
A Guiding Map on How to Manage Implementation of Innovation Projects in Industry 5.0

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Abstract:

Purpose: *The present study aims to present a guiding map on how to manage implementation of innovation projects in industries in the Era of Internet of things (IoT) and Industry 5.0.*

Design/Methodology/Approach: *The research design is descriptive in nature. Secondary data sources have been tapped efficiently and effectively. This study typically takes the form of a study of secondary data available on how to manage implementation of innovation projects in industries. To understand and conclude the major factors contributing towards problems in innovation management in the current era of industry 5.0 due to the rise of new environmental factors in business, we have gone through a number of reports and papers. This has the advantages of providing very rich information and avoiding the influence of others on the opinion of any one individual.*

Findings: *The speed of product development is key to success. This Pearson's map identifies and describes a wide range of organizational characteristics regarding the management of uncertainty in the context of innovation. Hence, it conveys in a very simple way an important message about the very complicated matter of managing uncertainty. Managing the innovation of products and processes is very different. Sometimes, the nature and the type of required products and markets are distinctly defined. Contrarily, very little is known about the technology that is being developed and how it can be used. The information obtained or researched showed that the three big companies continue to excel in the industry because of their own innovative strategy and techniques, not only limited to innovating their own services and products but by innovating their management and operations, from traditional management and operations to modern ones. Furthermore, the information showed that innovation is critical to business because it gives each company an identity which varies from one another, new ideas are being produced which can contribute to the business's longevity, and innovation allows a company to respond to the competition and changes in the market trend which, in return, are not left behind by what the consumers demand.*

Practical Implications: *The present study is useful especially for higher-level leaders and managers who want to make their organizations innovation-driven and are concerned about human/user-centeredness of innovation in the era of IoT and Industry 5.0 can get the maximum benefit out of it.*

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Originality/Value: *A key precondition for the survival of each enterprise is the continuous improvement of competitiveness, that is, the investment in innovation of products and services.*

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Paper type: *Research article.*

1. Introduction

A good business idea, continuous coordination and integration, application of modern technical and technological knowledge, skills and experience represent the basis on which innovation is implemented and on which it achieves desired market effects. An appropriate innovation strategy, which is in compliance with the enterprise's corporate goals, gives the enterprise an opportunity to decide which type of innovation it wants to develop.

Current practice shows that fast innovators, who through innovations conquer new markets, while retaining the existing ones, have an advantage. Based on a detailed evaluation of the extent and nature of change that innovation brings, enterprises can opt to develop and implement radical and/or incremental innovation. Incremental innovations are seen as small improvements that can be illustrated as solving problems where the goal itself is clear or recognizable. In contrast, the results of radical innovations are brand new products/processes, where the direction of research is known, but the outcome is unknown (Henderson and Clark, 1990).

The new state of society, often referred to as the knowledge society, rests on the possibilities and abilities to create new knowledge and transform it into economic value and wealth through innovation of products, services, and processes. In such a society, innovations become the most important source of market success and sustainable competitive advantage. The term innovation was first coined by the "Father of innovation", Joseph A Schumpeter (1934), in his famous book *The Theory of Economic Development*, where he defines innovation as "the commercial or industrial application of something new, a new product, process, or method of production; a new market or source of supply; a new form of commercial, business, or financial organization". Since then, innovation has become the most important element of any organization's success.

According to the Oslo Manual, another important feature of innovation is implementation, i.e., "A common feature of innovation is that it must have been implemented. A new or improved product is implemented when it is introduced in the market. New processes, marketing methods, or organizational methods are

implemented when they are brought into actual use in the firm's operations" (OECD, Gault 2018). It is an empirically established fact that innovation is very important for business, sustainability, growth, and prosperity, however, little has been done in business and policy communities to draw any systematic analysis to improve the overall innovation climate and make the implementability of the concept easier. Moreover, Joe Tidd (2006) has reviewed the most popular models of innovation, e.g., technological innovation (Joe 2006), organizational innovation (Isaksen *et al.*, 2007) and then tried to synthesize and synergize commercial, organizational and technological aspects of innovation (Tidd *et al.*, 2005).

Joe Tidd (2006) also highlighted another important factor, i.e., the problems and consequences if we fail to understand the concept and process of innovation management completely, as this will pose difficulties in its implementation. According to him, a mental model, i.e., how we frame problems associated with innovation is of the utmost importance for the proper implementation of the concept: if we fail to frame the problem accurately, it may lead us to a partial understanding of innovation. Most of the time, innovation takes place within a clearly defined set of rules that we can clearly understand and mostly involves players who try to innovate by doing what they do but in a better way (Joe Tidd, 2006).

Usually, we have a certain set of "rules of the game" under which innovation takes place, however, sometimes these rules of game change, and unleash hidden opportunities and challenges to existing players. According to Joe Tidd (2006) this is the main concept behind the "Creative destruction" of theory of economic development presented by Joseph A. Schumpeter (1934). Joe Tidd terms these changes in the rules of the game as discontinuities. With the increasing advent of interconnected devices, sensors and objects, substantial challenges have also emerged with respect to innovation management (Rizzo, 2016).

In order to make the management of these IoTs simple and ensure their seamless integration into the business process, a new type of innovation management framework is required. Vitali *et al.* (2017) further stated that technological advancements and the business applications of IoT are rapidly increasing, hence necessitating human/user-centered, technically feasible, financially viable, and marketable products that can create value for both customers and entrepreneurs.

Thus, now the focus is not just on innovation, but also on the implementation of innovation. Innovation will be implemented only through human/user-centered financially viable and marketable products. Moreover, Walch and Karagiannis (2019) concluded that, with the emergence of IoT and Industry 5.0 concepts, the proper alignment of enterprise model (business model) and information systems, together with the alignment of physical and cyberspace, is very important for making innovation implementable.

Fauquex *et al.* (2015) also stated that IoT devices and products should be “people-aware” and should be driven by user needs instead of technological advancements, and design thinking mindsets, processes, tools, and techniques are crucial for what they called “people-aware” IoT applications and products. The use-ability of design thinking for implementable innovation was also endorsed by Taratukhin, Yadgarova, and Becker, (2018). According to Ozkeser (2018), the main difference between Industry 4.0 and Industry 5.0 is increased human–machine interaction that empowers people to express themselves in the form of personalized products and services.

Industry 5.0 is providing customers with more customized products and services than ever before and this can only be possible with the increased engagement of humans in designing products and services. He believed that, due to increased human–machine interaction and more emphasis on human/user-centered products, Industry 4.0 is gradually giving space to Industry 5.0 as time passes.

Although businesses are still trying to cope with the challenges of Industry 4.0, due to very rapid technological advancements in the field of IoT and information technology, the next industrial revolution, i.e., Industry 5.0, is already knocking at the door (Paschek *et al.*, 2019). Although it is still a little early to say exactly how Industry 5.0 will disrupt existing business models, one thing is certain: Industry 5.0 will break down any barriers between the real-world and virtual world.

Daniel Paschek, Anca Mocan and Anca Draghici (2019) further added that, “People have different opinions when it comes to predicting the start of industry 5.0, but if you consider the speed of transformation of technology, we believe it is going to be here for sooner than most people think. The future is shaping now and we need to rise to the challenges if we are to thrive in the next revolution”. The European Economic and Social Committee (EESC) (see reference) describes Industry 5.0 as “focused on combining human beings’ creativity and crafts manship with the speed, productivity, and consistency of robots”. *The present study aims to present a guiding map on how to manage implementation of innovation projects industries in the Era of Internet of things (IoT) and Industry 5.0.*

2. Innovation in Business

Innovation, the process of bringing new products and services to market, is one of the most important issues in business research today. Innovation is responsible for raising the quality and lowering the prices of products and services that have dramatically improved consumers’ lives. By finding new solutions to problems, innovation destroys existing markets, transforms old ones, or creates new ones. It can bring down giant incumbents while propelling small outsiders into dominant positions. Without innovation, incumbents slowly lose both sales and profitability as competitors innovate past them. Innovation provides an important basis by which world economies compete in the global marketplace (Velinov *et al.*, 2023).

Innovation is a broad topic, and a variety of disciplines address various aspects of innovation, including marketing, quality management, operations management, technology management, organizational behavior, product development, strategic management, and economics. Research on innovation has proceeded in many academic fields with incomplete links across those fields (Tyagi *et al.*, 2023).

2.1 Importance of Business Innovation

In the workplace, innovation is critical because it gives businesses an advantage in accessing markets faster and providing a stronger link to new markets, which may lead to more prospects, particularly in developed nations. With the help of innovation, original ideas may be produced, giving the inventor a proactive, confident attitude toward taking risks and getting things done (Henderson, 2018). A company with an imaginative culture will grow rapidly, despite the fact that the creative process is not always easy. Although tried-and-true techniques are trustworthy, it is good to experiment with new ideas (Henderson, 2018). The phrase “adapt or die” is a universal truth for businesses to achieve success in this era.

From a survey conducted by The Boston Consulting Group, 79% of surveyed executives stated that innovation was one of their top 3 company objectives, which is the highest proportion since the poll began over a decade ago. Firms that consistently rank high in the annual “top 50 most innovative businesses,” according to the BCG, all have a common focus on research, technology, and development (Purcell, 2021). These companies continue to expand while staying one step ahead of the competition because they recognize the value of innovation. Business innovation helps a company differentiate themselves (Purcell, 2021).

At its most fundamental level, innovation means doing something that no one else in your business has done before. The goal of using innovation to produce or update the company’s product. For instance, one strategy is to produce or upgrade items until there is nothing else comparable on the market. Delivering value to customers should always be a top priority for business; but doing so in a memorable and distinctive way might become a significant part of the brand identity and business strategy. Business innovation helps company to respond to the competition and trends (Caprelli, 2020; Grima *et al.*, 2023).

Innovation can help a company to figure out what opportunities are presently accessible or will be soon. Successful companies not only respond to current consumer wants, but also predict future trends and build an idea, service, or product that can quickly and effectively meet future demand. It's dangerous to expand a business without first learning about competition. Market research may help company prepare for shifting marketplaces and keep company from falling behind the competition. By having market research include collecting and analyzing the information given by the competitors, helps company to have an innovation to improve the product and meets customer needs.

As trends, technology, and markets change, you will be able to keep ahead of the competition. Company executives must be able to think creatively and incorporate innovation into their business models to generate business development, stay relevant in changing times, and separate themselves from the competition. This isn't to say that a propensity to innovate is the only need for success: leaders must also have a firm grasp on how to put that creativity into action.

2.2 The Management of Innovative Projects

Innovation projects increasingly represent strategic support and inevitability in the growth and development of an enterprise. Implementation of an idea is realized through an innovation process within one or more innovative projects (related to products and/or processes). Innovation is both an innovative project and the output of the innovation process (project), thereby innovation consists of two basic elements, the generation (invention) and commercialization (exploitation) of the idea (Trott, 2005).

Nowadays there is a pronounced tendency for all innovations to be realized through projects, regardless of the area they are related to, or the size and structure of the organization. Successful management of innovation projects includes a pre-defined action plan, deadlines for implementation of tasks, so-called milestones, resource planning and etc.

Organizations often encounter unexpected difficulties and problems, therefore risking the fulfilment of their goals. In order to avoid these risks, management process should be broken down into three phases: pre-project management, project development, and post-project management. The pre-project management phase involves the selection and evaluation of the project idea and the very beginning of the project implementation. However, sometimes there is no adequate necessary information and knowledge which can lead to a poor assessment of the idea, capabilities, and capacities of an organization to realize that idea, and etc. The most effective way to avoid this risk is to develop a strategic approach to the process.

Development project management phase involves the integration of different capacities and resources. The greatest challenge in this process, especially for organizations that are still in development, is to find a competent team that can establish an appropriate approach to the management process and responds in a professional and efficient manner to the challenges of project implementation.

Post-project management phase does not relate to the development of the project itself, but to long-term sustainability and further improvement after the completion of the project. It is crucial to learn from the experience and to have good knowledge of the organization itself (Mandić *et al.*, 2014, p. 21). Measuring the present value of innovative projects is very difficult due to uncertainty and it requires more systematic and professional efforts, and all of these indicate that a significant

percentage of organizations cannot fully implement innovative projects (Keegan and Turner, 2002).

2.3 The Key Factors for the Success of Innovation

Innovation becomes the fundamental factor for the viability of the enterprise and its further development in a globalized economic environment. In times of global economic crisis, investing in innovation is the best way to overcome it. The environment is volatile and future events are every day more and more uncertain and unpredictable. Therefore, the current environment is characterized by complexity, turbulence, globalization and overall complex of new features. The discontinuity of environment prompts organizations to start with large and rapid changes, changes in their view of themselves and their environment, the way of their operations in the environment, and their everyday business.

Innovation is successful if it is possible through commercialization to refund the funds invested in its development and make a certain profit. The correct combination of strategy, structure, system, staff, and environment is required for successful innovation (Afuah, 2003). Productivity, which fosters economic progress, comes down to the economic growth, and the characteristics of a society are the key factor which drives economic growth through innovation (Castells, 2000). Innovativeness implies building effective mechanisms for the transfer of innovations in the economy and society. Also, the time span between the introduction of innovation and achievement of its full productivity is very important.

However, inventions relatively slowly become practice. In order for different inventions to be introduced and spread through the entire economy, factors involved in the production process must be subjected to changes. A significant number of factors determine the success of innovation. Innovative products and processes are key for the survival of the enterprise and its development. Organizational structure needs to be innovative, but also to enable realization and cultivation of innovation culture, as the dominant component of organizational culture.

Organization and innovation culture directly determine the success of innovation, which in turn strongly influences the success of the enterprise. An organization becomes sensitive to the demands and changes in the environment, and hence it is forced to constantly innovate both products and processes. If an organization wants to be innovative, it must learn continuously. The innovatively structured organizations enable innovative activities. They are able to mobilize and support creativity and entrepreneurship, and let their managers take an active role in this process (Quinn, 1985).

In highly innovative organizations staff is organized as to support innovation. In addition to the changes in the organizational behaviour and culture, innovative organization stimulates technological innovation as a prerequisite for higher

technological efficiency and improved business results. All of this implies that there is a direct link between the organizational level, i.e., the degree of organization's innovative development, and the efficiency of new technology in application.

Innovative organizations have multiple positive impacts that can be classified into four groups (Saren, 1990): economic factors, social and behavioural factors, information and communication factors, and organizational and management factors.

Economic factors encompass the size of the company, the degree of centralization, etc. Social and behavioural factors include the organizations value system, education of employees, organizational behaviour, etc. Information and communication factors relate to the information system, as well as, to connections or communications with scientific institutions, and in general to the knowledge in the environment. Organizational and management factors incorporate a delegation of responsibilities, motivation system, mentoring, career building (Robbins, 1987).

There is no doubt that organizational culture affects the functionality and success of the enterprise. It affects strategic decisions, including the decision to innovate. Organizational culture determines the capabilities of the enterprise to adapt to the requirements of the environment. By building innovative culture, management contributes to the continuous increase in innovation and their realization. Innovative culture in the enterprise is the one that simultaneously supports the innovative and creative thinking (Krstić, 2009).

3. Complexity and Issues of Innovation Management in the Era of IoT and Industry 5.0

With the increasing advent of interconnected devices, sensors and objects, substantial challenges have also emerged with respect to innovation management (Rizzo, 2016). In order to make the management of these IoTs simple and ensure their seamless integration into the business process, a new type of innovation management framework is required. Vitali, Arquilla, and Tolino (2016) further stated that technological advancements and the business applications of IoT are rapidly increasing, hence necessitating human/user-centered, technically feasible, financially viable, and marketable products that can create value for both customers and entrepreneurs.

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The concept of Industry 5.0 has also come through different development stages, commonly referred as Industry 1.0 (during the 18th and 19th century, focusing on human physical labor in industry and agriculture), Industry 2.0 (from the end of the 19th century to the 1980s, characterized by electrical and mechanical technological advancements) and Industry 3.0 (from 1980 to 2000, characterized by a shift to digital from analogue, modular products, and reduced product life cycles).

Recently exponential development in the field of IoT gave birth to Industry 4.0 (from 2000 to date, characterized by IoT, Big Data, electric vehicles, 3D printing, cloud computing, and artificial intelligence) (Yin, Stecke, and Li, 2018). Parallel to Industry 4.0, the concept of Industry 5.0 (from 2016 onward, characterized by a digital smart society, the integration of virtual and physical spaces, IoT, robots, augmented reality, innovation ecosystem, brain–machine interface and human centrality of technology) is also flourishing (Skobelev and Borovik 2017).

According to Ozkeser (2018), the main difference between Industry 4.0 and Industry 5.0 is increased human–machine interaction that empowers people to express themselves in the form of personalized products and services. Industry 5.0 is providing customers with more customized products and services than ever before and this can only be possible with the increased engagement of humans in designing products and services. He believed that, due to increased human–machine interaction and more emphasis on human/user-centered products, Industry 4.0 is gradually giving space to Industry 5.0 as time passes. His summary of different industry revolutions, their period, and characteristics is presented in the Table 1.

Table 1. *Evolution from Industry 1.0 to Industry 5.0.*

Era	Time Period	Characterized By	Explanation
1.0	1780	Mechanization	Industrial production based on machines powered by water and steam.
2.0	1870	Electrification	Mass production using assembly lines
3.0	1970	Automation	Automation using electronics and computers
3.5	1980	Globalization	Off shoring production to low-cost economies
4.0	Today	Digitalization	Introduction of connected devices, data analytics, and artificial intelligence technologies to automate processes further.
5.0	Future	Personalization	Industry 5.0 is focused on the

			cooperation between man and machine, as human intelligence works in harmony with cognitive computing, resulting in human/user-centered products and services.
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Source: Ozkeser, B. Lean innovation approach in Industry 5.0

Although businesses are still trying to cope with the challenges of Industry 4.0, due to very rapid technological advancements in the field of IoT and information technology, the next industrial revolution, i.e., Industry 5.0, is already knocking at the door (Paschek, Mocan, and Draghici, 2019). Although it is still a little early to say exactly how Industry 5.0 will disrupt existing business models, one thing is certain: Industry 5.0 will break down any barriers between the real-world and virtual world.

Daniel Paschek, Anca Mocan and Anca Draghici (2019) further added that, “People have different opinions when it comes to predicting the start of industry 5.0, but if you consider the speed of transformation of technology, we believe it is going to be here for sooner than most people think. The future is shaping now and we need to rise to the challenges if we are to thrive in the next revolution”. The European Economic and Social Committee (EESC) (www.eesc.europa.eu) describes Industry 5.0 as “focused on combining human beings’ creativity and craftsmanship with the speed, productivity, and consistency of robots”.

The transition from Industry 4.0 to Industry 5.0 will take place with improved and advanced human–machine interactions, and better automation through robots with the creativity and brainpower of humans (Paschek, Mocan, and Draghici, 2019). According to Seppo Leminen and Mika Westerlund (2012) a new innovation management framework is required for IoT and Industry 5.0 to work efficiently.

They further emphasized that IoT and Industry 5.0 needs an innovation management framework that can strike a balance between business and customer needs and between the level of openness and privacy. In reality, the widespread use and applicability of IoT are giving shape to a new ecosystem, i.e., Industry 5.0. (Nahavandi, 2019) stated that Industry 5.0 is based on the synergy between human and autonomous machines. He further added that Industry 5.0 is more human-centered as compared to Industry 4.0, as the focus of Industry 4.0 was only to improve the process of increased production.

However, Industry 5.0 is more focused on combining human brainpower and creativity, keeping sustainability and ambidexterity in mind. Özdemir and Hekim, (2018) stated that the IoT revolution is fueling the emergence of Industry 5.0 and these concepts will be intertwined in the near future. He further added that a new innovation management framework, with modern technology and an innovation policy that takes into consideration IoT, artificial intelligence and Big Data and

human/user centeredness, is required to reap the maximum possible benefits from Industry 5.0.

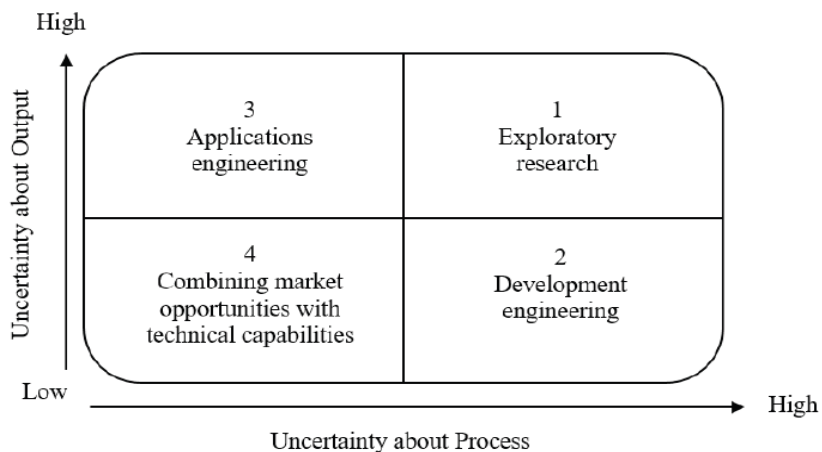
4. The Pearson's Map as an Important Part of Innovation

The management of the innovation process implies the attempt to develop the creative potential of a certain organization. Also, it includes finding new ideas and fostering creativity. The main characteristic of managing the innovation process is managing uncertainty. On the one hand, uncertainty comes from the future events which do not follow the course of past events, and, on the other hand, the knowledge about the future is always incomplete.

Uncertainty represents “the gap between the amount of information required to execute the task and the amount of information already possessed by the organization” (Galbraith, 1977). Pearson's uncertainty map is a tool for analysing and understanding uncertainty and the innovation process (Pearson, 1991). Pearson matrix presents the nature of the uncertainty and the way it changes over time.

Actually, the uncertainty framework was a result of a comprehensive analysis of main technological innovations, such as Sony Walkman, 3Ms Post-It-Notes and Pilkington float glass process. The map is based on the two separate dimensions (Figure 1), where the horizontal axis represents the uncertainty about the process (how to accomplish the aim), and the vertical axis represents the uncertainty about the output (what is the eventual goal of the project or activity). Additionally, these axes are split resulting in four fields.

Figure 1. *Pearson's uncertainty map*



Source: *Pearson (1991, p. 22).*

Quadrant 1: involves activities with a high degree of uncertainty about the methods and results. The specifics of this quadrant lays in the fact that the final aim is not clearly defined and there is a problem with the accomplishment of this aim. It is marked as ‘blue sky’ research, because the work seems far from reality, and potential products and markets are still unknown or ‘in the clouds. This is mostly the field of scientific organizations, which are not exposed to financial and time pressures that are present in the industry.

Quadrant 2: implies the situation in which the ultimate target is very clearly defined, and hence the business chance may have been noticed, but the way to reach the target is still undetermined. This type of activity is common for development engineering and for enterprises which constantly revise their production process by seeking ways to reduce costs and achieve efficiency.

Quadrant 3: relates to efforts in detecting how technology can be used more efficiently. There exists a huge uncertainty about the outcome. This section of activity is called applications engineering.

Quadrant 4: implies a high level of certainty. This field is based on innovative activities which combine market possibilities with technical abilities.

Research Finding 1: *Therefore, the speed of product development is the key to success. This Pearson’s map identifies and describes a wide range of organizational characteristics regarding the management of uncertainty in the context of innovation. Hence, it conveys in the very simple way an important message about the very complicated matter of managing uncertainty. Managing the innovation of products and processes is very different. Sometimes, the nature and the type of required products and market are distinctly defined. Contrarily, very little is known about the technology that is being developed and how it can be used.*

5. Practicing Successful Implementation of Innovative Projects

Business innovation helps company to respond to the competition and trends (Caprelli, 2020). Innovation can help a company to figure out what opportunities are presently accessible or will be soon. Successful companies not only respond to current consumer wants, but also predict future trends and build an idea, service, or product that can quickly and effectively meet future demand. It is dangerous to expand a business without first learning about competition.

Market research may help company prepare for shifting marketplaces and keep company from falling behind the competition. By having market research include collecting and analyzing the information given by the competitors, helps company to have an innovation to improve the product and meets customer needs. As trends, technology, and markets change, you'll be able to keep ahead of the competition.

Company executives must be able to think creatively and incorporate innovation into their business models to generate business development, stay relevant in changing times, and separate themselves from the competition. This is not to say that a

propensity to innovate is the only need for success, leaders must also have a firm grasp on how to put that creativity into action.

5.1 Business Innovation in Organization's Sustainability: Apple Inc

Apple is well-known for its software, hardware, and service advancements. It expanded from 8000 people and \$7 billion in sales in 1997, the year Steve Job returned to 137000 employees and \$260 billion in 2019. The organizational architecture and related leadership paradigm, which have played a critical role in the company's innovative success, are far less widely recognized. Steve Jobs laid off the general managers of all the business units (in 1 day), put the entire firm under one P&L, and merged the diverse functional departments of the business units into one functional organization, believing that traditional management had hindered innovation (Livescault, J.).

As entrepreneurial firms grow larger and more complex, business history and organizational theory argue that they must shift from a functional to a worldwide context to align accountability and control and avoid the bottleneck that develops when many choices are funneled up the org chart to the top. Apple demonstrates that a traditional strategy is not required, and that the functional structure may help firms cope with rapid technology development and market disruption. By giving business unit leaders complete autonomy over critical operations helps them to do what is best for their clients and optimize their outcomes, while also allowing executives monitoring them to evaluate their performance (Livescault, J.).

Apple's dedication to a functional structure does not imply that its structure has stayed unchanged. That organization has evolved as the relevance of artificial intelligence and other emerging fields has grown (Podolny *et al.*, 2021). People all know that having the proper people is crucial to creativity. For many businesses, this is a thorough hiring procedure that focuses on matching skills, knowledge, and talent to a specific task or set of duties. Besides many businesses, on the other hand, fail to realize the full potential of their most brilliant employees. Here's where Steve Jobs' counsel can help. "It doesn't make sense to hire smart people and tell them what to do," Jobs explained. "We hire smart people so they can tell us what to do" (Livescault, J.).

5.2 Business Innovation in Entrepreneurship: Facebook

There is no doubt that Facebook's organic reach has dwindled for most advertisers in recent years. That is not to say you should abandon this social media platform just yet. On the contrary, a recent poll of marketers found that Facebook is still the most successful social media marketing tool available (Web.com; 2021). As of October 2019, Facebook Marketplace is utilized by 800 million people each month in 70 countries. Given that the platform was just launched 3 years ago, this is a significant increase. It all began in February 2015, when Facebook introduced buy and sell

groups, which allowed users to post things for sale in such groups, complete with a product description, price, and pick-up or delivery location. Users spent more time on Facebook, posting about what they wanted to sell, seeking for goods to purchase, chatting with strangers, and using Facebook Messenger because of this feature (Pahwa, 2021).

Besides, for the seller, Facebook advertising is really specific. Sellers may segment their audience based on their geography, age, gender, hobbies, and other characteristics. Use the Custom Audiences tool to target current clients safely and discreetly. Local Awareness advertising, which reach clients on their mobile devices, are another option for marketing to local customers. Facebook allows sellers to communicate with website visitors.

Sellers may use Facebook's retargeting feature to show advertisements solely to individuals who have already visited their company's website. Friends of Friends is a feature on Facebook that allows customers to share the information to their friends. When the target consumers see product's Facebook posts or advertisements, their Facebook friends see them as well, double the impact of seller Facebook marketing efforts (Web.com; 2021).

5.3 Business Innovation in Business Model: Google Inc

Google stands out among the pantheon of internet-based firms as both highly successful and particularly creative. Since Microsoft, no firm has achieved such rapid success. Google is a master of IT and business architecture, as well as experimentation, improvisation, analytical decision-making, participatory product creation, and other unconventional kinds of innovation. It brings order to an otherwise chaotic thought process (Iyer and Davenport, 2014). The win-win-win proposition help Google manage to be so financially successful and sustainable overtime.

Google is the world's most powerful search engine. It was not, however, the first. In fact, when it first emerged in the late 1990s, it was one of the most up-to-date search engines. It quickly took off, though, owing to a sophisticated algorithm known as PageRank. Initially, it was unclear how the search engine would generate revenue. But one thing was apparent to the company's founders; it was supposed to be free for its users. But if users are not paying, who is paying for it? (Cassidy, 2020). Google operates based on an advertising business model in which businesses join the AdWords ad network. To put it in another way, they may bid on terms like "auto insurance" to offer their goods and services.

This approach works effectively because it allows companies to track the outcomes of their advertising, present their ads to prospective individuals, and pay based on how many people click on them. Besides, it is easy monetize publisher's content. On the internet, millions of fresh articles are produced every day. Why, therefore, have

so many publishers pressed the publish button? Of course, providing information has never been so simple. Anyone may now become a publisher owing to the internet.

However, because Google's strong algorithm can index the whole visible web, it makes it more difficult for publishers to be featured (Cassidy, 2020). By building a compelling value offer for companies and publications, Google has established a sustainable business model based on hidden income creation.

Research Finding 2: *The information obtained or researched showed that the three big companies continues to excel in the industry because of their own innovative strategy and techniques not only limited in innovating their own services and products but by also innovating their management and operation, from traditional management and operation to a modern ones. Furthermore, the information showed that innovation is critical to business because it gives each company an identity which vary from one another, new ideas are being produced which can contribute to the business longevity, and innovation allows company to respond to the competition and changes in the market trend which in return are not left behind by what the consumers demanded.*

6. Conclusion

In the conditions of a dynamic business environment and a constant struggle for survival in the market, innovation becomes the basic factor of the growth and development of an enterprise. Namely, it always leads to new solutions, new ideas, and new ways of doing business. The basic competitive advantage of each modern enterprise is reflected in its ability to innovate its own business. Generally, an innovation of an enterprise results in an advantage over the competition, while the resulting competitive advantage results in an increase in profit, which is the main goal of every modern enterprise.

A key precondition for the survival of each enterprise is the continuous improvement of competitiveness, that is, the investment in innovation of products and services. Innovation based operations play a key role in fostering prosperity, creating and sustaining competitive advantage. A key aspect of an effective and efficient organization is the active participation of each organizational unit in the innovation process. Innovations are not just the responsibility of research and development, marketing and production units, but involve simultaneous engagement of all functional areas within the enterprise.

7. Contribution and Practical Implications

The present study is useful especially for higher-level leaders and managers who want to make their organizations innovation-driven and are concerned about human/user centeredness of innovation in the era of IoT and Industry 5.0 can get the maximum benefit out of it.

References:

- Afuah, A. 2003. *Innovation Management: Strategies, Implementation and Profit*. Oxford: Oxford University Press.
- Caprelli, L. 2020. 7 Reasons why innovation is important [Internet]. Available from: <https://lisacaprelli.com/7-reasons-innovation-is-important/>.
- Cassidy, F. 2020. What is business innovation? [Internet]. Raconteur. Available from: <https://www.raconteur.net/business-strategy/business-innovation-guide/>.
- Castells, M. 2000. *Informacijskodoba - ekonomija, društvo i kultura: usponumreženogdruštva*. Zagreb: Golden marketing.
- Fauquex, M., Goyal, S., Evequoz, F., Bocchi, Y. 2015. Creating people-aware IoT applications by combining design thinking and user-centered design methods. In: *Proceedings of the IEEE 2nd World Forum on Internet of Things (WF-IoT)*, Milan, Italy, 14–16 December, pp. 57-62.
- Galbraith, J. 1977. *Organization Design*. Reading, MA: Addison Wesley.
- Gault, F. 2018. Defining and measuring innovation in all sectors of the economy. *Res. Policy*, 47, 617-622.
- Grima, S., Thalassinou, E., Cristea, M., Kadłubek, M., Maditinou, D., Peiseniece, L. (Eds.). 2023. *Digital transformation, strategic resilience, cyber security and risk management*. Emerald Publishing Limited.
- Henderson, R.M., Clark, K.B. 1990. Architectural innovation: The reconfiguration of existing product technologies and the failure of established firms. *Administrative Science Quarterly*, 35(1), 9-30.
- Henderson, T. 2018. Why innovation is crucial to your organization's long-term success [Internet]. *Forbes*. Available from: <https://www.forbes.com/sites/forbescoachescouncil/2017/05/08/why-innovation-is-crucial-to-your-organizations-long-term-success/?sh=63f291e43098>.
- Industry 5.0. Available online: <https://www.eesc.europa.eu/en/agenda/our-events/events/industry-50>.
- Isaksen, S.G., Tidd, J. 2007. *Meeting the Innovation Challenge: Leadership for Transformation and Growth*. Wiley: Hoboken, NJ, USA.
- Iyer, B., Davenport, T.H. 2014. Reverse engineering google's innovation machine [Internet]. *Harvard Business Review*. Available from: <https://hbr.org/2008/04/reverse-engineering-googles-innovation-machine>.
- Joe, T. 2006. *From Knowledge Management to Strategic Competence: Measuring Technological, Market and Organizational Innovation*. World Scientific: Singapore, Volume 3.
- Keegan, A., Turner, J.R. 2002. The management of innovation in project-based firms. *Long Range Planning*, 35(4), 367-388.
- Krstić, B. 2009. *Intelektualnikapital i konkurentnostpreduzeća*. Niš: Ekonomskifakultet.
- Leminen, S., Westerlund, M., Rajahonka, M., Siuruainen, R. 2012. Towards IOT ecosystems and business models. In: *Internet of Things, Smart Spaces, and Next Generation Networking*; Springer: Berlin/Heidelberg, Germany, pp. 15-26.
- Livescault, J. 8 Rules molding apple innovation culture – Braineet [Internet]. Braineet.
- Mandić, V., Rašić, V., Jevtović, J., Knežević, T., Subašić, L., ZlatičŠutić, D. 2014. *Metodologija za upravljanjeinovacijama*. Kragujevac: Univerzitet u Kragujevcu, WBCInnoprojektat.
- Nahavandi, S. 2019. Industry 5.0 - A human-centric solution. *Sustainability*, 11, 4371.

- Organization for Economic Cooperation and Development (OECD). 2005. Oslo Manual-Guidelines for Collecting and Interpreting Innovation Data. Organization for Economic Cooperation and Development (OECD): Paris, France; Statistical Office of the European Communities: Brussels, Belgium.
- Özdemir, V., Hekim, N. 2018. Birth of industry 5.0: Making sense of big data with artificial intelligence, “the internet of things” and next-generation technology policy. *OMICS J. Integr. Biol.*, 22, 65-76.
- Ozkaser, B. 2018. Lean innovation approach in Industry 5.0. *Eurasia Proc. Sci. Technol. Eng. Math.*, 2, 422-428.
- Pahwa, A. 2021. Everything you need to know about facebook marketplace [Internet]. Available from: <https://www.feedough.com/facebook-marketplace/>.
- Paschek, D., Mocan, A., Draghici, A. 2019. Industry 5.0-The expected impact of next Industrial Revolution. In: *Thriving on Future Education, Industry, Business, and Society, Proceedings of the MakeLearn and TIIM International Conference*, Piran, Slovenia, 15–17 May. Dermol, V., Ed.; ToKnowPress: Piran, Slovenia, pp. 125-132.
- Pearson, A. 1991. Managing innovation: an uncertainty reduction process. In: Henz, J., Walker, D. (Eds.) *Managing Innovation*, (pp. 18-27). London: Sage/Oxford University Press.
- Podolny, J.M., Hansen, M.T. 2021. How apple is organized for innovation [Internet]. *Harvard Business Review*. Available from: <https://hbr.org/2020/11/how-apple-is-organized-for-innovation?registration=success>.
- Purcell, W. 2021. The importance of innovation in business | Northeastern University. Northeastern University Graduate Programs. Available from: <https://www.northeastern.edu/graduate/blog/importance-of-innovation/>.
- Quinn, J.B. 1985. Managing Innovation Controlled Chaos. *Harvard Business Review*, 63(3), 73-84.
- Rizzo, A., Burrelli, G., Montefoschi, F., Caporali, M., Giorgi, R. 2016. Making IoT with UDOO. *IxDA*, 30, 95-112.
- Robbins, S.P. 1987. *Organization Theory: Structure, Design and Applications*. New Jersey: Prentice Hall, Inc.
- Saren, M. 1990. Determinants, Processes and Strategies of Technological Innovation: Towards an Interactive Paradigm. In: Loveridge, R., Pitt, M. (Eds.): *The Strategic Management of Technological Innovation*. (pp. 205-222). Wiley & Sons.
- Schumpeter, J. 1934. *The Theory of Economic Development: An Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle*. Galaxy Books Transaction Publishers: Piscataway, NJ, USA.
- Skobelev, P., Borovik, S.Y. 2017. On the way from Industry 4.0 to Industry 5.0: From digital manufacturing to digital society. *Industry 4.0*, 2, 307-311.
- Taratukhin, V., Yadgarova, Y., Becker, J. 2018. The Internet of things prototyping platform under the design thinking methodology. In: *Proceedings of the ASEE Annual Conference & Exposition*, Salt Lake City, UT, USA, 24-27 June.
- Tidd, J.A. 2006. *Review of Innovation Models*. Imperial College London: London, UK, Volume 16.
- Tidd, J., Bessant, J., Pavitt, K. 2005. *Managing Innovation Integrating Technological, Market and Organizational Change*. John Wiley and Sons Ltd., Hoboken, NJ, USA.
- Trott, P. 2005. *Management and New Product Development*. Pearson Education Limited.
- Tyagi, P., Grima, S., Sood, K., Balamurugan, B., Özen, E., Thalassinou, E. (Eds.). 2023. *Smart analytics, artificial intelligence and sustainable performance management in a global digitalised economy*. Emerald Publishing Limited.

- Velinov, E., Kadlubek, M., Thalassinos, E., Grima, S., Maditinos, D. 2023. Digital Transformation and Data Governance: Top Management Teams Perspectives. In Digital Transformation, Strategic Resilience, Cyber Security and Risk Management (Vol. 111, pp. 147-158). Emerald Publishing Limited.
- Vitali, I., Arquilla, V., Tolino, U. 2017. A Design perspective for IoT products. A case study of the design of a smart product and a smart company following a crowdfunding campaign. *Des. J.*, 20, S2592-S2604.
- Walch, M., Karagiannis, D. 2019. How to connect design thinking and cyber-physical systems: The s* IoT conceptual modelling approach. In: Proceedings of the 52nd Hawaii International Conference on System Sciences, Maui, HI, USA, 8-11 January.
- Web.com. 9 Reasons facebook is the most effective social media marketing tool [Internet]. Available from: <https://www.web.com/blog/grow/social-media/9-reasons-facebook-is-the-most-effective-social-media-marketing-tool>.
- Yin, Y., Stecke, K.E., Li, D. 2018. The evolution of production systems from Industry 2.0 through Industry 4.0. *Int. J. Prod. Res.*, 56, 848-861.