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KNOWLEDGE MANAGEMENT AND FORESIGHT ELEMENTS FOR SMALL AND MEDIUM ENTERPRISES

ZINĀŠANU PĀRVALDĪBAS UN FORSAITA ELEMENTI MAZAJIEM UN VIDĒJIEM UZŅĒMUMIEM

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1. Introduction

Nowadays the business environment is changing rapidly. Rapid changes in an environment make Small and Medium Enterprises (SMEs) more fragile than ever. To follow and to adapt to these changes, SMEs need to be flexible and agile. To gain a competitive advantage, SMEs need to be not only adaptive to the current changes in their business environment, but also need to forecast possible changes and keep competitiveness.

A relatively new discipline, called 'Foresight', offers to use different analytical methods to frame the future, foresee and forecast possible changes in an organization's environment. Foresight provides collaboration of different experts and stakeholders in order to make various future scenarios and create appropriate directions or plan for the most preferable scenario.

A small enterprise often is confronted with market imperfections and requires strengthening its competitiveness. SMEs also often have restricted resources that may reduce access to new technologies and innovation. Therefore, support for SMEs is one of the European Commission's priorities for economic growth [1].

Knowledge Management (KM) also is the essential tool to support SME and increase its efficiency and competitiveness using enterprise assets. Large and small enterprises around the world introduce different KM solutions to enhance business performance.

In this paper will be discussed how to align KM and Foresight techniques to support SMEs and to help them shape their future and to make competitive decisions. The purpose of

research is to identify how KM and Foresight supplements each other and what benefits the combination of KM and Foresight elements can bring to SMEs.

Chapter 2 provides small enterprise description, describes relevant enterprise aspects and responses to the question why it is important to support small enterprise by knowledge management technologies. Chapter 3 provides description of KM system's model, which contains components to support knowledge management in small enterprise. Chapter 4 provides brief description of Foresight technology and information about Foresight opportunities for enterprise development. Chapter 5 contains analysis of enterprise aspects, KM system's and Foresight elements combination. The result of this analysis is described in paper's conclusions.

2. Small Enterprises

Nowadays small and medium-sized enterprises (SMEs) play a central role in the European economy. They are a major source of entrepreneurial skills, innovation and employment [1]. SMEs can be broadly defines as:

- Micro businesses (0-9 employees) and small businesses (10-49 employees);
- Medium businesses (50-249 employees) [2].

The main function of enterprise is goods or service production according to customer needs. Very often enterprise model is described using IDEF 0 method notation [3, 4, 5]. Enterprise is defined as function which has inputs, outputs, controls and mechanisms.

The figure bellow show the enterprise function (see Figure 1). The input variables for enterprise are customer needs, existing performance/technology by which end product will be produced, raw materials, which will be used for that, and personnel skills, which allows produce goods or services. Control variables for enterprise function execution are internal and external environment of the firm, firm's budget, time and motivation of firms' personnel and top management. The mechanisms which support producing process of the product are raw materials purchasing, accounting, product sales and process management [4]. The enterprise function's results are goods, services and customer satisfaction.

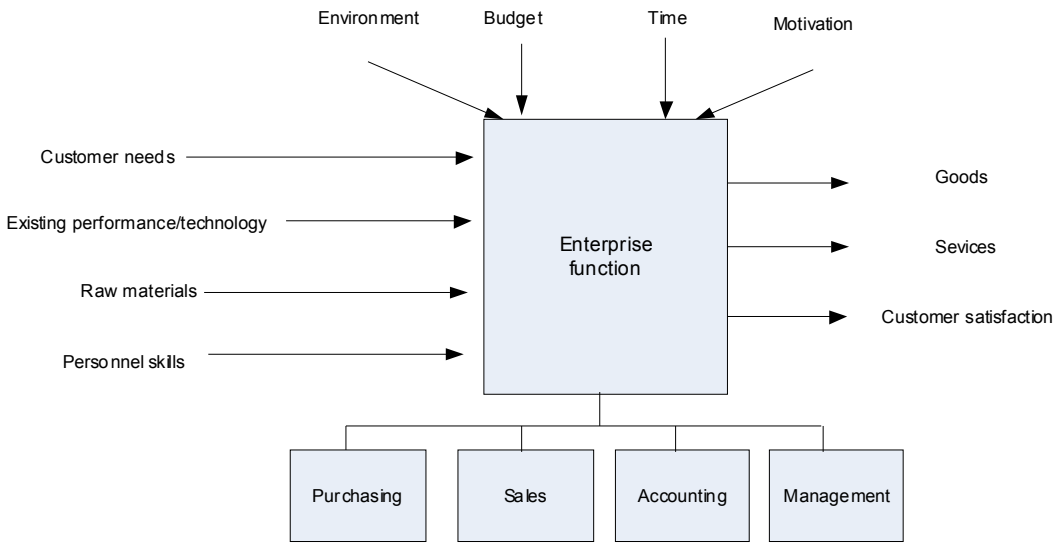

Figure 1. Enterprise function

How it is shown above the purpose of enterprise is to produce high quality product or services. Of cause, enterprises have also other objectives such as reduce the production costs, improve enterprise performance and increase competitiveness. These goals can be achieved with the help of different tools. One of them is Knowledge Management (KM).

Unfortunately, the fact is that KM literature has to date tended to focus on large-scale enterprises, which many have taken to suggest that KM has no relevance to SMEs. But the nature of SMEs- small, dynamic, flexible organizations, with an emphasis on close relationships between employees, suppliers and customers – means that knowledge has always been regarded as crucial aspect of their operations [2].

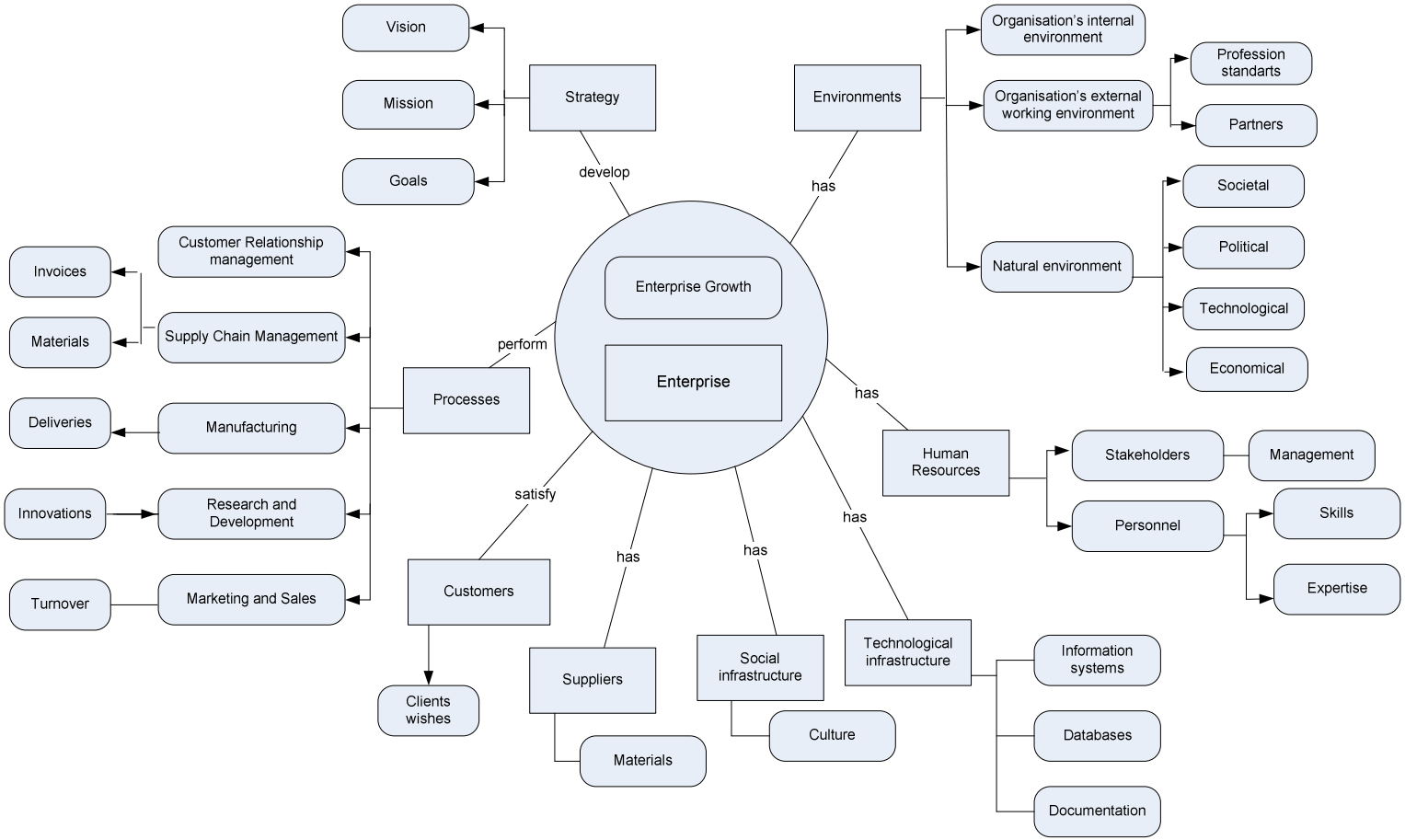

Figure 2. Enterprise elements

In order to provide SMEs appropriate KM initiatives or KM system, it is necessary to analyze SMEs infrastructure, their features and needs. Nowadays SME can be characterized by following aspects: strategy, environment, human resources, processes, technological infrastructure, social infrastructure, customers, and suppliers. To analyze SME's infrastructure the special model of SMEs was created (see Figure 2). The model shows different elements, which SMEs can have, perform, or influenced by. These elements are described in Table 1.

Table 1. Enterprise Aspects

Aspect	Description
Strategy	Each enterprise has strategy, which contain description of enterprise mission and vision and long-term and short-term goals for enterprise growth [6].
Environment	There are three types of environments: 1. Organisation's internal environment. 2. Organisation's external environment which include profession standards, partners, competitors. 3. Natural environment (social, political, technological, economical). All these environments influence enterprise work.
Human Resources [4]	Besides owners the personnel of enterprise can be divided into 2 groups – stake holders, usually they manage enterprise work, and other personnel which are responsible for enterprise process execution and product production.
Processes	There are six main groups of enterprise processes, which are supported in Enterprise Resource Planning systems: customer relationship management, supply chain management, manufacturing, research and development, marketing and sales, finance management.
Technological infrastructure [5]	Almost each enterprise has documentation related to work process, different information systems, databases to store information about goods, customers, suppliers [5].
Social Infrastructure [5]	Social infrastructure can include enterprise culture, institutions, management structures, personnel roles, and rituals of the enterprise society [5].
Customers [5]	Customers purchase goods or services provided by enterprise. Also goods development is influenced by customers' wishes [5].
Suppliers [5]	Suppliers provide raw materials for enterprise manufacturing process [5].

Analysis of SME's function and SME's aspects show that for successful work SMEs should know their market, understand its customers, appreciate local customs and cultures, encourage new ideas, be flexible in working environment, be responsible to customer demands and agile in business dealings [2]. These are the aspects that are important for supporting by KM in SMEs. KM system for SMEs should understand, capture and share different types of knowledge about market, enterprise environment, internal business processes, customers; suppliers, knowledge related to goods or services development.

3. Knowledge Management System's Model

Knowledge management involves the creation of value from an organization's intangible assets [7]. Many enterprises currently implement KM in order to leverage knowledge within their organization provide better services to their customers.

At the moment there are many approaches and frameworks how to implement KM in organizations. Different approaches to KM have been implemented across a variety of enterprises. But most of them are perspective task-oriented frameworks, which provide guidelines how to analyze enterprise internal assets and what KM activities should be implemented in the organization [7]. There are fewer models which provide KM components or parts as a whole system. There has not been established descriptive, generally accepted framework, which describes what KM elements can be implemented in small enterprises.

This paper provides a conceptual KM system's model, which elements can support different SME's aspects described in previous chapter. KM system's model for SME includes: strategy, technologies, resources, culture, knowledge processes, and business processes (see Figure 3). Each of these elements can be decomposed and described wider:

- Strategy – first of all knowledge management must be integrated within the strategic goals of the enterprise in order to fully realize its potential for enhancing organization performance [7]. KM system should support execution of enterprise mission and strategic goals.
- Technologies – there are wide range of Information and Communication Technologies (ICT) that support various KM needs in enterprise work process. Also there are set of different methods that can help realize KM in small enterprise without using ICT.
- Enterprise resources for KM execution are: human resources, documentation, information systems. Enterprise personnel have knowledge, share and need knowledge [8]. Documentation stores information about enterprise business processes and personnel's knowledge. Information systems also are main resource for KM as a source of information, because analysis of such information can bring new knowledge and support decision making.
- Enterprise culture (social infrastructure) influences style of personnel management, support learning, make enterprise atmosphere. These aspects are important for KM because corporate culture should support knowledge sharing between employees, mentoring and learning.
- Business processes - Jung and Choi said that business processes are an excellent delivery medium of knowledge as well as environment for creation of knowledge. Information about a process itself and process execution results is valuable corporate knowledge. Therefore KM system should be integrated with enterprise processes to provide enhance the performance of business processes, hence, the organization. [7]. KM system can support such enterprise process as: product manufacturing, research and development, customer relationship management, (mentioned in Chapter 2).
- Knowledge processes – create, share, apply [9]. In enterprise the following general knowledge management processes can be identified: knowledge is created in the brains of personnel or provided by other resource, created knowledge should be obtained and stored, then knowledge is shared within organization and after that knowledge is used (or re-used) by personnel to perform business processes. Each knowledge process can be supported by one or more ICT technology or other method.

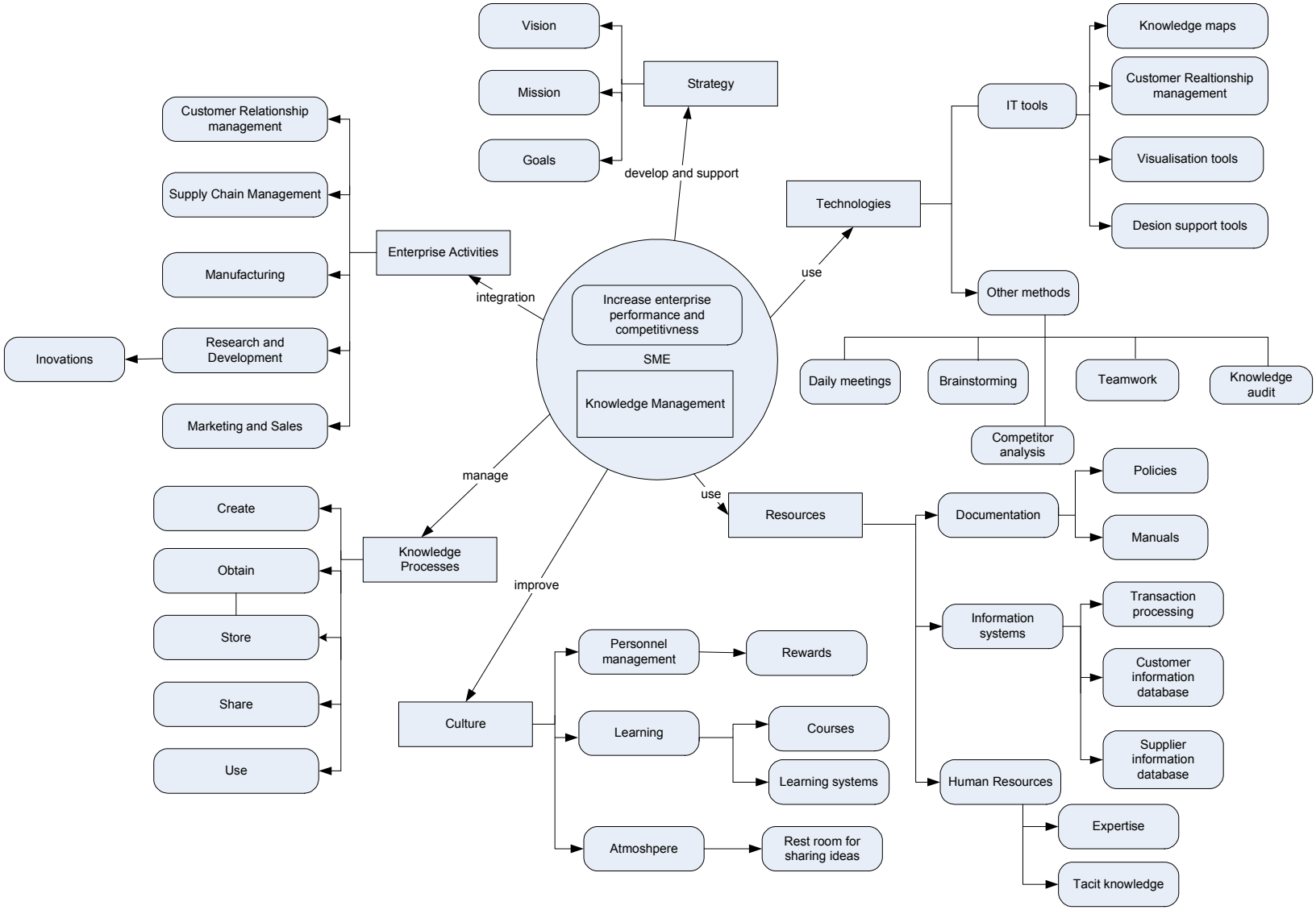

Figure 3. Knowledge Management for SME

Provided KM system's model shows enterprise aspects integration with KM elements. Combination of all these elements can be used as framework for KM system in small enterprises, because it instantly provide which KM elements can be used in SME and show what processes should be supported in small enterprise by KM system.

4. Corporate Foresight

Wilson said that understanding the past is important so organizations can learn from experience and mistakes, but those lessons alone are insufficient to prepare for what might be in the future. Indeed, when one considers that "all our knowledge is about the past, while all our decisions are about the future" [10].

Foresight is a tool which is aimed to help organization frame the future. Foresight is a process which allows people in an organization to develop a coherent forward view and to imagine, explore and assess a range of possible futures. It is not about prediction, but it is about informing strategy [10].

In Foresight technology the following aspects can emphasized: environments, methods, resources, processes and strategy [11]. Model below show these elements (see Figure 4).

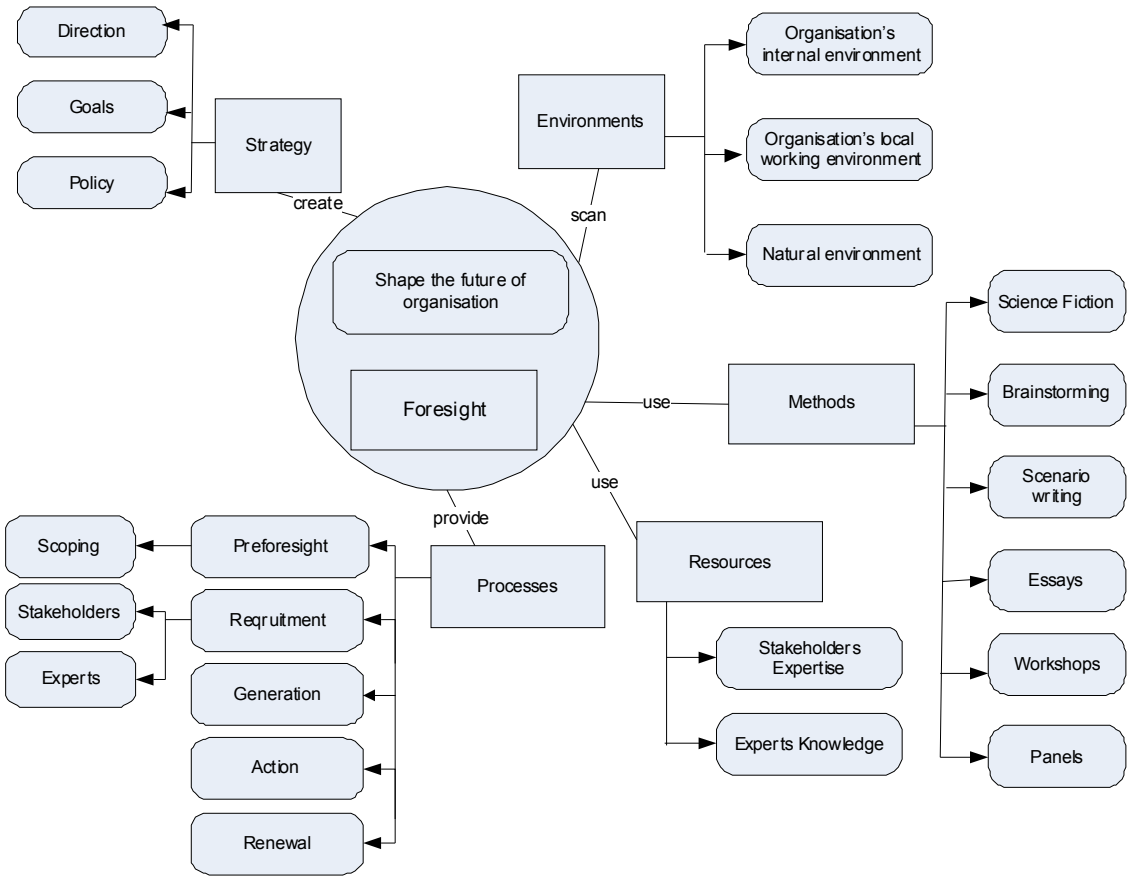

Figure 4. Foresight

How it is shown above Foresight elements are the following:

- Environments – Foresight is aimed to analyze possible changes in organization internal and local working environment, as well as follow organization's natural environment – political, social, and economical.
- Methods – To make Foresight organization can use different methods: brainstorming, scenario writing, essays, workshops, experts' panels. Some of the tools may be useful across several of the foresight activities [11].
- Resources – To perform Foresight initiative usually stakeholders and subject matter experts are invited to special sessions to discuss future demands.
- Processes – General Foresight process contains following stages: pre-foresight (scoping), which include gathering background information, eliciting views and advice; recruitment – selecting and inviting stakeholders and different experts that have knowledge and expertise in required area; generation stage includes such activities as: identifying and monitoring change; imagining alternatives futures; envisioning preferred futures; preferred plan creation and team-building [11]; action process includes such activities as foresight result's dissemination and implementing; renewal process is a final phase of Foresight process, when result of implementing foresight plan (or other activities) is evaluated and impacts is analyzed.
- Strategy – Organization strategy is main aspect, which can be changed by foresight project. Foresight analysis provides new directions for enterprise strategy to gain better results in the future.

Thus Foresight helps enterprise develop plan for new strategy, by using experts' and stakeholders' knowledge and different methods which allow describe and shape enterprise future. Foresight objectives and desired outcomes are following [12]:

- Ensuring competitiveness (for the future and sustainable innovation);
- Differentiating the company for future competition;
- Cultivating existing technology or knowledge areas;
- Identifying new technology or knowledge areas;
- Generating new business or new technological knowledge for the development of new business.

5. Combination of Knowledge Management and Foresight elements

Conducted research and modeling of SME's environment, KM and Foresight approaches revealed that there are common elements, which unite these three areas. The Figure 5 shows that almost all enterprise aspects are related to KM and some aspects are used for Foresight activities:

- *Strategy.* KM initiative should be aligned with enterprise corporate strategy, Foresight approach can help create plan for enterprise strategy.
- *Environments.* KM gather knowledge about enterprise environment [17], Foresight is aimed to analyze environments.
- *Knowledge.* KM is aimed to gather enterprise and personnel's knowledge, store and share it in order to support better enterprise process execution and create new knowledge. Foresight uses enterprise stakeholders' knowledge to shape enterprise future and identify new knowledge areas.

- *Processes*. KM and Foresight approaches have different processes, which use enterprise knowledge and expertise as resource. But enterprises can integrate their business processes with KM processes in order to support better enterprise process execution. Foresight approach can be used in development and research processes.
- *Technologies and methods.* There are many ICT technologies used for KM initiative implementation in enterprise, but there are also many non computer-based methods, which are used for KM and Foresight needs, for example, brainstorming (used for KM and Foresight), workshops (used for Foresight).

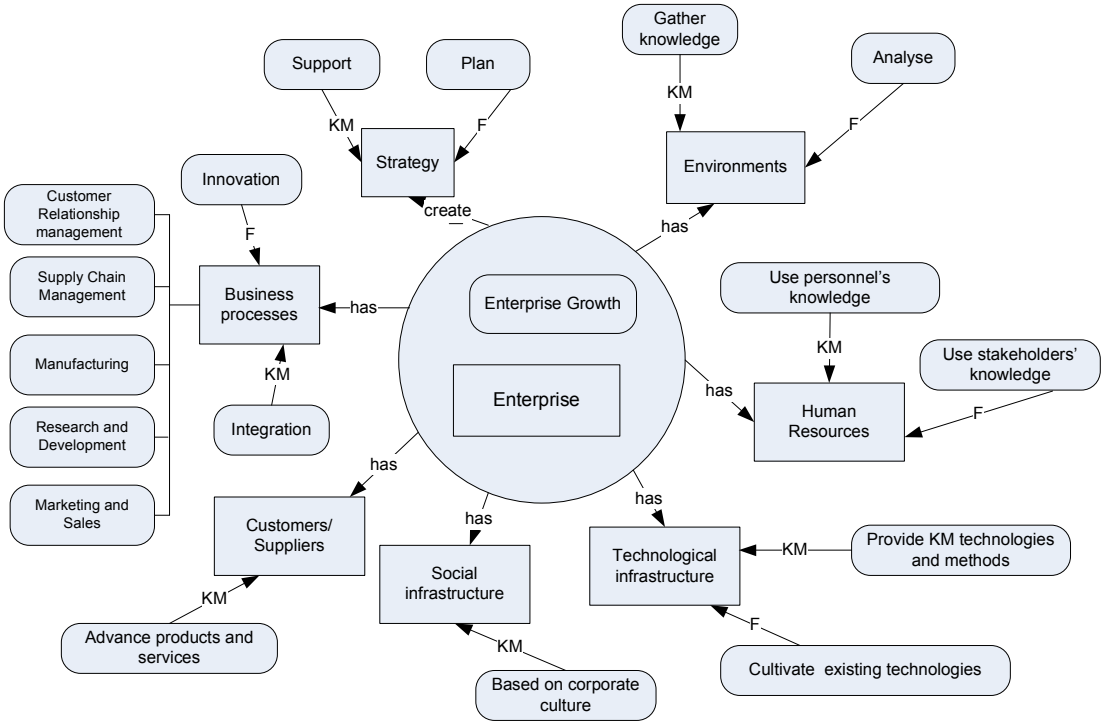

Figure 5. Knowledge Management and Foresight combination in SME

How it is shown above (see Figure 5) combination of KM and Foresight elements is possible solution that supports enterprise aspects and ensures competitiveness. But in the analysis provided below is shown that almost all foresight benefits can be supported and achieved by KM elements.

Table 2. KM and Foresight combination

Foresight benefits	KM element or KM process	KM support
Strategy formulation (i.e. participating in the formulation and implementation of strategic decisions) [16].	Strategy [17].	KM also helps enterprises to define corporate strategy. KM strategy's purpose is support enterprise strategy and goals.
Determining priorities (i.e. identifying the most desirable lines of R&D as a direct input into specific decisions – e.g. funding) [16].	Knowledge sharing; Corporate memory.	KM provides corporate memory to store enterprise knowledge, expertise and skills, which can be used for new product research and development.

Foresight benefits	KM element or KM process	KM support
Innovation catalysing (i.e. stimulating and supporting innovation processes between the different partners). Explore new markets, products and services [16].	Knowledge re-use; Knowledge creation [18]. Collaboration system for knowledge sharing [17].	Knowledge re-use process and collaboration systems in KM also supports creation of new knowledge and innovations in enterprises [13, 14].
Ensuring competitiveness (for the future and sustainable innovation) Differentiating the company for future competition [15].	Competitor analysis [17].	One of KM activities is competitor analysis, when enterprise should analyze their market position and create competitor knowledge map. These results also are used to create proper KM strategy.
Cultivating existing technology or knowledge areas [15].	Infrastructure's analysis [17].	Enterprise KM system also enhances existing enterprise technologies and support enterprise knowledge areas. Usually KM system is based on enterprise technological infrastructure.
Identifying new technology or knowledge areas [15].	Knowledge audit [17].	Enterprise knowledge audit is aimed to analyze existing knowledge and enterprise activities in order to identify new technologies and knowledge that are necessary to improve organization's business processes.
Generating new business or new technological knowledge for the development of new business [15].	New knowledge creation [18].	KM system supports new knowledge creation in enterprise via knowledge sharing and collaboration. New knowledge can be used to develop innovative solutions or new business.

Thus from one hand foresight can be used as one of the tools for the management of knowledge flows [15], when organizations needs to shape their future, but from another hand KM also provides opportunities to frame enterprise future and create innovations using KM system's elements.

Conclusions

The paper shows that combination of Knowledge Management and Foresight elements can bring many benefits for small and medium enterprises. KM initiative is a process that supports existing enterprise knowledge, store information about events that happened in the past, help to identify what kind of knowledge would be necessary in the future. Foresight initiative is a process that helps to frame enterprise future and develop appropriate strategy to keep or increase enterprise competitiveness.

The result of the research provided in this paper shows that implementation of KM system in enterprise can enhance not only knowledge management processes and enterprise performance, but also can be used as platform to make Foresight activities and frame the future. While Foresight frames future and identify future needs, KM technology provides knowledge for that, support execution of business processes and ensure enterprise

development. Appropriately used KM system can bring the same benefits as result of Foresight process.

Therefore small organization with restricted resources (budget, time, personnel) may use KM system's elements, which include new knowledge creation process, strategy development process and KM methods as: brainstorming, meetings, competitor analysis, knowledge audit, and collaboration to identify future needs of organization and develop appropriate strategy. In addition, if it is necessary to use Foresight activity independently, then KM system can be used as knowledge store to analyze current situation and evaluate enterprise resources for future demands.

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Pozdnakova A. Knowledge management and foresight elements for small and medium enterprises
Nowadays the business environment is changing rapidly. Rapid changes in an environment make Small and Medium Enterprises (SMEs) more fragile than ever. To follow and to adapt to these changes, SMEs need to be flexible and agile. To gain a competitive advantage, SMEs need to be not only adaptive to the current changes in their business environment, but also need to foresee possible changes and to overtake their competitors. In this paper will be discussed how to align KM and Foresight techniques to support business processes in SMEs to help them shape their future and to make competitive decisions. The purpose of research is to identify how KM and Foresight supplements each other and what benefits the combination of KM and Foresight elements can bring to SMEs. First of all paper provides small enterprise description and responses to the question why it is important to support small enterprise by knowledge management technologies. Then paper provides description of KM system's model, which contains components to support knowledge management in small enterprise. Also paper provides information about foresight opportunities for enterprise development and brief description of foresight technology. At the end paper provides analysis of Knowledge Management and Foresight combination. The result of analysis is provided in conclusions.

Pozdnakova A. Zināšanu pārvaldības un forsaita elementi mazajiem un vidējiem uzņēmumiem
Mūsdienu biznesa vide mainās ļoti ātri. Ātras izmaiņas vidē padara mazos un vidējos uzņēmumus (MVU) vājākus nekā agrāk. Lai sekotu un adaptēties šīm izmaiņām maziem uzņēmumiem jābūt elastīgiem un veikliem. Lai sasniegtu konkurētspējas priekšrocību MVU vajag būt ne tikai adaptīviem tekošām izmaiņām savā biznesa vidē, bet arī vajag paredzēt iespējamas izmaiņas un apsteigt konkurentus. Šajā rakstā ir izpētīts jautājums, kā saskaņot ZP un Forsaita tehnikas lai atbalstītu biznesa procesus mazā uzņēmumā, lai palīdzētu viņiem izstrādāt priekšstatu par nākotni un pieņemt konkurētspējīgus lēmumus. Pētījuma mērķis ir identificēt kā Zināšanu pārvaldība (ZP) un Forsaits papildina viens otru un kādus labumus ZP un Forsaita elementu kombinēšana var piedāvāt MVU. No sākuma raksts piedāvā maza uzņēmuma aprakstu un atbildē uz jautājumu kāpēc ir svarīgi atbalstīt mazos uzņēmumus ar ZP tehnoloģijām. Pēc tam raksts piedāvā ZP sistēmas modeļa aprakstu, kurš satur komponentes, lai atbalstītu zināšanu pārvaldību mazā uzņēmumā. Raksts piedāvā informāciju par Forsaita iespējām uzņēmuma attīstībā un Forsaita tehnoloģijas īsu aprakstu. Beigās raksts piedāvā ZP un Forsaita kombinācijas analīzi. Raksta pētījuma rezultāts ir aprakstīts secinājumos.

Позднякова А. Элементы Управления знаниями и Форсайта для малых и средних предприятий
В настоящее время деловая окружающая среда изменяется быстро. Быстрые изменения в окружающей среде делают малые и средние предприятия более хрупкими чем когда-либо. Чтобы следовать и приспосабливаться к этим изменениям, малые и средние предприятия должны быть гибкими и проворными. Чтобы получать конкурентоспособное преимущество, малые и средние предприятия должны не только адаптироваться к текущим изменениям в их деловой окружающей среде, но также должны предвидеть возможные изменения и опережать своих конкурентов. В этой статье будет исследован вопрос как согласовть Управление Знаниями (УЗ) и методы Форсайта (Предвидения), чтобы поддержать бизнес-процессы в малых и средних предприятиях, чтобы помочь им формировать их будущее и принимать конкурентоспособные решения. Цель исследования состоит в том, чтобы понять как УЗ и Форсайт добавляют друг друга и какую пользу может принести комбинация элементов УЗ и Форсайта малым и средним предприятиям. Прежде всего статья предлагает описание маленького предприятия и ответ на вопрос, почему важно поддержать маленькое предприятие технологиями управления знаниями. Тогда статья предлагает описание модели системы УЗ, которая содержит компоненты, чтобы поддержать управление знаниями в маленьком предприятии. Также статья предлагает информацию о возможностях Форсайта для развития предприятия и краткое описания технологии Форсайта. В конце статья предлагает анализ комбинации элементов УЗ и Форсайта.Результат анализа описан в выводах статьи.