



Tempus

Innovation Management

Study material



Управління інноваціями



2015

THE MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
Ternopil Ivan Puluj National Technical University

Innovation Management

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Управління інноваціями

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Study material

Навчальні матеріали

Проект

**Створення мережі міжуніверситетських Start-Up центрів
для підтримки та просування студентських інноваційних
проектів**

530349-TEMPUS-1-2012-1-FR-TEMPUS-JPHES



Ternopil, 2015
Тернопіль, 2015

УДК 338

Викладено матеріали практичного навчального курсу «Управління інноваціями» (Innovation Management), підготовленого для студентів з університетів та слухачів програми перепідготовки кадрів, представників органів державного влади та місцевого самоврядування, бізнесу, підприємств та організацій різних форм власності в рамках проекту TEMPUS-SUCSID «Створення мережі міжуніверситетських Start-Up центрів для підтримки та просування студентських інноваційних проектів» (530349-TEMPUS-1-2012-1-FR-TEMPUS-JPHES).

Присвячено методології та практиці управління інноваціями. Представлено лекційні матеріали, опис практичних занять, завдання для самоперевірки, методичні рекомендації щодо самостійного вивчення матеріалу курсу.

Управління інноваціями / [П. Д. Дудкін, О. М. Владимир, Т. І. Кужда та ін.]. – Тернопіль: ФОП Паляниця В.А., 2015. – 88 с.

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Tampere University of Technology, Finland

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Theme 1.

THE SUBJECT AND ESSENCE OF INNOVATION MANAGEMENT



LESSON OUTLINE

- The importance of innovation
- Definition of innovation
- Study of innovation
- Basic concepts of innovation management
- Classification of innovations

LEARNING OBJECTIVES

After going through this lesson the students will be able to:

- recognise the importance of innovation;
- explain the meaning and nature of innovation management;
- provide an introduction to a management approach to innovation;
- appreciate the complex nature of the management of innovation within organisations;
- describe the changing views of innovation over time.



1.1. THE IMPORTANCE OF INNOVATION

Innovations are an important factor of success in a competition which is getting increasingly intense. Only those who are able to invent themselves over and over again and thus gain new competitive advantages will be able to survive in the long run. This is true for companies, organisations, teams, employees and countries.

“ ... not to innovate is to die” wrote Christopher Freeman (1982) in his famous study of the economics of innovation. Certainly companies that have established themselves as technical and market leaders have shown an ability to develop successful new products. In virtually every industry from aerospace to pharmaceuticals and from motor cars to computers, the dominant companies have demonstrated an ability to innovate (*see* Table 1.1).

Table 1.1 Market leaders

<i>Industry</i>	<i>Market leaders</i>	<i>Innovative new products</i>
Aerospace	Airbus Ind; Boeing	Passenger aircraft
Pharmaceuticals	Pfizer; GlaxoSmithKline	Impotence; ulcer treatment drug
Motor cars	Toyota; DaimlerChrysler; Ford	Car design and associated product developments
Computers and software development	Intel; IBM and Microsoft; SAP	Computer chip technology, computer hardware improvements and software development

Indeed, the industrial revolution of the nineteenth century was fuelled by technological innovations (*see* Table 1.2).

Table 1.2 Nineteenth-century economic development fuelled by technological innovations

<i>Innovation</i>	<i>Innovator</i>	<i>Date</i>
Steam engine	James Watt	1770–80
Iron boat	Isambard Kingdom Brunel	1820–45
Locomotive	George Stephenson	1829
Electromagnetic induction dynamo	Michael Faraday	1830–40
Electric light bulb	Thomas Edison and Joseph Swan	1879–90

Today there is more and more discussion about the necessity for innovation in companies, which is subject to various factors [34]. Few markets are stable and four main factors (see Figure 1.1) create the need for innovation: *technological advances, changing customers, intensified competition* and *changing business environment*.

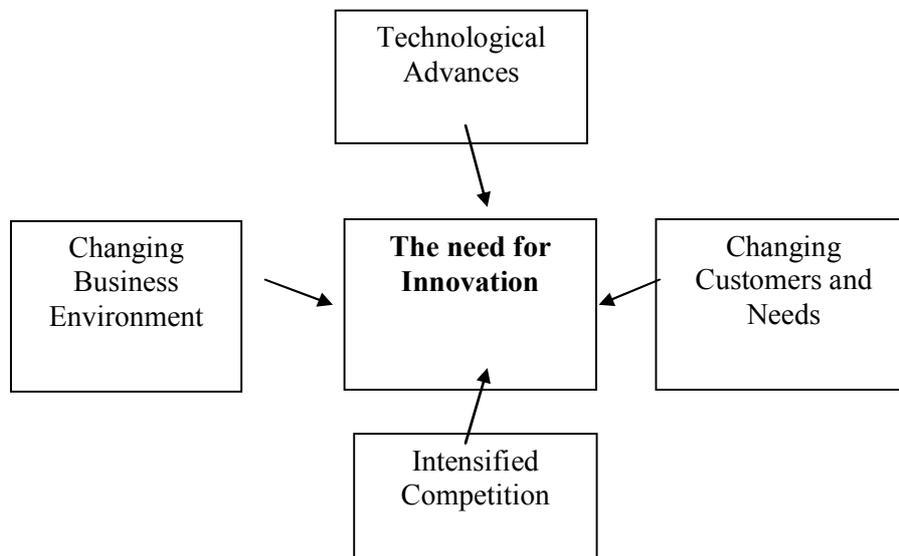


Figure 1.1 Drivers of the Need for Innovation [18]

1. Technological Advances. There are numerous examples of new technologies having a major influence on business. For instance, nanotechnology is increasingly being used in products, such as “easy to clean” surfaces. New technologies often create new industries and both biotechnology and multimedia have created significant employment over the past decades. In addition, new applications of established technologies are constantly emerging. With the vast array of technological developments, even multinational companies that used to conduct all their own basic research cannot keep abreast of all of the developments, using internal resources alone. Organizations need to monitor the progress of both the technologies they currently use and also that of potential substitutes. Technology is equally important for service companies and R&D is increasingly having a major impact on how service companies do business.

2. Changing Customers and Needs. The second driver of innovation is the changing characteristics and requirements of customers. Demographics show that many markets will evolve. For instance, the ageing population in the West will change many consumer markets. In contrast, other markets (for example, Southeast Asia) are largely made up of young consumers with different aspirations. The earnings in many newly industrialized countries will soar and demand for particular products and services will develop. For instance, the Whirlpool Corporation has recently launched the ‘Ideale’, the world’s cheapest

automatic washing machine, which retails at around \$150 in countries such as Brazil and China.

Changing customers also means that traditional market segments are disappearing or fragmenting and companies will need to adjust their product ranges accordingly – for example, car manufacturers now target over fifteen key segments in the US, as opposed to only five in the late 1960s. At the same time, there is the pressure for more environmentally acceptable, better value for money products and services. As basic needs are met, there is an additional challenge to innovation – determining customers’ hidden needs.

3. Intensified Competition. The third driver shown in Figure 1.1 is growing competition. Logistics costs have plummeted and, consequently, ‘safe, home markets’ are being threatened by foreign competition. Companies may also face competition from sources normally outside their industries.

4. Changing Business Environment. Business environments change and are always subject to change – sometimes gradual and sometimes radical.

Gradually markets have become more open as the market economy has been embraced by most governments. Many companies have focused on cost cutting. A gradual reduction in the resources required for key business processes has been achieved. A continued focus on efficiency gains will bring only diminishing returns and cost-reduction myopia needs to be replaced by a focus on increasing revenues and profits through new products and services.

Economic cycles have a radical impact. Downturns drive many companies to cut their investments in innovation but the winners which emerge have continued to invest.

1.2. DEFINITION OF INNOVATION

There are many misunderstandings about what innovation, in a business context, truly is. Innovation should not be restricted to:

- ✓ Big ground-breaking ideas or technological leaps forward.
- ✓ Creative jumps of the imagination which cannot be planned or prepared for.
- ✓ The R&D department or the “creative types” in marketing.
- ✓ Creativity “workshops”.
- ✓ Product based companies.

The term “Innovation” seems to derive from the Latin *novus* [27], which means new or young or novel. Too many companies focus on just one area of

innovation management – typically ideas generation – although there are other aspects of innovation management that are equally important.

There are different definitions of the term “*Innovation*”:

- ✓ a new idea, for others it means an invention (a materialized new idea);
- ✓ a new product (a developed invention);
- ✓ the act of creating a new product or process;
- ✓ to create a new business.

Innovation is the application of better solutions that meet new requirements, inarticulated needs, or existing market needs. This is accomplished through more effective products, processes, services, technologies, or ideas that are readily available to markets, governments and society. The term innovation can be defined as something original and, as consequence, new that “breaks in to” the market or into society [35].

Innovations result from ideas, if they are implemented in new products, services and processes, which find real usage and thus penetrate the market. Commercial success in the future will therefore depend mainly on the companies’ abilities to create new products, ideas and processes or take up innovations quickly.

Innovation = ideas + new products/services + market implementation

Innovations do not always have to be completely new ideas. The term innovation rather means the implementation of something new and results in a noticeable improvement for the user. They are characterized by a special characteristic, clear originality and a noticeable user benefit. Innovations are as a result qualitative new products, services, processes, structures, markets and cultures [34]. Innovation is an opportunity for something new, different. It is always based on change. Innovators do not view any change as a threat but as an opportunity.

1.3. STUDY OF INNOVATION

Innovation has been a topic for discussion and debate for hundreds of years. Nineteenth-century economic historians noticed that the acceleration in economic growth was the result of technological progress.

Schumpeter was among the first economists to underline the importance of new products as stimuli to economic growth. Indeed, early observations suggested

that economic development does not happen in any regular manner, but seemed to occur in “bursts” or waves of activity, thereby indicating the important influence of external factors on economic development.

This macro view of innovation as cyclical can be traced back to the mid-nineteenth century. It was Marx who first suggested that innovations could be associated with waves of economic growth. Since then others such as Joseph Schumpeter (1883-1950, was an Austrian American economist and political scientist), Nikolai Kondratiev (1892-1938, was a Russian economist, he is best known for proposing the theory that called “Kondratiev waves”), James Utterback (professor at Massachusetts Institute of Technology, Sloan) have argued the long-wave theory of innovation.

After the Second World War economists began to take an even greater interest in the causes of economic growth. One of the most important influences on innovation seemed to be industrial research and development. After all, during the war, military research and development (R&D) had produced significant technological improvements and innovations, including radar, aerospace and new weapons.

There was a need to understand how science and technology affected the economic system. A series of studies of innovation were undertaken in the 1950s which concentrated on the internal characteristics of the innovation process within the economy. A feature of these studies was that they adopted a cross-discipline approach, incorporating economics, organisational behaviour and business and management.

In particular, these studies realised that firms behaved. This led to the development of a new theoretical framework that tried to understand why some firms appeared to be more successful than others. The firm and how it used its resources was as the key influence on innovation.

Neo-classical economics is a theory of economic growth that explains the rate of technological change influences the rate of economic growth, but economic growth does not influence technological change. Rather, technological change is determined by chance. Also, neo-classical economic theory tends to concentrate on industry or economy-wide performance. It tends to ignore differences among firms in the same line of business.

Besides that, the activities that take place within the firm that enable one firm seemingly to perform better than another, given the same economic and market conditions, has been the focus of much research effort since the 1960s.

The Schumpeterian view sees firms as different – it is the way a firm manages its resources over time and develops capabilities that influences its innovation performance.

As the twentieth century drew to a close there was probably as much debate and argument concerning innovation and what contributes to innovative

performance as a hundred years ago. It was Schumpeter who argued that modern firms equipped with R&D laboratories have become the central innovative actors. This theory has a significant impact on the study of business and management today. Success in the future, as in the past, will surely lie in the ability to acquire and utilise knowledge and apply this to the development of new products. Uncovering how to do this remains one of today's most pressing management problems.

The importance of uncovering and satisfying the needs of customers is the important role played by marketing and these activities feed into the new product development process. Recent studies suggest that listening to your customer may actually stifle technological innovation and be detrimental to long-term business success.

In previous centuries it was easier in many ways to mobilise the resources necessary to develop and commercialise a product, largely because the resources required were minimal. Today, however, the resources required, in terms of knowledge, skills, money and market experience, mean that significant innovations are synonymous with organisations. It is important to note that more recent innovations and scientific developments (such as significant discoveries like cell phones or computer software and hardware developments) are associated with organisations rather than individuals (*see* presentation "Top-30 Innovations").

Hence, today's innovations are associated with groups of people or companies. Innovation is invariably a team game.

1.4. BASIC CONCEPTS OF INNOVATION MANAGEMENT

Now is considered that there are 5 innovation management concepts as being important for the years ahead [25]:

1. Customer-based innovation. Customer-based innovation' is all about finding new and more profound ways to engage with customers and develop deeper relationships with them. It based on:

- *Total customer experience* driven by a desire to build a deeper relationship with the customer.
- *Design-in emotion*: The second trend emerging in this space is the realization that, as technology allows manufacturers to deliver as much and often more functionality than the typical consumer can use, the bases of competition will change. Rather than compete on yet more features and functions we will see manufacturers compete even more on style, on

design and on emotional connection, with approaches used in the luxury and fashion markets being increasingly adopted in more traditional sectors. As one of the world's leading designers said at one conference: "Apple is a community and an ethos, of which the products are merely souvenirs". Apple is perhaps the most visible exponent of design as differentiator, but there is considerable work going on in leading research centers, in the automotive industry, and in software development to understand how to make an emotional connection with the customer through design of products, services and experiences, and how to build community, loyalty and advocacy.

- Social networking: The third converging trend is closely linked, i.e. the use of social networks to underpin companies' propositions and relationships with their customers. Software, hardware and media companies such as IBM, Sun and Microsoft have already well-established user-led innovation processes.

2. Proactive business model innovation. A business model defines how to create and capture value within a value chain, considering both operations and strategy. Business model innovation as a concept is certainly nothing new, but there is still much to be done to develop a convincing innovation management approach that is sufficiently systematic and repeatable to generate new, innovative business models.

There are three key trends in successful business model innovation in the future:

- Deliver "thick value": When companies deliver goods and services that truly leave the world better off, that's "thick value". That means creating real economic value; not simply capturing it from customers or suppliers, but genuinely making everyone better off.

Today business still often focuses on the creation of "thin value", i.e. purely profit-driven transactions between the organization and its stakeholders, as opposed to "thick value", which considers more lasting stakeholder value, for example increasing the resilience of stakeholders in the face of global societal and economic pressures such as climate change, demographics or energy security.

- Modular approaches: The need to be global and act local greatly increases the complexity of managing the business. Companies will increasingly need to take a modular approach to business models – innovating so that different modules can be used as building blocks in a range of market environments, each supporting the overall strategy of the company. One simple example of this is Unilever who employ the "Unilever Ladies" to distribute Unilever products to small villages.

-
- *More market adaptation*: There is an important need for companies to find better ways to generate innovative business models proactively to meet the needs of new markets, or to respond to new developing world competitors.

3. Frugal Innovation. Frugal Innovation is about originating and developing innovations in lower-income, emerging markets, taking the needs of poor consumers as a starting point, then transferring, adapting, applying and distributing them in developed markets. This is the opposite of the traditional innovation approach, which has been to develop innovations in the higher value “knowledge economies” of the developed world, to use the emerging markets as a low-cost manufacturing resource, and sometimes to strip the product or service of unnecessary cost and functionality to enable it to compete in the emerging markets.

Frugal innovation brings about a rethinking of the nature of innovation. Instead of “more” it is often striving for “less”, using clever technology to create masterpieces of simplification in mobile phones, computers, cars and financial services. Frugal innovation clearly is not just about innovating products, often changes in the whole supply chain are involved.

4. High Speed/Low Risk Innovation. One aspect that is set to become increasingly critical is the importance of getting to market not just fast, but also accurately and without flaws. Due to the rise in global brands and the arrival of vivid, uncontrolled, ubiquitous mass communication, there is the potential for immense destruction of shareholder value from any flaw in product or service. So that is expected to see further development of approaches and tools to drive fast, de-risked product and service innovation. For instance:

- ✓ *Gradual product rollouts* (It is expected to see less dramatic big launches and more of a continuing roll-out when new products and services are released to their markets. The approach reduces risk both for the manufacturer and the user and will become crucial as systems become ever more complex and inter-related).
- ✓ *Global 24/7 product/service development* (Global teams with virtual organizations will allow 24/7 development in pursuit of speed. More importantly they will allow a wider range of cultures and perspectives to be brought to bear in product creation).
- ✓ *Trial and experiment* (It is expected to see ever-increasing use of the trial and the experiment, starting already in the functional specification phase).

5. Integrated Innovation. Integrated Innovation is about taking innovation approaches that were once the domain of New Product Development (NPD) only – such as idea management, stage gates and portfolio optimization – and applying them consistently as an integral part of business strategy to achieve not only growth but also competitiveness.

The following aspects of Integrated Innovation as being important for the future:

- ✓ Systematic non-NPD innovation: This means greater and more consistent application of formal innovation tools and approaches to improve the effectiveness of proactive innovation in non-NPD areas such as management processes, manufacturing operations, business models, supply chain and sustainability. This will also include greater application of innovation management tools for cost reduction and competitiveness improvement.
- ✓ Radical/disruptive innovation: There will be a need for increasing proficiency and effectiveness in applying techniques to focus especially on radical innovation and new growth opportunities in adjacent or completely new business areas.
- ✓ Embedded innovation process ownership: They expect to see ownership of the innovation process shifting increasingly outside the Technology and R&D functions, ultimately becoming fully embedded in other business functions.
- ✓ Innovation integral to business strategy: Many companies already claim innovation as being integral to business strategy, but struggle to explain exactly how this happens – more post-event justification than reality. As innovation tools, including especially radical innovation tools, become more embedded throughout the organization, leading companies will become much better at applying them more purposefully and effectively in a corporate strategy context.

1.5. CLASSIFICATION OF INNOVATIONS

There are different approaches and features of the classification of innovation. Their critical analysis and synthesis allowed to create a classification system that contains classification features and selected according them types of innovations (see Table 1.3, 1.4).

Table 1.3 A classification of innovations

<i>Classification's features</i>	<i>Type of innovations</i>
Subject matter of innovations	Product innovation
	Process innovation
	Management innovation
	Commercial/marketing innovation
Field of operation (activity)	Production innovation
	Commercial/marketing innovation
	Social innovation
	Ecological innovation
	Legal innovation

Degree of novelty	Radical innovation
	Incremental innovation
	Systemic innovations
Scale of novelty	New for enterprise
	New for branch
	New for country
	World novelty
Addressee innovation	Producer
	Consumer
	Society
Degree of physical tangibility	Product innovation
	Process innovation
	Objects of intellectual property
Causes of occurrence	Strategy, which is prospective in nature and serves to ensure the competitiveness of the goods or services of the enterprise in the future
	Reactive, which arises as a reaction to the actions of competitors and aimed at improving the competitiveness of the goods or services
Kind resulting effect	Scientific and technological effect
	Economic effect
	Social effect
	Ecological effect

Table 1.4 A typology of innovations

<i>Type of innovation</i>	<i>Example</i>
Product innovation	The development of a new or improved product
Process innovation	The development of a new manufacturing process
Organisational innovation	A new internal communication system; introduction of a new accounting procedure
Management innovation	TQM (total quality management) systems; BPR (business process re-engineering); introduction of SAPR3 (SAP is a German software firm and R3 is an Enterprise Resource Planning (ERP) product.)
Production innovation	Quality circles; just-in-time (JIT) manufacturing system; new production planning software, e.g. MRP II; new inspection system

Commercial/marketing innovation	New financing arrangements; new sales approach, e.g. direct marketing
Service innovation	Internet-based financial services

Most scientists believe that the greatest practical importance has the classification of innovations for subject matter and the level of innovation novelty.

Comparing the various definitions of innovation, it can be seen that there are several common elements *what* is changed (such as product or process changes); *how much* is changed (whether it is completely new or only perceived as such); the *source* of the change (sometimes technology); the *influence* of the change (for example, its social or commercial value).



DISCUSSION QUESTIONS

1. Many innovations today are associated with companies as opposed to individuals. Why is this, and what does it tell us?
 2. What is wrong with the popular view of innovation in which eccentric scientists develop new products?
 3. Why do so many new products fail?
 4. Explain how technology differs from science, yet still does not equal innovation.
 5. What is the difference between an unsuccessful innovation and an invention?
-
-

Theme 2.

THE INNOVATION PROCESS AND CHARACTERISTICS OF ITS MAIN STAGES



LESSON OUTLINE

- The innovation process
- Main stages characteristics of new product life cycle

LEARNING OBJECTIVES

After going through this lesson the students will be able to:

- recognise the role of key individuals within the process;
- understand the main stages of new product life cycle; and
- recognise the need to view innovation as a management process.



2.1. THE INNOVATION PROCESS

The innovation process consisting of the sub processes input, project management and implementation. Organisational factors embrace the main field consist of strategy, corporate culture, human resources, budget and cooperation. These tell us if the environment is also suited for promoting innovations. To put it another way the whole process from idea to the implementation of new products/services to the market is pictured.

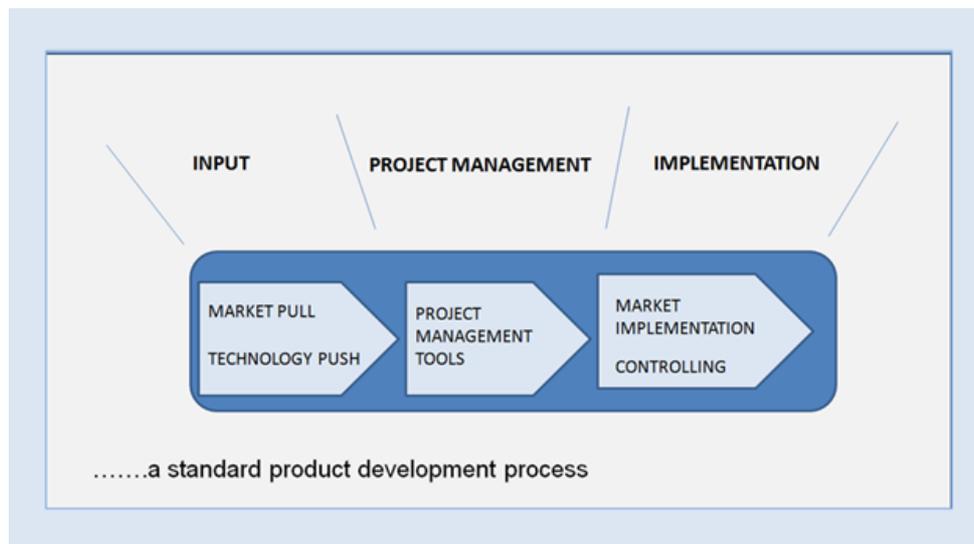
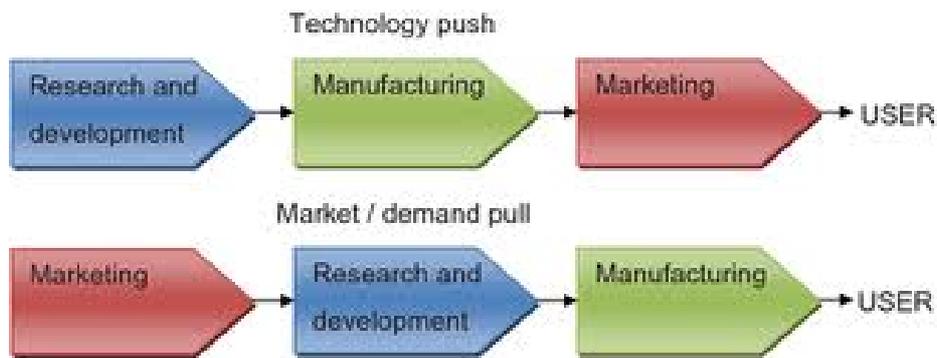


Figure 2.1 Innovation Circle in a narrower sense

- **INPUT:** The following questions will be answered: Where do the ideas come from? How can you act actively and systematically in this early innovation phase?

The starting point for successful new products and services are initially ideas, which can be derived from various company-internal and external sources. Finding those ideas can be significantly supported by different organisational and methodological measures.

Technological advancements and market needs are some of the significant forces fuelling the introduction of products and services in a wide range of business sectors. Many product and service providers have utilized the so-called *technology-push* and *market-pull*, the simple linear views of innovation which prescribe the use of technological discoveries and the involvement of the market respectively to produce goods and services.



- The term “**Technology Push**”, refers to advances in technology and the way in which these are introduced to the public / consumers, in the form of commercial products. In this model, research and development in new technology drives the development of new products. The technology push models starts with a technological development.

A good example is touch screen technology. The developments in electronic engineering have enabled smaller, smarter electronic components to be fitted into everyday products such as the mobile phone, personal hi-fi and cameras.

CAPABILITY PUSH



- 1 TECHNOLOGY ALREADY EXISTS
- 2 FIND DIFFERENT APPLICATIONS
- 3 FIND MARKET OPPORTUNITY

OPPORTUNITY PULL



- 1 SEE NEED/PROBLEM
- 2 DEVELOP TECHNOLOGY TO FULFILL NEED/
SOLVE PROBLEM

- The term “**Market Pull**”, refers to the need/requirement for a new product or a solution to a problem, which comes from the market place. The need is identified by potential customers or market research. A product or a range of products are developed, to solve the original need. Market pull sometimes starts with potential customers asking for improvements to existing products.

A good example of market pull influencing product evaluation is seen in the development of the digital camera. Twenty years ago, there was a “market” requirement for a camera without a film that could take endless photographs that could be viewed almost immediately. The technology of the time did not lead to the manufacture of such a device. However, technology has a habit of catching up

on market needs. Market pull eventually led to the development of digital cameras, once miniature digital storage, processing power and improved battery performance was available. Market pull ensured that photo editing software also developed, in parallel with the development of digital camera technology.

Market pull does not always work. Sometimes the market “calls” for a innovative new product, but the technology does not exist to support its development / manufacture. For example, electric cars are becoming more popular and the commuter market place, is open to the development of an environmentally friendly electric motor bike. A motorbike that can match the performance of petrol driven motor bikes. However, current electric motor and battery technology means this is not possible. Eventually, market pull will influence investment in research and development, ensuring the continued evolution of electric motorbikes.

➤ **INNOVATION MANAGEMENT:** How systematically should the innovation process be organized?

The goal of innovation management is the systematic support of the whole innovation process from the generation of ideas to the implementation of new products or services on the market.

The scope of duties of innovation management includes:

- Compilation and evaluation of innovative developments within and outside of the company.
- Development and maintenance of the company-internal innovation potential
- Acquisition of company-external innovations and their implementation in the company
- Planning, supervision, implementation and controlling of the company’s innovation activities
- Determination of the time for innovation to enter the market.
- Planning and realisation of possibilities to protect innovative developments (patents, licensing).

➤ **IMPLEMENTATION OR REALIZATION:** How can or should new products be introduced to the market? Accompanied by a controlling of the whole process.

The marketing instruments (4 Ps: product, price, place (distribution), promotion) are oriented on the events on the market. Because marketing is the for a company profitable satisfaction of its customers’ needs, customer habits and requirements must be recognized and analysed and the competitors’ behavior must be known.

Innovation controlling signifies all activities for the planning and supervision of innovation activities with the goal to ensure success:

- Efficiency: prevention of economic inefficiency in regard to time and costs
- Effectiveness: reaching of goals.

The following potential hurdles may occur for the market implementation of innovative products:

- ✓ **Complexity:** Highly complex products are hard to convey to the customers.

Remedy:

- Lay special care on professional communication, if needed include external experts.

- Argue in such a way that the customer sees a relation between his problems and the product.

- ✓ **Novelty of the problem solution:** Products that use new technology normally have a high need of explanation. You should be prepared for questions regarding process safety, quality and integration ability.

Remedy: Discuss all possible objections to the product in advance.

- ✓ **Product positioning:** Customers must see a reward for changing to the new product. Especially if the new product is more expensive than existing products, the advantage must be clearly recognizable.

Remedy: Wear “customer glasses” when positioning the product.

- ✓ **Social commitments and business history:** A product’s performance advantage is only one parameter for a buying decision. This means that even new and better products may not guide fixed customer relations into new ways without further ado.

Remedy: Assure the fulfilment of demands.

- ✓ **Access to and dependence from distribution channels:** Due to an increasing concentration of companies access to the large distribution channels gets increasingly decisive.

Remedy: Adapt to the conditions of future distribution and trading partners as early as possible. This makes sure that you are not somehow hindered when trying to introduce a new product to the market.

✓ **Regulations and admission procedures:** Products interesting in regard to the market or its technology may still fail because of legal and social frameworks.

Remedy: Take into consideration legal regulations, admission procedures and customer specific standards as an important framework for the marketing of products.

2.2. MAIN STAGES CHARACTERISTICS OF NEW PRODUCT LIFE CYCLE

Ideally the aim of every innovation process is to build up a new successful business with products that can successively be transformed into standard products and sold on one or more geographical markets. Figure 2.1 shows in principle the situation from the birth of a new product – i.e. from when new discoveries and/or new product ideas have emerged – to when the product is removed from production and sales.

1. Analysis of correspondence between internal and external development opportunities. To do this market opportunities and threats should be compared with the strengths and weaknesses of the company. On this basis we can identify how the present and prospective directions and activities of the company correspond the conditions and the situation on the market. As a result, activities which should be curtailed and which are worth developing could be determined.

Assessment of correspondence of company' internal and external development opportunities generated by the market can be accomplished using SWOT-analysis.

2. Innovative ideas generation. The *idea* is a general concept of the product that can be offered on the market.

The main sources of innovative ideas are:

- analysis of consumer needs;
- sales staff and dealers of the company;
- analysis of developments in science and technology;
- development of ideas by company's own scientific and technical personnel;
- analysis of competitors activities including analysis of their promising developments;
- the results of situational and simulation modeling of the consumer behavior in the present and the future;

- an analysis of development trends in the technological, economic, social, political, cultural, legal, ecological, demographic and other components of management environment.

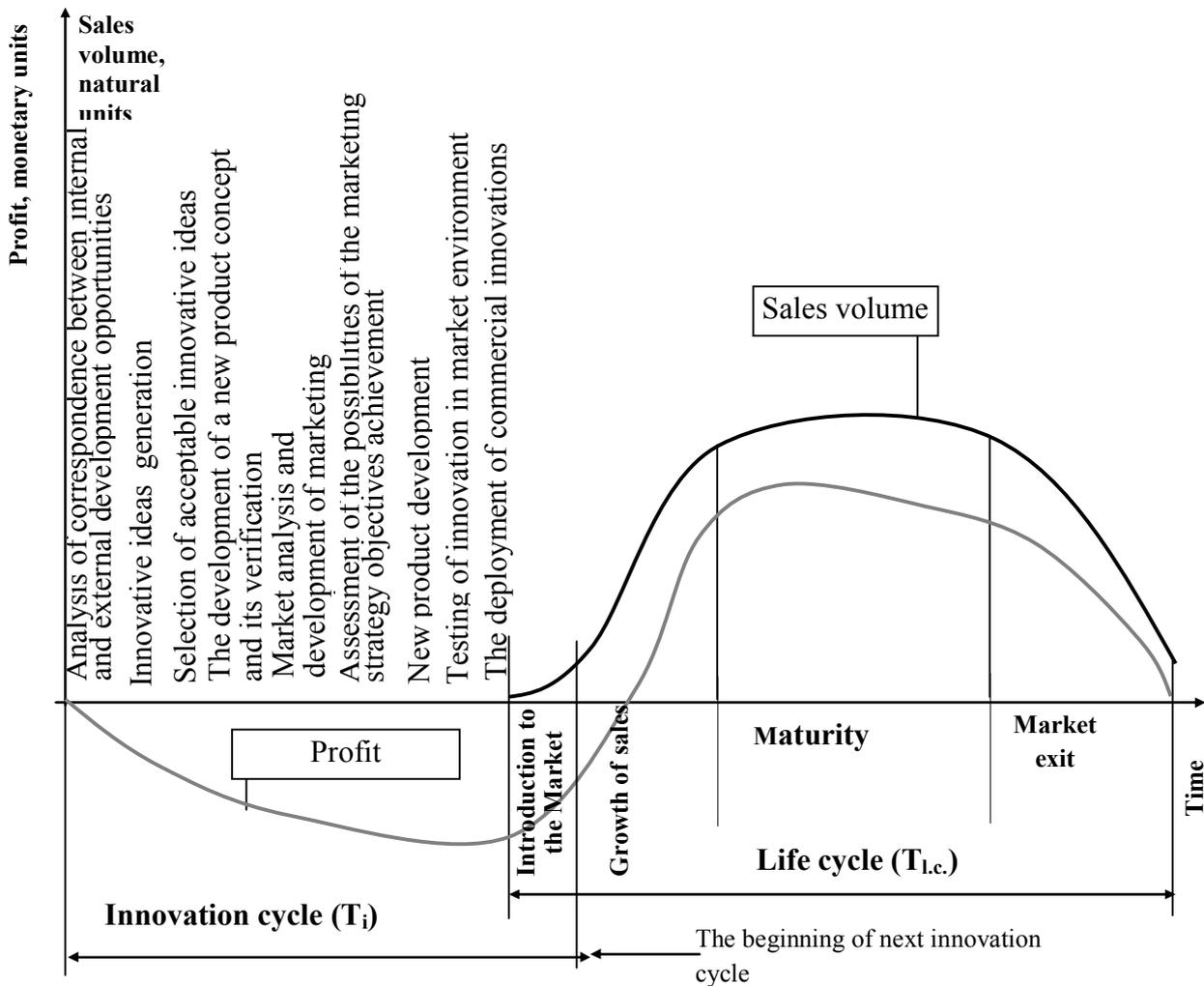


Figure 2.2 *The Innovational and life cycles of the product innovation*

There are many methods for generating the innovative ideas (intuitive and ordered). The most popular among the latter are: improving the prototype, brainstorming, synectics, elimination of deadlocks, morphological maps. Any criticism of ideas is prohibited at this stage, since the purpose of the stage is to generate their greatest possible number.

3. The selection of innovative ideas. At this stage most appropriate ideas for a particular company should be chosen from the variety of new ideas.

The verification may be performed on the basis of:

- conformity assessment of the innovative ideas that were accepted appropriate in similar situations;
- conformity assessment of innovative ideas to predetermined requirements;

- comparison of innovative ideas according to the list of criteria and indicators and their optimal choice.

Preliminary assessment of innovative ideas involves obtaining answers to the following questions:

- the probability of existence of a future market for innovation;
- is there a technical and economic feasibility of development, production and promotion of innovations to the market;
- whether the innovation is profitable and how it will affect the enterprise?

Such evaluation is often performed using the expert method, since elements of uncertainty are very influential at this stage due to an inaccurate, incomplete and conflicting information.

Note: In Ukraine the percentage of the implemented ideas does not exceed 20 % of their whole number. For comparison, in Japan it is 68 %, USA – 52 %, Sweden – 45 %, Poland – 30%. Combined with low innovation activity of domestic producers this indicates going away from the accelerating economic prospects.

4. Development of the innovative product concept and its verification (concept is considered as innovation idea easily understandable for consumers). Typically, the testing of innovation plan (a new product or service) is carried out by questioning of users and analysis of the results.

Herewith the idea of the product should be considered at three levels, where each subsequent one describes a higher degree of specific innovations, and therefore the degree of elaboration and consumer appeal (*see Figure 2.3*).

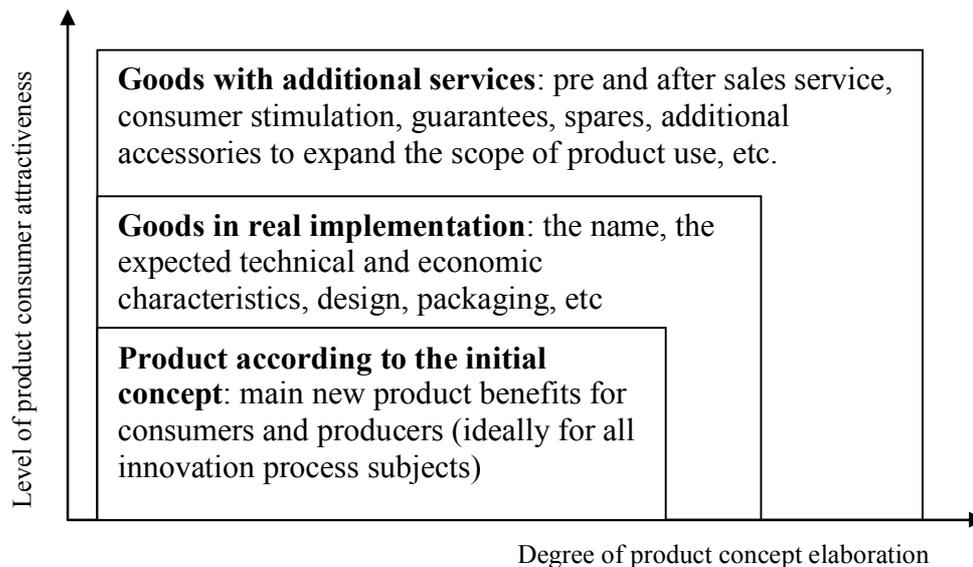


Figure 2.3 New product concept representation levels

5. Developing a marketing strategy to promote innovation to the market. It involves a serious research and leads to marketing strategy development and promotion the innovation to the market. The main tool for this analysis is segmentation.

In general, the marketing strategy includes: a strategy of formation and development of target market, product strategy, pricing strategy, products promotion strategy (including sales and goods movement), strategy of demand creation and stimulation.

6. Evaluation of the economic feasibility of the enterprise goals presented in the marketing program. Evaluation is performed according to the following criteria:

- intellectual and technological capabilities of innovations implementation in the new product that meets the needs and demands of consumers;
- possibility of implementing an innovative idea into a commercial product;
- market opportunities of promoting an innovation on the market and bringing it to consumers;
- innovative project resource supply: information, raw materials, finance, etc. (existing and needed);
- sources of investment in R&D and development activities, testing, pre-production, promotion, distribution and marketing;
- risk degree and the possibility of its prevention, reduction or compensation;
- expenditures for the design, production and promotion of innovation on the market;
- profitability.

7. Development of design and technological innovation documentation, manufacturing of prototypes and testing.

At this stage a prototype is produced and if necessary is tested in laboratory with the following documentation specification. Based on the laboratory tests results, operating documentation will be specified (please, see above). When designing innovations to assess the possibility of its concept implementation to the new product, one can use the recommendations of J. Jones. It should be noted that computer-aided design (CAD) tools are widely used to develop the design and technological documentation including software and computer systems.

8. Testing of innovation in market conditions.

It is performed by test marketing. Its goal is to simulate the process of introduction and promotion goods to market in certain market areas. The results of this process will later be used throughout the entire target market.

Recently, computer modeling is used for testing the product innovations. In particular this is virtual shops where product modifications are being sold, using different versions of its design and packaging, shops showcase decoration, etc.

9. Deployment of commercial innovations production in the amount specified in the marketing program.

At this stage an existing market opportunities and threats, emergence of new ones and transformation of one into the other (transition of the opportunities into threats and backwards) should be constantly monitored.

Despite a large number of stages of the innovation process, they are certainly necessary. The cost of works at each subsequent stage is nonlinearly increase compared to the previous stage therefore the thorough elaboration of possible solutions can reduce the probability of possible adverse consequences (see Table 2.1) [19]. Finally it should be noted that only 1 or 2 innovative ideas out of 100 reach the commercialization stage, while those which remained, have the probability of market success of 25-50%.

Table 2.1 Shares of success and failure on the stages of the innovation process

Indicators	Stages				
	<i>Ideas generation and selection</i>	<i>Business analysis</i>	<i>Product development and manufacturing</i>	<i>Product testing</i>	<i>Commercial production</i>
The share of expenditures at the stages of typical completed project, %	7,3	3,7	22,7	18,6	42,7
Share of expenditures on product innovation both successful and not, %	14,7	6,1	36,9	16,7	25,6
Successful projects, %	34,7	45,2	52,1	58,8	66,3
Unsuccessful projects, %	65,3	54,8	47,9	41,2	33,7



DISCUSSION QUESTIONS

1. Explain how organisational heritage influences the innovation process.
2. Explain the key individual roles within the innovation process and the activities they perform.
3. Explain why consumer market testing might not always be beneficial.

Theme 3.

METHODS OF SEARCHING FOR INNOVATIVE IDEAS



LESSON OUTLINE

- Classification and characteristics of methods for searching and generation of ideas
- Method of prototype improvement
- Brainstorming
- Synectics
- Elimination of the “dead lock” situations
- The use of morphological maps

LEARNING OBJECTIVES

After going through this lesson the students will be able to:

- understand difference between various methods to generate and validate ideas of innovation; and
- recognise the need to use methods to generate innovation ideas.



3.1. CLASSIFICATION AND CHARACTERISTICS OF METHODS FOR SEARCHING AND GENERATION OF IDEAS

Comparative analysis of formal methods to generate and validate ideas of innovation and recommendations for their use are presented in Table. 3.1.

Table 3.1 Comparative characteristics of methods for generation and selection of innovative ideas

The name and nature of the method	Field of application	Benefits	Disadvantages
Prototype improvement: identify prototype (the best model on the market) drawbacks and finding ways to improve it	Improving existing products: improving their design and functional characteristics, economic characteristics, etc.	The plain inheritance of the known product (if the prototype is in demand then its modification will be too)	The product is not always could be improved; minor improvements may lead to loss of competitiveness
Brainstorming: group generation of ideas to solve the problem assuming prohibition of ideas criticism, followed by their assessment	Quick generation of as great number of ideas as possible to solve formulated problems.	Speed; increased chance to find an acceptable solution; multidimensional problem analysis.	The quality of ideas is independent of the duration of its search; the results require further research
Synectics: orientation of group of professionals spontaneous intellect functioning (with various types of analogies) for the analysis and solution of the given problem	Search of general (fundamental) solution of the given problem	Allows to overcome developers preconceptions and provides innovative ways to solve problems	Requires an experienced and strong leader, careful selection of experts and their prior training
Elimination of the dead-lock situations: the search for new solutions if traditional ones are not effective.	Solving complex problems that cannot be solved by traditional methods in traditional search areas (sectors).	Allows to solve problems in a situation where there is no acceptable solution	Knowledge, experience and traditions of developers are below the level of search areas.
Morphological maps: expansion of problem solution search area	Finding solutions for new problems	Allows to quickly generate a number of possible solutions and choose the most appropriate one.	Requires developers experience and knowledge of the problem structure

3.1.1. METHOD OF PROTOTYPE IMPROVEMENT

The main provisions of the method we will consider using the following example.

Example. Estimates for groups of indicators for competing products (manufacturers of centered pumps) are shown in Table 3.2.

Table 3.2 Comprehensive indexes of competing pumps

Producer	Index groups				
	Qualitative	Technical	Service	Economical	Integral (K)
"Nasosenergomash"	0,1500	0,1823	0,2500	0,2169	0,7992
"Livgidromash"	0,0601	0,1687	0,0500	0,4000	0,6788
"Uralgidromash"	0,0844	0,1811	0,0291	0,3103	0,6049
"Kaluga Turbine Plant"	0,0828	0,1801	0,0459	0,2804	0,5892

Table 3.2 analysis shows that the pumps produced by "Nasosenergomash" which are better according to the integral factor, can be taken as the prototype. However, these pumps, surpassing competitors' products by groups of qualitative, technical and service indicators (although there is a backlog on some indicators within groups) significantly lose to them on the group of economic indicators. Therefore development of new improved pump system should take into account this fact. This requires concentration of efforts, especially in order to improve economic performance such as prices and energy consumption per volume of fluid unit. The first one requires finding reserves to reduce the first cost, the second shows the need of equipping pump with less powerful engine. As for technical performance it is required to reduce the size and weight of pumps.

3.1.2. BRAINSTORMING

The task to offer the idea of innovation, which can be designed, manufactured and introduced to market by a particular company is set for a selected group (several groups) of professionals (usually the group includes 5-6 people or more). At the same time any criticism of ideas is prohibited even "wild" ideas accepted for consideration.

All proposed ideas should be recorded. Brainstorming requires each participant to possess profound skills and experience in a particular field of activity being analyzed. However practice shows that newcomers may also offer some

interesting ideas that can be implemented. J. Jones states that a group of 6 people can generate up to 150 ideas during half an hour.

After recording the ideas their authors are invited to read the records one by one. Members of the working group listen and record their thoughts. Observed ideas and commentaries will then be analyzed and grouped and in future they serve as a basis for finding the best solution.

3.1.3. SYNECTICS

This method involves search (generation) of the idea which can solve the problem (the idea of innovation) in several stages. Let us look on them in detail.

1. To chose a group of experts that will generate the idea of innovation. This group should include invited specialists in different areas of expertise and employees of an innovative enterprise (they have to represent different structural units).

2. Provide this unit with an opportunity to acquire practical skills in the use of analogies to guide the spontaneous brain activity to solve a problem or task, such as the development of innovation.

Often the following types of analogies should be considered:

- *direct* (real): for example, from biological systems: modern submarines sheathing which reduces the friction of the water and the noise made by analogy with the skin of dolphins and other animals living in the water;
- *subjective* (corporal): for example, when a developer is trying to imagine himself as a certain product or unit, imagine what it would feel like been, for example, the wing of the aircraft, which forces would effect him in this case, etc.;
- *symbolic* (abstract), when the characteristics of certain object or phenomenon are equaled with the characteristics of the other one. In particular, a decision tree, bolt head, the noise of the ship or aircraft, etc., sound absorption, radiation trapping;
- *fantastic* (unrealistic) when things or phenomena are imagined as those required by designer, developer or researcher, although they can not be such as those inherently.

For example, a daemon that can let molecules of a certain substance to pass one by one, a giant who can move the whole building to a certain distance and etc.

3. To set a task to a new developers group which they have to complete (to find a solution to a particular problem). Mostly synectics is used to develop new products and solve problems that arise meanwhile.

3.1.4. ELIMINATION OF THE “DEAD LOCK” SITUATIONS

This method involves the generation of innovation ideas in the following ways:

1. Using the transformation rules that can be applied to poor decisions in the field of traditional search. The following transformation are acceptable: use in other way, adaptation, modification, strengthening, weakening, replacement, rebuilding, inversion, unionation.

Example. In the mid 90s many universities in Ukraine faced the problem of survival, because governmental funding was clearly insufficient. To overcome the crisis, a practice of preparing extramural students on contract (paid) basis was introduced. However difficult financial position of students majority prevented them from coming to the university to take exams and paying for hotel accommodation. These charges had to be paid in addition to their official education costs.

To solve the problem inversion was used, which can be interpreted as situation reverse, i.e. the replacement of students visits to the university by university teachers visits to students. Further study of the ideas showed that the problem could be solved by creating educational and counseling centers at schools, colleges, technical schools, for example, in regional centers. A small rents allowed to set up a installation and exam sessions and hence studying directly in the cities (and other locations) where the students lived just by slightly increasing tuition fees (10-15 %). Thus, inversion of the situation allowed to solve the problem.

The basic solutions supposed to be transformed can be obtained artificially by advanced introduction of any clearly unacceptable solution.

2. Finding new relations between the parts of the previous improper decision. Alternatively it is possible to examine the associations that arise while pair-wise comparison of the mutual relations of certain elements of a product or system.

Example. Improvement of a table lamp design can be accompanied by an analysis of the mutual relations for the following pairs: stand – rack, rack – lighting element, lighting element – lamp shade, switch – rack; switch – stand, etc. In this case various options for the relationship of two elements will be analyzed, such as setting one onto/inside another, replacing one another, etc.

3. Project situation revaluation (reassessment). Developer (designer) who is “deadlocked”, records complications, and then replaces every word (or phrase) with synonymous ones.

Example. The designer describes the complications: "Welding product casing can lead to heterogeneities of its parts strength, warping its corps and non-compliance with the preset shape and size". Replacing the words "welding product casing" by "the formation of the casing" can suggest to replace the welding process by casting.

3.1.5. THE USE OF MORPHOLOGICAL MAPS

Let us look at the example of the generation of innovative ideas for room heating, which would be cheap and less expensive in exploitation than existing ones, easy to use and environmentally friendly. Moreover it also have to be taken into account that Ukraine has limited oil and gas reserves but some surplus in electricity production.

Generation of innovation idea will be conducted according to the following enlarged algorithm:

- Identify the functions which an acceptable product should be able to perform.
- Show a wide range of elementary solutions on a chart i.e. alternative means of implementing each function.
- Select one acceptable elementary solution for each function.

Below is the example of using this algorithm to solve the problem (Table 3.3).

Table 3.3 Morphological map

The main parameters	Intermediate solutions				
	1	2	3	4	5
Air temperature	warm air from the central source	convector in the room	convector radiator in the room	source of regulated thermal radiation	other
Air circulation	natural circulation	forced circulation	natural convection	forced convection	other
Air humidity	unregulated	humidifier - vaporizer	other		
Heating element	High temperature electric heater	High temperature electric heater with an open flame	panels with low temperature fluid circulation	low-temperature heater	Surfaces heated by convection
Temperature gradient	due to the placing of the heating element	due to the placing of the heating element	other		
Heating mode	constant throughout the day	periodical turning on during the day	daytime	at night, with the periodic turning on in daytime, to maintain temperature control	other
Heat carrier	water	air	oil		other
Energy source	coal	fuel oil	gas	electricity	other

Dark shading shows the traditional centralized water heating system. Lighter shading shows innovative option. It involves the use of heating element that heats using electricity during nighttime when it is cheap. In this case the heat is accumulated in the oil cooler and is used during the daytime.



DISCUSSION QUESTIONS

1. What are the advantages of prototype improvement method?
 2. What is the difference between brainstorming method and synectics?
 3. Define the ways of the innovation ideas generation under elimination of the dead-lock situations method.
 4. Explain the features of use the morphological map.
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Theme 4.

THE ORGANIZATION OF CREATIVITY AS A PROCESS



LESSON OUTLINE

- Creative initiative as an objective process of innovation development system
- The emergence of creative initiatives
- Obstacles to the development of innovative initiatives
- The rules for transferring creative initiatives
- Organization of inventive and innovative work at the enterprises

LEARNING OBJECTIVES

After going through this lesson the students will be able to:

- understand the nature, scope and utility of creativity;
- explain the dilemma facing all organisations concerning the need for creativity and stability;
- provide an understanding of a number of rules for transferring creative initiatives; and
- recognise impact of inventive and innovative work on the enterprises.



4.1. CREATIVE INITIATIVE AS AN OBJECTIVE PROCESS OF INNOVATION DEVELOPMENT SYSTEM

Creating an environment that fosters creativity at the work place is a crucial part of the innovation management. Such an environment contributes to generation and creation of innovative ideas. The creative environment requires support of the so-called *innovative climate* that follows a special corporate culture on the microlevel and is also a part of micro-environment in a company. *Innovative climate* is defined as the working conditions established during a certain period of time that contribute to fostering the creativity environment, the changes and innovations.

Organizational culture of such a team is an integral characteristic that includes the system of values, behavioral modes of employees, management type, the features of control system, assessment modes and motivation system.

Creativity inspires and leads to emergence of innovations. *Creative people* have the following distinct features:

- Flexible thinking;
- Nontrivial approach;
- Curiosity;
- Insistence;
- Goal-oriented in problem solving.

Individuals as well as successful companies or project teams might have the feature of creativity competence. The key *elements of creative companies* are:

- Flexibility of organizational structures;
- Well-coordinated teamwork;
- Loosen allocation of responsibilities;
- Employees' substitution;
- Teamwork in generation of goals and problems.

Such companies do not criticize for the mistakes, since trials and errors contribute to the employees' capability to constantly search for new ideas.

The common management principles of such companies include team-orientation or business-process. They lack rigid hierarchy and have fewer management levels in comparison to the typical organizational structure based on bureaucracy principles.

Informal leadership is of great relevance at these companies. The leader in such a team is rather a mentor than a formal head of organization. An effective leader helps the team members to fulfill their potential by the right motivation to achieve goals, using financial and other motivation tools.

An *initial stage of innovation process* is the *search for ideas*. In order to enjoy fully the innovation potential, a company has to foster an environment, in which its members feel the support of the senior management for any new innovative ideas regardless their seemingly trivial or inadmissible nature.

Favorable innovation climate presumes the creation of the environment of trust. It also includes the process of identifying and overcoming of those factors that “block” creative efforts. Furthermore, it requires the cooperation in searching activities of staff members, the enlargement of innovators’ powers at the working place, the employment of organizational and psychological tools that help to generate new ideas.

An innovation-oriented company with the well-developed management culture always keep expanding the range of intellectual activities, encourage the active emergence of ideas, including those very diverse and uncommon. Therefore, the main task of the leader is to identify talented people, to foster conditions for their activity and to remove the impediments for creativity’s growth.

4.2. THE EMERGENCE OF CREATIVE INITIATIVES

An idea is the beginning of the innovative entrepreneurship. The driving forces for the emergence of innovative idea are the knowledge of staff members, personal or professional experience, insights, perspectives of employees and the capacities to implement all of those in reality.

The process of an innovative idea formation, which might lead to a business success, requires:

- Finding out the way of the utility creation that is valuable for consumers;
- Creating the mix of particular features that ensures the emergence of a given utility;
- Creating a unique formula that helps achieving the maximum profit.

The examples of *sources of innovative ideas* include:

- Consumers as subjects of consumer studies;
- Researchers who are working on innovation or searching new materials; as well as a product’s features that have the potential of new products or services;
- Competitors as subjects of their own strategies, and activities related to consumer studies and created innovations;
- Sales forces, dealers, and other intermediators;
- Company employees (the emergence of innovative ideas requires the involvement of as many employees as possible).

According to P. Drucker, the sources of opportunity that ultimately drive innovation are:

- ✓ The organization's own unexpected event like successes, failures, or other external event;
- ✓ Incongruities, that is the discrepancies between the reality as it is and our perceptions ("the reality as it should be");
- ✓ Process needs (they imply elimination of shortcomings);
- ✓ Changes in industry and market structures;
- ✓ Changes in demographics;
- ✓ Changes in meaning, perception, or peoples' values;
- ✓ New knowledge, both academic and non-academic.

Business development involves not only the scheduled collective work of researchers and inventors engineers, but also the intuitive insights of individual co-workers. Creative ideas are not meant for planning or logic deduction from the previous practice, since their basis lays in the breakthrough logic. In the beginning, such ideas lack clarity, they are hard for description and validation, often seem weird and categorically unpractical. However, while implementing such odd ideas (either of their own or of external origin), the talented entrepreneurs actively change our world. The aggregated creativity energy of entrepreneurship is the key component for the development of world economics.

4.3. OBSTACLES TO THE DEVELOPMENT OF INNOVATIVE INITIATIVES

Managers play the key role in the emergence of innovative initiatives. They may either actively support the creation of innovations or explicitly as well as implicitly hamper innovation activity. The main problem, hampering the innovations, could consist of unsuitable or inappropriate management style.

The reasons for limiting innovative initiatives include *psychological* and *emotional factors*, such as fear of being wrong, misunderstood, criticized, regarded as incompetent. They also include *professional factors*, such as competitiveness and related conflicts, lack of experience, over-categorical judgments, lack of alternative options, narrow knowledge. The *perception factors*, limiting the innovative initiative, include categorical and narrow thoughts, lack of adequate intellectual level. Finally, *personal factors* include ambition, sensitivity, idleness, arrogance, self-interest, and conservatism.

Among the other obstacles, there are *inadequate or ineffective motivation techniques used by managers*. The reference to an employee that made a mistake as a negative example or the support of the employees that lack the innovators'

features could serve as an illustration of such inadequate techniques. The employees should have the room for mistakes in order to reveal their innovative potential.

In addition, the excessive bureaucracy of organizational structures hampers the innovative process to a large degree and prevent both the generation of ideas and introduction of innovations. This situation involves fear and constraints that discourage creativity.

Another problem for innovation is the *manager's conservatism*. Manager does not see or is unwilling to see the innovative idea as feasible. As a result an idea lacks the support and further practical development. However the experience of successful companies proves that many brilliant ideas seem, at the first sight, unfeasible or inadmissible in that organization or even in the society.

Often the problem that is related to the lack of creativity includes the *differences in the situation assessment between the employees and the senior management* that lead to unfavorable perception of innovation. This might be explained by the fact that the company management possesses the important and valuable information which is not available for employees. Such a problem could be solved by building the efficient vertical communication networks.

The next problem is *the lack of horizontal connections or their weak or inefficient coordination in the organization*. Successful innovations require the experience engagement of several departments all together, whereas unsuccessful innovations are often the result of the weak cooperation. Therefore the big companies working on innovations actively involve the employees of different departments into the innovation process. The small innovation organizations solve this problem by modifying the team roles.

Many employees *lack creativity* in their work due to the *permanent time issues related inadequate allocation of tasks or lack of time management*. At the same time the senior management is often in a stress that leads them to grasp the very first idea and stop searching for new creative ideas. These and other problems could be addressed by the efficient innovation management.

4.4. THE RULES FOR TRANSFERRING CREATIVE INITIATIVES

The experience of successful companies working on innovations and the research in innovation management suggest that overwhelmingly the best managers at such organizations are those who have engineering or similar background, leadership skills and respect of their colleagues. Such leaders usually reveal their technical and creative skills during projects implementation. They exercise ingenuity and competence in management, adaptability to the

existing conditions, and capable to achieve successful cooperation between the research and organization's management. Strategic aim of such a leader is to unite the creative and innovative skills of the staff with the commercial aims of the company without resorting to hardline techniques.

In practice such an approach presumes giving the researchers the freedom to create and to provide them with the necessary technical resources. Together with this, there is a need for the establishment of close contacts between the management personnel and researchers. During the formal and informal meetings the researchers should be directly involved in decisions regarding the planning, financing, assessment of their own work. As a result the combination of the maximum research freedom with the maximum understanding of researchers' ideas by the senior management to the largest degree ensures the coincidence of the researchers' personal goals and the company's goals.

The establishment of such cooperation mechanism in practice is a complex process. The factors that contribute to its realization, first of all, include the fostering of the emotionally favorable environment. To achieve this, the manager has to apply the motivation techniques at the company in a right way. The researcher's motivation includes: 1) search for the truth; 2) search for social utility; 3) financial interests; 4) search for colleagues' recognition and acknowledgment and so on. The manager should take into account these needs while developing the motivation mechanisms at the company.

M. Edwards and D. Sproull identified a range of factors to enhance creative process and innovative initiatives.

The *first group* of such factors of primary importance includes:

- elimination of obstacles that hamper the emergence of innovative skills within the company; development of skills that allow employees to frame the problem in a wide context;
- multiple the methods of problem solving;
- development of internal communication;
- refusal to employ the authoritarian methods of management and involvement of many people in the decision making.

The *second group* of factors includes:

- an increase of the employees' self-esteem;
- activities that promote and support the innovative initiatives;
- development of the discussion skills that exclude bias or judgmental approaches;
- development of flexible mind and imagination.

The *third group* includes the factors that do not get much attention but, according to the authors, could significantly matter for enhancement of innovation products. These are:

- 1) The steps allowing the employees to better understand the basics of the company's reorganization and develop the participatory skills for the innovations' process. The lack of such knowledge and skills have caused many innovations to fail.
- 2) The steps that develop the employees' time management and stress reduction skills.
- 3) The systematic normative improvements are the necessary condition for the enhancement of company' innovative potential and the innovations' support. Unless the norms are changed for the benefit of innovations' support, the new ideas and proposals are bound for meeting resistance.
- 4) Another condition is to use the creativity criteria for the assessment of an employee or a company professional activity and to measure level of performance of the methods for increasing creative possibilities.

4.5. ORGANIZATION OF INVENTIVE AND INNOVATIVE WORK AT THE ENTERPRISES

In recent years, the most innovative enterprises employ the *collaborative innovation type* of work that involves contribution of each participant in the cooperation process. Due to participation in collective activities an employee increases his/her own professional competence. The employees of such enterprises are oriented towards collaboration with the colleagues from other departments. They also exercise flexibility in decision-making and changing positions. These features as well as collaborative work serve the basis for employees' personal development.

Nowadays the *idea incubator* environment became the popular way to motivate innovative ideas at the enterprise. The employees of different company's levels are gathering to produce innovative ideas without any company bureaucracy pressure or interference. The value of such an approach consists in an employee's independent elaboration of the perspective idea at incubator without coordinating all of the issues with the senior management. Today many successful companies such as Boeing, Adobe Systems, Ball Aerospace, Ziff Davis and others, have chosen this approach.

One of the approaches to the successful implementation of innovations is defined as a *model of horizontal networks*. According to this model, employees of

different departments of an enterprise all contribute to the emergence of innovation products and processes. While working in teams the experts of those departments exchange the ideas and solve diverse innovation tasks. The models of horizontal networks are often transformed into the *rapid cycle teams* that are not only multifunctional but also international teams with additional resources and power to finalize the innovation project early.

Venture financing of risky innovation projects is the most effective and widespread private form of innovation activity enhancement in conditions of market economy in the recent years.

Venture activity is directed on temporary pooling of the legal and/or individual capitals to create small but mobile and efficient enterprises that finalize and commercialize certain innovation projects. After successful implementation of such projects these enterprises either are taken over by the bigger enterprises or strengthen the financial positions by selling the innovations' licenses. In the latter case, the profit from the innovation licenses sales is invested into the own production development and commercialization.

Venture innovation activities involve the risks of private capital investment in cooperation with the entrepreneurs with organizational and intellectual potential. The aim for such an involvement consists in the possible future profits from the implementation of innovation ideas and commercialization without any guarantees for success. A general indicator of different forms of risks is the financial risk of entrepreneur and investor assessed as the potential losses in case of unsuccessful implementation of the possible project (regardless its reasons). The main function of venture funds is the process of financing of risky projects at initial stages showing the maximum uncertainty of costs' return.



DISCUSSION QUESTIONS

1. Discuss the dilemma faced by all firms of trying to listen to customers' needs and wants and yet also trying to develop new products for those customers that they do not yet serve.
2. Name the reasons for limiting innovative initiatives include.
3. Identify the rules for transferring creative initiatives.
4. Discuss the features of organization of inventive and innovative work at the enterprises.

Theme 5.

FORMS OF INNOVATION ACTIVITIES AT THE ENTERPRISES



LESSON OUTLINE

- Introduction of new products and technologies, developed by the company itself or by external bodies
- Intellectual property objects
- Specialized innovative enterprises, the main characteristics of the innovative enterprise

LEARNING OBJECTIVES

After going through this lesson the students will be able to:

- explain the significance of technology trajectories for firms investing in technology;
- recognise the importance of firm-specific competencies in generating longterm profits;
- recognise the difficulties of managing uncertainty; and
- identify the activities performed by key individuals in the management of innovation



5.1. INTRODUCTION OF NEW PRODUCTS AND TECHNOLOGIES, DEVELOPED BY THE COMPANY ITSELF OR BY EXTERNAL BODIES

Promoting innovative (scientific and technical) products to markets is connected with features of the relevant markets and products. These include the following:

- innovative products as a result of innovative activity can become a commodity on almost all phases and stages of an innovative cycle, except those results which make the state secrets;
- consumers of scientific and technical products at all stages of an innovative cycle are subjects of managing, i.e. developers of scientific and technical products are suppliers of an innovative product for its use in innovative activity of the consumer;
- the market of innovations is most often new both for the seller, and for the buyer owing to novelty of offered goods;
- it is the market with small elasticity of demand from the price, that is the price policy only slightly influences sales volumes especially at the first stages of life cycle of an innovative product as goods;
- the market of innovations rather narrow in comparison with other markets. Especially it concerns scientific, technical and knowledge-intensive products of manufacturing purpose;
- the market of innovations is characterized by the exclusive degree of uncertainty of result (risk) caused by unpredictability of consumers reaction on an innovative product.
- it can be no direct competitors on the market owing to monopoly for intellectual property;
- not only developers of innovative products and its consumers are subjects of the market, but also intra-branch and external competitors, producers of accompanying products and services; producers of substitute products. The last two subjects of the market at certain stages of scientific and technical products as goods life cycle can become the strong contenders not less dangerous, than intra-branch competitors.

Innovations are characterized by short or long life cycle. Innovations in the field of information and communication technologies, consumer goods usually have short life cycle as updating of products in the market happens very quickly. The majorities of the small innovative companies are connected with production of short - time innovations and, owing to their flexibility, have a possibility of fast transition to release of other product. Besides, the small innovative companies

are limited in primary financial resources for introduction of innovations with long life cycle.

Innovations with long life cycle are in demand of considerable initial investments, but have an impact on the market for a long time. The large companies are more interested in innovations with long life cycle as they allow them to play an important role in the market for a long time. This approach also defines a various marketing policy. As the small innovative enterprises enter already existing market of products, they have to actively advertise their product to secure a certain share of the market.

The large enterprises often form the new market of products. In this case buyers need more time to understand that a new product is required.

Distinction in innovations promotion by small and large innovative enterprises defines also a different approach to the use of intellectual property objects (OIP) and licenses. It is necessary also to estimate an interest of the businessman to rather widely use intellectual property.

5.2. INTELLECTUAL PROPERTY OBJECTS

At introduction of objects of intellectual property in a civil turn the solution of a question on a form of use of this object always is necessary to the owner: to do it in own production or to choose one of forms of commercial use. According to recommendations of the World Intellectual Property Organization commercial transfer of OIP can be carried out as follows:

- sale of all exclusive rights on OIP by the owner;
- licensing;
- know-how transfers.

In addition, there are another forms of OIP commercialization such as paying in authorized capital of the enterprise, getting a credit against security of OIP, franchising. To choose an optimum decision of commercial OIP use the following should be done:

- patent research aimed at determining a technological level and trends of development of objects of innovative activity, their patentability, patent purity, competitiveness on the basis of patent and other information;
- the market research including study and analysis of developed new goods competitiveness factors using inventions and other OIP, and also research of tactical forming factors of the market and prospects of its development during life cycle of goods inventions.

Choosing a form for OIP use is carried out on the basis of possible options comparison. Use of intellectual property objects (for the industrial enterprises first of all, of industrial property objects (IP)) in the own production is the most effective option. After all in this case all profit on use of given object remains at the industrial enterprise possessing exclusive rights on it.

However there is a variety of reasons making the use of industrial property objects owned by industrial enterprise, in own production complicated:

- there is no possibility on industrial enterprise to finance production using objects of industrial property owned by the given enterprise;
- the cost of production made using industrial property objects owned by the enterprise will be obviously too high to provide the necessary volume of realization and profit;
- manufacture of products mentioned above doesn't correspond to a profile of primary activity of the enterprise;
- legislation doesn't allow to organize manufacturing and sales of products using the given industrial property object.

If it is impossible to organize own production using given OIP it may be possible to sell the license for the right to use object of industrial property. The profit from such form of commercial use of industrial property object, as experts estimated, will be for 70-90% less than from application of the previous option. However trading licenses can make sometimes much more profit than the organization of own production.

Very often the best option will be combined form of commercial use of industrial property object at the industrial enterprise i.e. both own production and sale of licenses.

Sale of all exclusive patent rights by the owner is a full assignment of industrial property object from one subject to another without time limitation (certainly, within period of this right validity according to the legislation) and without limiting the territory (within the territory of action of a transferred exclusive right).

Licensing is granting by the patent owner to other physical or corporate body of the permission to commit one or more actions in a certain country during the limited period of time. The owner of the patent issued in the given country has an exclusive right to commit actions mentioned above. License agreement (contract) that secures such a deal is the most common means of transmitting rights for use of the industrial property objects protected owing to the state registration. License trade is the main form of technology transfer.

The license contract is characterized by the following main indicators:

- conditions of the license usage;

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- the volume of the rights transferred under license;
 - mode of license object legal protection (patent law object, means of an individualization, copyright object);
 - nature of license object usage (industrial or commercial);
 - degree of industrial development of license object (at a stage of idea, technical solution, industrial development, etc.).

Cash award as a payment for the license acts as a payments under a licensing agreement of three types:

- royalty;
- lump-sum payment;
- the combined payment.

The royalty is a license remuneration in the form of periodic assignments (a share from profit or amount of sales of products made on licensed technology). In pure form or in combination with other types of payment these assignments are the part of the majority (up to 90%) of license agreements. Royalty are usually paid at the end of every year of the agreement action, starting from the moment of finished goods release. In the presence of a condition on payments in the form of a royalty in the contract, the condition about the minimum guaranteed payments can be there as well. In long-term relations the differentiated rates that vary by years are applied. Specific rates cuts when sales grow are used for stimulation of the licensee to expansion of volume of output. Such form of payments is connected first of all with desire to share risk. In case of failure with license product manufacturing losses will be sustained both by the licensee and the licensor.

Lump-sum payment represents payment of firmly fixed sum of license remuneration at once or by 2-3 portions i.e. doesn't depend (formally) on the volume of realization of products made under licenses. In this case all risk is taken by the licensee that is good for the licensor. But, on the other hand, licensee will lose a chance to get super-profits in case of unexpected success of a license product.

In practice the combined payments including the initial sum in the form of lump-sum payment (10-13% of the total price of the license) and the subsequent periodic assignments (royalty) are used most often.

The problems connected with commercial use of IP can be divided into the following main groups:

- 1) problems of regulation of the relations at creation of IP objects at the enterprise;
- 2) problems of acquisition and payment of property rights on use of IP objects created outside the enterprise;

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- 3) problems of ensuring protection (safety) and legal protection of IP objects;
 - 4) problems of commercial use of IP as property (intangible assets) of the enterprise;
 - 5) financial and economic problems of use of IP and the organization of its accounting.

5.3. SPECIALIZED INNOVATIVE ENTERPRISES, THE MAIN CHARACTERISTICS OF THE INNOVATIVE ENTERPRISE

As experience shows, the majority of the small innovative enterprises work at some stages of product (innovation) life cycle. Large organizations often work at all stages of innovation life cycle. Let us consider distinctive features of some types of the organizations (enterprises) which are engaged in different degree in innovative activity. We will provide only brief information about them (see Table 5.1). Any organizational and legal form of the listed innovative organizations is possible.

The last decades of XX and the beginning of the XXI centuries are characterized by activation of processes of internationalization, globalization and integration. Therefore the most perspective form of integration at microlevel now is the cluster form. The task of clusters is creation of the economic blocks (clusters) in national economy which include firms and the organizations, connected by manufacturing of end products and a geographical position.

Thus the area in which they are settled down should be considered as place of accumulation of "the critical weight" of social and human capital, scientific, innovative and production potentials. Only if such a combination exists clusters are steady, systemically emerge and competitive. Clustering is already spread in more than 50% of leading countries economies and it acts as a new vector of world economic system development.

Clusters characterized by such key elements as: geographical concentration; specialization; set of characters; competition and cooperation; critical weight; cluster life cycle; innovation.

Geographical concentration of clusters facilitates an exchange of ideas and people, specific natural resources or other unique local assets becoming more affordable. It, in turn, encourages and strengthens innovative activity. Nature of cluster specialization is not necessarily limited by any sector. Clusters can develop in the combined directions when they are exposed to internal or external influences. The interconnected specialized suppliers and the qualified consumers increase competitiveness of a cluster in the global markets. Clusters

also can create intensive alliances with various organizations, such as universities, research institutes, the public authorities, the organizations of consumers, etc.

Table 5.1 Distinctive features of the progressive specialized and large complex innovative organizations

Type of organization	Definition of activity	Distinctive features of the innovative enterprises
Marketing organization (MO)	The organization which is engaged in market segmentation, competitiveness standards development, marketing concept implementation in innovative enterprise units, innovative enterprise strategy development, distribution system definition, advertizing and stimulation of sales of goods acceleration	<p>Marketing is subdivided on strategic and tactical ones. Strategic marketing is directed on implementation of the marketing concept at the first stage of product life cycle (LCP) and the first function of management. If for the sake of momentary resources savings modern research methods will not be applied at this stage then at the subsequent LCP stages organization will suffer losses, in hundreds and thousands times exceeding the economy received earlier. It is necessary to produce what buyer awaits, and not what you are capable of producing.</p> <p>Distinctive MO features.</p> <ul style="list-style-type: none"> – orientation of all activities to perspective and to consumer; – progressive system of research information support; – professionalism and high salary of employees; – skill to communicate, mobility and comparative youth of the personnel; – high culture of customer service
Research Organizations (RO), Research Centers (RC)	Organizations which are engaged in scientific and experimental assessment of competitiveness of goods standards materialization possibility, development of innovations, their testing and diffusion	<p>Results of market and scientific research in the form of novelties will be embodied in the relevant documents (inventions, patents, methods, a know-how etc.) at a stage of fundamental and applied research. These novelties can be implemented within own enterprise, i.e. will turn into innovations, or can be sold so that commercial result will be received.</p> <p>Distinctive RO/RC features:</p> <ul style="list-style-type: none"> – implementation of marketing concept; – very high level of funds and information provision of research staff work; – compliance of working conditions to the international standards; – freedom of creativity; – high culture.

Type of organization	Definition of activity	Distinctive features of the innovative enterprises
Manufacturing enterprise (organization)	The organization which is engaged in development of new products manufacturing, mass production, tactical marketing and sales of manufactured products	<p>The manufacturing enterprise is engaged in a materialization of innovations results. At high quality of preliminary production works it is required to provide high quality of products manufacturing, tactical marketing, sales. Innovations implemented in production therefore the commercial result of innovative activities will only come after sales.</p> <p>Distinctive features of manufacturing enterprise:</p> <ul style="list-style-type: none"> – carrying out high-quality market research of the enterprise "entrance" (suppliers) and "exit" (consumers); – existence of the modular integrated easily readjusted technology ensuring product quality and saving resources.
Scientific Parks (SP)	Innovative organizations incorporated with large scientific centers (universities, institutes)	<p>Distinctive SP features:</p> <ul style="list-style-type: none"> – existence of the innovative center or university, higher education institution with a high scientific potential; – high level of research and development novelty. <p>There are three types of SP:</p> <ul style="list-style-type: none"> – SP in the narrow sense of the word, only involved in research; – research parks where innovations is brought to a stage of a technical prototype; – c) incubators (in the USA) and the innovative centers (in Western Europe) within which universities "shelter" newly emerging companies, providing them with land, laboratory equipment, etc., for a modest fee.
Industrial Park	Compactly located complex functioning of which is based on commercialization of scientific and technical activity and acceleration of innovations advancement to goods production	<p>Distinctive features of Industrial park:</p> <ul style="list-style-type: none"> - presence of organizations which form full cycle of innovation production: from ideas to promotion of innovations to the market (scientific institutions, higher education institutions, industrial enterprises, service departments etc.); – compact location; – area limitation; – availability of good quality infrastructure; – location in environmentally friendly picturesque areas; – high efficiency of innovative activity.

Thus, forms of innovative activity at the enterprises depend on the size of the company, a choice of development strategy, a field of activity, degree of involvement in cooperation with other participants of the market.



DISCUSSION QUESTIONS

1. Can organisations operate across the entire spectrum of innovation activities?
 2. Explain the fundamental dilemma facing organisations and the tensions it creates.
 3. Explain how technology differs from science, yet still does not equal innovation.
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Theme 6.

VARIOUS ORGANIZATIONAL FORMS OF INNOVATIVE



LESSON OUTLINE

- Classification of innovative enterprises
- Innovation strategy of enterprises
- Strategy of Violents, Patients, Commutants, Explerents

LEARNING OBJECTIVES

- provide an understanding of the concept of the innovative enterprises;
- recognise the importance of technical and commercial capabilities in innovation management;
- recognise a variety of different innovation strategies; and
- distinguish different innovation enterprises



6.1. CLASSIFICATION OF INNOVATIVE ENTERPRISES

Organizational structure of innovation management is the organization involved in innovative activities, research and development. **Scientific organization** is the organization (institution, enterprise, company) for which the R&D is the main activity. Scientific research and developments may be the general kind of activity for the department which is also part of the organization (institution, enterprise). Presence of such departments is not dependent on belonging to one or another sector of the economy or legal organizational form of ownership.

In accordance with the recommendations of the Frascati Manual (2002 Edition), the following is the classification of scientific organizations by sector of science and types of organizations united by organizational characteristics and specialization of work.

Table 6.1 Classification of innovative enterprises

Sector	Contents
State	Organizations providing management for the State and meeting the society demand at large (defense, public order, public health, culture and leisure, social security). Non-profit organizations which do not make a profit but mainly involved in the research activities related to public and administrative functions.
Entrepreneurial	All organizations and businesses whose main activity involves production of goods or services for sale, including state-owned and venture entrepreneurs.
Higher education institutions (HEIs)	Universities and other HEIs, regardless of funding source or legal status. Research institutes, innovation centers which are under direct control or management, or associated with universities.
Private non-profit (non-commercial)	Private organizations (professional societies, unions, associations, public and charitable organizations, foundations) which not keen to get profit.

Among the organizational structures of innovation management special role belongs to **small firms** because small groups are more mobile, better perceived and generate new ideas. For example, in the United States 7 of the 13 most important inventions in the steel industry were created by independent inventors and all others by small firms.

Small Research Business was formed about 60 years ago in the 20th century. Small and medium-sized research firms were often created near the university

centers, jointly renting and using land, laboratory and information technology equipment from the universities.

For example, there are more than 3,000 small and medium-sized electronic firms located around Stanford University which employs 190-200 people each. Each of them focused on the development of one or two kinds of new products, and generally provides 20% of world demand for computer and electronic components of a particular species. In the Japanese Processing Industry there are 750,000 factories, 70% of them are small businesses employing from 1 to 9 people, and 10% are companies employing 10-20 people. All of them have also been implicated in innovative activity.

The American practice of organizing exploratory research has generated entrepreneurship in the form of **venture business**. It is represented by small independent firms specializing in research, development and the manufacturing of new products, created mainly by research scientists, engineers and innovators. Venture businesses have circulated in the United States, Western Europe and Japan.

6.2. INNOVATION STRATEGY OF ENTERPRISES

General Strategy of Organization

Strategy is the creation of the unique and advantageous position which provides certain choices of activities. Michael Porter's different variants of common strategies reduced to the three basic types of strategies: **stability, growth, reduction**.

1. The **stability strategy** is focusing on existing lines of business and supporting them. It is typically used by large firms.
2. **Growth strategy** involves organization increase, often through penetration and capture of new markets. Growth strategy could include vertical or horizontal integration.
3. **Reduction strategy** may be applied in cases when the survival of the organization is threatened. Its varieties shown below:
 - *Reversal Strategy*. It is used if the organization is not effective but has not yet reached its critical point. This strategy means giving up producing unprofitable products, surplus labor force, poor working distribution channels and further search for effective ways of using resources mechanism.
 - *Separation Strategy*. If a company has several types of business and at the same time one of them does not work well, it can be waived. Sale of

this business unit or its transformation into a separate operating company is a good way to proceed.

- *Liquidation Strategy*. When approaching critical point (bankruptcy) closing process (liquidation) and selling business assets will occur.

The main innovation strategy

The basis for the development of innovative strategy constitutes the theory of product life cycle (PLC), the market position of the organization and its science and technology policy. As a model, usually one of the following types of investment strategy is taken:

1. *Offensive innovation strategies* are typical for firms whose activities are based on the principles of business competition. They are inherent to small innovative organizations.
2. *Defensive innovative strategies* are aimed at keeping the organization's competitive position on existing markets. The main function of such strategy is to strengthen the relation "input-output" in the innovation process. This type of strategy requires intensive research and development (R&D).
3. *Innovation imitation strategies* are used by organizations or those having strong market position and technology but are not pioneers in the market of various innovations. The essence of the model is the production of basic consumer properties using copied (but not necessarily technical features) innovations and placed on the market by small innovative organizations or leaders.

Choice of innovation strategy

Innovation strategy is based on the principle of "time is money". Choice of innovation strategy is based on the stage of the product life cycle. According to modern science, in any given time period the competitive production unit (organization, institution), specializing in the production of products to meet specific social needs, is compelled to work on the goods directly relating to the three generations of technology: the outgoing, the prevailing and emerging (prospective).

Professor Porter identifies three types of strategies: **cost leadership**, **differentiation** and **focus**. They were first set out by Michael Porter in 1985 in his book "Competitive Strategy: Techniques for analyzing industries and competitors" (Figure 6.1).

Target/Market Scope	Advantage		
	Low Cost	Product/Service Uniqueness	
Broad (Industry Wide)	Cost Leadership Strategy	Differentiation Strategy	Industry-wide
Narrow (Market Segment)	Focus Strategy (low cost)	Focus Strategy (differentiation)	Focus

	Cost	Differentiation
Industry-wide	Lowest cost across the industry	Better product/service across the industry
Focus	Lowest cost within an industry segment	Better product/service within an industry segment

Figure 6.1. Porter, M.E. *Competitive Strategy: Techniques for analyzing industries and competitors* New York: The Free Press (1980)

The *low cost leader* in any market gains competitive advantage from being able to produce at the lowest cost. Factories are built and maintained; labor is recruited and trained to deliver the lowest possible costs of production. “Cost advantage” is the focus. Costs are shaved off every element of the value chain. There are two main ways of achieving this within a **cost leadership strategy**:

- Increasing profits by reducing costs while charging industry-average prices.
- Increasing market share through charging lower prices while still making a reasonable profit on each sale because you've reduced costs.

Differentiated goods and services satisfy the needs of customers through a sustainable competitive advantage. This allows companies to desensitize prices and focus on value that generates a comparatively higher price and a better margin. The benefits of differentiation require producers to segment markets in order to target goods and services at specific segments, generating a higher than average price.

To create a successful **differentiation strategy**, organizations need:

- Good research, development and innovation.
- The ability to deliver high-quality products or services.
- Effective sales and marketing so that the market understands the benefits offered by the differentiated offerings.

The focus strategy is also known as a '**niche**' strategy. Where an organization can afford neither a wide scope cost strategy nor a wide scope differentiation strategy, a niche strategy could be more suitable. Here an organization focuses its effort and resources on a narrow, defined segment of a market. Competitive advantage is generated specifically for the niche. A niche strategy is often used

by smaller firms. A company could use either a cost focus or a differentiation focus.

Hybrid Strategy (*combination of cost leadership and differentiation strategies*).

This new **hybrid strategy** may become even more important and more popular with increase of global competition. Compared to companies relying on a single generic strategy, companies that integrate the generic strategies may position themselves to improve their ability to adapt quickly to environmental changes and learn new skills and gain new technologies. This would more effectively leverage core competencies across business units and product lines, and would also help produce products with differentiated features or characteristics that customers value, and provide these differentiated products at a low cost, compared to competitors' products.

This is because of the multiple, additive benefits of successfully pursuing the *cost leadership* and *differentiation* strategies simultaneously. *Differentiation* enables the company to charge premium prices and *cost leadership* enables the company to charge the lowest competitive price. Thus, the company is able to achieve a competitive advantage by delivering value to customers based on both product features and low price.

Michael Porter did not solely define the basic competitive strategy.

6.3. STRATEGY OF VIOLENTS, PATIENTS, COMMUTANTS, EXPLERENTS

Violents (*"Overall-cost Leadership strategy" by M. Porter*) defined as a firm with a "power" strategy. They have high capital and technology development. Violents engaged in large-scale and mass production of products for a wide range of consumers, impose "middle terms" for quality and are satisfied an average price level. Company Violents (as patient) are profitable. *Profitableness* is an indispensable condition of firms. They should have a position of an innovation manager and be very careful to change their policies.

Explerents are the pioneers of business (*"Focus strategy" by M. Porter*). The strategies they realize are oriented on risky innovations based on applying the newest highly-efficient technologies leading to maximum profit and venture investments. According to expert's estimations, risks of this type of strategy are extremely high. The most positive approximations give three out of ten venture projects reaching the break-even point; six loose and only one can become highly profitable. Explerents can't independently replicate innovations. Procrastination is threatened too with the emergence duplicating copies or analogues. Union with a strong firm (even under condition of uptake and

subordination) allows to achieve favorable conditions and even save a certain autonomy.

Patients (*"Differentiation strategy" by M. Porter*) are placed into (tied to) niche specialism and production of small batch of elite goods and overcharge purchasers. Usually their goods are of very elastic demand and is what commits them to the tough forms of competitive struggle; meeting the needs of the market generated by the action of fashion, advertising and other media. Patients operate on the stages of growth of output and simultaneously on stage of decreasing inventive activity.

Commutants (*"Focus strategy" by M. Porter*) are small, non-specialized companies. They are very flexible and use any possibilities for business, but usually don't possess extended manufacturing or Research and Advanced Development capacities. Commutants cover the remaining parts of the market. These companies tend to replicate the competitors' commercial secrets rather than create themselves. This is why we do not emphasize their role in our research. They take everything that does not cause interest at Violent, Patient and Explerent. Their unification role is connecting; therefore, they were called "communicator". They actively contribute to the promotion of new products and technologies on a massive scale creating new services on their basis. It accelerates the process of diffusion of innovations. Innovative management companies should be well versed in the specifics of buyer of the goods, the situation on the market, and also precisely, quickly and reliably anticipate potential crises.

Another way to market is the creation and development of the pioneering explerent companies. The founders of the company, breaking consumer's stereotypes and business traditions are forced over a long period of time to overcome the inertia of the market. Further development of the company takes place within the *violents strategy*. Thus, the numbers of cases with positive developments dynamics of firms are limited as follows:

1. Commutant → Violent → Patient;
2. Explerent → Violent → Patient;
3. Explerent → Violent.

Based on this scheme, the management of any company for developing the strategy should be defined depending on answers to the following questions:

1. What type of strategy is mainly used for the firm's current business?
2. What are the possible scenarios for its further development in the desirable and undesirable directions?
3. What should be done for the development of the company in the required direction?

The importance of the R&D development in entrepreneurship is that it creates structures that support and stimulate the development of small innovative enterprises. These are technology parks, innovation and business incubators which can be implemented to any profitable project.

Business incubators are usually patronized by the bank, ready to invest some venture capital into incubator projects. **Business angels** are private investors putting money into innovative projects (StartUp) start-ups in exchange for a return of investment and share in the capital. Business angels invest some of their own funds in the most innovative companies on the early stages of development: this is the “seed” (seed) and the initial (start-up) support of their technical and commercial development.



DISCUSSION QUESTIONS

1. Difference between three types of strategies: cost leadership, differentiation and focus.
 2. Discuss the main organisational characteristics that facilitate the innovation process.
 3. Explain the features of strategy of Violents, Patients, Commutants, Explerents.
 4. Name the numbers of cases with positive developments dynamics of firms.
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Theme 7.

STATE REGULATION OF INNOVATION ACTIVITIES



LESSON OUTLINE

- The role of the state and national 'systems' of innovation
- The notion of intellectual property. International scientific and technological cooperation
- Fostering innovation in 'late-industrialising' countries

LEARNING OBJECTIVES

After going through this lesson the students will be able to:

- understand the wider context of innovation and the key influences;
- recognise that innovation cannot be separated from its local and national context and from political and social processes;
- understand that the role of national states considerably influences innovation; and
- identify the structures and activities that the state uses to facilitate innovation



7.1. THE ROLE OF THE STATE AND NATIONAL 'SYSTEMS' OF INNOVATION

To support our understanding of the process of innovation within the enterprise we must also grasp a basic understanding of the way the economy interrelates with global and regional economies on local and national levels. Not only do national economies tend to be dominated by a form of economic organisation (e.g. the *Chaebol* in South Korea or *Keiretsu* in Japan), it is also the case that the relationship between state and business differs radically from one national space to the other. Such interrelationships in society generate a business environment with a unique business value system, attitude and ethic. Historically, this difference created advantages and disadvantages for business organisation across a range of activities, the most important of which may be perceived as the process of innovation. This would seem to be the case given the crucial role played by innovation in the history of capitalism.

The answer to the question of whether there is a role for the state in the process of innovation has been addressed in different contexts (e.g. Porter, 1990; Afuah, 2003). The literature on the subject has attracted attention to the following points, where state action may be necessary:

1. *The 'public' nature of knowledge that underpins innovation.* This refers to the role that can be played by the government in the process of idea generation and its subsidisation and distribution. This way, economic actors may be stimulated to work on new ideas, alongside state organisations, and may endeavour to convert such ideas into marketable goods or services. For instance, by granting intellectual property rights to producers of knowledge and by establishing the necessary legal infrastructure to support those rights, the state may promote knowledge generation.

2. *The uncertainty that often hinders the process of innovation.* Macro-economic, technological or market uncertainties may hinder innovation. When the companies are risk-averse in investing funds in innovation projects, then the state may promote such activities through subsidising, providing tax advantages and supporting firms to join R&D projects. Forming a stable economic environment, where funds could be extended by the banking system to productive firms, also creates a favourable long-term perspective, for one of the first preconditions of strategy making is economic stability. Thus, expectations of low inflation, low interest rates and stable growth will encourage firms to invest in entrepreneurial activity (particularly given that other areas, e.g. portfolio investments, are less profitable to invest in).

3. *The need for certain kinds of complementary assets.* Provision of electricity, roads and water has historically assisted industrial development; recently, the establishment of communication systems (e.g. communication superhighways),

legal infrastructure and the formation of industrial districts have been issues where state action has led to favourable outcomes with tangible and intangible conditions created for enterprises.

4. *The need for cooperation and governance, resulting from the nature of certain technologies.* For the development of possible networks, which will enhance and promote the diffusion of new technologies and innovations, the state may set the vision and enhance the possibilities for better communication and joint decision making.

5. *Politics.* Lastly, in terms of politics, national states still have a key role in foreseeing and contributing to international and regional standards of business making within the system of 'national states' and in creating consent and cohesion in the national arena among domestic forces. Such standards are increasingly becoming environmental, safety and human rights standards in industrial or business activities.

7.2. THE NOTION OF INTELLECTUAL PROPERTY. INTERNATIONAL SCIENTIFIC AND TECHNOLOGICAL COOPERATION

The need for state regulation of innovation processes caused by objective circumstances of all countries' economic development. Innovations in modern society are becoming a factor of economic growth stabilizing and national security strengthening. Therefore, the state must exercise its regulatory impact on innovation processes.

In different countries, the process of state regulation of innovation processes can occur in different ways, which is reflected in the state legislative acts.

Japan has a minimum of own natural resources at its disposal, therefore the government considers the scientific and innovative policy as a most important means of stimulating overall economic growth and enhance the international competitiveness of the country. The Japanese government does not manage industrial development as the decision-making authority, a mutual partnership probably exists between the elements of the state apparatus and the industry sector based on pragmatic solutions, mutual respect, coordinated activities aimed at achieving common goals.

In France the level of centralized regulation of innovation is the highest, research are recognized as national program and presented in the form of five-year strategic research plans.

In England there is no system for innovation's centralized control, but well designed interaction mechanism exists, enabling the coordination of innovations development at the state level.

In the U.S., economists and sociologists see in the venture business a deliberate entry of the U.S. economy in a phase of growth of the new "Kondratiev cycle".

State regulation of innovative activities should be done by:

- identification and support of innovative activities priorities directions on state, sectoral, regional and local levels;
- formulation and implementation of national, sectoral, regional and local innovation programs;
- creation of the legal framework and economic mechanisms to support and stimulate innovative activities;
- protection of the rights and interests of the subjects of innovative activity;
- financial support of the innovation process implementation;
- introduction of preferential taxation of innovative activities;
- support of the operation and development of modern innovation infrastructure.

Thus, there are four main forms of innovative activities support (Fig. 7.1).

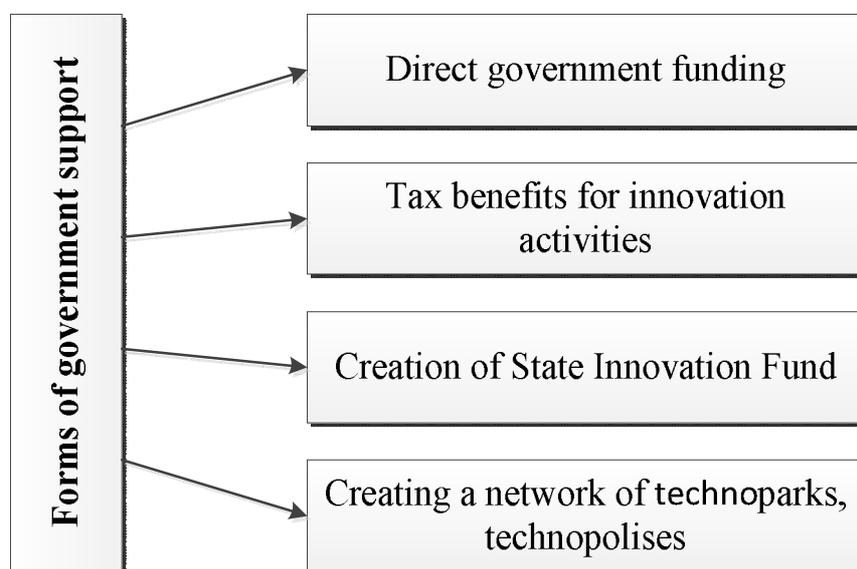


Figure 7.1. *Forms of public innovation support*

State regulation of innovative activities requires an effective management mechanism, that is a set of tools (economic, motivational, organizational and legal) for purposeful influence of subjects of innovative activities state regulation in order to achieve an indicated aim.

There are roughly four options for innovative policies that were the priorities during different periods (in various combinations) in developed countries (Fig. 7.2).

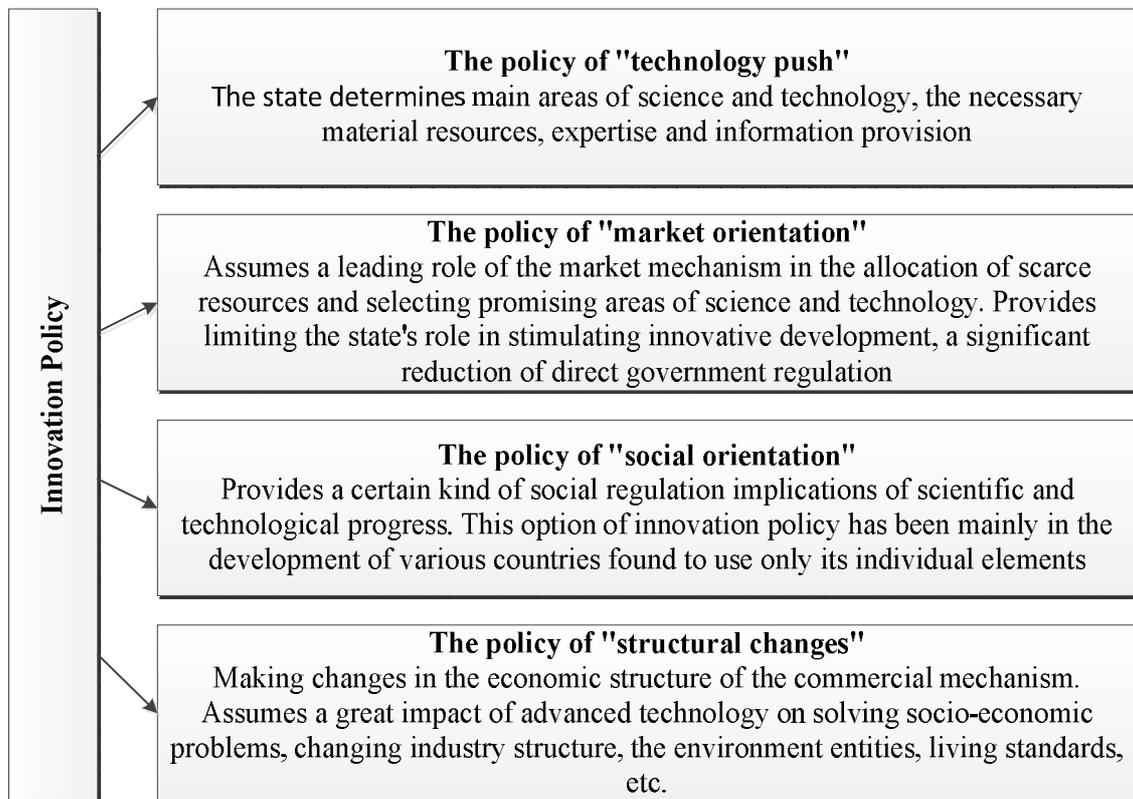


Figure 7.2. Types of innovation policy

Features of implementation of purposeful influence of subjects of state regulation on each stage of innovation process should be taken into account during the process of state regulation of innovative activities.

Some specific features of state regulation of innovation processes at the national and regional levels are shown in table 7.1.

International experience on influence on the innovative processes indicates a lack of formal criteria which would ensure effective scientific, technological and innovative development. Each state creates its own national innovation system through which exercises in particular government regulation. This regulation includes measures of state support for innovative activities and aimed at ensuring economic growth of the state and improvement of its competitiveness.

Table 7.1 Features of state regulation of innovation processes

Stages of the innovation process	The level of government regulation	
	state	regional
Fundamental research	Almost completely organized and funded by the state	There is indirect interference in economic activities of relevant scientific (research) institutions as the organizations that operate on the certain territory; coordination of activities in some areas
Applied research		
Development and design	The government can stimulate innovative activities through tax remissions, direct financial assistance from centralized funds, etc.	Subjects of state regulation of innovative activities at the regional level can assist in accessing technology, cancellation (reduction) of some local taxes, carry out direct financial assistance from regional budgets, etc.
Trial Introduction		
Industrial production	Intervention of state or municipal enterprises in economic activities	
Marketing	Public authorities provide access to relevant statistics and background information	
Sales	The state takes measures (legislative and administrative) to protect domestic producers, to lobby their interests in foreign markets, to organize public and international exhibitions, presentations, fairs, PR-campaigns, etc.	Majority of innovative products procurement is organized through a system of government orders; assistance provided through the provision of equal and transparent access to the competition and the organization of regional and interregional exhibitions, fairs, presentations, PR-campaigns, etc.

7.3. FOSTERING INNOVATION IN 'LATE-INDUSTRIALISING' COUNTRIES

There is no guarantee for continued technological leadership. The geography of innovation has shown regional, national or local variations in time. One proof in this regard has been the case of south-east Asia. Although the late developers followed more or less similar paths towards industrialisation, some managed significant achievements, particularly in the attitude of the private sector to innovation and technology development (for example, Taiwan, Malaysia and Korea). Almost all latecomers started with the exports of basic commodities, and through the application of a mix of policies in different periods, they aimed for industrialisation. When innovation is considered, the focus of entrepreneurs and

businesses was initially on imitative production (so-called ‘reverse engineering’) in relatively unsophisticated industries. When the business environment became conducive to business activity, after initial capital accumulation in key industries, then an upward move was observed along the ladder of industrialisation. In many countries such a transformation required an envisioning state, actively interfering with the functioning of the private enterprise system. In some cases, it set ‘the prices wrong’ deliberately (Amsden, 1989) to protect and promote infant industries; in others, it created enterprises itself in order to compensate for the lack of private initiative in the economy (Toprak, 1995).

Although there are significant differences between the cases of Latin American countries and their south Asian counterparts, their paths of industrialisation also bear similarities. Initially, all were exporters of raw materials and importers of highertech products. In achieving the transformation, the move from simple technology sectors towards higher-value-added and heavy industries seems to be the key to their successes. This was achieved with the complementary use of (inward-looking) import-substituting industrialisation (ISI) and (outward-looking) export-oriented (EOI) economic policies. The main difference in south Asian economies, which, in retrospect, seems to be their main advantage, was that after the initial phase of ISI, they opened up to international competition through an EOI regime in contrast particularly to Latin American countries, Turkey and Ukraine.



DISCUSSION QUESTIONS

1. Discuss the tangible features that it is necessary for the state to put in place to foster innovation.
 2. How can the state encourage entrepreneurs and businesses to invest in longer time-horizons?
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Theme 8.

EVALUATING THE INNOVATIONS EFFICIENCY



LESSON OUTLINE

- Methods for evaluating the effectiveness of innovative projects

LEARNING OBJECTIVES

After going through this lesson the students will be able to:

- identify the different types of methods of evaluating the effectiveness of innovative projects.



8.1. METHODS FOR EVALUATING THE EFFECTIVENESS OF INNOVATIVE PROJECTS

Innovative project is a form of targeted innovation management of the company. The process of innovation implementation in the company is based on the developed set of relevant documents and attraction of investment in the innovative projects.

Evaluating the effectiveness of innovation is the most important stage in the process of adopting innovative solutions.

Methods for evaluating the effectiveness of innovative projects:

1) Method of Net Present Value, *NPV*.

Present Value (*PV*) is a formula used in Finance that calculates the present day value of an amount that is received at a future date.

$$PV = \frac{C_1}{(1+r)^n}$$

where:

C_1 – Cash Flow at period 1;

r – Discount Rate;

n – number of periods.

Time value of money is the concept that receiving something today is worth more than receiving the same item at a future date. The presumption is that it is preferable to receive \$100 today than it is to receive the same amount one year from today, but what if the choice is between \$100 present day or \$106 a year from today? A formula is needed to provide a quantifiable comparison between an amount today and an amount at a future time, in terms of its present day value.

Net Present Value (*NPV*) is a formula used to determine the present value of an investment by the discounted sum of all cash flows received from the project.

$$NPV = \sum_{i=1}^T \frac{C_i}{(1+r)^n} - \sum_{i=1}^T \frac{IC_i}{(1+r)^n}$$

where:

C_i – Cash Flow by years;

r – Discount Rate;

IC_i – Initial Investments over the years;

n – the consecutive years of financial resources investment;

T – the number of years of getting a profit from investments.

Or, if the output investments are one-time:

$$NPV = -IC + \sum_{i=1}^T \frac{C_i}{(1+r)^n}$$

When a company or investor takes on a project or investment, it is important to calculate an estimate of how profitable the project or investment will be. In the formula, the $-IC$ is the initial investment, which is a negative cash flow showing that money is going out as opposed to coming in.

The formula for the discounted sum of all cash flows can be rewritten as

$$NPV = -IC + \frac{C_1}{(1+r)^1} + \frac{C_2}{(1+r)^2} + \dots + \frac{C_T}{(1+r)^n}$$

If $NPV > 0$, then the project should be accepted. The owner receives profit.

If $NPV < 0$, then the project should be rejected. The owner will have losses.

If $NPV = 0$, then the project is neither profitable nor unprofitable.

Example: Company will expect to invest \$500,000 for the development of its new product. The company estimates that the first year cash flow will be \$200,000, the second year cash flow will be \$300,000, and the third year cash flow to be \$200,000. The expected return of 10% is used as the discount rate.

Solution: The following table provides each year's cash flow and the present value of each cash flow.

The net present value of this example can be shown in the formula

$$NPV = -500,000 + \frac{200,000}{(1+0,1)^1} + \frac{300,000}{(1+0,1)^2} + \frac{200,000}{(1+0,1)^3}$$

Year Cash Flow Present Value

0 -\$500,000 -\$500,000

1 \$200,000 \$181,818.18

2 \$300,000 \$247,933.88

3 \$200,000 \$150,262.96

Net Present Value = \$80,015.02

Cash flow for the project comes not only at the end or beginning of the year, but may be distributed by month, decades, days and other sub-periods. To determine the *NPV* of the project suggest that payments on the project are received at the end of each sub-period equal amounts. Then, *NPV* during the accounting period *i* years will be:

$$NPV = C \cdot \frac{\left(1 + \frac{r}{t}\right)^m - 1}{r \cdot \left(1 + \frac{r}{t}\right)^m} - IC$$

Example: Investment project brings the annual earnings of $C = \$400\,000$ for $n = 3$ years. One-time capital investments in the project account for $\$600\,000$. Annual discount rate $r = 24\%$. It is necessary to determine the net present value if cash flows are made: a) once a year; b) each quarter; c) every month.

Solution:

$$\text{a) } NPV_1 = 400000 \cdot \frac{(1 + 0,24)^3 - 1}{0,24(1 + 0,24)^3} - 600000 = 400000 \cdot \frac{1,91 - 1}{0,24 \cdot 1,91} - 600000 = 192\,000.$$

$$\begin{aligned} \text{b) } NPV_2 &= 400000 \cdot \frac{\left(1 + \frac{0,24}{4}\right)^{4 \cdot 3} - 1}{0,24 \cdot \left(1 + \frac{0,24}{4}\right)^{4 \cdot 3}} - 600000 = 400000 \cdot \frac{(1 + 0,06)^{12} - 1}{0,24 \cdot (1 + 0,06)^{12}} - 600000 = \\ &= 400000 \cdot \frac{1,01 - 1}{0,48} - 600000 = 240\,000. \end{aligned}$$

$$\begin{aligned} \text{c) } NPV_3 &= 400000 \cdot \frac{\left(1 + \frac{0,24}{12}\right)^{12 \cdot 3} - 1}{0,24 \cdot \left(1 + \frac{0,24}{12}\right)^{12 \cdot 3}} - 600000 = 400000 \cdot \frac{(1 + 0,02)^{36} - 1}{0,24 \cdot (1 + 0,02)^{36}} - 600000 = \\ &= 400000 \cdot \frac{2,04 - 1}{0,24 \cdot 2,04} - 600000 = 400000 \cdot \frac{1,04}{0,49} - 600000 = 248\,000 \end{aligned}$$

2) Method of Profitability Index, *PI*.

This index is an addition to *NPV*.

$$PI = \frac{\sum_{i=1}^T \frac{C_i}{(1+r)^i}}{IC}$$

If $PI > 1$, then the project should be accepted.

If $PI < 1$, then the project should be rejected.

If $PI = 1$, then the project is neither profitable nor unprofitable.

Project profitability index shows the amount of income (asset growth) of the project on monetary unit of investments and the amount of net profit.

3) Method of Internal Rate of Return, *IRR*.

This index is the discount rate when the amount of revenue resulted from the project equal to the initial investment (spending). Assessment of projects with *IRR* is based on determining the maximum amount of the discount rate ($IRR = r$), at which the project will be breakeven ($NPV=0$).

$$\sum_{i=1}^T \frac{C_i}{(1 + IRR)^n} - IC = 0$$

If the project will be financed entirely by loans of commercial banks, then value of *IRR* indicates the upper limit of the allowable level of bank interest rate above which the project becomes unprofitable.

4) Methods of Payback Period, *PP* and Discounted Payback period, *DPP*

The method is aimed at defining the period of investment return. Algorithm for calculating the payback period depends on the uniformity of the distribution of predicted income from investments:

a) if the income is distributed evenly by year

$$PP = \frac{IC}{PC'}$$

where PC' is average annual profit margins;

b) if the income is distributed unevenly: Index of discounted return period takes into account time factor and it is needed the discounting.

Always $DPP > PP$, because the process of discounting is used.

Example: The company reconstructed and for that it was spent \$50 000. As a result, revenue for the billing period in years was under \$ 12 000; 18 000; 20 000; 25 000; 15 000. The discount rate adopted by 20%. It is necessary to determine the payback period using different methods.

Solution:

1. Determine the payback period without discounting cash flows based on the average value of cash inflows.

The average value of cash flows will be:

$$C_{av} = \frac{12 + 18 + 20 + 25 + 15}{5} = 18000$$

$$PP = \frac{50}{18} = 2,78 \text{ years}$$

2. Calculate the payback period taking into account the discounted cash flows at the discount rate $r = 0,2$.

Discounted flow cash over the years will be:

$$C_1 = \frac{12}{(1+0,2)^1} = 10\,000; C_2 = \frac{18}{(1+0,2)^2} = 12\,500.; C_3 = \frac{20}{(1+0,2)^3} = 11\,600;$$

$$C_4 = \frac{25}{(1+0,2)^4} = 12\,000; C_5 = \frac{15}{(1+0,2)^5} = 6\,000$$

Based on the data of cash flow, we define its average value:

$$C_{av} = \frac{10 + 12,5 + 11,6 + 12 + 6}{5} = 10\,420.$$

The payback period on the basis of discounting:

$$PP = \frac{50}{10,42} = 4,79 \text{ years}.$$

6) Method of Break-Even Point Analysis.

The method essence consists in determining the critical volume of sales at which revenues from sales is equal to costs, that is, the sales volume, after which the company will begin to make a profit.

$$X_{BEP} = \frac{A}{V - VC}$$

where:

A – the fixed costs, the value of which does not depend on changes in the volume of sales in the relevant period;

V – the unit price;

VC – the variable cost per product unit.

In this method it is necessary to compare the predicted sales of goods (services) with critical sales. It enables to develop measures to expand the markets.

7) The method of operating instrument (production).

A new production activities, conditioned by capacity reserves capacity and expanding sales, can be evaluated using the operational effect.

$$B_o = \frac{BP - C}{P_r} = \frac{BM}{P_r}$$

where:

BP – the sales revenue;

C – the variable costs of production and marketing;
 P_r – the profit from sale of goods (works, services);
 BM ($BP - C$) – the gross margin.

The greater the impact of operating instrument the greater the business risk.

Evaluation of the effectiveness of innovation should be performed based on complex considering such effects as scientific and technical, social and economic.

Possible **level of risk** must also be taken in attention when assessing effectiveness. Potential losses or gains (of business income) should be found to calculate the **cost of risk**:

$$C_r = P_p - P_p \times I_n + P_p \times I_v,$$

where:

C_r – the cost of risk;

P_p – the planned profit excluding risk;

I_n – the probability of profit loss because of adverse outcomes;

I_v – the probability of a successful outcome.

After determining the probability of risk its acceptable level could be chosen.

When making most management decisions it is recommended to adhere to the "average" level of risk when any possible losses of the planned profit do not exceed 50%. After determining the acceptable level of risk, its management system will be developed, which includes a subsystem of adaptation to risky situations.

The strategy of risk management is the art of risk management in an uncertain economic situation, based on the prediction of risk and methods to reduce it. Rules of risk management strategy are shown in Fig. 8.1.

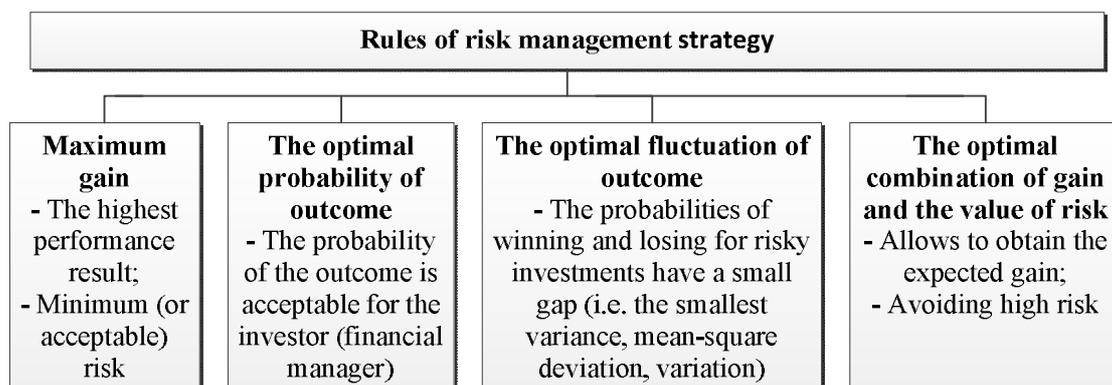


Figure 8.1. Rules of strategy risk management

The methods used in strategic risk management are shown in Fig. 8.2.

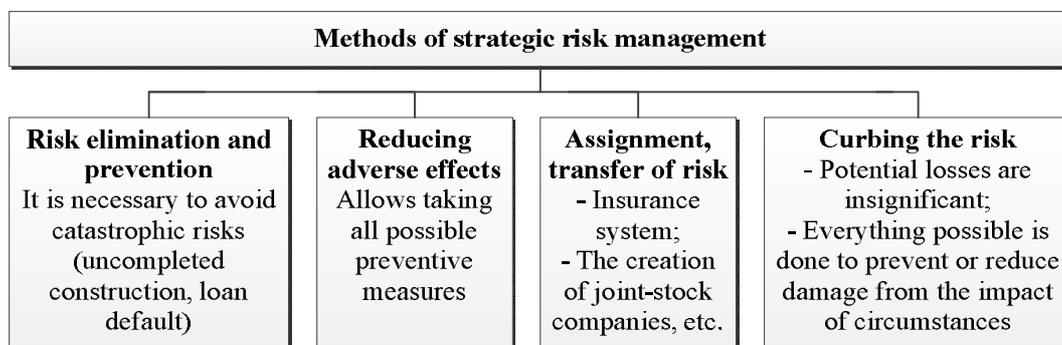


Figure 8.2. Methods of strategic risk management

All rules and methods described above aimed at reducing the risk of the investment project and increase its efficiency.



DISCUSSION QUESTIONS

1. What measures would you apply in assessing the success of a new product?
2. Discuss some of the strengths of different methods for evaluating the effectiveness of innovative projects.

GLOSSARY

Bowman's Strategy Clock is a model used in marketing to analyse the competitive position of a company in comparison to the offerings of competitors.

Brainstorming is a method of searching for innovative ideas based on the group generation of ideas to solve the problem (assuming the prohibition of ideas criticism), followed by their assessment.

Break-even point is the critical output in physical units, production and sale of which provides a break-even enterprise management.

Business angels are private investors putting money into innovative projects start-ups in exchange for a return of investment and share in the capital.

Business environment – is the combination of internal and external factors that influence a company's operating situation.

Business-incubator; firm-incubator is the subject of innovative infrastructure created for the purpose of formation of the new enterprises, workplaces and economic development of the region on the basis of a complex method of the organization of innovative process.

Co-creative Type of Activity represents the staff interactions where each employee enhances his/her own professional competency on the account of collective activity.

Combination strategy: many organizations pursue a combination of two or more strategies simultaneously, but a combination strategy can be exceptionally risky if carried too far.

Commutants are small, non-specialized companies which are very flexible and use any possibilities for business.

Competitive advantage: according to Michael Porter, competitive advantage can be gained through sharing opportunities among a firm's existing and potential business units. Porter's five-forces model addresses the means for gaining competitive advantage in organizations.

Competitiveness of production is the ability of production to meet the market requirements

Cost-effectiveness of innovation is the ratio of economic benefit from innovation to the cost of implementation.

Cost Leadership is the strategy of producing goods at a lower cost than one's competitors.

Customer base – is the group of customers who repeatedly purchase the goods or services of a business. These customers are a main source of revenue for a company.

Consumer properties of production is the set of technical, esthetic and other properties of production creating its useful effect and appeal to consumption.

Differentiation Strategy is one of three generic strategies in which a firm strives to create and market unique products/services for various customer groups.

Discounting is the method of bringing the future value of money to their present value.

Elimination of the dead-lock situations is a method of searching for innovative ideas based on the search for new solutions if traditional ones are not effective.

Explorers are the pioneers of business which strategies are oriented on risky innovations based on applying the newest highly-efficient technologies leading to maximum profit and venture investments.

Focus Strategy is one of three generic strategies in which a firm tries to appeal to one or more customer groups focusing on their cost or differentiation concerns.

Focused Strategy Based on Differentiation: differentiation (quality, brand and customization) depending on its resources and capabilities.

Focused Strategy Based on Cost Leadership: concentrating on a narrow buyer segment and out competing rivals by serving niche members at lower cost than rivals. **Patients** are placed into (tied to) niche specialism and production of small batch of elite goods and overcharge purchasers.

Frugal innovation or frugal engineering – is the process of reducing the complexity and cost of a good and its production.

Idea is a general concept of the product that can be offered on the market.

Idea Incubator is a place where the employees of different company's levels are gathering to produce innovative ideas without any company bureaucracy pressure or interference.

Innovation – is the development and application of new (and/or modification of existing) tools, products, services or processes.

Innovative activities – for proof of scientific and technical ideas, inventions, developments to result suitable for practical use.

Innovative activity is the activity providing creation and realization of innovations.

Innovative Climate is defined as the working conditions established during a certain period of time that contribute to fostering the creativity environment, to the changes and innovations.

Innovative infrastructure is the set of subjects which is carrying out material, technical, financial, organizational and methodical, information, consulting, etc. works aiming the implementation of innovative activity.

Innovative management is the set of the principles, methods, means and control methods aiming the increase of investments efficiency enclosed in its realization.

Innovative marketing is the identification and research of the innovations market, development of the marketing offer on innovation commercialization.

Innovative potential is a set of different resources including the material, financial, intellectual, scientific and technical and other ones necessary for implementation of innovative activity.

Innovative process is the process of consecutive work on transformation of an innovation to production and its promotion on the market for commercial application.

Innovative product concept is considered as innovation idea easily understandable for consumers.

Innovation project (the document) is a set of technical, organizational-legal and accounting-financial documentation required for the project.

Innovative project is a complex system of interrelated and interdependent in resource terms and executing measures to achieve specific goals (tasks) on priority directions of science and technology.

Integrated Innovation – is the coordinated application of scientific/technological, social and business innovation to develop solutions to complex global health challenges.

Intellectual property is the set of exclusive rights on results of creative activity, production, performed works and services.

Investments of innovations is the set of the material and intellectual values invested in implementation of the innovative project.

Kondratiev cycle – averaging fifty and ranging from approximately forty to sixty years, the cycles consist of alternating periods between high sectoral growth and periods of relatively slow growth.

Know-how is the technical, organizational or commercial information having the real or potential commercial value owing to uncertainty to its third parties which isn't present a free access legally; the owner of information takes appropriate measures to protection of its confidentiality.

Life cycle of production is the set of the interconnected processes describing consecutive change of a production condition from initial requirements to utilization.

Marketing is the control system of production and marketing activity based on the complex analysis of the market and providing efficiency of realization of production through satisfaction of needs and needs of the consumer.

Marketing strategy implementation – is traditionally considered as the “doing” stage in the planning process and follows the “dreaming” stage, commonly referred to as strategy formulation.

Model of Horizontal Connections is a model of employees’ interactions, in which the employees of different departments of a company all together contribute into the emergence of innovation products and process.

Morphological maps is a method of searching for innovative ideas based on the expansion of problem solution search area.

New product development (NPD) – is the complete process of bringing a new product to market. A product is a set of benefits offered for exchange and can be tangible (that is, something physical you can touch) or intangible (like a service, experience, or belief).

Nominal interest rate is the current market rate without inflation.

Organizational Culture of innovation team is an integral characteristic that includes the system of values, behavioral modes of employees, management type, the features of control system, assessment modes and motivation system.

Organizational innovation is the innovation connected with creation or improvement of the organization and production management, processes, a manpower.

Patent research (of production) is the research of a technological level and tendencies of production development, its patentability, patent purity and competitiveness.

Patentability is the compliance of estimated industrial property to the criteria necessary for receiving legal protection by the patent legislation of the concrete country (region).

Payback period is an indicator of the effectiveness of innovative investments that characterizes the period during which they fully return.

Process of implementation of innovations is a set performed in a certain sequence of scientific, technological, industrial, institutional, financial and commercial steps to innovation.

Product adaptation occurs when a company modifies a product for a foreign market.

Product innovation is the innovation connected with development and deployment of new or advanced production (products) or other enterprises already realized in work practice and which can be promoted through technological exchange (unlicensed licenses, a know-how, consultations).

Product Life Cycle Analysis is a forecasting technique which analyzes/predicts the performance of a product/service during each stage of its development.

Prototype improvement is a method of searching for innovative ideas based on identifying prototype (the best model on the market) drawbacks and finding ways to improve it.

Quality management is the coordinated activities for the management and management of the organization in relation to quality.

Rapid Cycle Teams are the type of teams in innovation management that have additional resources and powers to finalize the innovation project early.

Rate of return (internal rate of return) is one of the most important indicators for evaluating the effectiveness of innovative investments. It measures the rate of return on a particular innovative solutions, resulting discount rate at which future cash flow value of innovation is reduced to the present value of the invested assets.

Satisfaction of consumers is the correspondence of consumers' implementation to their product requirements.

Scientific activity is the creative activity directed on receiving new knowledge of the nature, the person, the society, artificially created objects and on use of scientific knowledge for development of new ways of their application. Scientific research can be fundamental and applied.

Socio-economic impact assessment focuses on evaluating the impacts development has on community social and economic well-being.

Scientific organization is the organization (institution, enterprise, company) for which the R&D is the main activity.

State Innovation policy is a set of forms and methods of state activity aimed at creating inter institutional mechanisms, resource support and development of innovation, the formation of motivational factors intensify innovation processes.

Stakeholder is a person, group, or business that has an interest in the outcomes of a firm's operations.

Synectics is a method of searching for innovative ideas based on orientation of group of professionals spontaneous intellect functioning (with various types of analogies) for the analysis and solution of the given problem.

Technological park is the subject of innovative infrastructure which is carrying out formation of conditions, favorable for business development in the scientific and technical sphere in the presence of the equipped information and experimental base and high concentration of qualified personnel.

Technology – is the making, modification, usage, and knowledge of tools, machines, techniques, crafts, systems, and methods of organization, in order to solve a problem, improve a pre-existing solution to a

problem, achieve a goal, handle an applied input/output relation or perform a specific function.

The consumer (of production) is the legal or natural person using this production for designated purpose.

The innovative enterprise is the enterprise (association of the enterprises), developing, making and realizing innovative products and (or) services.

The innovation process is the process of creation (development and production) and of commercialization of innovations embodied in new products, technology, management, etc., which have customer value.

The innovative sphere is the sphere of activity of producers and consumers of innovative products (works, services), including creation and distribution of innovations.

The invention is the technical solution which is new, having legal protection, inventive level and is industrial application.

The licensor is the party transferring to the licensee a right to use object of intellectual property according to the license agreement

The licensee is the party acquiring a right to use object of the license according to the license agreement.

The license agreement is the agreement or the contract under which one party transfers to other party a right to use object of the license under certain conditions.

The scientific organization is the legal institution to carry out performance of research, developmental and technological works, and which has necessary facilities and staff (in some countries the procedure of accreditation exists).

Violents: defined as a firm with a "power" strategy, engaged in large-scale and mass production of products for a wide range of consumers, impose "middle terms" for quality and are satisfied an average price level.

RECOMMENDED OR REQUIRED READING

Main:

1. Corporate strategy. SAGE library in Business and Management //Editor Jeffrey A Krug. / James Neelankavill, Roger Bennett, Dan Kiple, Alfred Lewis, Harvard Business R. SAGE Publications, 2008.– 1176 p.
2. Frascati Manual: Proposed Standard Practice for Surveys on Research and Experimental Development, 6th ed. OECD Publishing, 2002. – 256 p.
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4. Managing Creativity and Innovation (Harvard Business Essentials), Boston, Massachusetts, 2003 // Electronic resource. Mode of access: <http://www.amazon.com/Managing-Creativity-Innovation-Business-Essentials>.
5. Peter Drucker Innovation and Entrepreneurship // Electronic resource. Mode of access: <http://ua.bookfi.org/book/1303970>.
6. Peter Merrill Innovation generation: creating an innovation process and innovative culture, 2008 // Electronic resource. Mode of access: http://books.google.com.ua/books?id=4WBpKMnbOJgC&pg=PA39&dq=innovation+process+stages&hl=ru&sa=X&ei=Z7nNUo_eKsap4AT5goHIAw&ved=0CC8Q6AEwAA#v=onepage&q=innovation%20process%20stages&f=false.
7. Rick Eagar, Frederik van Oene, Charles Boulton, Daniel Roos and Cindy Dekeyser. "The Future of Innovation Management: The Next 10 Years", 2011 // Electronic resource. Mode of access: http://www.adl.com/uploads/tx_extprism/Prism_01-11_Innovation_Management_01.pdf.

Additional:

1. Wouter Koetzier, Christopher Schorling 5 Key Points to Consider when Developing an Innovation Strategy // Electronic resource. Mode of access: <http://www.innovationmanagement.se/2013/07/03/5-key-points-to-consider-when-developing-an-innovation-strategy>.
2. Marian Underweiser, Richard M. Ludwin, Marc A. Ehrlich Understanding the Innovation Cycle Electronic resource. Mode of access:

http://www.thersa.org/_data/assets/pdf_file/0020/126542/IBMinnovationcyclesfinal.pdf.

3. Roberta B. Ness (2012) Innovation generation: How to produce creative and useful scientific ideas. Electronic resource. Mode of access: <http://books.google.com.ua/books?id=OFcXfIZgn0C&printsec=frontcover&dq=generation+of+idea&hl=ru&sa=X&ei=0b70UoWTB-jl4QS6qYHgDQ&ved=0CFkQ6AEwBg#v=snippet&q=generation%20of%20idea&f=false>.

Internet based materials:

1. <http://www.nvca.org/>
2. <http://www.evca.eu>
3. <http://innopolis.info/>
4. <http://www.unctad.org/>
5. <http://www.managing-innovation.com/>

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Підписано до друку 04.12.2015. Формат 60×90, 1/16.
Друк лазерний. Папір офсетний. Гарнітура TimesNewRoman.
Умовно-друк. арк. 3,8. Наклад – 100 прим.
Замовлення № 04122015-3

Друк ФОП Паляниця В. А.
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