METHODS APPLICABLE IN INNOVATION MANAGEMENT

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Abstract: *Innovation Management is currently a rapidly developing business area. In addition, as there is a growing need for new processes and products to be marketed, there are also several partial areas that are using new or embedded methods. These methods can be used by enterprises to develop management of the innovation process, accelerate processes, or deeply understand changing market situation. The article presents three methods that can be used in the field of innovation management and which serve different purposes. The Stage Gating Method, basically used in project management, offers the possibility of an effective and clearly defined management of the innovation process. The Innovation Maturity Level Method reflects the state of the enterprise regarding to innovation and offers opportunity to understand how enterprises can access innovation. The last of the three methods - Design Thinking is the method used in various drafting solutions or in the problems that need to be reflected in model situations. This method of innovation management brings reliable way of creating new ideas and managing them, helps to design prototypes and end products efficiently. Thus, the article provides a brief overview and draws attention to the use of innovation management methods.*

Keywords: *innovation management, Stage Gating, Innovation Maturity Level, Design Thinking*

JEL Classification: *O30*

1. INTRODUCTION

In modern enterprises, processes are happening in environment of constant change. These conditions create the need for proper decision-making and management of people and processes. Many processes can be managed through defined methods that have defined frameworks and procedures. These procedures make it easier for managers to make the right decisions, while guaranteeing consistent results. Innovation management in position of one of the most changing environments creates area for development of methods for every process. The article presents three methods that can be used in the field of innovation management in managing and deciding on innovations.

2. METHODS

In this part there are described the methods of Stage Gating, Innovation Maturity Level Method and Design Thinking. Each method is described in four parts by a basic principle, a model, an algorithm that can be applied to a problem and a possible use in business practice.

Stage Gating is a project management technique in which the project is divided into phases separated by decision points known as gates. In every gate, the manager, management committee or the board of directors decides, if the process can continue to the next stage. Decisions are made based on the forecasts and information available at that time, including business case, risk analysis and the availability of the necessary resources (money or people with the right skills and competences). [2]

A good analogy for process control in the Stage Gate way is the production process to produce any physical product. The way to improve the quality of the output from the process is to focus on the process itself in order to eliminate errors in the process. The Stage Gate process is divided into several stages or workstations. Between each workstation or phase is the checkpoint or quality control gateway. For each gate, a set of outputs is specified, as well as a set of qualitative criteria that the product must pass before moving to the next workstation. Phases are where the work is done; the gates are control points of certain quality. Stage gating systems are, as mentioned before, used also to manage the innovation process. They divide the innovation process into a predetermined group of stages, which are composed of a set of prescribed, related and often parallel activities. For example, at the testing stage, a list of mandatory or optional activities such as prototype tests, field trials with customers, pilot or trial production and marketing testing can be provided. Typically, these systems include four to seven degrees and gates, depending on the company or division. Typically, a higher-level gateway is more demanding to implement, but also increases the quality of information, while managing the risk at the same time. Figure 1 shows six process levels and six gates through which the desired change is made.

Showed Stage Gate process can be described also by the algorithm. This algorithm contains six stages, in which the change is made, and the Stage Gate process achieves it goals:

1. Creating an Idea - this stage usually deals with discovering the opportunities that can be used and what ideas would work best. When a given idea is chosen, it must be submitted to the council for approval. This is the first gateway to the Stage Gate process.
2. Concept - at this stage, team decides on the technical design of the project. They also decide how beneficial the product would be for consumers and whether they would be successful on the market. It is also important to assess competition in the market. When satisfied with the proposed solutions, the findings must be submitted to the management for approval.

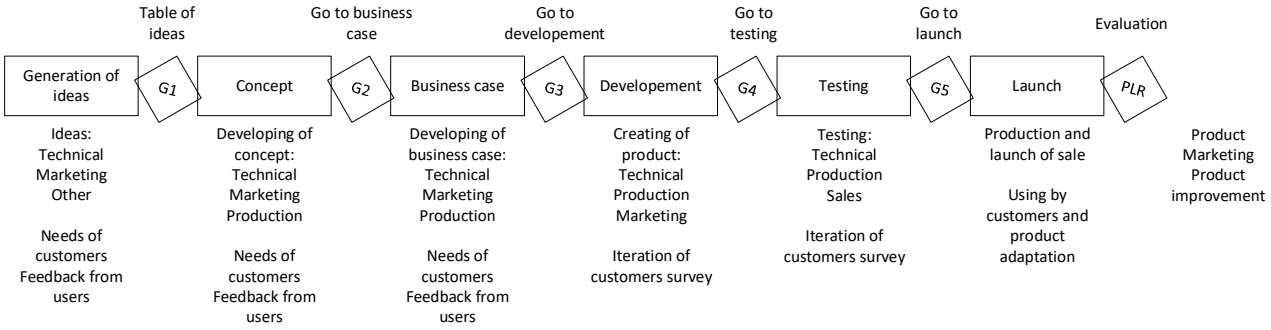

Figure 1 Stage Gate process
Source: Modified according to [3] [4]

3. Business case - this is the most important stage from which the success of the project depends. At this stage, all aspects of the feasibility of marketing, technical and business focusing are analyzed, and a plan is developed that has three main parts - specific details of the new product and project, why this project will be successful and a new product development plan.
4. Product development - during this stage is implemented the concept. Includes designing and manufacturing a new product, deciding on plans for launching the product, and planning the tests that need to be done.
5. Testing and validating a new product - this stage involves product validation by product testing, product creation, product acceptance, and financial benefits to the company.
6. Starting the product - this final stage involves placing a new product on the market. [8]

Example of using the method can be: development of new products, software development, improving processes, business exchange, product innovation, creating a product portfolio.

Innovation Maturity Level Method is designed to identify the level of innovation maturity in an enterprise, offering strategic steps to create an innovative organization along with the development of an organization's ability to innovate.

This method is based on the framework for evaluating innovation in an enterprise, and according to the state of the enterprise, it puts the enterprise in one of four levels. These levels are broken down by business collaboration with customers when designing innovative products. Four levels of business are named:

1. push innovations,
2. validation of the solution,
3. market overview,
4. market research.

The method shown in table 1 examines whether an enterprise only offers customized solutions that they think their customers will want, or they are dedicated to various activities that will help you choose the best solution before putting an innovative solution. An interim review of required market results may significantly increase the competitiveness of the business, according to this table. The best option is that an early warning system is built to uncover the growing needs of the market, enabling businesses to respond instantly to innovative solutions to customers' needs.

This model is mainly used in business auditing and offers a certain logic scheme that can be used to formulate recommendations for innovation and innovative processes for the enterprise.

For evaluating the enterprise, it is necessary to match current state of the enterprise to one of four levels of innovation maturity. These levels are described as:

1. Push innovations - the company starts with its own ideas and launches the solutions that it thinks its customers will want. This type of innovation is clearly focused on suppliers and is very popular nowadays.
2. Validation of the solution - the company is still starting with its own ideas of what it thinks customers will want but verifies their solutions in customer dialogue. This solution is still focused on the supplier but compared to the first level offers the advantage that if the idea is inappropriate or the customer does not consider it useful, there is a great chance that the solution will be rejected before entering the cost phase of development.
3. Market overview - this level reflects true customer-driven innovation. The company starts with a variety of interviews to explore the market's results, offering customers the hypotheses that can express different company designs. An advantage compared to the previous level is that with this hypothesis formulation, an enterprise does not question its ability to deliver functional solutions only.

Table 1 Four levels of innovation maturity level method

LEVEL	LEVEL DESCRIPTION	MATTER
1	Push innovations	What do we want to innovate?
2	Validation of the solution	What are the innovation possibilities according to customer needs?
3	Market overview	What do customers want to innovate?
4	Market research	What will customers want to innovate?

Source: [1]

This means that it cannot create a bad name for customers. This solution brings two strong competitive advantages: a much larger set of possible solutions to be considered and clear routing to determine which of the solutions the customer wants to improve. The third level creates the possibility of a strong competitive advantage.

4. Market research - this is the highest level of customer-focused innovation. The company has built an intelligent early warning system to uncover the growing needs of the market as soon as there is noise about the possibility of some innovation. This level does not provide a deeper level of knowledge than level three, but it brings this knowledge upwards, which represents a major competitive advantage in innovation. As a result, the supplier can explore and refine potential solutions significantly ahead of the competition.

Example of using the method: business innovation audit, monitoring the company's innovative potential, increase the innovation potential of an enterprise by recognizing higher levels of innovation maturity, the need to increase the competitiveness of the business. [7]

Design Thinking is the method of proposing a solution to a problem. It is also a solution to problems beyond the field of design practice, such as in the business and social context. This method provides problem-solving for the resulting product and is particularly useful for solving complex problems that are vague or unknown. [6] It uses understanding of the necessary human needs, conveying the problem into human logical thinking, creating many ideas in brainstorming meetings, and adopting a practical approach to prototyping and testing.

As shown if figure, the Design Thinking process contains 5 steps, which are connected in several ways. The algorithm of this method can be described in 5 steps:

1. Empathy - the first step in the Design Thinking process is to gain an empathic understanding of the problem that needs to be addressed. The main activities of this step are interviewing experts, getting information about the problem, and getting rid of your own assumptions or subjective views of the problem.
2. Defining (Problem) - at this stage, the collected information is collected and organized, a problem or problems are defined, while their clarity and simplicity are important.
3. Creating of ideas - during the third stage of the design process, designers make suggestions. In this step, designers need not focus on just one problem, but they can think of opening and linking problems across the system.
4. Prototype - at this stage, the project team will create several inexpensive, downsized product versions or specific features that are in the product to explore solutions to the problem created in the previous phase. Prototypes can be shared and tested within the team itself, in other departments or in a small group of people outside the project team. This is an experimental phase and the goal is to find the best possible solution for each of the problems identified during the first three phases. By the end of this stage, the designer should have a better idea of the limitations that are part of the product, the problems that are present,
5. Testing - designers or reviewers strictly test the entire product using the best solutions identified during the prototype phase. This is the las step of the 5-step model, but in a repetitive process, the results generated during the test phase are often used to redefine one or more problems and inform users about product comprehension. [9]

The method of design thinking can be used for the following issues: creating a new product, innovation, proposal to address the shortcomings of the various systems, the need to understand the customer's understanding of the product.

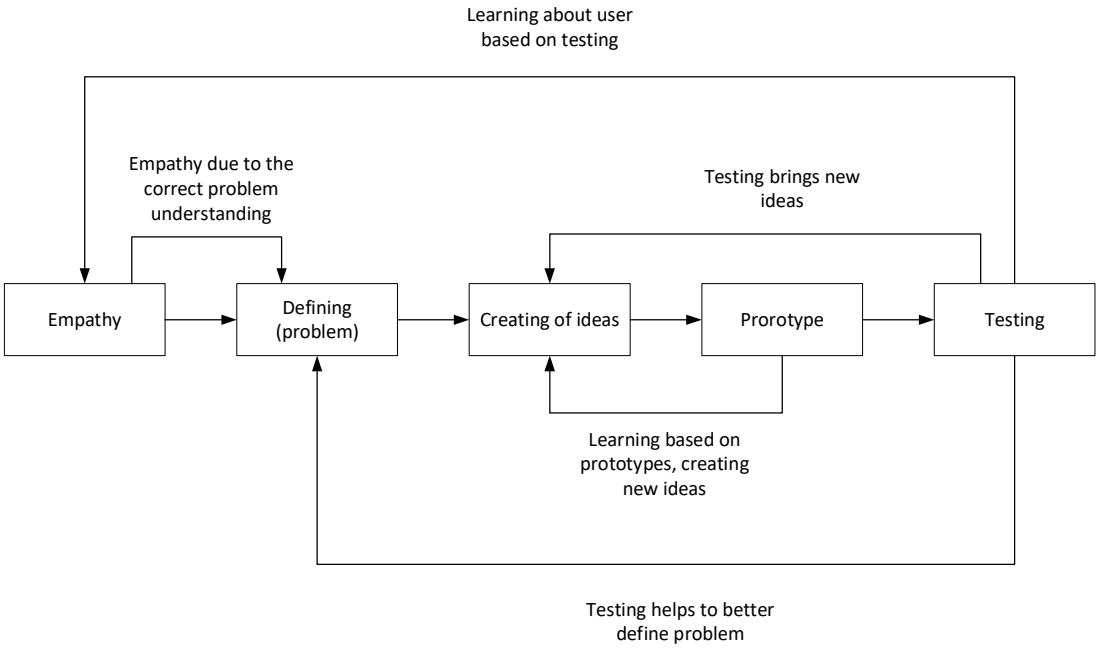

Figure 2 Design Thinking process
Source: Modified according to [5]

3. CONCLUSION

Based on the available information, it can be said that each area of innovation management requires the use of certain practices and methods. Three methods that can be successfully applied in innovation management were described in the pape. Despite their origin, from other parts of the corporate environment, they help to solve problems in the field of innovation management. To complement these methods, it would be possible in a further study to summarize a larger number of methods and to point out the possibilities of using them in a different environment than originally designed.

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