four main types, according to their innovation focus, and by understanding the pre-project innovation process and the activities and modules that comprise it, we have been able to develop four propositions about the types of tools and methods that these situations demand. The next phase of the research, which has just begun, will test these propositions by collecting data about the use of tools and methods across multiple projects in eight companies (two companies from each of the four types). Initial findings from the data will be presented at the BAM Conference to begin to test the propositions and research question.

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