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# InnoTools



# **INNOTOOLS: INNOSTRATEGY**

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#### INTRODUCTION

The development of this product is the result of the implementation of the contract BMP1/1.2/2370/2017, for the project "Innovations Platform and Tools for increasing the innovation capacity of SMEs in the Balkan – Innoplatform", financed by the EU transnational cooperation programme "BalkanMediterranean" 2014-2020. The project "Innoplatform" is implemented under Priority Axis 1 - "Entrepreneurship and Innovation", SO2: Innovative territories and Investment priority 3d – supporting the capacity of SMEs to grow in regional, national, and international markets, and to engage in innovation processes.

#### OVERALL OBJECTIVE OF THE PROJECT

Developed by 6 PPs covering all 5 countries of the Balkan MED area, the main project objective is to facilitate innovation and support the commercialisation of innovation in SMEs with a focus on growth and internationalization.

#### MAIN ACTIVITIES TO ACHIEVE THE DEFINED MAIN OBJECTIVE

Project's specific objectives are:

- SO1: to assess the current national and regional environment and its challenges when it comes to innovation, growth and internationalization of businesses;
- SO2: to advance existing knowledge and develop common understanding on business model innovation with a focus on internationalization;
- SO3: to develop expertise, tools, and guidelines for strengthening SMEs capacities to introduce product and process innovations;
- SO4: to establish a supporting network of Centres of Excellence in Innovations, to foster transnational cooperation, and provide external expertise and support to SMEs in introducing innovations; and
- SO5: to raise awareness on the importance of innovations for the survival, growth and internationalization of SMEs.

#### EXPECTED RESULTS OF THE PROJECT:

- 1. National and regional assessments on the current environment for innovation, growth and internalization; and
- 2. Two specific web based services (1) InnoScorecard for assessing and ranking the nations/regions; and (2) InnoRegion, a collaborative and informative web based service focused on the dominant industry in the region of each partner.
- Common knowledge and understanding on business model innovations for internationalization in a form of a Study and Guidelines developed though field research
- 4. Set of innovations tools based on web 2.0 (InnoTools) to strengthen SMEs capacity to systematically and successfully introduce product and process innovations

5. Establishment of 6 Centres of Excellence to provide outside expertise and support SMEs in introducing innovations and facilitating their cooperation with the research institutions.

# I BACKGROUND

The importance of innovation for economic development and growth is explicitly stressed in the European Union's economic policy and is confirmed in the assumptions of the most recent strategy for Europe. According to the Europe 2020 strategy the major driving forces, Iveraging countries' development and competitiveness will be: research, innovations and education. "Innovation Union" flagship describes innovation in various aspects including new or upgraded products, processes, services, new business models, and new forms of organization and collaborations. Innovation is defined as an advantageous eco-system for new idea generation and implementation. The focus is placed on innovation in SMEs, identified as the backbone of the EU economy. According to Eurostat data, the number of SMEs in all EU countries exceeds 99% of total companies' number. They employ an increasing number of people which makes SMEs the prevailing part of the economy and its driving force. Therefore European Commission policy in relation to SMEs is mainly focused on the promotion of entrepreneurship and skills; fostering the innovation and growing potential; the improvement of their access to markets and strengthening dialogue and consultation with SME stakeholders. Most SMEs, especially micro- and small ones, are independent and do not belong to any enterprise group, but medium-sized enterprises are often part of a group. This is most widely spread in manufacturing and to a lesser degree in innovative and knowledge-intensive business services, where SMEs traditionally play an important role.

The growth and innovation generating potential of SMEs has been the subject of many studies during the last decades. SMEs are also important in terms of employment and gross value added, especially in smaller countries such as the Balkan-Mediterranean programme countries. In all countries, SMEs are open to internal and international trade. According to SME's Performance Review (EC DG E&I), the Balkan MED region lags behind the EU average when it comes to innovations in SMEs. At the same time according to the Global Competitiveness Index, the region as a combination of efficiency driven (Macedonia, Albania, Bulgaria) and innovation led economies (Greece and Cyprus) lags behind the averages in both groups. Balkan MED is also regionally uneven and may benefit from a stronger transnational cooperation, especially in research and innovation.

There are a number of obstacles SMEs encounter when trying to apply innovations in their products, services and management:

- Deficiency of a strategic plan, particularly in innovation planning and development
- Inappropriate management, which does not tolerate risk taking, failure or anything "out of variance"
- Lack of resources or time for innovation planning, management and execution
- No processes, models or approaches available for moving ideas into execution
- Deficiency of education/training on creative problem solving, idea management and innovation management concepts

These weaknesses could be alleviated by business plans and innovation support management, whether done by independent experts, by special innovation centers or by online web-based tools. These innovations tools, services and guidelines will be useful in strengthening the capacity of SMEs to introduce process and product innovations. The advantages of this approach are the following:

- The web-based services will be available 24x7 regardless of location, while the established Centre of Excellence could assist SMEs from a limited area;
- The web-based services will grant the SMEs a number of scenarios they could follow or adjust to their specific needs;
- The web-based services could be applied as a complement to the local Centre of Excellence. The SME could try various scenarios in their business model creation and innovation support using the web-based tools and then they can contact the CoE experts to adjust the details, to obtain assistance in product prototyping or to discuss the process or product innovation.

The major purpose of each enterprise is to become a successful organization which achieves its goals efficiently. With purpose to do so, SMEs often establish a set of principles the management department follows. As it is known, the innovation development and management is not a single step, but a continuous process, which requires dedicated efforts for innovation culture, mindset and discipline within and across the company. Based on this assumption, SMEs could use the web-based services with purpose to examine new models, products or services and evaluate their plans against different scenarios.

# II. GENERAL TERMS – DEFINITION AND SCOPE

There are several general terms used in all InnoTools Guidelines. These are:

**SMEs (Small and Medium Enterprises)** are defined as "enterprises, or enterprises that employ a maximum of 250 employees with an annual turnover/annual balance sheet that does not exceed 50 million euro." (European Commission, 2005). In the process, we make clear distinction of:

- Micro enterprises consist of 10 or fewer employees and have annual turnover/annual balance sheet that does not exceed 2 million euro;
- Small enterprises have 50 or fewer employees and an annual turnover/annual balance sheet of maximum 10 million euro; and
- Medium enterprises have 250 or fewer employees with annual turnover/annual balance sheet that is no more than 50 million euro.

In InnoPlatform, the focus is placed on the number of employees.

EU uses the definitions of **innovations** coming from the OECD Manual (OECD, 2005), which recognizes four distinctive types of innovations:

- "A **product innovation** is the introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics." (p. 48).
- "A **process innovation** is the implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software." (p. 49)
- "A marketing innovation is the implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing." (p. 49)
- "An **organizational innovation** is the implementation of a new organizational method in the enterprise's business practices, workplace organization or external relations." (p. 51).

**Business Model Innovations** have not yet been sufficiently operationalized neither as a separate type of innovation, nor as a combination of other innovation types. InnoPlatform perceives BMIs as changes of all three components of the business models: 1) value creation, 2) business systems, and 3) revenue generation. In operational terms, innovation activities which result in all four types of innovations are recognised as business model innovations.

#### III. INNOSTRATEGY

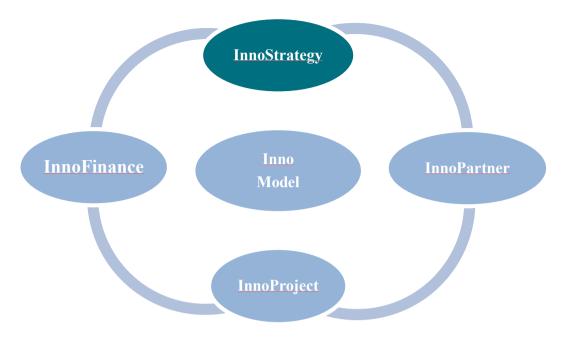
#### 3.1. Description

InnoStrategy is one of the tools from the 5 InnoTools – Figure 3.1., which main aim is to provide a methodological and easy know-how for strengthening the innovation capacities of SMEs.

The five InnoTools are as follows:

- 1. **InnoModel** is knowledge derived from the Business Canvas model. The main aim of the InnoModel is to provide a snapshot of the current business model of SMEs and startups as a reflection of their strategic approach, i.e. business strategy.
- 2. **InnoStrategy**, is a know-how on how to methodologically connect the critical elements of SMEs development strategy, the technological plan, and the plan for positioning of new product/service at markets. The main aim of InnoStrategy is to provide a systematic approach towards the development of innovations, creating a good base for every individual innovation project the SME plans to undertake in the near future.
- 3. **InnoPartner**, is a know-how on how to identify, approach and solicitate Partners for Innovation activities deriving from SME's technological strategy and identified needs in the process of developing and launching new products and services. The main aim of the InnoPartner is to provide a systematic approach in the acquisition of new technology and knowledge required for the innovation projects of SMEs.
- 4. **InnoFinance**, is a know-how on how to approach the financial evaluation and assessment of the company given its business model, and to assess and evaluate its potential innovation projects. The main aim of InnoFin is to provide a systematic approach in deciding which projects should be pursued given a company's development goals.
- 5. **InnoProject**, is a know-how on how to successfully introduce new products/services at the market. The focus of InnoProject is on a single new product/service; therefore, the tool reflects the knowledge from the new product development processes adjusted to the context of SMEs.

Figure 1.InnoTools



Source: Project InnoPlatform, (2018)

**InnoStrategy** is focused on the identification and articulation of the most suitable development strategy for the company by closely exploring the opportunities and threats arising from the markets, the intensity of the competition and company's existing internal resources and capabilities vis a vis the required technologies for development of new products and services, or the introduction of new processes.

As a result, the concept of a development strategy provides two primary mechanisms that link the business planning (InnoModel) and the innovations projects (InnoProject).

- The first mechanism helps in defining the *Development goals*: based on the scanning of the external and internal environment, the SME identifies the market pull and the technology push factors which helps the company in modifying and translating its business strategy into specific development demands. These requirements focus on the characteristics of the development: the number of new products, and the development opportunities.
- The second mechanism is the *Aggregate project plan*, in which the company determines the combination of projects that fit into the business strategy and reflects the internal resources and capabilities of the company.

The potential benefit of the effective development strategy is threefold:

- 1. Better market position;
- 2. Efficient resource utilization; and

3. Improvement of the overall organizational processes and performance.

In the case of a *market positioning*, in an ideal situation, a new product can set the industry standards and create barriers for entry in the competition, or open up completely new markets and expand the competitive focus. Regardless of the path, superior products and processes are a tool for developing a sustainable competitive advantage, building stronger competitive barriers, setting the image of a leader through the dominant market design, expanding supply, and increasing market share.

The advantages in *efficiently using the available resources* cover the recycling of already implemented research and development (R&D) projects, and the utilization of an existing resource (sales, production, service) when applying new technologies in the product and the production, as well as in the elimination of further weaknesses that preclude other products or processes to be fully utilized.

Certainly the most important advantage in the development is in *the renewal and the transformation of the enterprise*. The dynamics, image, and growth associated with the development of new products and processes stimulate the dedication, inventiveness, and creativity of the whole SME. This success, in turn, improves SME's ability to attract the best people, improve their integration and speed up the pace of change. Development projects are often a driving force for changes in the ways of thinking, creation of a new paradigm of the enterprise. At the end, all these benefits improve the SME performance.

# 3.2. Methodology

Methodologically speaking, the main theory behind InnoStrategy is a combination of the following methodologies:

- Scanning of the macro environment and the industry context (usually done through PESTEL tool and Porter's Fife Forces) used in identifying elements of the technology push and market pull;
- Scanning of the internal environment (Resource based view on strategy) used in identifying elements of the technology push
- The Business Canvas Model used in linking strategy with the organizational resources, capabilities and value;
- The development matrix of Ainsoff for exploring new strategic directions based on the opened opportunities and threats different types of development projects
- Evaluation of the identified opportunities in terms of sustainability, affordability and feasibility (SAF frameworks) leveled at functional level in the form of mapping.

In InnoStrategy the theory and the corresponding mechanisms are modified into the following specific elements:

- 1. Business Canvas Model (base)
- 2. Product/market fit Product/Market strategy
- 3. Technological fit Technological Strategy
- 4. Setting Development Goals
- 5. Developing and Aggregate Plan of Projects

# 3.3. InnoStrategy - Application

# 3.3.1. The Concept of Development Strategy

In reality, most SMEs approach the development of new products and processes with a poor methodology and structure. The critical elements of the strategy, the technology plan, and the plan for the market positioning of the product, are loosely related to each other, mainly through individual projects. It usually results into failure to meet the project objectives and poor innovation activities and performance. Traditionally, the majority of SMEs and start-ups make only modest analyses and predictions of the technology and market development before setting the course and most often these analyses are not directly integrated in the individual product development projects.

InnoStrategy builds on the practice of high performing SMEs. They undertake a systematic approach to the Development strategy (Figure 3.1.) which provides a much better basis for each individual innovation project. This approach affirms the four main goals of the development strategy, which are:

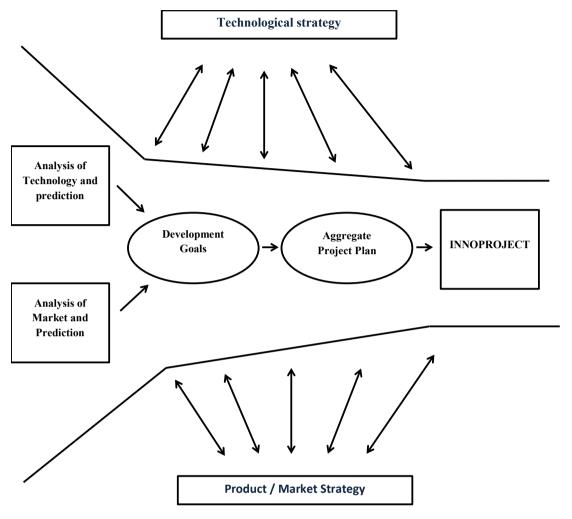
- Creating, defining, and selecting a set of projects that will provide innovative products and processes;
- Integrating and coordinating the functional and technical activities, as well as the team of internal and external members engaged in the development activities;
- Managing the development efforts in order to achieve business goals as efficiently and rationally as possible;
- Creating and improving the capabilities needed for the development and sustainability of the competitive advantage.

# The *objectives of the development strategy* are:

- 1. Identification of development goals; and
- 2. Setting an aggregate plan of projects.

The main activity is integrating the Technology strategy with the Product/market strategy.

Figure 2.Development Strategy



Source: Modified from Dukovski (2001)

# 3.3.2. Product/Market Strategy and its Planning

The product/market strategy includes 4 important questions:

- 1. Which products will be offered (width and depth of the production line)?
- 2. Which will be the target buyers (the boundaries of the market segment to be served)?
- 3. How the products will reach those buyers (which distribution channels will be used)? and
- 4. Why buyers will give preference to our products in terms of the competing products (recognizable attributes and values)?

Starting from the aspect of product and process development, the critical point in the product/market strategy is the number of basic products/services (platforms) of the SME, as

well as the frequency of the introduction of new products/services. The development projects are, in fact, means of introducing changes in productivity.

There are various forms of basic products and derivative products (derivatives). Start-ups usually have one, while micro and small enterprises have relatively few basic products that do not change so often, but they offer many variations along with the basic product lines. In terms of business model innovators, these SMEs are characterized as the **Small scale business model innovators**. They are the most numerous in the Balkan Mediterranean area (71,7 % of all business model innovators).

Other usually larger SMEs (small and medium enterprises) choose to have several basic products, which change often, along with numerous variations. These are closer to the definition of the **All-round goods innovators**. All-round goods innovators are the second most frequent form a business model innovator in the Balkan Mediterranean Area (19% of all business model innovators). In some industries, the frequency in improving the product performance is defined by groups that promote the industry standards. SMEs are free to offer variations as much as they want around these platforms, depending on the needs.

# 3.3.3. Critical Aspects of the Product/Market Strategy

Linking the product/market strategy, to the specific development projects, requires an answer to the following questions:

- 1. The number, timing and frequency of changes in the basic products,
- 2. The number, timing, frequency, and relationship to the product/market strategy of the derivative products.

The way in which an SME solves the first question defines the development of the basic products. There are five specific factors which need to be considered when making the decision for the development of the basic products:

- 1. *Technology Evolution*. The speed of technological change affects the scope of the available new knowledge and when it can be included in the new generation of platforms.
- Competition. The frequency and the time in which the competition introduces a new generation of platforms influence how long an existing generation will survive on the market.
- 3. *Return on the investment*. The necessary investments for the development of new products and the adequate production, together with the profits generated by the new product, determine the total production volume that will allow a reasonable return on the invested funds before the next generation has been introduced.
- 4. *Customer support*. Ensuring the sustained flow of products that meet the needs of the target markets and distribution channels for "fresh" products and products that are adapted to the environment, affect the time and the structure of the generation of products that are offered.

5. Available resources. In general, the development of the platform for a future generation of products requires significant assets for a longer period. The available resources are limited by the available work staff, the productivity and the resources that can be awarded for research and development, and usually are generating renewal on every two years.

What the SME does with the basic product also affects the derivative products from it. The products derived, range from products that begin with a basic product variant, to a very rich variant or even a combination of products. Very often the market does not see a big difference between the basic and the derivative product. Unlike the market, for the development of the production of products, this difference is essential, in order to distinguish the necessary resources.

The development strategy, together with the product/market strategy, clearly defines those differences:

- The time of development of the derivative products and their introduction on the market in terms of the introduction and the life cycle of the generation of the platform from which they were derived;
- The sales part that is expected to be realized from the products derived, in relation to the platforms;
- The nature of the markets and the distribution channels that will be supplied with derived products in relation to the supply of the basic products;
- The level of development and production investments (sales, production, service) for the projects carried out;
- The role of the derivative products in continuing the life cycle of the basic (platform) products and maintaining the market position until the introduction of the next generation of the platform.

These issues should be considered both on strategic and tactical level. At the strategic level, the choice should be such that the product/market strategy and the long-term development are compatible with a company's business goals, and are feasible at the same time. At the tactical level, rules should be adopted which are ensuring discipline and with which the aggregate plan of projects and the individual projects shall also ensure successful implementation of the market/product strategy and the development strategy.

# 2.3.4. Technology Fit: Strategy and Planning

The goal of the technology strategy is to lead the company in the procurement, development, and application of technology for creating a sustainable competitive advantage. In order to link these elements of the development strategy to the success of a particular development project, it is necessary to clearly understand what technology is, what are the characteristics of a strong technological strategy, and what are its key elements. It is also vital to have a plan for achieving

the goals through a group of projects and complementary products that develop SMEs technical knowledge.

Initially, the technology strategy provides an answer to the following questions:

- 1. What is the focus of the technological development of the Company? and
- 2. Which technologies are critical for the competitive advantage of the company?

#### **EXAMPLE**

A particular ironmongery may have decided to be the leader in the quality and the speed of continuous coursing. This technology is based on scientific achievements in metallurgy, thermodynamics, mechanics, mechanical engineering and electronic management. The solution requires knowledge of machine construction, computer modeling, materials development, metallurgy and electronics. There are certainly many other knowledge requirements that are needed in order to become a top iron maker, but the technology strategy is focused only on these areas. This also defines the areas in which the company will further develop and grow, and also the areas in which it will continue using the generally available, standard technologies.

In this context, the technology must include the knowledge ("know-how") that the company needs to develop, and it is related to the development, the production, and the marketing of its products, and their delivery to the final buyers. Part of this knowledge can be based on long years of experience, and part can come from current scientific research. This knowledge is "know-why" i.e. a deep understanding of the essence of the products and the processes.

The first step in the creation of a technology strategy, it is its *focus* that involves the defining of those opportunities with which the SME will develop a sustainable competitive advantage. For most companies, there is a wide range of important areas, but only for some, the company shall decide to build real superior abilities.

After defining the scope and the focus, what remains is to answer the question which *sources* of knowledge remain open?! This is the third critical question of the technology strategy. The technological opportunities can be internally developed with investment in people, equipment, laboratories and procedures, or through research and development projects. There is a possibility for a technology to be received outside of the SMEs, through cooperation with universities, with joint ventures, licenses, and purchases. The two sources are not mutually exclusive. On the contrary, the appropriate combination of internal and external sources is a key dimension of the strategy. Although one source may be dominant, the other usually plays an important role as well.

This can be shown in the example with the ironmongeries. In order to achieve the set advantages, it can attract significant internal sources, i.e. to build experimental machines and to develop prototype control systems. It can also partner with a supplier of equipment in the development of modern system management and sponsor the university research in the field of modeling heat transfer. Even when the primary source is external (for example, the product's surface protection license), the company needs internal resources to evaluate the external work and to integrate it into internal operations. Hence, the next two questions of the technology strategy are:

- 1. What role will external and internal resources play?
- 2. How will they be integrated?

Once the scope, focus, and resources of the company's capabilities are defined, the SME needs to determine the *timing and frequency of the introduction*. Part of the introduction time concerns the introduction of technology on the market. With the example of our ironmongery, this may mean that that one may decide to be a pioneer in finding new technology as a top development project, but it can choose - to delay the launch at the market, after others have paved the way for it, i.e. to choose to be a fast follower for a market player after he spends substentil resources in developing the market. Although, ironmongery is the first mover in the game, the others are pioneers in the commercial section. If it did not have its advanced development, the sole choice of the company would have been to follow the others, and it would probably be a slow follower.

The frequency of the introduction and the accompanying language will depend, in part, on the nature of the technology and the markets in which it occurs. For example, the computer-disk technology changes much more often than the one of the automobile engines. In addition, it is a part of a strategic choice. The company, as an extreme solution, can choose the strategy of frequent small changes, which ensures the cumulative continuous improvement of the performers. The opposite approach is - the strategy of big steps. In this case, the company chooses to perform rare, but major changes in technology, which correspondingly, significantly change the condition of the product.

#### 3.3.5. Setting Development Goals

The technology strategy and the product market strategy provide input for identifying the development goals of the SME. However, these goals need to reflect the basic business goals and objectives of the company as well.

Typically, these goals cover market penetration rate, sales revenue and profit goals. They also include introduction of new products and technological achievements. These goals need to be SMART or:

• Sustainable;

- Measurable;
- Achievable;
- Realistic; and
- Time bound.

Their realization cannot be accomplished without integration of these goals into every single innovative project of the company. All development and innovative projects need to have a clear role in the overall process of realizing the development goals. At the same time, at project implementation level, all innovative projects need to have objectives which will be aligned with the overall development goals of the company, and they need to have well defined indicators for monitoring. SMEs typically measure the following indicators: quality of the products (new performances) (small scale innovators) and the required time to the market (All round good innovators).

# 3.4. Maps and Mapping

One of the most important elements in establishing the basis for an efficient development project is the achievement of equity and integration of the strategies of the functional units (marketing, engineering, production). There are specific frameworks and techniques for identifying and integrating functional strategies and linking them to the full focus of the business. We will call the framework a map, and the procedure for its application - mapping. Setting up an analogy between the planning of the trip by making a map and making a plan for a development program is deliberate. The development of a group of maps that define the competitive field in each of the functions is a powerful development process. If this process is well done, the maps and the mapping will identify the critical aspects, will build a common framework and language for communication and decision making, and help to create a shared understanding between the top and the functional management for business development directions.

The map definition is actually a graphic representation of the driving forces of the sustainable advantage of certain functions, over time, in terms of competition.

Effective managers postulate the foundations for successful development much earlier than the start of the project. When the project starts, the project leader and the project team need to have a clear idea of the strategic direction in the business and its functional units. A typical business plan focuses mainly on the financial and marketing information and is not sufficient for the desired goal. In addition, it is not enough to add to the business plan the plans of the functional processes. What is needed is to understand where the business is moving, what functions need to be done to achieve this and also how the current project fits into it all. From this follows that the basis of each successful project should be based on the identification and integration of the strategies and the functions, and their connection with the direction to which the business is moving.

# 3.4.1. The concept of functional maps

In every business, as in every function of the business, there are driving forces that define the critical characteristics of the competitiveness. For example, in the marketing of commodities, the driving force can be the changed nature of the distribution channels with a growing affirmation of the lower-priced discount retailing and the super-big market stores. In the same business, the introduction of electronic management, the plastic tables of small but powerful electric motors, can create new opportunities for products that open up new segments of the market. At the same time, the expansion of a diversity can be followed with the intention of low prices in the highly competitive market. This exerts a strong pressure on the production process, in which the traditional cost-cutting techniques (standardization and automation) may be in conflict with the need for a flexible and an increased diversity of products.

The mapping has clear goals - to identify the driving forces for the business and the functions and to graphically reflect their implications on the competitiveness. In this way, the defined functional map has the following distinctive features: it is a visual, graphic representation of the driving forces of the market, as well as the position of the company on the market in relation to the critical competitive dimension, over time and in terms of the competition. Each of these elements is critical. The most important matter of the maps is precisely in the ability to give to the managers the ability to see the evolution of the critical dimensions of the market, in technology and production. Although, good maps are based on data and analysis, their shared visual representation significantly increases the communication and understanding of the process. The demand, maps that show the driving forces, and the critical dimensions over time is a centralized characteristic in the achievement of their fundamental meaning: to help managers to see where they are at the moment, where they should be positioned, and, where they might go.

The presentation of the development of the marketing, engineering and production over time, allows us to discover the current trends, and it is a good framework in which alternative paths of action can be evaluated. The setting up of the driving forces and the critical dimensions of competitiveness in the historical context is an important element in providing a strategic direction for the development of products and processes.

With a visual, graphic representation of the critical dimensions of competitiveness over time, functions form a group of maps that allow communication, and focus the attention on important issues and also provide a historical context. However, the benchmarking is missing, i.e. standards that open up new perspectives. According to this, the last request for an efficient map is precisely the comparison with the competition. The discovery - where we are and where we are going, cannot be realized only with internal data. A relevant data is not just the former budget and/or plans, but also what has been achieved by the strongest competitor. And more than that, seeing what the competitor has achieved, can lead us to penetrate deeper into the

differences of the competition performances. We can find out, for example, that while our company has followed the strategy of a broad product program, our strongest competitor has focused on marketing and development resources in several key manufacturing areas in which they dominate the business.

This view of the essence is most significant in the creation of the business strategy and provides an important context for deciding on the process of the development of new products and processes. Maps help to ensure - all functions share the mutual vision of the direction of the development, and the individual projects contribute to this. The mapping allows efficient mobilization of all the company's resources, its capabilities and knowledge. Maps are tools to guide the way toward functional perfection and they allow the strategic integration of perfection around the common goal. Additionally, maps help the company to direct its investments. With the presentation of the aforementioned driving forces, the maps help to clarify the choice the company faces in terms of which market to service and with which products. Furthermore, which production facilities to apply, which technology to use and which direction to take in the design of the product.

The specific maps that the business team chooses to develop will depend on the state of the business, but few maps are found that correspond practically to a wide range of businesses. These maps are shown in the Figure 3., along with the indication of the specific measures used in the maps and possible sources of information.

Figure 3.Examples of functional maps

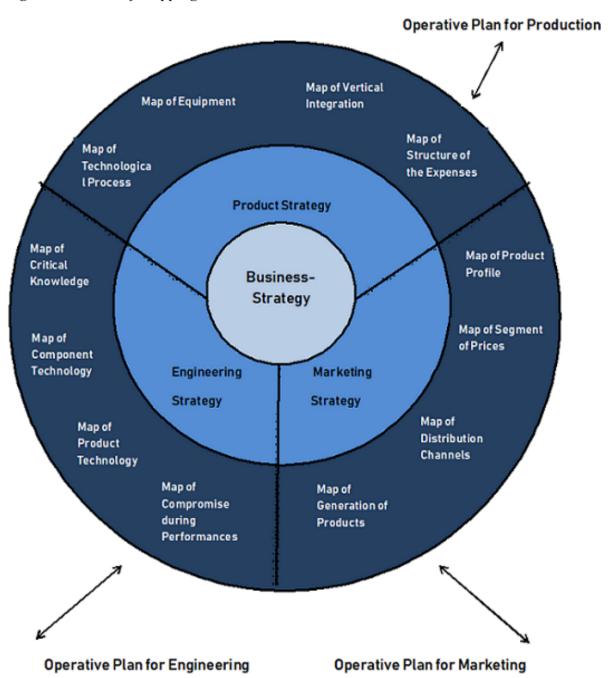
Functional area / type of map	Concept and used specific measures	Sources of data							
MARKETING									
Product profile	Product attributes relative position in relation to competition.	Customer Interview, Marketing Research, Product Testing.							
Distribution channels	Sale by channels, part of the market by channel.	Sales companies, Commercial publications, Reviews.							
Generation of products	Schedule for launching new products, model life cycle, relationship between products.	Selling documentation							
ENGINEERING	1	•							
Critical significance	Composing an engineering workforce according to knowledge.	Internal work staff surveys, interviews or comments from engineering managers.							
Component technology	Performance of critical components made from various technologies.	Test data, product ranking.							
PRODUCTION									
Process technology	Degree of automation, percentage of output in different types of processes.	Production research, project data.							

Their relationship with one another, with the key strategies and the operational plans are also shown in Figure 3.2., in order to illustrate the layout of maps, as well as to suggest the way maps can be used to identify the relevant strategic content of individual business functions. Several maps developed for a Coolidge Corporation shall be shown, as they relate to: the design, the production development and the marketing of vacuum cleaners. In each case an attempt is made to identify the dimensions of competition that are central to the efficiency of the function and the competitive position of the business. Additionally, to these functional maps, several integrating maps are displayed that reveal the driving forces that extend over the limits of the functional areas.

# The types of maps are the following:

- Marketing maps
- Engineering maps
- Production maps
- Integration maps

Figure 4. Process of Mapping



Source: Modified from Dukovski (2001)

# 3.4.2. Process of mapping

The illustrated maps show the critical driving forces in the business and help to clarify important strategic decisions and directions. The main strength of the maps is not so much in

the graphics or in the documents, but in the processes that are used to create. What is very important to underline for laying the foundations for an effective development process is mutual understanding among managers and team members from various fields, who together are trying to produce the product. Although, important parts of a knowledge are contained in the maps, the common understanding arises from the process of their creation. If maps are not used to structure and inform decisions and actions, they are of little value. If they are developed and utilized in an efficient process, maps can play an important role in the creation of the common vision and understanding.

The efficient mapping process has two parts. In the first part, teams define critical driving forces in the business and the functions, but then collect data that are needed to map these forces in relation to major competitors. In the second part, teams develop in-depth knowledge of the maps and share the same with all involved stakeholders in the new product development.

Teams can use these maps as a starting point for the development and implementation of operational plans, to indicate directions of development in the entire company, and provide framework of the development plans for specific products and processes which will be further considered.

With an aim, to give effective outcomes, they must be transformed into operational plans within each function, and used to develop resource allocation criteria for each of the projects. One of the things that the maps should be used for, is to help answer the priorities, objectives and the focus on the research for a set of development projects that the business would like to introduce within the planning horizon. Maps and mapping are not just an exercise or an analysis tool. If they are effectively introduced, they become an integral part of the overall business management. There are many things left to learn about how to use maps and how they can become an effective tool, but research gives a variety of reasons for a bad mapping process:

- To lower down the managers with the mapping process;
- To consider maps as "filling out forms";
- To use only internal information;
- To think only conventionally;
- To ignore historical trends;
- To be used only historical trends;
- To treat maps as a target only for yourself;
- Not to share information from the early stages;
- To allow one of the functions to dominate;
- To use the maps in the decision making process.

# 3.5. Types of development projects

Although we can use many classifications of the development projects, the most useful would be the classification in accordance with the degree of changes (innovations) in the product / process that are covered by the project. As shown in Figure 3.3., the degree of product changes

as well as the extent of changes in the manufacturing process can be combined to define several types of development projects. Differentiating project types is important not only because it clarifies managerial considerations for planning, employment, and the implementation of individual projects, but also helps in the development of the aggregate project plan because each type of project requires a different level of resources.

Figure 5. Type of Projects

Research and development	<b>Process Changes</b>			
Product Changes	New Key Processes	Future generation processes	Product upgrade	Adjustments and incremental changes
New Key Product	Breakthrou gh and Radical Change			
Future Generation of Products			Platform or Future Generation	
Extension to a Product Family  Improvement of Existing Products.			 	

Source: Modified from Dukovski (2001)

# 3.5.1. Research and development / advanced development projects

The boundaries of the Diagram in the Figure 3.3. define the area of the commercial development projects that can be realized in a company. Two types of projects lie beyond these boundaries: (1) advanced development projects and (2) joint, or partner projects. While the projects in the frames of the primary diagram of the graph are focused on the introduction of visible, profitable products and processes, the focus of the research and advanced development projects is to create knowledge (know-how/know-why) as a pre-commercial product development.

Typically, few SMEs realise the advanced development projects, and it is usually approached through investments in developing in-house expertise and knowledge. As the development progresses, the SME moves from the advanced development projects to those for commercial development; however, the frames of the aggregate project plan should also include the advanced development projects.

# 3.5.2. Joint or partner projects

The joint or partner projects should also be taken into account when preparing the aggregate project plan. They are a more common type of an R&D project for the SMEs. This type of project requires a different way of implementation. Basically, each project is in a partnership form. The company can form a partnership with another organization to conduct research, or advanced development, to give a new concept of product, or to simply extend the product line. It usually is a University, Research Institution or a High tech company. Instead of just using the resources of the company, the partner company often provides unique and substantial resources (often full resources), and it can also realize the full management of the project. Lately, companies have used the partner projects widely in cases where their own resources do not produce development results beyond expectations. At the same time, SMEs have also found themselves in the other role of these partnerships. They are usually the ones which identify faster the strategic opportunities in the industries, and after they develop the solution they are usually acquired by the large companies as this move is more efficient for the development efforts of the large companies. Nonetheless, regardless of the role, it is important for the SMEs which are part of these development projects of larger companies, or have partners themselves in their own development efforts, to have a good assessment of the required resources for the endeavor.

# 3.5.3. Incremental or derivative projects

In the lower right corner of the Figure 3.3. we have the projects that create products and processes that are derived, hybrids, or improvements to existing projects. These include versions with reduced costs of an existing product, to improved versions of an existing product. As reflected in the positioning of this class of projects, they include incremental changes in products with little or no change in processes, then incremental changes in the production process, with little or no changes to the product, as well as products that have an incremental change in both parts. Such projects require significantly smaller resources rather than projects that provide a new basic product, because they use the existing products or processes and extend their application.

# 3.5.4. Reversal projects or radical projects

At the other end of the spectrum are the projects that introduce significant changes in the product and the process. These reversal projects, when fully successful, establish new product and process key. They can create an entire product category for the business or represent an entry for the company in a new business. Most of these projects focus on products, as they often perform a new application or function and their success depends on attracting and satisfying new customers. However, they also contain significant developmental changes and processes, i.e. the process is probably a critical point for the success of the product. Top management can give some freedom to the teams working on the reversal projects, in terms of choosing the production process, rather than dictating to them, the application of existing technology and equipment.

# 3.5.5. Platform projects or projects of the next generation

In the middle of the spectrum between the derivative projects and the reversal projects are the so-called projects of the next generation or platform projects. These projects are a new system solution for the buyer, introducing significant changes either in the production process or in the product or in both. In cases where careful planning and reassignment is carried out, the platform projects provide a solid basis for mass and subtle improvements in cost, quality and performance in relation to previous generations. That is why they are also called as projects of the next generation.

The platform projects deserve special attention in the development of the aggregate project plan. They not only offer a great competitive advantage and potential for establishing markets, but also because the practice of underfunding them is very often present. Therefore, the hierarchical plan offers the opportunity to understand the problems related to the platform projects and to detect the consequences of performance, as well as to develop guidelines for integration of the platform projects into the aggregate project plan.

The projects of the next generation are more than creating a single product and its production process. To function as a platform, the project of the next generation must develop a product and process with the following three key characteristics:

- 1. *Key performance characteristics that correspond to the primary needs.* The solutions that the project gives the project should be targeted, system solutions to the needs of a key customer group.
- 2. To support one whole product / process generation. Platform projects create products and processes that with additional development efforts can be expanded and improved by adding and subtracting more individual characteristics, creating a product and process family. Although the platform is tailored to the needs of the key buyers, it must be adaptive and with expansion opportunities.
- 3. Link to previous and subsequent generations. In case of established SMEs, the platforms provide migratory routes for buyers, enabling passage from one generation to the next. This provides stability for the customers, as well as for distribution channels, and allows the company to strengthen its position and resources more strongly. The platforms are not interrupting the world in which customers live.

In essence, the platform projects create products (and processes) that contain the appropriate architecture for system solutions offered to customers. It is an architecture of the system that allows them to add other characteristics or to take away existing ones, adjusting the product to the particular market. The architecture of the platform helps SMEs make decisions. For example, the critical choice in the aggregate plan is whether the initial offer of the platform should be fully-equipped and which can later be impoverished by creating derivative products, or it should be a poor version to which characteristics can be added to create further products. Both strategies can be found in similar markets.

# 3.6. Development of an aggregate project plan

In our discussion of different types of projects, selecting the appropriate combination of projects, as well as the sequencing of the platforms and the implemented projects, confirms the strength and importance of the aggregate project plan. There are several steps in the same:

Step 1: Define the types or the classes of the development projects that need to be covered by the aggregate project plan. Start-ups and micro companies will begin with one, eventually two, development projects. The larger and more advanced SMEs should begin with all five categories or types of projects shown in Figure 3.3., and then improve it with the specification of the characteristics to be used in the decision making, i.e. which of the individual projects is of which type. This results in a set of criteria that can be used to classify any project within the five groups.

Step 2: Define the critical resources and time of the cycle necessary for completion for each particular type of project. More often than not, companies conclude that a critical resource is the human resource and are trying to determine the required time equivalents of the people who will realize the project from start to finish. Companies also consider it useful to specify the expected cost of money for each of the team members, as it helps in defining expectations and provides further information on the cost of implementation of the individual project types.

Step 3: Identify the existing available resources for development efforts (especially human resources, according to Step 2), and the actual active projects with their end-of-life requirements. This results in the explicit identification of the available capacity for the active set of projects.

Step 4: Calculate the use of the capacity based on the results of Step 3. This can be done using the drawing which shows the required resources for each evaluated project for a specified period of time. The result is a preview of the use of the capacity of the company for each of the observed projects in the following time periods, and in the case of completing the projects on time.

Step 5: Define the desirable future combination of projects according to types. This balances the strategic choice with the practical reality, in determining the critical resources to be assigned to each of the projects. In established SMEs, the management can decide to allocate the resources depending on the projects' requirements. It is important the specified combination to be realistic in the time horizon for which the aggregate project plan is created and appropriate to the company's strategy, the innovation opportunities and the existing product/market requirements.

Step 6: Decide with which projects to start. For an established SME this involves re-examining of the existing projects to ensure whether we continue or not with implementation; and determining whether to start and with which project to start in the planning period. This is not just a simple selection from the list. The company may need to redefine the projects in order to define the set that offers the greatest opportunities for a particular company strategy and resources.

Step 7: Determine and integrate them into the planning of projects and the needed future changes to improve the development performance (speed, productivity and quality). Projects do not only create new products, but also have the potential to build new development capabilities. The project can be a driving force for getting into a new CAD-system or a new approach to the organisation of the project. Additionally, new systems and procedures (a new process of engineering changes) should be planned and coordinated along with the ongoing projects. Therefore, the aggregate plan of the projects should identify where the company intends to make significant changes and how the changes will be related to the development of products and processes.

# 3.7. Aggregate Plan of the Projects

The process of the elaboration of the developmental goals integrates the technology and the financial plans, from the aspect of justification and intentions. The aggregate plan of projects represents the second scale of integration, at the level of the individual projects and resources. The reason for developing such a plan is to decide on the project or the group of projects to complete the development goals, and to build the capabilities of the organisation needed for the realization of the same. Although, the aggregate project plan is absent in most companies, its concept is relatively simple.

The first step in developing an aggregate project plan is to ensure development resources that are used for appropriate types of projects and for their combination. In most companies, development projects belong to one of the four types already discussed in Figure 3.3. These are the following categories:

- Research or advanced development projects. The goal is to create new knowledge to apply to a specific development project.
- Reversal development projects it represents the creation of the first generation of completely new products and processes.
- Platforms or development projects for a particular generation. These are projects platforms that have already been mentioned before. They typically have a lifetime of the design for a several years and represent the basic architecture for a group of projects derived from them.

- Derivative development projects. These are significantly narrower in scale and assets compared to the platforms. They upgrade and improve the separated performance of particular products in order to better match the specific market segment.

# IV. CONCLUSION

Once the Aggregate plan of projects is made, regardless of the number of project in it (it could be one if it is a Start-up), the enterprise begins with its implementation. The implementation is approached through a combination of the methodology for managing the introduction of new products and the standard methodologies for project management and implementation. This leads to the application of the fifth InnoTool – InnoProject.

InnoTools - InnoStrategy, which is a subject of the document, contributes towards the realization of the Deliverable 4.3. of the project Innoplatform:

- 1. Identification of the 5 InnoTools and the concept of the know how that will be developed; and
- 2. Development of the scope, methodology and application of each of the InnoTools;

By meeting the preceding objectives, the methodology becomes the input for the Deliverable 4.5. Development of the scope and technical specification of the 5 InnoTools of InnoPlatform.

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# APPENDIX 1 – GUIDELINE FOR APPLICATION OF INNOSTRATEGY IN SMES

APPENDIX 2 – INNOSTRATEGY BOARD MAP FOR TEAM BUILDING EXERCISE

APPENDIX 3 – BOARD MAP FOR THE MAPPING PROCESS

APPENDIX 4 – POWERPOINT PRESENTATION FOR THE TOOL

# InnoTools – InnoStrategy





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