Innovation Management as an Important Segment of the Maintenance and Business Development in IT Companies

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Abstract. Innovation is becoming an increasingly common concept seen as a necessity for survival and progress in today's business world. For many organizations, innovation still seems unattainable, and the reason for this is often prejudice, old or bad organizational culture, and the mindset in all structures of the organization, from management to employees. The concept of innovation is often defined as something completely new, unprecedented and associated with the notion of an innovative product or service that a company offers to the market, but the concept has a broader meaning. Innovation has become particularly necessary due to rapid technological development, shortening of the product life-cycle, globalization of markets and greater competitiveness. The aim of this paper is to provide an overview of recent research results published in peer-reviewed publications related to the development of innovation management in the IT sector from three aspects: mindset, process and outcome.

Keywords: Innovation management · IT companies · Innovative mindset

1 Introduction

Today, expected management outcomes include continuous innovation of products, processes, marketing models and approaches, the information supply chain, and business model innovation in general. The continuous and accurate traceability of companies' activities is of increasing importance for their survival and progress. The development of technologies and the more widespread application of artificial intelligence, machine learning, the Internet of Things, virtual reality, robotics, automation, biotechnology, etc., also have a significant impact on the way companies operate employee and management development. According to [1], the mindset and attitude of employees towards innovation and the development of an organizational culture that supports change in the business environment are also crucial. When recruiting employees, more and more attention is paid to the willingness and ability to solve problems in a different way, outside of their usual framework. A breadth of knowledge and an interdisciplinary approach to solving problems and developing innovative solutions are expected, as well as a willingness to

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take risks and accept challenges. According to [2], developing innovation strategies is a major challenge for managers because innovation as such is often unknown in terms of the outcome that is achieved in conjunction with existing business practices and whether it is balanced across the business portfolio. There are tools available to help them compare their company's innovations with those of other companies in order to formulate an innovation strategy while minimizing the possibility of bad decisions. Regardless, the risk associated with the implementation of innovations in business may influence the manager's attitude that the innovations are for a different company or business unit than the one in which they operate. As [3] points out, innovation management is a struggle through several phases over a long period of time, and it is important to be aware that the need to start over may arise at any time.

Managers'/leaders' attitudes toward innovation can vary, some of them inclined to change, others more inclined to maintain the status quo. According to [4], innovation is a process that requires creativity and a certain amount of freedom to develop new ideas, but also continuous learning. It is often not easy to discover innovative employees and give them the opportunity to realize their ideas. On the one hand, the reason for this may be that they do not like to be exposed, on the other hand, they may be afraid that their idea will be rejected or that someone will copy it. As indicated in [5], open communication and working in teams can greatly contribute to employees to dare to share their ideas with colleagues and superiors. They need to be made aware that criticism is important and that they should have a positive attitude toward it. It should also be emphasized to them the importance of accepting feedback from colleagues and superiors, which they can use to improve their proposals. In the IT sector, which is pointed out in [3], this is often in contradiction to the presence of introverted employees who tend to work independently, and often lack problem-solving skills, critical thinking, innovation and creativity.

IT companies often use agile methodology in their daily work, where employees have a lot of tasks and final sprints every day. Innovative but quick solutions are expected from agile teams. According to [6], the above is not conducive to the development of innovations, which requires time and not a stressful environment. Changing the way of work and the working environment can have a positive impact on the creativity of employees and the generation of innovations. It seems interesting to point out one of the conclusions of the research conducted by the Boston Consulting Group (BCG) in 2020 during the pandemic caused by the COVID 19 virus, which states: "This crisis has provided a unique opportunity to reinvent the workplace. Things that might once have seemed impossible have proved surprisingly workable. With collaborative productivity essential to innovation, the changes will enable companies to become more competitive. And given the employee desires for flexibility, the changes will also allow companies to recruit and retain the best talent" [7]. Also according to [8] "the development of a new product provides more benefits to the company, such as competitive advantages, positive change in the strategic direction, return on investment and profit, improved image, strengthened marketing/brand, attraction of good personnel, development and growth of the company, etc.

Various methods and processes are already used for encouraging creativity and innovation of employees, for example Methods of design thinking, Lean startup, design

sprint, Reward programme, Brainstorming, an Open Innovation (OI) Approach, but as indicated by [9] "a good business idea, continuous coordination and integration, application of modern technical and technological knowledge, skills and experience constitute the basis on which innovation is implemented and on which it achieves the desired market effects. An appropriate innovation strategy, which is in compliance with the enterprise's corporate goals, gives the company an opportunity to decide what kind of innovation it wants to develop."

After researching the previously published knowledge on the subject, the paper was written in a hypothesis-driven manner;

- today's business leaders and entrepreneurs must continually educate themselves to boldly drive innovation and innovative ways of working in business and ultimately successfully manage
- in IT companies that should base their business on innovation, the status quo occurs when the way the innovation is managed is not continuously considered
- changing the way people work and the workplace can have a stimulating effect on employees in terms of generating innovative ideas

The paper provides an overview of research results published in primary, secondary and tertiary peer-reviewed sources. The method of analysis, synthesis, induction and deduction of published facts was applied. After the introduction to the topic, the second part of the paper points out the importance of the intellectual capital of the company, which is the basis for an innovative approach to work. A model of the division of intellectual capital is described, which ensures easier control and evaluation of parameters, through which employees and managers can get feedback on the value of their company in this segment, identify any shortcomings and react in time to improve the situation. It then describes some of the methods that companies use to try to promote an innovative approach to solving problems and developing new products, services, processes, ways of working, etc. The third part of the paper highlights the specificities and requirements that managers face today, as well as the necessary skills, knowledge and ways of working that they should have in order to develop innovation and creative solutions together with their employees.

2 An Approach to Innovation in IT Companies

Knowledge leads to innovation. It ensures a competitive advantage, so that by improving the knowledge and skills of their employees, companies can develop their competencies that allow them to have a more competitive position in the market. As stated in [10]: "Companies in the high technology sector are in an unfavorable situation as global manufacturers, under pressure from new, cheaper or technologically superior competitors, seek to penetrate all available markets".

2.1 Importance of Intellectual Capital

In [11] it was pointed out that many companies attach importance to intangible and personal intellectual capital, which is the accumulation of knowledge and skills of employees, their mutual relations, reputation in the market, etc. According to [12], the term

intellectual capital does not refer to all the knowledge in the organization, but only that which can be converted into value and enables the achievement of competitive advantages. Figure 1 made according to [11] shows the model of intellectual capital, which belongs to the intangible assets of the company and is a part of the market value. According to it, intellectual capital is divided into three basic parts (human capital, structural capital and consumer capital). Human capital includes knowledge, skills, abilities and experience of employees who use them by participating in the company's business processes, but take them with them when they leave the company. Structural capital is created by the activity of human capital, and includes the organizational structure, business processes, habits, routines, databases, systems, as well as patents, licenses, etc. Consumer capital is the company's ability to ensure business progress in synergy with business partners, customers or service users. It refers to the quality of their relationships, and also has other names, for example in [13] it is called relational capital, and in [14] clients' capital.

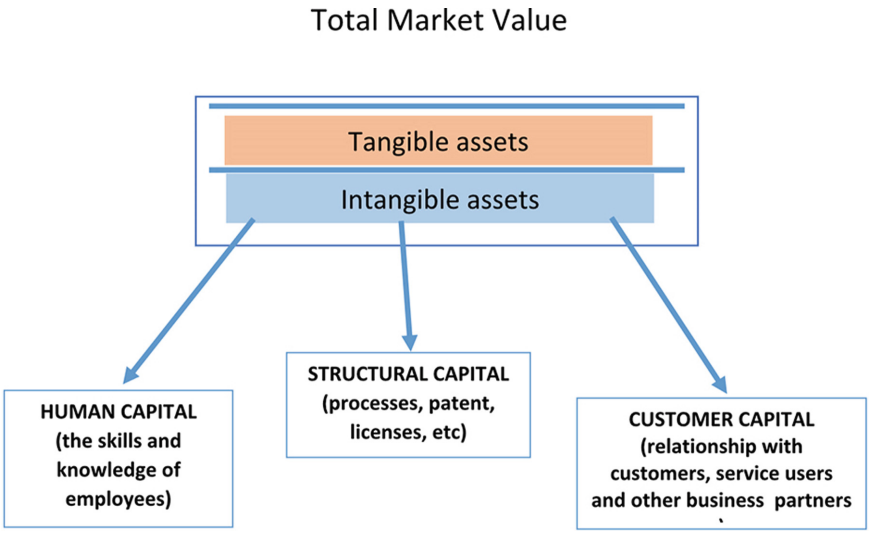

Fig. 1. The intellectual capital model

As pointed out in [15], all segments can be measured, thus ensuring their easier controlling and management. They also give future investors a better picture of the company's market value. Modern companies, especially those in the IT sector, create added value through the interaction of all the previously mentioned forms of intellectual capital. Managers and employees can be more certain of whether they are on the right track in terms of how they work, whether they have achieved a professional degree in a particular field, by having an insight into the situation related to the individual mentioned parameters. Moreover, they can work towards increasing this part of the company's value. As indicated by [16], a high level of knowledge in certain areas of activity can give individuals an incentive to continue working, openness to new solutions, easier communication, and confidence in dealing with colleagues, partners, and customers.

2.2 Methods to Achieve Results

One of the stimulating methods for generating innovative solutions is an Open Innovation (OI) Approach through which companies can use external data more efficiently to generate new ideas. Using this method, companies can upgrade their intellectual capital in order to increase their business value. By applying this approach, individuals and teams responsible for research and development work in companies will have a different role and will have to change the way they work. Figure 2 made according to [17] shows that the company will use its own knowledge, but also what the market offers, i.e. the knowledge of its partners, which can be shared.

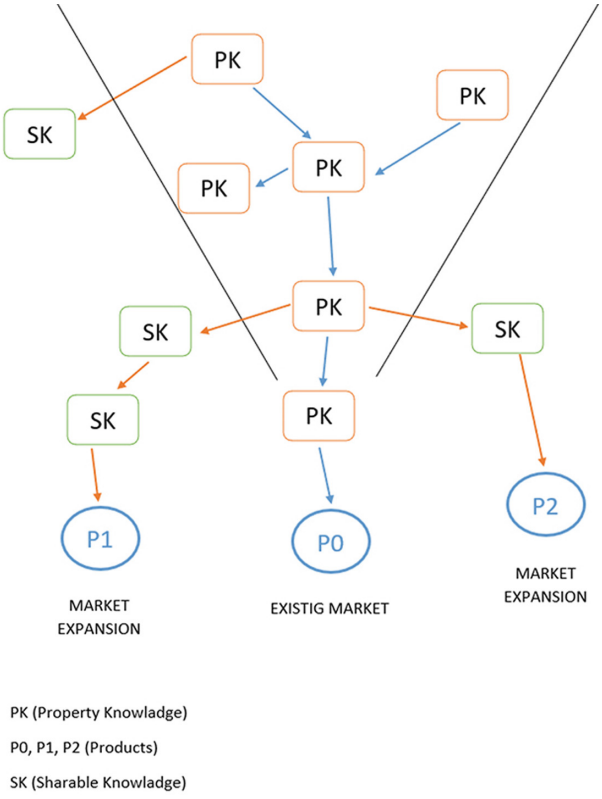

Fig. 2. Open innovation in terms of shareable and proprietary knowledge.

As indicated by [17] "the proprietary knowledge could also join with partners resulting in shareable knowledge and creating a new market. Another possibility is that the combination of proprietary and shareable knowledge will result in new products with various partners." Partnership evaluation is one of the obstacles that can arise along the way, as it is often not easy to integrate the capabilities of the company and its partners. To avoid this problem as much as possible, companies try to seek innovative ideas from their existing partners in the value chain, such as suppliers or customers [18]. As indicated by

[3, 19], there are other methods for idea generation in innovative organizations besides the ones described before. One of them is the development of an agile and innovative culture in such a way that employees are not constantly overwhelmed with work and do not work overtime all the time. The reason for this is that under such working conditions they cannot muster the energy and will to come up with new ideas. It is necessary to give people time to think, but also to reward them for successful work. Design thinking methods are used when the problem comes from the customer, the market or internally and someone needs to be able to design it. It is very important that the problem is defined in a way that the company can solve it, i.e. its employees. They need to understand the challenge and feel that they are capable of solving it. Then they need to brainstorm a solution, prototype it very quickly to test the solution and redesign the idea. At the end, they have to improve the solution. With this method, the company can test the way customers use a certain product and then determine the current and future needs. The main components of the lean startup method are developing ideas, measuring all the data, and then learning and programming. Lean provides the opportunity to approach the customer in a different way before the project begins and can reduce risk and budget for the reason that the Minimum Viable Product is created to begin learning. It is the version of a new product that allows employees to gather facts about customers with the least amount of effort. Design sprint "provide fast forwarding to the future to see the finished product and customer reactions before making any expensive commitments" [20]. It consists of five phases: Understand, Diverge, Converge, Prototype, and Test. In the understanding phase, the focus is on the question, "What is the problem?" in the divergence phase the employees try to find solutions and sketch them, in the convergence phase they decide on a solution and plan the prototype. Then in the prototype phase they design a prototype that can be tested, and in the final phase they test it with real users. The rewards program can vary. According to [3], it must be consistent with the company's culture of innovation and current strategy. Rewarding employees should be based on measurable parameters. For example, they could base it on the number of new idea submissions, the number of submitters and on the quality of ideas connected with the innovation strategy of the organization. Brainstorming offers the opportunity to collect and share ideas in the form of a workshop, where it is important to get participants excited about the topic with a short presentation. They are given explanations that include an up-to-date overview of customers and competitors in relation to the chosen topic and the latest trends in the field. Brainstorming should be combined with innovation task force meetings and an internal open idea competition. In this way, employees get an overview of a complete ecosystem in which their product lives, and silent employees also have another opportunity to participate in innovation initiatives through workshops.

3 Innovation Management

Innovation must be managed. Without proper leadership, innovation will very easily fail to take off. Figure 3, made according to [21] shows the evolution of strategic operations and their management over time. The challenges that managers face are becoming increasingly complex. The continuous progress of technology, the expectations of employees, the quantity of products and services, their quality and the uniqueness expected by the market are constantly changing the ways of management in companies.

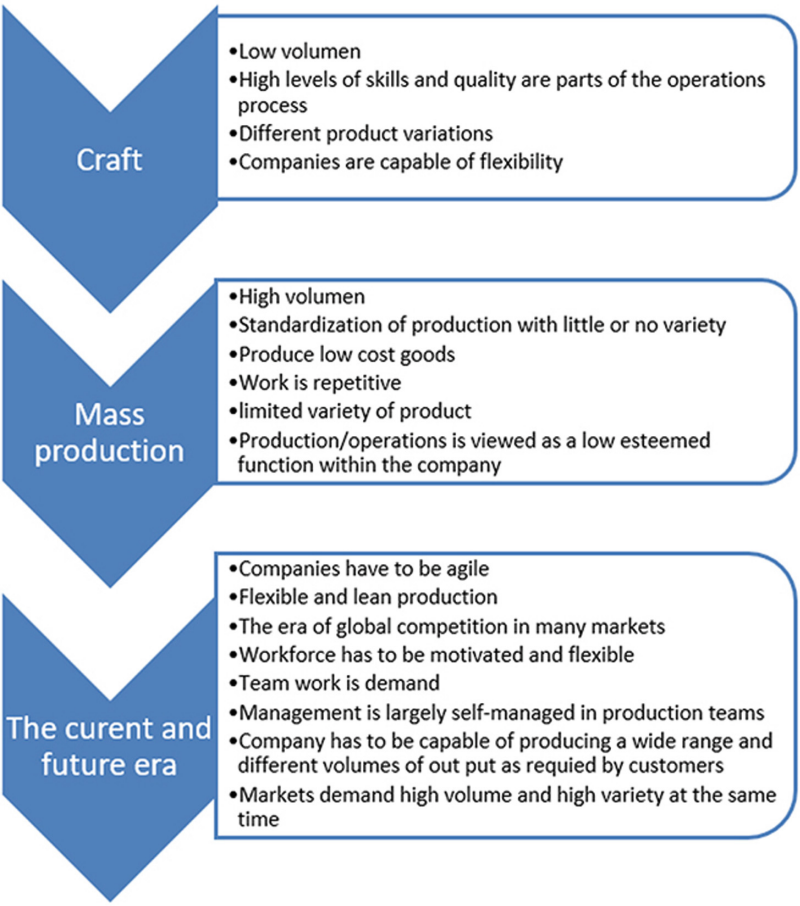

Fig. 3. The transformation from craft to strategic operations

Today's way of doing business requires effective and efficient work, the creation of new products or services in the shortest possible time, at the lowest possible cost and with a quality that satisfies the consumer. For this reason, products/services are often developed through projects. Such a way of working also requires a special management approach.

Project managers must have various knowledge and skills in order to perform their tasks successfully. According to [22] these are: "1. Project Management Fundamentals knowledge and project management software skills (such as the knowledge of using Microsoft Office, email, etc.); 2. Business management skills related to budgeting, finance, procurement, organizational dynamics, team development, performance management, coaching, and motivation; 3. Technical knowledge gained through experience and expertise in the project's focus area (with this knowledge, the manager is more credible, can ask better questions, validate team members' estimates and detailed plans, help solve technical problems, develop better solutions, and provide greater leadership); 4.

Communication skills which include all written communication skills (correspondence, emails, documents), oral communication skills, facilitation skills, presentation skills, and active listening; 5. Leadership skills which includes interpersonal skills, adaptability, flexibility, people management, degree of customer orientation, analytical skills, problem solving skills and so on".

As pointed out in [3], some of the characteristics of innovators in organisations come with time. It is often not easy for managers to deal with them. For example, innovators have a need to satisfy their inner needs, they want to initiate new projects guided by their ideas, they need to break the current status quo, they want to open up new possibilities, visions, and future scenarios, they like to imagine and dream, and they have a strong need to turn their visions into reality.

As stated in [23, 24], it is necessary to develop the organisational culture in such a way that employees are open to suggestions from their colleagues and managers. It is important to pay attention to the fact that employees' creativity, which is the basis for developing innovative products, is not stifled in the sense that they lose interest in work and become demotivated. It is necessary to give them feedback on their proposals and to show them other possibilities if an idea does not fit the situation and is not feasible. It is necessary to encourage research and development because they are often prerequisites for the emergence of innovation in a company. Sometimes innovation can arise spontaneously from the previously acquired knowledge of an individual employee, but according to [10], it most often arises through the planned phases shown in Fig. 4.

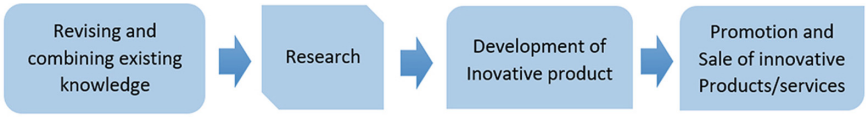

Fig. 4. Development and realization of innovations in the company

Certain innovations are the direct result of previous scientific efforts, so it is preferable to first revise and combine the knowledge acquired so far. If certain necessary knowledge does not exist, then the company starts considering the possibility of investing in research and development. This phase includes creative work in research and development departments, as well as informal or occasional research in other company departments.

Innovations have certain strategic advantages for companies, depending on the mechanism of action with regard to the user. Some of them are shown with Table 1 which is made according to [25, 26].

As pointed out in [27], evaluation criteria should be established at each stage of the product planning and development process. They should be comprehensive and quantitative so that the product can be carefully evaluated at each stage of development. They should be established so that the new idea is evaluated in the context of the market opportunity, competition, marketing mix, financial and production factors. The goal is that it competes with the products/services that exist on the market, i.e. it should have a unique differentiated advantage based on the assessment of competitive products/services that meet the same consumer needs. As indicated in [28, 29], it is

Table 1. Strategic advantages of innovation.

Mechanism	Strategic advantage
The novelty of the product or its maintenance that is offered	Offering something that no one else can offer
New in the process	Offering a way to implement the process in a way that others cannot provide—faster, with lower costs
Complexity	Offering something that others can't do until they pay a license or some other fee
Time advantage	Being the first and having a significant market share related to a new product or service
Platform design	Offering something that provides a platform on which other variations can be built
Rewriting the rules	Offering something that is a completely new product and way of using it, making the old one unnecessary
Reconfiguration parts of the process	Rethinking how parts of the system can work together—building more effective networks, outsourcing, etc.

also important after designing an innovative product/service that through the existing managerial abilities of individuals in the company, marketing strategies and established distribution channels, that product/service achieves a market share. Also, according to [30], it is necessary to take care that it contributes to the financial well-being of the company, it is necessary to monitor the production cost per unit, marketing and distribution costs, the amount of capital required, and the break-even point.

It is also important to take care of existing business processes so that costs related to human resources and equipment do not grow too much. Timely care should be taken of the education of employees and the acquisition of the necessary equipment if necessary in order to meet the quality and quantity demanded by the market. It also seems important to highlight the results of the GEM research (Global entrepreneurship monitoring for 2021), as published in [31], indicates that the Republic of Croatia is building its competitiveness in sectors of medium and high-tech intensity. In terms of the employee entrepreneurial activity (the development of a new product/service or creation of a new business unit for the employer), it has been significantly above the average of European Union countries since 2011, when monitoring of these indicators began. In 2021, 9.4% of employees in the Republic of Croatia had entrepreneurial activity within their company, while the average for the EU countries that participated in the survey is 5.3%. The above should give employers and managers an additional incentive related to the management of innovations in companies, especially in the IT sector, which according to the indicators above is the generator of the competitiveness of the Republic of Croatia on the market. Also according to [32, 33], the state plays a major role in positioning companies in the competitive environment. It can help in the form of a low interest rate for investments

and a favorable investment climate. Also important for companies is a well educated and motivated workforce, the training of which is made possible by the well developed education system of the respective country. In addition, the low inflation rate and the rapidly growing domestic market are also important.

4 Conclusion

The focus of this paper is to give an overview of contemporary issues that theorists and scientists are increasingly dealing with in order to improve the operations of companies that must efficiently and effectively deal with the opportunities and challenges brought by globalization. Innovation in products, services, and processes is essential to a company's progress, as well as its survival. It is also increasingly recognized that well-paid jobs based on innovation and knowledge play an important role in promoting the progress of a country. Economic activity is becoming increasingly turbulent worldwide, and competition is fierce in all business sectors. This especially concerns the IT sector, whose market knows no borders, and the speed of change in the products and services they create every day is extremely high. It is recognized that human potential plays a key role and that the term innovation today has a much broader meaning than before. It includes the development and adoption of new types of products, services, production processes and business and organizational models. The promotion of creative and innovative thinking largely depends on the organizational culture of the company.

It can be such that it encourages and supports individuals and teams to be generators of innovation or limits and slows down their action. Policies, procedures and processes that take place in companies also play a big role in creating an enabling environment. Companies that do not provide permanent education and skill building for their employees, that invest insufficiently in technologies and hold back organizational changes are lagging behind in the global race for innovation advantage. They must be aware that investing in product research and development is a necessity in order to achieve economic progress, although there is always a risk that the expected results will not occur. Their success does not only mean prosperity for their employees, but also income growth and improvement of living conditions on a global level. Companies today are multinational, especially those which belong to the IT sector. With their activities, they influence the wider social community, considering that their products are used worldwide, and due to the nature of their work, they employ people in different destinations. For this reason, the job of a manager today is increasingly complex. Managers of all segments of the company should be open to accepting innovative and creative solutions of products, services, processes and ways of working proposed by employees if they can be implemented considering the company's business environment (internal and external). They should encourage an interdisciplinary approach during the generation of these solutions, sharing of information between employees, teamwork, continuous improvement of skills and knowledge of employees and themselves. As a continuation of this conducted research, it should be useful to do a survey to find out from the managers of IT companies which methods they use in order to come up with innovative ideas from employees. Also, how employees react to certain methods and which ones they accept the most. Try to find out if any other methods are applied in innovation management besides those mentioned in the paper.

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