IMPROVING INNOVATION CULTURE IN THE FRONT END

Case Ruukki Metals Oy

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ABSTRACT

The purpose of this thesis was to examine how organization culture affects innovativeness and to define ways how to improve innovation culture. The client of the study was the research and development function of Ruukki Metals Oy, Hämeenlinna. Innovation culture was examined in case company's front end, because improving innovation culture in the front end supports the total innovation process. The objectives of the study were to define the areas of innovation culture in need for improvement in the case organization and to provide ideas how to improve innovation culture. The third objective was to create a model for assessing innovation culture.

The required theoretical information was gathered by examining existing literature and research on organization culture and innovations. Based on the theoretical findings, a model for assessing innovation culture was created. The created innovation audit tool was utilized in the empirical research that was conducted by interviewing experts working in the front end of the case organization. Analysis was made by constructing entities of the results that described certain themes.

Research results revealed a rather balanced common innovation culture in the case organization. The main findings demonstrate that the case organization can consider improving innovativeness by arranging direct interaction with customers, communicating strategy thoroughly, arranging time to think, encouraging risk-taking, and by developing a system to collect and utilize overall information and experiences efficiently. In the future, innovation audit can be conducted on a general level in the research and development function of the case organization.

Keywords Innovation, innovation culture, organization culture, front end, innovation audit

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TIIVISTELMÄ

Opinnäytetyön tarkoitus oli selvittää miten organisaatiokulttuuri vaikuttaa innovatiivisuuteen ja määritellä keinot innovaatiokulttuurin kehittämiseksi. Tutkimuksen toimeksiantaja oli Ruukki Metals Oy:n tutkimus- ja tuotekehitysorganisaatio Hämeenlinnassa. Innovaatiokulttuuria tutkittiin kohdeyrityksen innovaatioprosessin alkuvaiheessa, koska innovatiivisuuden kehittäminen prosessin alussa vaikuttaa koko innovaatioprosessiin. Tutkimuksen tavoitteena oli määritellä innovaatiokulttuurin kehitettävät osa-alueet kohdeorganisaatiossa ja antaa kehitysideoita innovatiivisuuden parantamiseksi. Tavoitteena oli myös kehittää työkalu innovaatiokulttuurin arvioimista varten.

Tutkimuksen teoriataustaksi perehdyttiin innovaatioita ja organisaatiokulttuuria koskevaan kirjallisuuteen ja tutkimukseen. Teoreettisen viitekehyksen pohjalta luotiin työkalu innovaatiokulttuurin arvioimiseksi. Arviointityökalua käytettiin empiirisessä tutkimuksessa joka toteutettiin teemahaastatteluina. Haastateltavat olivat kohdeyrityksen innovaatioprosessin alkuvaiheessa työskenteleviä asiantuntijoita. Saatu aineisto analysoitiin rakentamalla tuloksista teema-alueisiin perustuvia kokonaisuuksia.

Tutkimus osoitti, että kohdeorganisaation innovaatiokulttuuri on melko hyvin tasapainossa. Tutkimustulosten perusteella esitellään kehittämisideat, joiden avulla organisaation innovatiivisuutta voidaan edelleen vahvistaa. Tärkeitä elementtejä ovat seuraavat: luoda suoria asiakaskontakteja, kommunikoida strategia perusteellisesti, järjestää aikaa ajattelulle, rohkaista riskinottoon ja kehittää tiedonkeruujärjestelmä yleisen tiedon ja kokemusten hyödyntämiseksi tehokkaammin. Tulevaisuudessa innovaatiokulttuuria voidaan arvioida yleisemmällä tasolla kohdeyrityksen tutkimus- ja tuotekehitysorganisaatiossa.

Avainsanat Innovaatio, innovaatiokulttuuri, organisaatiokulttuuri, innovaatioprosessin alkupää, innovaatiotesti

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1 INTRODUCTION

1.1 Background

Organization culture is extremely significant on how organizations function. It also has an essential impact on the degree to which innovation is supported in the organization. Innovations are unlikely to succeed if the surrounding organization culture is not favorable. Therefore, objective of the study is to examine how organization culture affects innovativeness and to identify ways how to improve innovation culture. The perspective of the study is the front end of innovation process. Importance of front end phase is emphasized because of the impact it can have in the total innovation process. Improving innovation culture in the front end supports the overall innovation culture in the total innovation process.

The client of the study is the research and development function of Ruukki Metals Oy, Hämeenlinna. Ruukki Metals is a part of Rautaruukki Corporation that supplies metal based products and services to several customer industries. Ruukki Metals focuses on special steel products such as high-strength, wear-resistant, and special coated steels. Research and product development activities in Ruukki Metals are located in two research centers, in Hämeenlinna and in Raahe. Research and development function in Hämeenlinna focuses on development of cold rolled and metal coated sheet products, color coated sheet products, and tubular products.

In the case study, innovation culture in the front end of innovation in Ruukki Metals' research and development function in Hämeenlinna is examined. Based on the theoretical findings, a model for assessing innovative organization culture is created. This model is utilized in the empirical research in order to assess innovativeness and to identify potential development targets in the case organization. Information is collected by themed interviews that are conducted as personal interviews. The results of empirical research are analysed and based on the analysis, areas of innovation culture in need for improvement in the case organization are defined. In conclusion, suggestions for improving innovation culture are provided.

1.2 Objectives and research questions

The long term objective of the study is to provide valuable information for Ruukki Metals' research and development function in Hämeenlinna how innovation culture can be improved in the front end of innovation. The research aims to provide a comprehensive description of innovation culture in the case organization, define the areas in need for improvement, and provide improvement ideas. The outcome will help the company to evalu-

ate and improve innovation culture also more widely in the whole research and development function.

There are two short term objectives of the study. One is to define the factors of organization culture that affect innovativeness and the second one is to create a model for assessing innovation culture that can be utilized in other functions and business areas with applicable parts.

The research questions are:

1. What are the areas of innovation culture where there is need for improvement in the case organization?
2. How can innovation culture be improved in the case organization?
3. How can innovative organization culture be assessed?

1.3 Innovations and innovativeness

Innovation can be defined as a novel creation that produces value, or a process of turning opportunity into new ideas and of putting these into widely used practice. Innovation is often confused with invention, but that is only the first step in the long innovation process. Innovation includes not only an invention, but also developing ideas into their final form and commercialization. (Nagji & Tuff 2012; Tidd, Bessant & Pavitt 2001, 38)

OECD's Oslo Manual defines innovation as "the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organisational method in business practices, workplace organization or external relations". Thus, innovation includes a wide range of activities in addition to research and development, for example organizational changes, training, testing, and marketing. Innovation can occur in any sector of the economy. (OECD n.d.)

The degree of novelty is an important aspect of an innovation. It is not imperative for an innovation to be universally novel but it can be novel for the company, for the selected market, or for the industry. (Apilo, Salkari & Taskinen 2007, 22) Traditionally innovations are understood as product or service innovations, but innovations can also focus on processes, management, design, or business models. Thus, innovations should be related to the whole business, not only to products or services. (Solatie & Mäkeläinen 2009, 29)

The intentional nature of innovation is often emphasized. Innovations are intended to derive expected benefits from a change. The benefits can be economic, like growth in profits, competitive edge, and added value. (West & Farr 1989, 16) Possible benefits of an innovation can also be personal growth, increased satisfaction, improved group cohesiveness, or better interpersonal communication. (Solatie & Mäkeläinen 2009, 29)

For many organizations innovativeness is vital for achieving and maintaining competitiveness. Cost cutting is not enough in a long term to survive, but business model innovations can offer key to success in cost competitive markets. It is possible to achieve better business environment by questioning the stabilized business models. Additionally, organizations often seek for positive corporate image with innovations. Talented professionals perceive innovative organizations as more attractive employers than their stabilized rivals. Such innovative companies attract also investors, and are desired partners when creating cooperative networks between organizations. Organization's innovativeness and learning ability are the most difficult to duplicate and thus they offer genuine competitive advantage for the company. (Apilo et al 2007, 17−21)

In Finland, 46 per cent of companies had innovation activity related to products and processes between 2008 and 2010. The majority of these enterprises had also launched product innovations on the market or adopted process innovations. Innovation activity was more common in manufacturing enterprises than in service enterprises. Altogether 15 per cent of the total turnover of the companies in 2010 came from product innovations launched during 2008−2010. Innovation expenditure reported by enterprises totaled EUR 7.3 billion in 2010. (Official Statistics Finland 7.6.2012, 8−12)

1.3.1 Types of innovation

Innovation types can be classified in several ways. The most common ways are to classify innovations based on the degree of innovation or based on the focus of innovation.

In the aspect of innovation degree, innovations are divided in incremental and radical innovations.

Incremental innovations build on existing knowledge bases and provide small improvements in well-defined current offerings. Thus, it is a question of continuous improvement of company's offerings. With incremental innovations, companies do not have to change their way of doing business. Majority of innovations are incremental because they are less risky and the results are easier to predict. Improvement in televisions from black-and-white to colour to digital to flat-screen is an example of an incremental innovation. Incremental innovations emerge continuously and they are needed for sustained growth. (Hoskisson, Hitt, Ireland & Harrison 2008, 339; Apilo et al. 2007, 23)

In contrast to incremental innovations, radical innovations usually provide significant technological breakthrough and create new knowledge. Microprocessor chip and mobile phone in their time are examples of radical innovations. Change in business concept is inevitable and in order to achieve

radical innovations companies must change their operations processes and structures. So, radical innovations challenge the existing. These types of innovations have become increasingly important to achieve and sustain a competitive advantage in many industries, but they are more unusual because of the difficulty and risk involved in the development process. (Hoskisson et al. 2008, 339; Apilo et al. 2007, 23)

In addition to the degree of innovation, innovations can be classified by the target of innovation. Innovation can be focused on products, services, processes, or business models.

Product innovation can be a new product or a remarkable improvement in an existing product that is launched in the market. A new or essentially improved product differs from previously produced goods with respect to its characteristics. There can be for example significant improvement in technical performance, components, materials, software, or user friendliness. (Official Statistics of Finland n.d.) Ruukki's energy panel system for decreasing heating energy needs and Kone's machine-roomless elevator that saves space in buildings are examples of domestic product innovations (Kone Corporation 2012).

Service innovations change successfully the way to create value for customers. The target of service innovation can be more extensive than product innovation's, but a physical product can be a part of service innovation. Also service innovations can be totally novel services or new or modified ways to offer established services for customers. Customers are in an important role in service innovation process. In order to understand how customers create value and how value creation will develop in the future, the service provider works in close, confidential interaction with key customers. Successful service innovations change the company's strategic positioning in the market. Internet-based bank services are an example on modern service innovations. (Apilo et al. 2007; Solatie & Mäkeläinen 2009, 30)

Process innovations improve internal or external processes of the company in a novel way. They are important in order to improve organization's operational efficiency and thus they preserve competitiveness. Usually process innovations decrease production costs, improve productivity, or increase satisfaction at work. It is typical for process innovations that customers do not notice them. By time, process innovations are realized in faster service or better products. Process innovations are extremely important for a company because they support product and service innovations. (Mäntyneva 2012, 42−43; Solatie & Mäkeläinen 2009, 35)

Business model innovations are strategic innovations that affect the customers directly. A company can have several business models to utilize in different business environments. An outstanding business model can increase competitiveness in an industry where services and products do not

genuinely differentiate from competitors. (Mäntyneva 2012, 44−45) Continuously changing business environment and tightening competition require improvement of business models. Although all types of innovations are important, business model innovations can be argued as vital for a company's existence. (Antola & Pohjola 2006, 50) An example of business model innovation is Finnish ABC chain, a crossover of a gasoline station, a grocery, and a restaurant.

In order to gain success, companies need to combine different types of innovations, and thus strict boundaries between different innovation types are not recommendable. Professor Pirjo Ståhle (Boxberg & Jouslehto, 2012) emphasizes especially combination of product and service innovations and know-how in technology industry in order to success in a long-term. Nevertheless, classification is needed in order to be able to consider strategic choices related to innovation activities. Profound classification enables companies to define what kind of innovations are worth pursuing. Innovation classifications can help companies to clarify its dedication and to communicate it internally and in the innovation network. Classification helps to identify differences between innovation types and different requirements for them. (Solatie & Mäkeläinen 2009, 38; Apilo et al. 2007, 28)

1.3.2 Individual creativity and innovativeness

Innovativeness is often discussed as an organizational feature. Amabile (1988, 126) states that organizational creativity refers to the generation of novel and useful ideas in the organisation whereas innovativeness also includes the capability to take action after an idea is presented. An organisation is always based on individuals and thus creativity and innovativeness is examined here on individual level.

Amabile (1988) identifies three components in the individual creativity: domain relevant skills or expertise, creativity-relevant skills, and task motivation (Figure 1). All these components are needed to bring about creativity. The higher the level of each of the three components is, the greater the overall final level of creativity is. (Amabile 1988, 156)

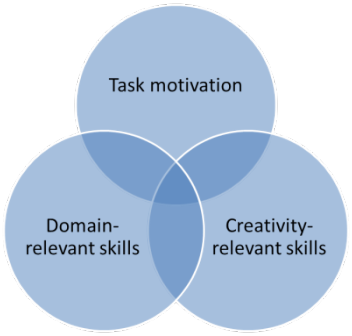

Figure 1 The components of individual creativity based on Amabile (1988).

The domain-relevant skills include knowledge, technical skills and basic talent. This expertise is the raw material for creativity. The creativity-relevant skills consist of thinking and working styles, and styles of approaching the world. Without these skills, the individuals will produce only ordinary ideas. (Amabile 1988, 156) Task motivation includes two elements: individual's baseline attitude toward the task and individual's perceptions of his or her reasons for taking the task. Motivation is the most important of the three components of individual creativity. Domain relevant and creativity-relevant skills determine what the person is capable of doing, while task motivation determines what the person will actually do. (Amabile 1988, 133, 156)

Amabile further divides motivation into intrinsic and extrinsic motivation (Amabile 1988, 134). Extrinsic motivation comes from outside the individual, for example in the form of rewards and evaluation. Intrinsic motivation comes from the inside of individual, so called person's passion for challenge. People are most creative when they are intrinsically motivated, in other words, when the work itself is motivating. (Amabile 1998, 76)

Solatie and Mäkeläinen (2009) believe that without creativity it is impossible to achieve remarkable innovations. They describe creativity as seeking alternatives, recognizing new perspectives, and trying new means. They believe creativity is something else than analytical thinking, intelligence, or knowledge management. There is no right or wrong way in creativity, but several ways of doing things. Creativity requires courage to take risks and experiment. It needs time to think and needs to be practised for example by different creative problem solving techniques. Solatie and Mäkeläinen state that creativity differentiates companies from competitors and provides genuine competitive edge. (Solatie & Mäkeläinen 2009, 80−85, 163)

Furthermore, entrepreneur Saku Tuominen claims that creativity is not an inborn feature but it is an attitude towards life that anyone can adopt. According to him, it is a question of willingness to do things differently and better than others. In other words, creativity is open-mindedness and will to question the existent. Fundamental is to stop considering unsuccessful experiments as failures, because that restricts creative thinking. Doing things differently is often toilsome and insecure, which creative people tend to tolerate. (Juntunen 2013, 19)

The components of creativity and innovativeness on individual level are very much alike. Creativity focuses on generating ideas, whereas innovativeness includes also promotion, development, and application of ideas. Creativity can thus be seen as a building block for individual's innovativeness, but in addition to creativity, innovativeness includes the ability of conducting the generated ideas. (Haukola, Lempiälä & Moisio 2009, 21)

West and Farr (1989) define innovative actions as separate activities that aim to the creation, introduction, and application of beneficial novelty at any level of an organization. Kleysen and Street (Haukola et al. 2009, 22) identified five categories of individual's innovative behaviour: opportunity exploration, idea generation, idea enrichment, promotion, and implementation. The nature of innovative activities is always insecure, there is no guarantee that a promising idea results to an innovation. Especially in the front end of innovation the success and feasibility of ideas is still insecure. Still, developing different kinds of ideas is always valuable because it maintains innovative climate and creates prerequisites for innovations. (Haukola et al. 2009, 22)

2 ORGANIZATION CULTURE EMPHASISING FRONT END OF INNOVATION

2.1 Organization culture as a background for innovations

Organization culture is defined in several ways in the literature. Hofstede (2001, 9) defines culture as mental programming of human mind that separates one group of people from another. Therefore, organization culture defined by Hofstede (2001, 391), is collective programming of minds that separates the members of one organization from another. It is maintained not only in the minds of its members but also in the minds of its other stakeholders, meaning everybody who interacts with the organization (Hofstede, Hofstede & Minkov 2010, 345). Organization culture is holistic, historically influenced, socially constructed, and relatively stable. Shared perceptions of daily activities are the core of organization culture. (Hofstede 2001, 393−394)

According to Lundy and Cowling (Martins & Terblanche 2003, 65) organizational culture is "the way we do things around here". Martins and Terblanche (2003, 65) determine organizational culture as deeply planted, often subconscious, values and beliefs that are shared by personnel. Organization culture is manifested in the typical characteristics of the organization. Therefore, it refers to a set of basic assumptions that worked well in the past and thus are accepted as valid assumptions in the organization. They are maintained in continuous process of people interaction, in other words as the right way in which things are done or problems should be understood in the organization. A strong culture provides shared values that ensure that everybody in the organization is on the same track. (Martins & Terblanche 2003, 65)

Organizational culture includes the basic assumptions as well values, structures and physical environment. Values refer to something that is valuable and worth pursuing. Basic assumptions define why certain issues are

desirable in an organization and others are disapproved. Basic assumptions also determine the facts that belong to work and the level of importance and urgency. Assumptions are partly subconscious, and thus difficult to acknowledge and even more challenging to change. Physical environment, organizational structures and tools represent the outermost layer of organizational culture that is most visible but also most superficial. (Haukola, Lempiälä & Moisio 2009, 27–28)

Culture is highly significant for how organizations function: from strategic change to everyday leadership and customer relations and interactions, and to knowledge management. (Alvesson 2002, 2) Thus, culture has an impact on the degree to which innovation is encouraged in an organization.

Martins and Terblanche (2003, 65) divide the role of organization culture in two dimensions: the functions of organizational culture, and the influence that organizational culture has on the different processes in an organization.

Martins and Terblanche (2003, 65) present Furnham's and Gunter's views how to divide the functions of organizational culture to internal integration and coordination. Internal integration includes the socializing of new members of organization, creating the boundaries of the organization, the feeling of personnel's identity, and commitment to the organization. Coordination function can be described as creating competitive edge, making sense of the environment in terms of acceptable behavior, and social system stability which is the glue that binds organization together.

Martins & Terblanche (2003, 65) emphasize the role of organization culture influencing different processes in an organization. Organizations use different resources and processes to lead behavior and change. Organization culture influences behavior indirectly and thus complements rational managerial tools. Culture is communicated for example through symbolism, feelings, behavior, and physical settings. Rational tools and processes like strategic direction, goals, technology, structure, and communication are designed to do things. For example in mission and goal statements the organization culture fills the gaps between formal announcements and actual actions.

A model of organization culture was presented by Martins in 1997. Martins' model is based on the interaction between the organizational subsystems, external environment, internal systems, and the dimensions of culture. (Martins & Terblanche 2003, 66) According to Martin's model, the culture encompasses eight different dimensions:

1. Mission and vision: determines employees' understanding of the vision, mission, and values of the organization and how they can be transformed into individual and team goals and objectives.

2. External environment: defines the level of focus on external and internal customers, and also personnel's conception of the effectiveness of the community involvement.
3. Means to achieve objectives: concentrates on organizational effectiveness and how organizational structures and support mechanisms contribute to it.
4. Image of the organization: focuses on the image to the external world and if the organization is a desired employer.
5. Management processes: determines the way in which the management processes take place, including e.g. decision making, innovation processes, and communication.
6. Employees' needs and objectives: focuses on the integration of employees' needs and objectives together with those of the organization.
7. Interpersonal relationships: concentrate on the relationships between personnel and managers, and on the management of conflict.
8. Leadership: focuses on specific areas strengthening leadership, as perceived by personnel. (Martins & Terblanche 2003, 66)

This model can be used to illustrate organization culture in a company. Thus it can be used as a background to define which determinants of organization culture influence the degree of innovation and creativity in the front end of innovation process. (Martins & Terblanche 2003, 67) Those determinants are covered in chapter 3 in this research.

2.2 Front end of innovation

Innovation process encompasses a wider entity than the traditional new product development process. It comprises the whole period from idea generation to emergence of an innovation. Innovation process is commonly divided into three phases: front end, new product development project, and commercialization. Front end of innovation is defined as those activities that become before the formal and well-structured new product and process development. The biggest difference between the front end and the rest of the innovation process is that front end consists of continuous, iterative activities and the rest of the process is structured and consists of projects. (Apilo et al. 2007, 131–132, 134; Koen et al. 2001, 49, 51)

According to Kim and Wilemon (2002, 27), the front end of innovation starts with the recognition of an opportunity and ends with the creation of a concept together with a decision about whether it will be chosen for further development. Importance of front end phase is emphasized because of the impact it can have in the total new product development. Managing front end can become an important competitive advantage and a core competency in performing company's innovation strategy. Also Apilo et al. (2007, 132) state that in the front end the company creates its perception on future development of technologies, markets, and customer re-

quirements, and chooses the billets for its future competitiveness. Due to its informal and ambiguous nature, the front end of innovation is considered as the most challenging phase of the innovation process. On the other hand, it presents one of the greatest opportunities for improving the overall innovation process. Towards the end of the product development process, possibilities to influence the results become more difficult and are more expensive. (Apilo et al. 2007, 132; Koen et al. 2001, 46)

The front end of innovation is often considered chaotic, fuzzy, and uncertain. The conventional term "fuzzy front end" (FFE) is commonly used in the literature, but in this research term "front end of innovation" (FEI) is preferred.

2.2.1 Linear model of the front end

Linear models traditionally bring clarity to the front end of innovation. In 1988 Cooper (Cooper 1998, 209–210) introduced the stage-gate process for moving new product projects from idea to launch (Figure 2). The model was developed to improve effectiveness in new product development process.

In the stage-gate model the new product project is divided into stages separated by gates, or decision points, where the continuation of the process is decided. The traditional stage-gate process breaks the new product project into seven stages:

- discovery
- scoping
- building the business case
- development
- testing and validation
- launch
- post-launch review (Cooper 1998, 209–210; 2001, 130–131; 2008, 214).

In each stage the project team undertakes the work, finds the information needed, and does the data analysis. Each stage is followed by a decision gate for making go/kill decision on the idea. (Cooper 1998, 209–210; 2001, 130–131; 2008, 214)

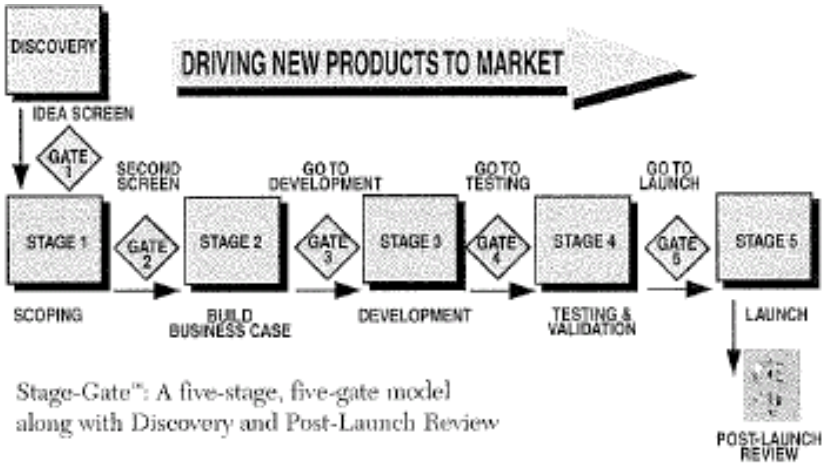

Figure 2 The Stage-Gate Process according to Cooper (2001, 130).

In Cooper's model the first three stages, namely discovery, scoping, and building business case, can be considered as comprising the front end of innovation process (Figure 3). These stages take place before serious financial commitments are made at the go-to-development gate. (Cooper 1998, 210)

The first stage, so-called ideation stage, includes pre-work designed to discover and uncover opportunities and generate ideas. The second stage of preliminary investigations is a quick investigation and scoping for the project. It contains preliminary market, technical, and business evaluation, which are undertaken by very small team of technical and marketing people. The third stage is a detailed investigation phase where the business case is constructed. The stage includes market research, a detailed technical and manufacturing assessment, and a detailed financial analysis together with a business analysis. The deliverables of stage three include a product specification, a project justification, and a detailed project plan. The third stage is best handled by a team consisting of cross-functional members of the organization. If the idea passes the next decision point, go-to-development gate, it will enter the formal new product development phase. (Cooper 1998, 210; 2001, 133, 136)

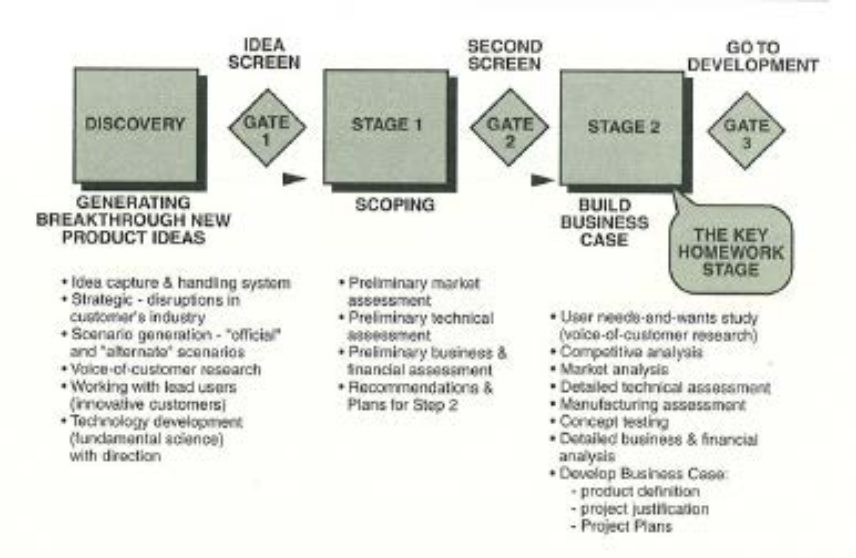

Figure 3 The first stages in the Stage-Gate Process according to Cooper (2001, 179).

Coopers' stage gate model has commonly been in use in companies for managing product development, but it has also been criticised for being designed only for incremental product development, not for platform and breakthrough projects (Koen 2005, 83). In 2008 Cooper introduced next-generation versions of stage-gate model with more flexibility and adaptability, arguing also that the original model is not actually linear but often misinterpreted due to the visual graphics associated to it (Cooper 2008, 216).

2.2.2 Non-linear model of the front end

In order to catch the true nature of the front end, Koen et al. (2001, 47–48) moved in their research from a sequential process model to a non-sequential relationship model. They introduced a cyclical model for front end activities in their new concept development (NCD) model (Figure 4). According to the new concept development model, the front end of innovation consists of three key parts: five front end elements, the engine that powers the elements, and external influencing factors.

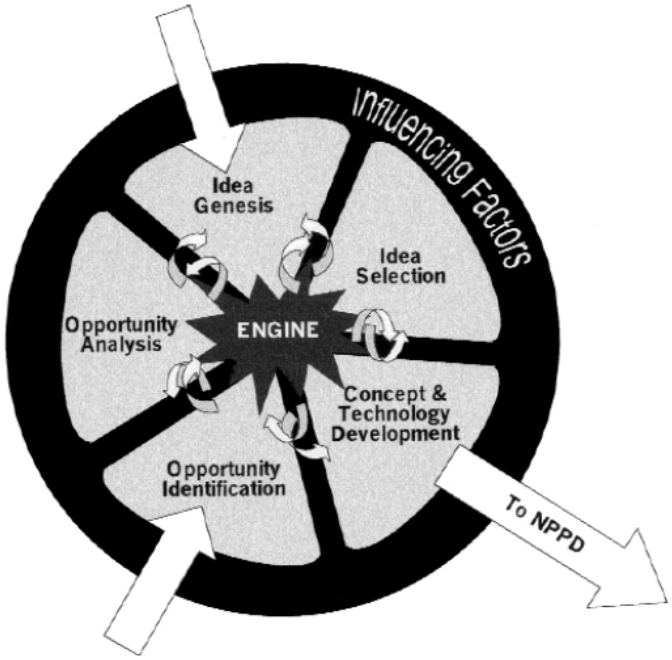

Figure 4 Front end activities according to Koen et al. (2001, 47).

In the new concept development model (NCD), the five front end elements are opportunity identification, opportunity analysis, idea genesis, idea selection, and concept and technology development. The engine represents organization culture, management support, and business strategy. These power the five key elements that can be controlled by the company. The engine sets the environment for successful innovation, and competence in it differentiates very innovative companies from less innovative ones. The third key part, influencing factors, include organizational capabilities, the outside world, and enabling sciences. These factors affect the decisions of the two inner parts. The same influencing factors affect the entire innovation process and are relatively uncontrollable by the company. (Koen et al. 2001, 47–48; Koen et al. 2002, 8, 12)

Koen et al. (2002, 8) emphasize the usage of term ‘element’ instead of term ‘process’ in the model. The model has a circular shape to suggest that the ideas are expected to circulate and iterate between and among the five front end elements. The flow can encompass the elements in any order or combination and each element can be used more than once. In addition, the elements are expected to proceed in more random and non-sequential way. Thus, the front end can be commenced with any of the five activities, although it typically begins with opportunity identification or idea genesis and ends with concept development, which leads to the product development process. Further, the separation between the influencing factors and the five key elements is not rigid in this model. Interactions are expected to occur continuously between the influencing factors, the five key elements, and the engine. (Koen et al. 2001, 48–49; Koen et al. 2002, 8–9)

In innovative companies, identification of opportunities is part of everyone's job. Thus, knowledge on understanding customer requirements, changes in the industry and business environment, and development of technology are encompassed extensively. Collaboration of such experts supports the recognition of opportunities as well genesis of ideas. Also customers and supplier network can be utilized in the activities. Still, genesis of ideas must be goal-oriented. Company's innovation strategy determines the goals and objectives for the kind of ideas that are needed. (Apilo et al. 2007, 134−141)

Ideas need to be generated and refined in order for them to pass the idea evaluation and selection phase. In idea refining, the original inventors give their rough ideas to other experts to be processed for example in workshops. A part of idea generation is reviewing mature ideas critically in the aspect of customer requirements, corporate strategy, resources available, and implementation possibilities. That can be done in the form of small technology analysis, test prototypes, or visualization. In practice, disclosure and generation of ideas is often restricted by patent based rewarding system that supports individual idea generation. In idea evaluation phase the continuation of the idea process is decided, whether the idea is taken into concept development phase or stored for possible future usage. (Apilo et al. 2007, 148−150)

2.2.3 Work group climate and collective activities supporting the front end

Innovations seldom result from efforts of an individual, but innovation is a social activity and most often requires contribution of several individuals in the organization. This social aspect is emphasized in the beginning of the innovation process. Most of the people in the front end of innovation process work in formal or informal groups or teams, and group work is thus a natural part of innovation activities in the front end.

Factors predictive for innovativeness in a work group have been studied in the literature to some extent. West and Anderson (1998, 239–241) found vision, participative safety, task orientation, and support of innovation to be beneficial for innovative climate in a work group. Vision is defined as an idea of a valued outcome. Work group's objective should be clear and accepted among all the individuals of the group, and vision should be relatively attainable in order to facilitate innovation. Climate of participative safety relates to active involvement in group interactions wherein the atmosphere is of trust and support. Task orientation means a general interest to excellence in task performance. Quite often innovative groups focus on social activities but not on performing the task itself. Task orientation also describes a climate which supports the adoption of improvements in established policies and procedures. The fourth factor, support for innovation, can be either articulated or functional, or both of them. Articulated support is stated in documents or in verbal expressions. For sufficient support for

innovation also concrete elements like resources and support from the authorities are needed. (West & Anderson 1998, 239–241)

As well as individual characteristics described in the previous chapter, also collective activities of work teams are important to support the front end of innovation. Hargadon and Bechky (2006, 489) studied the interactions that stimulate collective innovativeness. They define collective activities as what people do together. Collective activities are of key importance in creating new interpretations of current knowledge and developing ideas into useful concepts. Most of this interaction happens informally, takes place face-to-face and is of ad-hoc nature. Hargadon and Bechky distinguished the interactions in four categories: help seeking, help giving, reflective reframing, and reinforcing (Figure 5).

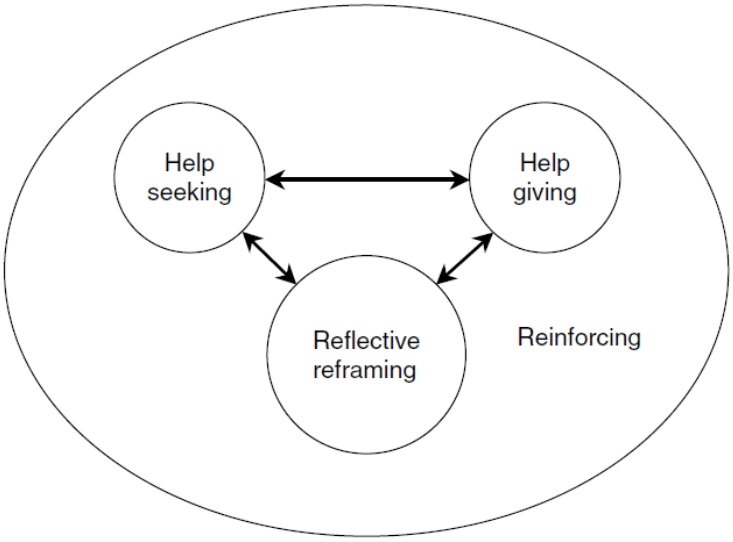

Figure 5 Interactions stimulating collective innovativeness (Hargadon & Bechky 2006, 490).

Help seeking includes all the activities a member of a group uses when trying to find assistance in solving a problem. In many organizations help seeking is supported by formal means like meetings, brainstorming sessions, and supportive databases. The informal ways of help seeking are more important and useful than the formal ones, though. The informal ways include face-to-face interaction and use of personal networks. For innovations, it is important that organizations appreciate the ability of stating questions and asking help for identified problems in addition to appreciating giving answers. (Hargadon & Bechky 2006, 490–491)

With help giving activities members of the group react to requests of help and give their time for helping others. In bureaucratic organizations, help giving is often formal and slow and does not concern requests coming outside the existing job assignments. Such constraints impede help giving. In innovative organizations help giving is spontaneous, timeliness, and even proactive. Help giving activities play a vital role in bringing about collec-

tive innovativeness since they shape the way help is asked and create possibilities for expressing novel insights. It is difficult for individuals working alone to generate new interpretations or generate new insights. (Hargadon & Bechky 2006, 491)

Reflective reframing can be defined as activities that take place in situations where there are no clear questions or answers. This category requires considering and challenging the original question; whether there is a better question to be asked. In reflective reframing two or more people change their own views in order to find a common way to perceive a certain matter. Together they strive to discern the matter at hand and are willing to change their own basic assumptions in order to achieve the correct interpretation. Thorough discussions are important in reflective reframing because through them the deep level of knowledge can be reached. (Hargadon & Bechky 2006, 492)

The fourth category, reinforcing, refers to the way the three above discussed interactions are strengthened in the organization. Help seeking, help giving, and reflective reframing are all mutually reinforcing activities. They usually appear in combination and activate each other. The way those activities are used is related to the prevailing organization culture. For instance, organization culture can support help giving but help seeking can be considered as a sign of incompetence. That has a strong influence on personnel's willingness to take part in help seeking activities. Reflective reframing activities are often problematic from the viewpoint of organization culture: efficiency in finding solutions often surpasses reflective reframing and thus hinders innovativeness. (Hargadon & Bechky 2006, 493–494)

3 DIMENSIONS OF INNOVATION CULTURE

The organizational context has an important influence on success and failure of innovations. It does not matter how well the internal systems are developed for defining and developing innovative products and processes they are unlikely to succeed unless the surrounding organizational context is favorable. Developing an innovative climate is not a simple matter since it consists of a complex network of behaviors and artifacts. Management can intervene by changing structures and processes, but changing the culture is not likely to happen quickly or as a result of single initiatives. (Tidd et al. 2001, 337)

Apilo et al. (2007, 97) also emphasize the long-term nature of changing the organization culture and that industries, companies and people inside the companies are different. They state that building a creative and innovative climate involves systematic development of organizational structures,

and communication policies and procedures. In changing innovative culture the key question is to find motivation for the change: to answer the question why the change is inevitable in a current operational environment. (Apilo et al. 2007, 127)

It can be argued that organization culture impacts in a holistic way on the daily functionality of the organization and also the innovativeness of the organization (Haukola et al. 2009, 27). In Koen's model of the front end introduced in chapter 2.2.2 in this study, culture is an essential part of the engine that powers the elements of the front end of innovation. Therefore, it is essential to examine closer the features supporting innovative organization culture.

Martins and Terblanche (2003, 64) in their study defined the determinants of organizational culture which influence innovation and creativity (Figure 6). As a basis for the determinants they used Martin's model of organization culture that was described in chapter 2.1 of this study. Martins and Terblanche present that each dimension of organization culture has an influence on the degree to which innovation and creativity appear in the organization. That influence is divided into five determinants of organizational culture affecting innovation and creativity:

- strategy
- structure
- support mechanisms
- behavior
- communication (Martins & Terblanche 2003, 70).

These determinants have a role in improving innovation and creativity in the front end, and the way in which they operate either support or restrict innovation and creativity. Naturally all the determinants overlap and interact with each other. (Martins & Terblanche 2003, 73)

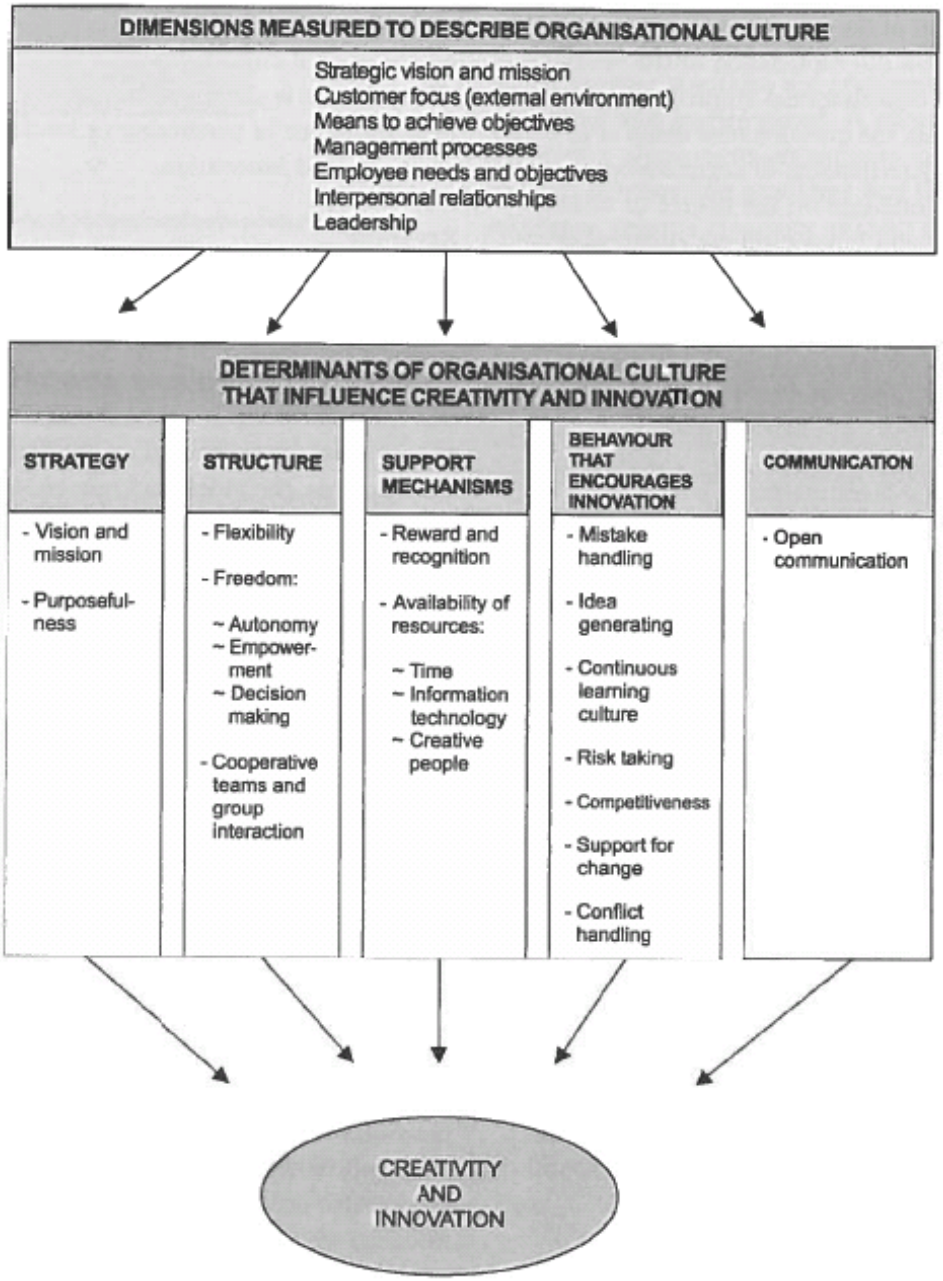

Figure 6 Influence of organizational culture in innovation and creativity (Martins & Terblanche 2003, 70).

Innovative organization culture and ways how to improve it in the front end is examined closer in the following chapters. The structure of the chapters is based on the above described determinants of organization culture that influence creativity and innovation, defined by Martins and Terblanche.

3.1 Strategy

Innovation strategy is a part of the corporation strategy. Company's vision functions as the basis for innovation strategy. Vision is a descriptive picture of company's desired future state, and provides the organization with direction more than specific goals for innovation activities. Vision guides the choices related to company's future activities. (Mäntyneva 2012, 72) There are several definitions for innovation strategy. Robbins determines innovation strategy as a strategy that promotes the development and implementation of new products and services (Martins and Terblanche 2003, 69). Apilo et al. (2007, 57) define that innovation strategy expresses the means how an organization achieves its vision through renewal.

Apilo et al. (2007, 58) consider strategic thinking more important in creating innovation strategy than the traditional way of strategic planning. Strategic thinking is an organizational learning process with plenty of room for open discussions. Strategic thinking examines six different directions. The first direction, the future, is explored by visioning. The past is analyzed and learnt through experiences, using so called tacit information. The upside view helps understanding wide entities whereas downside direction explores the logic of business activities. Other industries are studied by the fifth direction, called the side perspective. Exploring the distant future scenarios means also defining the own desired futures, not only predicting factors related to the future.

According to Apilo et al. (2007, 60) innovation strategy answers the question how to innovate and how the company should pursue its business objectives through new innovations. It includes much more than just the technological understanding. Innovation strategy determines customers, the desired radical level of innovations, types of innovations, and competitive situation.

Customer determination means defining to whom the company wants to produce new solutions. In today's world, one cannot assume the customer base to remain the same forever. The pursued customers might differ from company's current customers. Company's competences and resources may match better with other customers or another customer segment might prove faster growth rate or higher profitability in the future. Definition of earning logic is an essential part of customer determination. (Apilo et al. 2007, 60)

Determining the desired *radicality level of innovations* is affected by company's ability for risk taking, the gap between current competences and competences required for achieving the objective, available resources, how challenging the vision is, and company's readiness for a change. Radical innovations require challenging the existing. If the company is not ready to change their way of doing business, it is not worth pursuing radical innovations. (Apilo et al. 2007, 61)

In innovation strategy, *types of innovation* mean the ways how to pursue novelty and change. As described in the earlier chapter of this study, innovations can be focused on products, services, processes, or business models. This focus on innovations is defined in company's innovation strategy. (Apilo et al. 2007, 61)

Determining the *competitive situation*, company selects whom it wants to compete with and defines the desired competitive edge. Companies seeking for sustaining competitive edge strive for it by either seeking external possibilities, in other word with positioning, or by building their strategy on unique internal resources. The strategy of positioning requires innovations for improving cost efficiency and processes, and is suitable for a business environment that changes slowly. In more dynamic business environment, longer-term dominant position is pursued by a strategy built on unique internal resources. On the other hand, in industries where environment changes rapidly, renewal of internal resources can be too slow. Thus, combining the internal and external potential is often considered as the best strategic option for such markets. Brown and Eisenhardt use term "competitive edge" for finding balance with internal and external potential. (Apilo et al. 2007, 61−62)

Innovation strategy is constant interaction of five elements: vision and strategy, innovation strategy, potential, need for change, and resources (Figure 7). Novel innovations, i.e. potential, can be recognized in customer needs, industry transition, and development of technology. Company's need for change can derive from supply portfolio, technology portfolio, development project portfolio, or from the desire to improve company's profitability or performance. Resources can act either as enablers or inhibitors for innovation. They create the limits for company's ability to innovate. Relationship with company's strategy is also interactive: innovation strategy brings novelty to corporate strategy and vice versa. (Apilo et al. 2007, 62−63)

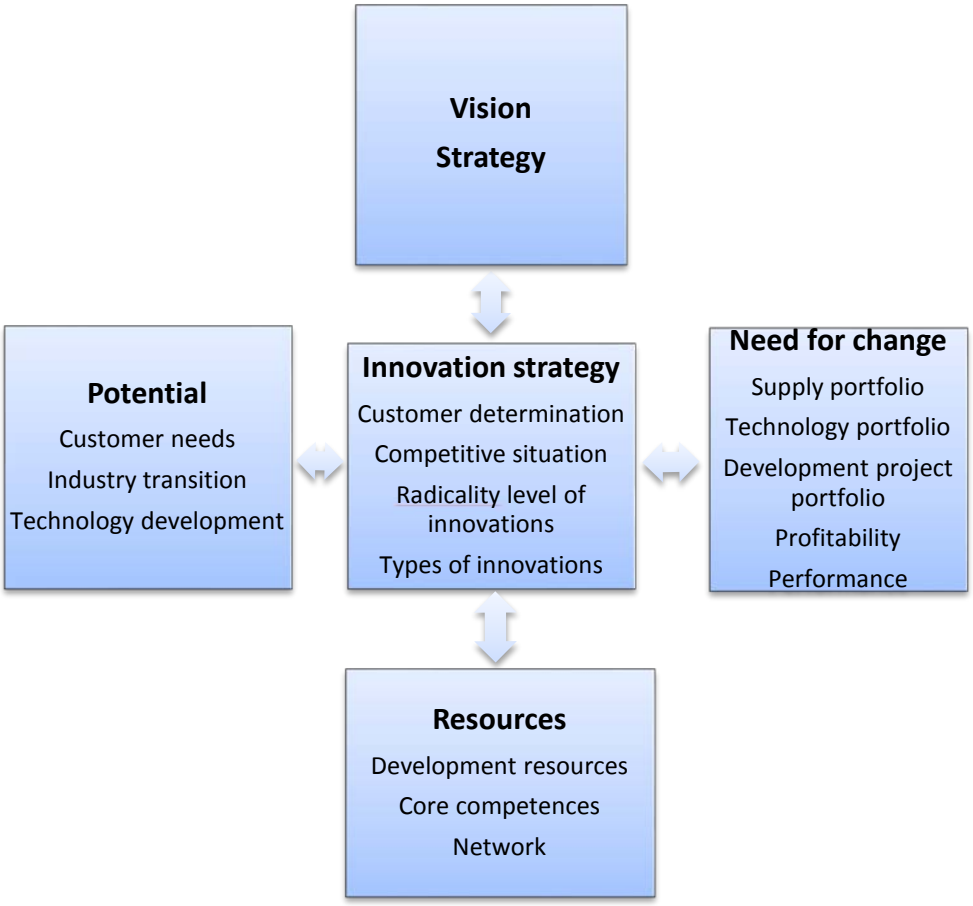

Figure 7 Elements of innovation strategy and their interrelations based on Apilo et al. (2007, 62−63).

In order to organize and analyze its innovation strategy, a company can use different innovation strategy tools. Such tools are for example program management, portfolio management, technology roadmaps, product roadmaps, and scenarios. (Apilo et al. 2007, 68−72) Closer examination of management tools is limited out of the focus of this research.

In addition to the perspectives of Apilo et al, Solatie and Mäkeläinen (2009, 145) emphasize enabling innovative thinking and supporting the identification of new opportunities in innovation strategy. According to their theory the elements of a good innovation strategy are:

- Describing the goals and objectives.
- Communicating the vision throughout the organization.
- Defining the ability of taking risks and encouraging into risk taking.
- Allocating sufficient resources.
- Inspiring people to innovative work (Solatie & Mäkeläinen 2009, 141).

Solatie and Mäkeläinen (2009, 145) mention that explicit innovation strategy is especially important in organizations consisting of independent local business units. If the strategy is unclear all the local units will find their own ways to execute the innovation strategy.

Both Martins and Terblanche (2003, 69) and Tidd et al. (2001, 316) emphasize the importance of understanding the vision and mission. To achieve that, the strategy should be clearly articulated in the organization. Also for the implementation of innovation strategy, it is extremely important to communicate it clearly to own personnel and also to other stakeholders. Communication is crucial in order for personnel to know what they are expected to do for the innovation strategy to actualize. (Mäntyneva 2012, 83)

Apilo et al. (2007, 102) highlight the importance of middle management when implementing vision and strategy. They state that organizational strength emerges when members of the organization commit themselves in the common objectives. Management's task is to create visions and inspire employees. Management should communicate objectives clearly and help individuals to seek their own roles in order to achieve the common objectives. The objectives and visions set by the management should encourage personnel and be such that people can commit to them so that company's goals will be evolved to individuals' goals. (Apilo et al. 2007, 104)

Innovations do not just emerge passively, but innovation activities need a goal-oriented, explicitly built strategy to be based on. The role of management is highly important in implementing the innovation strategy in the front end of innovation. In front end, enabling innovative thinking and supporting identification of new opportunities are essential elements for the strategy. Experts in the front end need concrete goals and tools that are communicated clearly in order to identify new opportunities and create successful and sustaining innovations.

3.2 Structure

Organization culture influences organizational structure and operational systems in an organization. In order to support the emergence of innovations, an organization needs a structure and goals for that. Creativity or open culture alone cannot reach results without the support of appropriate systems and processes. Apilo et al. (2007, 101) state that it is more essential to arrange prerequisites in an organization for utilizing creativity and innovativeness, than accumulate creativity and innovativeness themselves. Solatie and Mäkeläinen (2009, 142) then again present that without creativity anything radical seldom happens. Thus, both creativity and systems are needed for innovative culture. A systematic process offers the people a common language and way to act. The logic of processes and systems

should be simple in order to reveal resources for innovation work itself (Solatie & Mäkeläinen 2009, 164).

Referring to Arad et al., Martins and Terblanche (2003, 70) demonstrate that structural characteristics like flat structures, autonomy, and work teams promote innovation. Flexibility, freedom, and cooperative teamwork together with group interaction have a positive influence on innovative climate. On the other hand, values like control, rigidity, and stability tend to restrain innovation.

According to Apilo et al. (2007, 109) an innovative organization is non-hierarchical and flat in structures, because innovations arise by doing together in collaborative communication, not struggling with hierarchy. Usually, smaller companies are more agile in decision making than larger ones. Larger companies can ease the hierarchy with different information systems and communication technologies. The benefit of large companies is the probability of multiple talents accumulating in the company. The challenge is to recognize these talents and make them collaborate. (Apilo et al. 2007, 109) On the other hand, the need to eliminate smothering bureaucracy and strict structures can lead to a chaos trap without increasing innovativeness. Too loose organizations and informal environments can sometimes act against the interests of successful innovation. All innovations do not work in too loose organizations. The key issue is to find the appropriate balance concerning the structure of the organization and retain certain routines and planning systems. (Tidd et al. 2001, 315)

Apilo et al. (2007, 110-111) demonstrate that an innovative idea needs support from both persons and systems to evolve into a potential innovation. Principally, structures and processes should be constructed for the advancement of innovations. Thus, innovations become everyday practice and their importance is acknowledged. On the other hand, certain kind of chaos and rule-breaking nature closely related to innovations requires flexibility from the processes. Innovation processes and systems support the majority of innovations but not all of them. Thus, specific kind of sensibility, flexibility, and risk-taking is needed in order not to smother innovativeness. There are times when the best potential innovations come outside the process.

According to Martins and Terblanche (2003, 70) freedom as a core value in stimulating innovation is manifested in autonomy and empowerment. Amabile (1998, 5) discusses the importance of giving people freedom and autonomy concerning the process. That autonomy should take place within company's clearly specified strategic goals. The goals should remain stable for a meaningful period of time, because creativity and innovativeness suffer if the target keeps moving. Without a clear target freedom around process is pointless. Autonomy in innovation process supports creativity and innovativeness because freedom in approaching their work increases employees' intrinsic motivation and sense of ownership. Autonomy also

allows employees to approach problems in ways they can best utilize their expertise and creative-thinking skills.

In addition to autonomy, freedom is manifested in empowerment. Management should believe in personnel and encourage them to be more innovative by empowering them instead of controlling them (Martins & Terblanche 2003, 71). Empowerment can refer to any kind of formal and informal means of sharing decision-making power and influence between managers and subordinates (Hofstede et al. 2010, 333). It can be conducted in several ways in organizations. Managers can recognize that employees are capable of doing more than they have done in the past. Personnel can be made feeling trusted, in order for them to be able to carry out their tasks without constant checking. Empowerment can be conducted also through giving employees control of decision making, self-confidence, and recognizing their achievements. (Hall, Jones, Raffo, Anderton, Chambers & Gray 2009, 391)

Martins and Terblanche (2003, 71) refer to Arad et al. when presenting that cooperative, well-established work teams support innovation. Such work teams encourage diversity and individual talents that complement each other. Arad et al. introduce several aspects of effective team work: mutual trust and respect, understanding each other's perspectives, effective communication, openness for new ideas, and desire to solve differences, among others. Both Martins and Terblanche (2003, 71) and Apilo et al. (2007, 108) mention the importance of cross-functional teams in innovative organization and how different functionalities, like product development, production, sales, marketing, and management, should have plenty of contacts with each other.

According to Amabile (1998, 6) design of work teams is fundamental for innovativeness. She emphasizes that mutually supportive groups with diverse perspectives and backgrounds come up with innovative ideas. Also Solatie and Mäkeläinen (2009, 66−67) have examined the design of work teams, describing that global new phenomenon and trends arise in cities like London and New York due to their vast ethnical background. Therefore, they state that the more heterogeneous the personnel are the wider perspective and diversified ideas there are for the innovation work in the organization. Thus, companies should combine people with different background, way of thinking, and set of values.

Amabile (1998, 6) states that various intellectual foundations and approaches to work enhance innovative ideas. She sees diversity as a starting point and states that teams must have three other essential features: members sharing excitement over the team's goals, displaying a willingness to help team mates through difficulties, and every member recognizing the unique knowledge of other members. Creation of truly innovative work teams requires managers to have a thorough understanding of their people. People have to be assessed for their knowledge, attitudes about fellow

team members and collaborative process, problem-solving styles, and critical motivation factors. Building a homogenous work team is often alluring and such teams tend to work lucratively, but diverse perspectives generate more innovativeness than homogenous teams.

3.3 Support mechanisms

Innovations in an organization can be supported by the help of several support mechanisms. Reward and recognition, availability of resources, and managerial encouragement are considered as the major ways of support. The role of management is emphasized for conducting activities to promote innovativeness successfully.

There are two differentiating aspects in the literature for rewarding and recognition in the perspective of innovativeness. Some authors emphasize the meaning of monetary rewards, whereas the others point out the importance of softer values in the form of non-monetary recognition like career opportunities and job itself. Nevertheless, support is the job of organizational leaders. They must arrange appropriate systems and highlight the values that make clear that innovative efforts are the priority and innovativeness is rewarded consistently (Amabile 1998, 7).

Solatie and Mäkeläinen (2009, 73) strongly speak on behalf of the monetary rewards as a way of motivation. They claim that idea innovators and executors should be rewarded with a remarkable sum of money. Rewarding strengthens motivation and commitment, and giving money is a clear way to reward the personnel. They also emphasize the meaning of common office parties meant for the whole organization to celebrate the success: no matter how many people are actually rewarded, the whole organization is involved with innovation activities and everyone's input is equally important.

Solatie and Mäkeläinen (2009, 180−181) studied the way how Finnish companies reward personnel for innovations and ideas, and noticed that technology and information technology companies tend to use rewards the most. Rewarding was more obvious the higher innovativeness was defined in company's core values. The common level of rewards was relatively low in many of the companies: a package of coffee, a trophy, a parking lot, or including innovation activities in the monthly salary. Only few Finnish companies participating in the survey rewarded innovations more generously in the form of money, bonuses, or equivalent ways. Thus, the researchers raised the questions: How long do highly educated personnel do their best if somebody else gets the financial benefits from their ideas? How long does it motivate them to carry out innovations?

According to Amabile (1998, 7) creative organizations avoid using money as rewards, because monetary rewards easily make people feel they are

bribed or controlled and thus hinder innovativeness and creativity. To sustain their intrinsic motivation, the passion, most people need to feel that their work matters to the organization. Amabile (1998, 6) emphasizes that more than offering extrinsic rewards for particular outcomes, managers in innovative organizations freely acknowledge innovative work often before the commercial outcome of those efforts is visible. New ideas are met with open minds. Instead, culture of strict evaluation is very time-consuming, leads people to concentrate on external rewards and punishments, and even creates climate of fear.

Non-monetary rewards can be defined as practices or events that are also important for motivation. They are for example the job itself, career or development opportunities, flex-time arrangements, work community, recognition and feedback from work. (Moisio & Lempiälä 2008, 259)

Referring to Arad et al., Martins and Terblanche (2003, 71) present that if innovative behavior is rewarded in way or another, it will become the general way of behaving in the organization. In practice, a confrontation is obvious: in many organizations employees are rewarded for well-proven methods and flawless work, whereas genuine innovations are based on creative thinking and risk-taking. Therefore, personnel should also be rewarded for risk-taking, experimenting, and generating ideas. (Martins and Terblanche 2003, 71) Once again, the management has a remarkable role in supporting innovativeness. They should be sensitive to which methods of reward and recognition will inspire personnel in their specific organizations to be more innovative.

In an organization where innovation is promoted, employees are allowed time to think innovatively and experiment. Emphasis in productivity and downsizing in an organization brings more pressure on personnel and thus restricts innovativeness. (Martins & Terblanche 2003, 71) For example in Google company the employees are allowed to spend twenty per cent of their working time for any creative activities (Solatie & Mäkeläinen 2009, 69). Amabile (1998, 5) uses the term “incubation period”. Innovativeness often takes time, because it can be slow going to explore new concepts and put together unique solutions. Therefore, time for exploration and incubation periods are essential for improving innovative organization culture. Under certain circumstances time pressure can heighten creativity and innovativeness, but fake deadlines or impossibly tight deadlines hinder innovativeness by creating distrust and causing burnout. (Amabile 1998, 5) Innovativeness leads to efficiency but on the other hand it also requires inefficiency. That is, innovations need time to think. Ideas do not evolve into innovations if there is no time to stop and explore if the idea is already mature. (Antola & Pohjola 2006, 105−107)

$I=T^3$ Innovation Equals Time to Think. (Jonas Ridderstråle & Kjell Nordström, 2004)

In addition to time, money is another main resource for supporting innovativeness. Money is needed for people to know how far their ideas should be developed before they will be evaluated. Sometimes just an idea is enough, sometimes visual design is required for an idea to succeed and to be communicated further. These factors must be determined in advance. Additionally, personnel need to know accurately how much money is there for each innovation project. (Solatie & Mäkeläinen 2009, 70)

Physical spaces supporting creativity and innovativeness are considered essential in many innovative companies. Open, comfortable offices are widely in use in those companies. Additionally, they arrange innovative working spaces that totally differentiate from ordinary working spaces, for example rooms with massage or sports option, water elements or divans. The purpose of these innovative spaces is to get employees to think out-of-the-box, far away from routine thinking. Still, Amabile (1998, 6) claims that physical space is not nearly as important as other resources influencing innovativeness. According to her, open atmosphere will not hurt innovativeness, but it must not be created at the expense of more important resources related to innovativeness. It also depends on industry-specific requirements and common way of actions how highly the importance of physical space is valued.

Successful innovations require also information technology as a support mechanism. Information systems are not intrinsic value themselves, but when utilized correctly they can be of notable assistance. When information and knowledge are distributed widely in the organization, it increases the opportunity for utilizing the know-how. In addition to common office software, information systems that can be utilized in innovations are for example initiative boxes, idea management tools, discussion forums, and customer relationship management tools, together with data warehouses for competitor, patent, and business information. (Apilo et al. 2007, 127−129)

Recruiting creative personnel is an important part of promoting the innovative culture in an organization. Both Martins and Terblanche (2003, 71) and Apilo et al. (2007, 106) emphasize diversity in the appointment of innovative people. Apilo et al. emphasize the distinct educational background of persons especially in the front end of innovation, stating that encountering disparity generates innovations. Furthermore, Apilo et al. (2007, 104) discuss about individual's entrepreneurship and its importance in innovations. Creating entrepreneurial spirit is important when creating something new. They indicate that it is also essential to provide each member of the organization with assignments that are according to each member's interests. Also Amabile (1998, 5) highlights the importance of matching right people with right assignments. Perfect matches stretch employees' capabilities, but the amount of stretch is crucial: too little stretch makes employees feel bored and too strong stretch easily overwhelms people. Making a good match requires detailed information about employ-

ees and their abilities. The process of matching people with assignments is time consuming, and thus often despised in organizations.

Innovativeness feeds innovativeness. People like to work in organizations where future is constantly pondered and novel things are recognized. When a company is perceived as an innovative one, top candidates tend to apply for open positions in the company. Qualified people appreciate working with qualified colleagues. Thus, innovativeness strengthens the positive corporate image. (Solatie & Mäkeläinen 2009, 21−23)

Both Martins and Terblanche (2003) and Amabile (1998) find management's trust and encouragement of high importance for innovative organizational culture. They also point out that quick decision making promotes the implementation of innovation. As given innovative ideas in business have to be new and also useful, and somehow influence the way business gets done. The dilemma is that it is usually impossible to predict which ideas will be vital. In innovative organization, managerial encouragement comes in other forms than rewards and punishments. Managers can support innovativeness by serving as role models, persisting through challenges, and encouraging collaboration and communication within the team. (Amabile 1998, 6)

It can be argued that the role of management is extremely important when allocating adequate resources for innovativeness in an organization. Extremely tight funding, people, time, and other resources make employees to channel their innovativeness into finding additional resources, not developing something new (Amabile 1998, 5). According to Official Statistics of Finland (7.6.2012, 16), innovating companies regard lack of own funding and lack of qualified personnel as the most important obstacles for innovation activity. Furthermore, investment of resources is possible only if the management truly believes that innovation activities bring value to the company (Solatie & Mäkeläinen 2009, 70).

3.4 Behaviour that encourages innovation

Innovative behavior has been defined as all actions led to the introduction, development, and application of new and valuable ideas (West & Farr, 1989). Innovative behavior enables creation of successful innovations but does not guarantee them.

According to Martins and Terblanche (2003, 72) behavior that supports innovation can be improved by encouraging activities in following seven segments:

- mistake handling
- idea generating
- continuous learning
- risk taking

- competitiveness
- support for change
- conflict handling (Martins & Terblance 2003, 72).

Martins & Terblanche (2003, 72) present Brodtricks's view on how the way in which mistakes are handled in the organization will determine how free the personnel will feel to act creatively and innovatively. Tolerance of mistakes is considered as an essential element for organizational culture that encourages innovativeness. Also Apilo et al. (2007, 106) find secure climate, where also mistakes are seen as learning opportunities, to encourage experimenting more radical solutions than the traditional ones. According to Ryan and Thusman and O'Reilly (Martins & Terblanche 2003, 72), successful organizations do not only reward success but they also acknowledge failures for example by creating opportunities for open discussions and learning from mistakes. Amabile (1998, 7) discusses about "failure value" for projects that do not achieve commercial success but can otherwise be very useful for the organization. Dead ends can sometimes be very enlightening. Often in business knowing what does not work can be as useful as knowing what does.

Referring to Filipczak, Martins and Terblanche (2003, 72) demonstrate that innovations are supported in a culture where personnel is encouraged to generate new ideas without being harmed. In such cultures the focus is on what is supported instead of on what is not viable. Still, emergence of ideas must be goal-oriented. Solatie and Mäkeläinen (2009, 71−72) believe that fair evaluation of ideas is essential in encouraging people to generate new ideas. Enthusiasm is preserved when evaluation is open and objective. Thus, the evaluation system must be known beforehand in the organization. Favoring certain people or teams kills innovation very effectively. Fair assessment does not mean that all ideas are approved, but still, plentiful ideas are needed for keeping up the innovative culture. (Solatie & Mäkeläinen 2009, 71−72)

Continuous learning orientation in an organization can be maintained by focusing on being inquisitive, encouraging personnel to talk to internal and external customers, keeping knowledge skills updated, and by learning creative thinking skills (Martins and Terblanche 2003, 72). Apilo et al. (2007, 115) state that organization's ability to innovate is tightly connected to its ability to learn. Learning organizations are innovative, and learning is encouraged in innovative companies. A learning organization is quick to respond to changes, and continuous change is normal life today in the majority of industries. In an environment of continuous change, the ability to renewal and finding fresh solutions is essential. In the front-end of innovation, individuals' capability to collect and analyze massive amounts of information is emphasized. Additionally, conversation and cooperation between persons is needed. Apilo et al. (2007, 106) highlight that trust between individuals and teams is prerequisite for organizational learning and give possibility for creating new. Tidd et al. (2001, 328) em-

phasize the motivator role of training people. People value the experience of acquiring new skills, and feel valued as a part of the organization. Training and development also enable people to take more responsibility and show more initiative.

For shaping environment of innovation, allowing risk taking is important, especially in the front end of innovation. Organizations may freely question to what degree it is acceptable to not meet expectations when trying something new? (Koen et al. 2002, 13) Referring to Judge and Filipczack, Martins and Terblanche (2003, 72) state that a culture with too many management controls will prevent risk taking experimenting, and consequently restricts innovation and creativity. However, the assumption that risks may be taken as long as they do not harm the organization will not encourage employees to be innovative by experimenting and taking risks either. Certain balance should be achieved in the degree to which taking risks and experimenting is allowed in an organization. According to Martins and Terblanche (2003, 72) the balance can be reached by the following activities:

- Expressing the expected results.
- Appointing the responsibility of monitoring and measuring risk taking to someone in the organization.
- Creating a tolerant climate in which mistakes are accepted.
- Regarding mistakes as learning experiences.
- Assuming there is a fair chance of risks being successful (Martins and Terblanche 2003, 72).

Allowing risk taking already in the front end is remarkable for radical innovations. In innovative organizations, even wild ideas are freely expressed for the work community to evaluate and criticize. Constructive criticism is important as such in order to get the best ideas to be developed further. If the criticism is too crushing, people feel that it is not worthwhile to express their ideas. Thus, harsh criticism diminishes idea generation and innovations. (Mäntyneva 2012, 59)

In innovative organizations, competitiveness is understood as an important aspect of the culture. Competitiveness in an organization is closely linked to continuous learning orientation: it depends on the knowledge of the organization, how the knowledge is utilized, and on organization's ability to learn new (Valtiokonttori 10.4.2012). Referring to Read, also Martins and Terblanche (2003, 72) state that competitiveness in organizations has shifted to the creation and adaptation of knowledge. Building a culture of competitiveness, managers should seek for external knowledge in addition to internal knowledge. Competitiveness is supported when personnel is encouraged for free debate and discussion. (Martins & Terblanche 2003, 72) Creating competitiveness is strongly bonded with establishment of cooperative work teams and recruitment of creative and qualified personnel, themes that were covered earlier in this study. Qualified people inherently

possess competitiveness and thus strengthen the characteristic in their team and in the whole organization.

When employees get the feeling they are supported for change, their innovativeness and creativity is affected positively. Managers can create a culture that supports change for example by looking for new and improved ways of working and creating a vision that highlights change. When managers reveal an overall positive attitude towards change, it can help personnel to work freely, and thus encourage innovation. (Martins and Terblanche 2003, 72). Adopting a culture that encourages change requires commitment of all management level persons. In practice, that seldom comes true. If for example a summer worker suggests the foreman a new way to improve the production process, he easily gets rejected with the words: "I have been working here for ten years so I do know better than you. Don't come and advise me". (Antola & Pohjola 2006, 92)

As discussed in the earlier chapter, management's trust an encouragement is an important support mechanism for innovations. Trust is especially crucial in conflict handling. Organizational conflict can be defined as "a state of discord caused by the actual or perceived opposition of needs, values, and interests between people working together" (Organizational conflict, 19.10.2012). Conflicts occur everywhere where different people collaborate with each other. They can take place in all levels of organization: between individuals or teams, on department level, or between personnel and management. As well as tolerance for mistakes, tolerance for conflicts is considered as an essential element for innovative organization culture. If discrepancies occur, managers should be able to handle them constructively. Understanding different individual thinking styles help managers in their job. The whole personnel can also be trained in the process of constructive confrontation. (Martins and Terblanche 2003, 72)

Developing mechanisms for resolving conflicts is important for innovation success in the front end. Discrepancies divert time and energy from the main issues, affect efficiency, and deteriorate the working climate. Thus, they should be handled carefully, quickly, and if possible, proactively. Conflicts can be prevented by a culture that is open for communication, encourages discussions, defines clear rules, has practices for feedback giving and receiving, and creates favorable circumstances for team work and collaboration. If conflicts occur, they should be solved immediately, primarily within the working society but if needed, external help is sought. Managers should have the courage to address the problems, seek for cooperation, and aim for a solution. (Etera n.d.)

3.5 Communication

What is communication? Åberg (2006, 83, 85) defines communication as an exchange process of messages between the sender and the receiver that act in a certain cultural and physical context. These messages carry information. Above all, communication is not just transmitting messages or information by using different medium. Communication is also creating meanings, sharing, and interpretation. Different individuals give diverse meanings to the messages based on their own life experiences.

Organizational communication in turn is a process that interprets state of matters concerning activities of the organization or communal activities between the members. This interpretation is transmitted to others using interactive network. Differing from personal communication, organizational communication takes place in organized framework. In addition to individual goals, organization communication supports achievement of organization's objectives. Reasons for organizational communication are support for basic functions, profiling, informing, committing, and social interaction. (Åberg 2006, 96)

Barret and Robbins, (Martins & Terblanche 2003, 73) present that open and transparent communication based on trust has a positive effect on innovation and creativity. Therefore, in order to improve innovation culture in the front end, it is necessary to create an open-door communication policy that includes free communication between individuals, working groups, and departments. Open communication encourages trust between individuals and makes personnel feel emotionally safe, which in turn promotes innovation and creativity. (Martins & Terblanche 2003, 73) Important in open communication is that it is multidirectional and utilizes multiple channels. In innovation process the problems often occur just because of failure in communication, especially between different functional elements in the process. Thus, improving clarity and frequency of communication in such interfaces are critical to innovation success. (Tidd et al. 2001, 338−339)

From the perspective of innovation culture, the meaning of internal communication is emphasized. Internal communication has the following basic roles, defined by Juholin (2006, 141−147):

- Constructing culture and communality.
- Transmitting precise and basic information.
- Acting as a managerial tool.
- Increasing satisfaction and job wellbeing (Juholin 2006, 141−147).

Fundamental for an internal open-door communication policy that supports innovation culture is to fulfill the aforementioned basic roles of internal communication. Thus, the basic roles are examined here in the aspect of open and transparent communication.

Internal communication constructing culture and communality. The collective culture is created and maintained through open communication. Juholin (2006, 141) presents Tukiainen's view that organization is an entity, and communication culture is one of its features. Positively experienced communication and transparent communication climate increase common satisfaction and improve organization's results. Referring to Määttä, Juholin (2006, 143) emphasizes the meaning of discussion culture as a part of open communication culture. Discussion forums are needed for these open conversations. Discussion culture promotes understanding, and understanding brings unique competitive advantage because through understanding people can motivate and commit genuinely. (Juholin 2006, 141−143) Communality in the work place can be strengthened by the help of open communication. That in turn creates relaxed and free atmosphere, which strengthens sense of security and trust. (Juholin 2008, 47−48) Security in turn promotes innovativeness in organization.

Internal communication transmitting precise and basic information. Internal communication functions as a tool for transmitting precise and basic information in the organization (Juholin 2006, 143). When this is done openly, it promotes innovation and creativity in the organization. Main contents of internal communication include basic information on organization, its objectives, and means to achieve the objectives. On the other hand, internal communication provides current information on the state of affairs. The criterion is what kind of information people require to be able to perform their tasks as well as possible and experience their work meaningful. Meaningfulness derives from getting knowledge, understanding it, being able to discuss about it in the work community, and thus conceptualizing through interaction. Meaningfulness in turn supports innovation culture. An important content area of internal information, related to both current and basic information, is organization's strategy and thus also innovation strategy. Poor communication diminishes or prevents implementation of strategy. (Juholin 2006, 143−144) Instead, the strategy should be clearly and openly articulated in the organization. Open communication is important in order for the personnel to know what they are expected to do for the strategy to come true. (Mäntyneva 2012, 83)

Internal communication as a managerial tool. Encouraging information sharing and collaboration is an important way for organizational leaders to enhance innovation (Amabile 1998, 7). Management's role is of concern both in strategic and daily communication. Managerial communication that supports innovation and creativity emphasizes the entity and is far-reaching. Employee satisfaction towards their job and towards the whole organization is strengthened by managerial communication that is experienced open, confident, and respectful for individuals. (Juholin 2006, 145) Satisfaction in the organization builds up innovation culture. Smythe (Juholin 2006, 146−147) emphasizes management's role in controlling the flood of information and its interdependence with job satisfaction. Management should focus on increasing the understanding of the personnel by

the means of open and confident communications, and decreasing the overload of information, because increasing quantity of information does not necessarily increase satisfaction. On the contrary, overload of information exhausts and confuses personnel and eventually converts to ineffective communication.

Internal communication increasing satisfaction and job wellbeing. Satisfaction with communication is described by Juholin (2006, 146) as common satisfaction with received information together with possibilities to be heard and have influence in own work community. Communication satisfaction anticipates satisfaction and commitment with own work community. For supporting satisfaction with communication, managers' communication style and behavior, face-to-face communication, and interpersonal network are emphasized. In transparent internal communication that promotes satisfaction, management communicates personally the essential matters related to the whole community and its environment. It is the question of prominence, not necessarily the quantity of information that matters. Information is also easily available. In person's own immediate surroundings, that is work team or department, positive feeling of atmosphere and mutual interaction play an important role in supporting satisfaction. Satisfaction with communication is supported also when personnel get the possibility to influence own work, career, and development. In practice that is often achieved by discussions with own superior. Thus, it can be argued that satisfaction with communications is mainly based on interaction between individuals. (Juholin 2006, 149−150) Satisfaction with information flow in its part contributes to the overall work satisfaction and wellbeing and thus strengthens innovation culture.

An open-door communication policy that includes free communication between individuals, work teams, and departments enhances innovation culture. When creating such an open-door model, the basic roles of internal communication must be carefully taken into account. Based on the elements examined above and Juholin's new agenda for work community communication introduced in 2008 (Juholin 2008, 63), a model for open internal communication in the front end includes the following factors:

1. Important matters are handled interactively. They are discussed about and the common understanding is ensured. That does not mean consensus: things can be disagreed and disapproved. The main thing is that different opinions are genuinely valued.
2. Up-to-date information is always available for people who need and utilize it. Everyone understands their own role and responsibility in producing, refining, and exchanging the information.
3. Atmosphere is relaxed and informal. Everybody dares to speak and express their opinions and experiences. Questioning and doubting is allowed.

4. Participating and influencing in a working community is possible for everyone. People have possibility to be heard and have influence in own work community.
5. Learning together and distribution of knowledge support individuals and the whole community. That is enabled by straightforward communication including multidirectional and continuous feedback.
6. Discussion culture is encouraged. Activities and communication take place in forums that are open sites for knowledge exchange, or through traditional communication channels. Adequate communication technology is important but alone it is not enough. Willingness and capability for openness and interactivity are crucial.

The internal open-door communications model supports and enables conducting the basic roles of internal communication: constructing culture and communality, transmitting precise and basic information, acting as a managerial tool, and increasing satisfaction and job wellbeing (Figure 8).

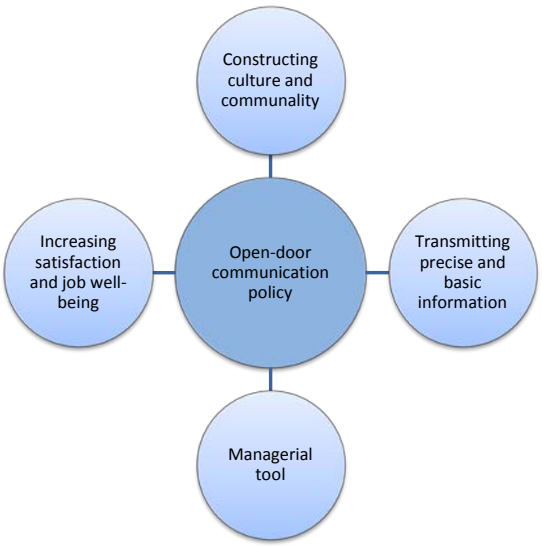

Figure 8 Relationship between open-door communication policy and basic roles of internal communication.

Organization culture impacts in a comprehensive way the innovativeness of the front end. The dimensions of organization culture that affect innovation can be divided into five categories: strategy, structure, support mechanisms, behavior, and communication (Figure 9). The way in which these areas of organization culture operate either supports or restricts innovation and creativity in the front end. Naturally all the dimensions overlap and are in continuous interaction with each other.

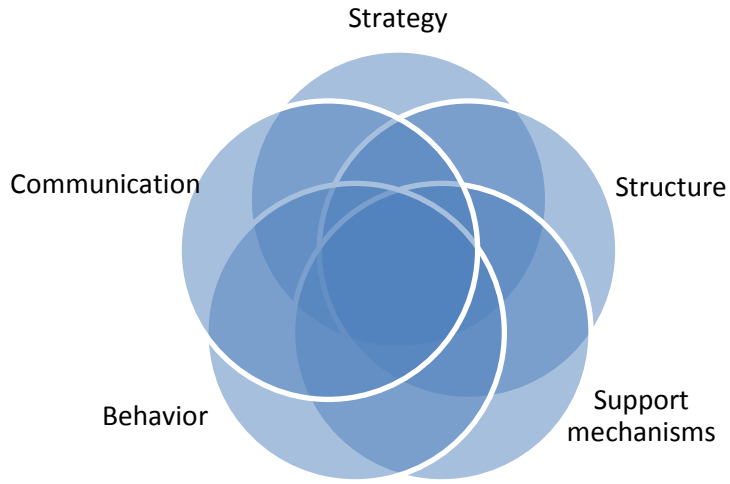

Figure 9 Dimensions of innovation culture.

Innovation strategy is a part of corporate strategy and it promotes the development and implementation of new products and services. It responds to the question how to innovate and how the company should strive for its business goals through new innovations. In the front end, enabling innovative thinking and supporting identification of new opportunities are essential elements in strategy. Strategy and vision should be communicated clearly in the front end in order to commit people to the goals and objectives. Management's role is highlighted in this: experts in the front end require concrete goals and tools in order to identify new opportunities and create innovations.

Structure is needed for supporting the emergence of innovation; open culture and creativity alone are not enough. For an organizational structure, non-hierarchy and flat structures are considered as conducive for innovation also in the front end. The key issue is to find the appropriate balance between structure and flexibility that is needed for innovations. In the front end, giving people freedom around processes by the means of autonomy and empowerment strengthens innovation culture. Freedom should always be targeted around clearly specified strategic goals. In order to work effectively in well-established work teams, people need common objectives, mutual trust, effective communication, and desire to solve differences, among others. The design of teams is also essential, because when people with diverse perspectives and backgrounds are put together they generate more innovativeness than homogenous teams.

Reward and recognition, availability of resources, and managerial encouragement are considered as the major support mechanisms for innovations. Rewarding can be monetary or non-monetary, for example in the form of career opportunities or job itself. It is important to find correct methods for

rewarding in own organization. In the front end, the timing of recognition is essential: acknowledging innovative work before the commercial outcome of efforts is visible. Personnel in the front end should be recognized for risk-taking, experimenting, and generating ideas, not only for flawless work and particular outcomes. Concerning availability of resources, time to think and experiment is highly emphasized in the front end. Ideas do not evolve into innovations if there is not time to stop thinking and experimenting, in other words to have so called incubation periods. In the aspect of innovativeness, the importance of matching right people with right assignments is highlighted as a support mechanism.

Behavior that supports innovation can be improved by several ways in the front end. In an innovative organization culture mistakes are tolerated well and they are considered as learning opportunities. Personnel are encouraged to generate and present new ideas and the ideas are evaluated fairly and openly. For that, evaluation system is known beforehand in the organization. Personnel's continuous learning and self-development is encouraged, because a learning organization is quick to respond to constant changes in today's business environment. Training and education also motivates people in their work. Allowing risk taking is especially important in the front end because without taking risks, novelty does not arise. Risk-taking is remarkably important for emergence of radical innovations. Then again, certain balance should be achieved in the degree to which taking risks and experimenting is allowed. Also an overall positive attitude towards change and constructive way of handling conflicts encourage innovation in the organization.

Open communication supports innovation and creativity in the front end. Therefore, an open-door internal communication policy including free communication between individuals, working groups, and departments is needed. Fundamental for such policy is that it supports fulfilling the basic roles of internal communication. In an open-door communication culture important matters are handled interactively, and real time, relevant information needed for experts' work is easily available. Discussion culture is encouraged by for example arranging different kind of forums for conversations, but willingness and capability for openness and interactivity are more important than tools and systems. In an open communication culture personnel has the possibility to influence own working community. Altogether, innovation is supported in a front end atmosphere that is relaxed and everyone can present their own thoughts and experiences.

3.6 Theoretical framework

The theoretical framework of the research deals with organization culture as a basis for improving innovation culture. Organization culture can be described as deeply planted values and beliefs that are shared by personnel and that separate the members of an organization from another. Organiza-

tion culture is maintained in the minds of its members and in a continuous process of people interaction, but also in the minds of other people interacting with the organization. Organization culture is extremely significant on how organizations function. Thus, it also has an essential impact on innovativeness and how it is supported in the organization. Even when the internal systems and processes are streamlined for innovations, they are unlikely to succeed if the surrounding organization culture is not favorable. Changing the organization culture does not happen quickly since the culture consists of a complex network of dimensions interacting with organizational subsystems, external environment, and internal systems. Amending the culture has to be systematic and comprehensive. The determinants of organization culture influencing innovation and creativity are strategy, structure, support mechanisms, behavior, and communication. By identifying ways how to improve these dimensions innovative organization culture can be advanced.

Theoretical framework also focuses on the front end of innovation, since improving innovation culture is throughout this research constantly reflected to the beginning of innovation process. Front end of innovation, FEI, is the first phase of innovation process before new product development project and commercialization. In other words, front end of innovation can be determined as those activities that become before the formal and well-structured new product or process development. The beginning of innovation process consists of continuous and iterative activities whereas the rest of the process is structured and consists of projects. Thus, due to its informal and ambiguous nature, the front end is considered as the most challenging stage of the innovation process. Importance of the phase is highlighted because of the influence it can have in the total new product development process. In the front end phase, possibilities to improve the results are the highest and changes are still relatively easy to make. Front end of innovation can be depicted in linear models or in non-sequential relationship models. Regardless of the model, front end of innovation includes opportunity discovery, opportunity analysis, idea emergence, selection and refining of idea, and building a business case. At the end of front end phase the continuation of the idea process is decided, whether it will enter the formal dew product development stage. Since group work is a natural part of the front end, positive work group climate and collective activities of work teams support the front end of innovation.

Figure 10 illustrates the two areas of theory described above. In this research they are connected and create the foundation for the theoretical framework.

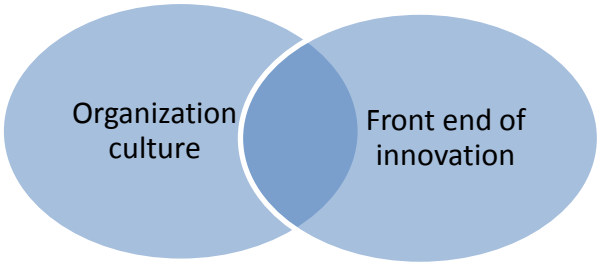

Figure 10 Theoretical framework of the research.

4 RESEARCH PROCESS

4.1 Research design

Methodology, or research strategy, is defined as a general approach to studying research topics. It refers to the choices made about cases to study, methods of data gathering, forms of data analysis et cetera in planning and executing a research. In other words, methodology defines how one will proceed studying any phenomenon. It is the principles that guide the research execution (Silverman 2006, 15.) This research has a qualitative approach and it is conducted following the research design demonstrated in Figure 11.

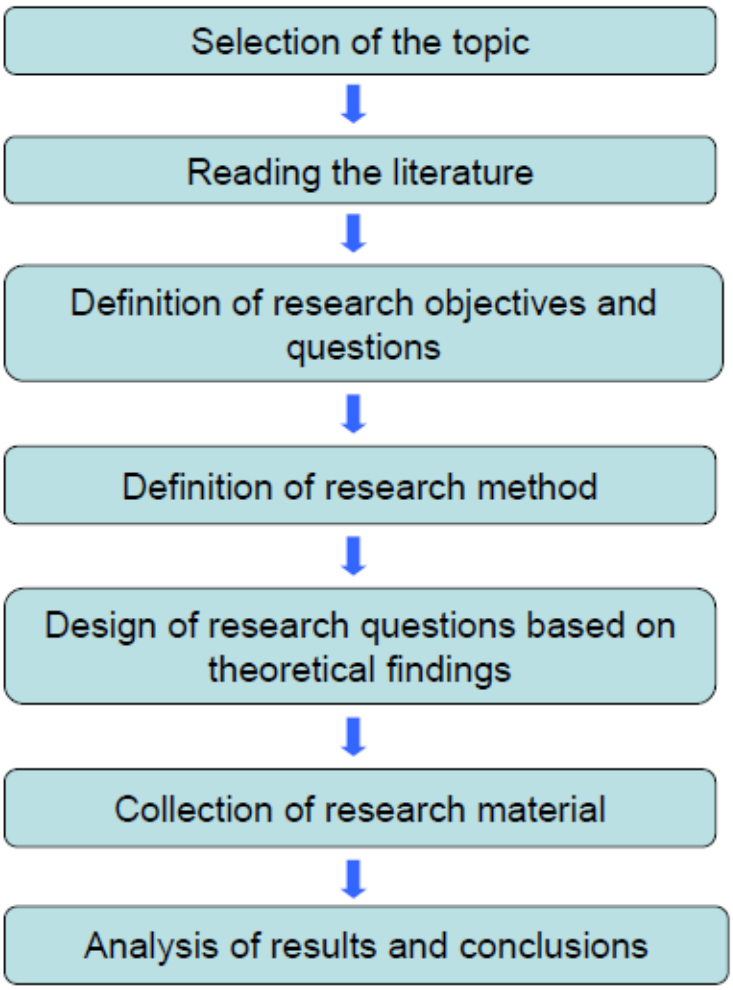

Figure 11 Research design.

The research theme was chosen out of the researcher's personal interest to innovativeness in common. When exploring the existing literature and research together with discussions with experts in the case organization and the thesis' supervisor, the topic was closer defined to concern improving innovation culture in the front end of innovation process.

Existing literature and research was used to create and confirm the researcher's theoretical understanding and knowledge on the topic. Alongside the reading process, the research objectives and questions were defined more precisely. Reciprocally, the gradual development of question setting helped focusing the reading process. The researched topic was problematized and crucial questions and objectives were determined. As described in the introduction section of this study, the objectives of the research are to define the factors of organization culture that affect innovativeness and identify ways how to improve innovation culture.

The theoretical background material collected was used to create a framework for the research, and based on the framework the research questions were defined. Consequently, a tool to assess innovation culture in the case organization was created. The method chosen for the empirical research was themed interview that were conducted as personal interviews. The results of innovation audit tool and themed interviews were combined and analyzed using thematizing as a method for analysis. Finally, the results were reflected and conclusions for improving innovation culture in the case organization were made.

4.2 Description of the case company

Rautaruukki Corporation, using marketing name Ruukki, specializes in steel and steel construction. Ruukki operates in some 30 countries and employs around 9 000 people. Net sales in 2012 totaled EUR 2.8 billion. Company's vision is to be an innovative and acknowledged provider of energy-efficient steel solutions to build a better living environment together with the customers. Energy-efficient steel solutions cut energy costs throughout the life cycle of an end-user product or solution. Ruukki's structure is divided in two business divisions: Metals and Construction. Ruukki Metals Oy focuses on special steel products such as high-strength, wear-resistant, and special coated steels. Ruukki Construction Oy supplies solutions for industrial and commercial construction, residential roofing, and infrastructure construction. (Rautaruukki Corporation 2012a)

Corporate technology supports and coordinates research and product development activities in Ruukki. Majority of product development activities is done in the business divisions, namely Metals and Construction. (Rautaruukki Corporation 2012b) Research and product development activities in Ruukki Metals are concentrated in two research centers, in Hämeenlinna and in Raahe. Experts in the research centers work in close cooperation with each other and also with the specialists of corporate technology. Product development experts in Hämeenlinna focus on development of cold rolled and metal coated sheet products, color coated sheet products, and tubular products. The structure of the function is organized according to the before mentioned product groups. For example chromium-free color coating for steel sheets, a solution for more environmentally-sound products, is developed in Hämeenlinna unit. The products received an award in Laatukeskus Excellence Finland's Quality Innovation of the Year competition in 2012 for a responsible development project (Rautaruukki Corporation 2012d).

Ruukki's corporate way of handling development work is described by a linear model of solution and product management (SPM) process (Figure 12). The same model is at use in Ruukki Metals. Solution and product management is utilized in different kinds of development work: solution and product development, production process development, et cetera. The

aim of SPM is to improve effectiveness of development work, to make development work and resource management possible over organizational borders, and to promote networking. Also the management of development projects and product portfolios, and introduction of development work is easier when using one common process. When following the SPM process, projects are documented properly and in a similar way. (Rautaruukki Corporation 2012b) However, SPM is not implemented in all projects. Projects utilizing SPM process in Ruukki have predefined and clear deliverables, extend more than three months, and fulfil a certain budget level. Smaller projects have their own process model, so called project charter. Product development manager responsible for the product group in question decides on continuation of such projects. (Steen, interview 10.12.2012)

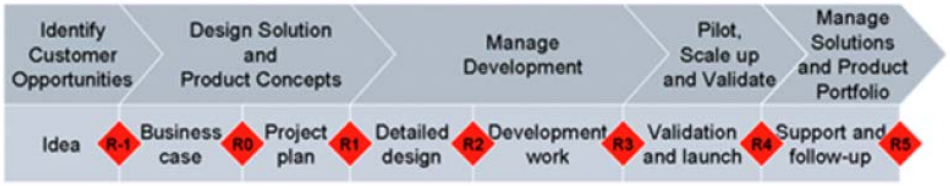

Figure 12 Model of Rautaruukki Corporation's solution and product management process.

Ruukki's solution and product management (SPM) process consists of five sub-processes beginning with management of ideas and ending with solutions and product portfolio management. The proceeding of projects is controlled by go-stop decisions which are made at process gates. The SPM process includes seven gates in which the steering groups or responsible persons make the decisions. The gates are mainly situated at the interfaces between different sub processes which are obvious decision points in the process. The content of gates can differ between different types of projects. (Rautaruukki Corporation 2012c)

The first sub-process of Ruukki's solution and product management process is identifying customer opportunities. The phase comprises the front end in the company's innovation process, in other words the activities that become before the formal and well-structured new product and process development. In Ruukki's front end of innovation, ideas are created, classified, upgraded and evaluated, and ideas are chosen for further development at the gate (Figure 13). (Yli-Kovero, interview 21.8.2012; Rautaruukki Corporation 2012c)

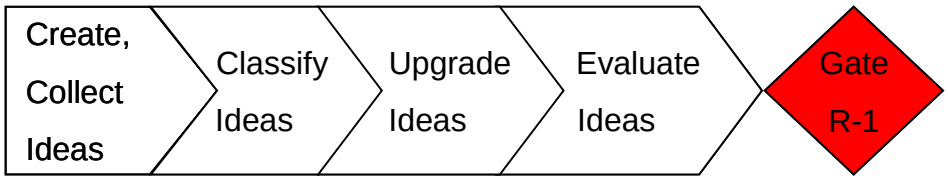

Figure 13 Identify customer opportunities sub-process in Rautaruukki Corporation.

The path towards a new product or other development starts by generating ideas. An idea does not have to be something big and revolutionary, but often several small ideas into same direction can be equally valuable. The aim of the first sub-phase, creation and collection of ideas, is to gather ideas via intranet, email, from other processes, and also actively search and create ideas. The other processes in question include specified support processes like customer relation management or sales and operation planning. Active idea search and creation contains special idea creation events that can be arranged by Ruukki's line organization. The aim is to collect ideas from different areas such as new products, solutions, and business opportunities. All ideas are stored in idea management system called Orchidea. Orchidea is open for all Ruukki employees and ideas can be freely commented at any phase of the idea handling process. (Rautaruukki Corporation 2011; Rautaruukki Corporation 2012c; Yli-Kovero, interview 21.8.2012)

The target of the second part of the sub-process, classifying ideas, is to categorize the ideas so that they can be routed to the correct development steering group. At this stage also the person or persons responsible for upgrading the idea are defined. The aim is to find the best person to upgrade the idea in cooperation with the presenter of the idea. The ideas are also classified into five categories according to the type of idea: business development, product and solution development, way to operate, production, and other. Idea management team is responsible for the classification of ideas. In case of a possibly patentable innovation an invention report is filled and sent to the manager responsible for industrial property rights in the company. The manager is also informed about new designs. (Rautaruukki Corporation 2012c)

The third step in the process of identifying customer opportunities is upgrading ideas. The aim of this process part is to collect information about the presented idea. At this stage, the collected information can be an estimate or based on the best available knowledge. The collected information answers how the idea supports Ruukki's strategy and portfolios. It describes what additional value the idea can offer to the customer, and how the idea creates competitive value to own company. The information collected determines competence feasibility and technical feasibility: what kind of competence and technical capacity is needed in order to develop the idea into a new product. Also the risks related to the idea are described. The nominated upgrader together with the presenter of the idea

has the responsibility to upgrade and collect information about the idea. A rough guideline is that this phase should not take longer than one day. (Rautaruukki Corporation 2012c)

The last sub-phase, evaluating ideas, aims to evaluate the ideas against the information collected in the previous step. In this phase, ideas are given evaluation points on a scale from zero to five, when zero point means poor and five points stands for excellent. Also risk evaluation is made by points one to five, where one point stands for no risk and five points mean very high risk. After evaluation the points are calculated and a relative percent value (how many points the idea has got from the possible maximum) is given to each idea. Evaluation of ideas is responsibility of a nominated five-member team consisting of specialists and steering group representatives. (Rautaruukki Corporation 2012c)

Ruukki's development steering groups make decisions at the process gate which ideas proceed to the next sub-process. If the idea is rejected, it will be stored in the archive. If the idea passes the decision point, it will enter the formal new product development phase. In case the decision cannot be made because of missing information, a person will be chosen to supplement the idea. The decision will be made after the information is complemented. Development steering groups are responsible for follow-up that approved ideas proceed as decided and to ensure that the responsible person for next stage has sufficient information about the idea and about the decision of steering group. (Rautaruukki Corporation 2012c)

4.3 Research method and execution

The research approach in this master's thesis is qualitative, and the specific method for gathering information is themed interviews.

Qualitative and quantitative research can be considered as complementary to each other rather than being opposite to one another. They are research approaches that are in practice difficult to divide accurately from each other. Qualitative and quantitative approach can complement one another when qualitative research is utilized as a preliminary test for quantitative research or vice versa, or when these two research approaches are used concurrently. Traditionally, it has been understood that quantitative research deals with numbers and qualitative research with meanings, but numbers and meanings are always mutually dependent on each other. The choice between the research approaches depends on the objectives of the research. (Hirsjärvi, Remes & Sajavaara 2009, 136−137)

Qualitative research was chosen for this study because it is the best way to clarify the settled research objective. Exploring the existing research on the topic also assured the researcher on utilizing qualitative approach. According to Hirsjärvi et al. (2009, 137), the purpose of the research guides

strategic choices for the research. In this research, the purpose is to survey innovation in organization culture and also to explain the phenomenon. Thus, qualitative research was considered the most suitable way to fulfil the purpose because it aims to comprehensively understand the quality, features, and meanings of the research subject.

Methods are specific research techniques or procedures that are used to gather and analyse information. In qualitative research, methods that disclose researched persons' viewpoints and voice are favoured. Such methods are for example themed interview, open interview, participative observation, and focus groups. Different methods can be used alternatively, concurrently, or combined in different ways depending on the research problem and resources available. (Hirsjärvi et al. 2009, 164; Tuomi & Sarajärvi 2009, 71)

The method chosen for this research is themed interview. Themed, or semi-structured, interview is an intermediate from structured interview and open interview. The themes for the interview are known, but the questions are not precisely formatted or structured. Thus, the chosen themes lead the interview. Themes used in interview derive from the framework of the research. Semi-structured interviews emphasize people's interpretations, meanings people have given to things, and how meanings emerge in interaction. (Hirsjärvi et al. 2009, 208; Tuomi & Sarajärvi 2009, 75)

According to Tuomi and Sarajärvi (2009, 73−74), the advantage of interview as a method is flexibility. The interviewer has a possibility to repeat the question, amend misunderstandings, clarify phrasing, and to converse with the interviewee. Also the order of questions can be changed flexibly. An important virtue of interview is that when the informants are selected discretionarily, they have true knowledge and experiment on the research subject. Thus, the informants are usually keen on participating in the research and they are also easily reachable afterwards for possible cross-checking. On negative side, preparing and conducting interviews is time-consuming and often also money-consuming. (Tuomi & Sarajärvi 2009, 73−74) Materials collected by interviews are bounded by context and conditions, and thus the respondents may speak differently in the interview than in some other conditions. Therefore, the results of the research should be generalized only moderately. (Hirsjärvi et al. 2009, 207)

Materials collected by interviews are often vast, and they should be extracted and examined soonest after the interviews are conducted. Then the material is still fresh and inspires the researcher. Also possible complementing and clarification is easier to make right after the interviews. Sometimes transcription and analysis is conducted simultaneously with material collecting process. (Hirsjärvi & Hurme 2010, 135) Recorded material can be transcribed word by word, or selectively according to the themes of the interview. Another, still uncommon way is to make conclusions directly from the collected material. (Hirsjärvi et al. 2009, 222)

The main phases in analysing interview-based material are description, classification, and combination. It is common in qualitative analysis that these phases proceed in more random and non-sequential way and can be described in a form of a spiral. (Hirsjärvi & Hurme 2010, 143−144) There are several methods available for qualitative analysis, for example thematizing, classification, discourse analysis, conversation analysis, and grounded theory. Main principle is to choose the method that answers the research questions the best. (Hirsjärvi et al. 2009, 224) The method chosen for content analysis in this research is thematizing, where the idea is to search the material for views and features that describe certain themes. (Hirsjärvi & Hurme 2012, 173) Thematizing is a natural combination with themed interview, since the utilized interview themes already create certain structure in the material.

The analysis does not alone tell the results of the research, but the results of analysis are explained and interpreted. In other words, the researcher reflects the results of the analysis and makes own conclusions out of them. In order to generate a general view of the results, synthesis is created. Synthesis collects the main things and gives clear answers for research questions. Conclusions of the research are based on the created synthesis. (Hirsjärvi et al. 2009, 229−230)

The framework for themed interview was comprised based on the theory covered in this research. The main objective of the research was to assess innovation culture in the case organization and define ways how to improve it. Therefore, a tool for innovation audit was developed based on the dimensions of innovation that were examined in chapter 3 in this study: strategy, structure, support mechanisms, behavior and communication, together with front end of innovation. There were ten statements collected under each dimension. The statements were evaluated on a scale from zero to five. Detailed information on the audit tool and evaluation scale is available in Appendices 1 and 2 of this research. Based on the average scores, diagrams describing common innovation culture in the case organization and each dimension separately were created.

The themes of the innovation audit tool were utilized also in the themed interview and thus a separate framework for interviews was not necessary to create. The interviewees were selected discretionarily to represent comprehensively the core functions of the front end in the case company, Ruukki Metals' research and development function, Hämeenlinna. Altogether eight persons were interviewed. Before the actual interviews, functionality of the innovation audit tool and interview framework was tested with a test person. Interviews were conducted as personal interviews and they were recorded. Interviews took place in Ruukki's premises in Hämeenlinna between 15.−25.1.2013. They were conducted in personal office rooms or in separate meeting rooms in order to ensure privacy. Each interview lasted from one to two hours. The session started with a themed

interview and at the end of each session innovation culture was assessed by filling in the innovation audit tool.

The content analysis in this research was made by utilizing thematizing as an analysis method. Transcription of the recordings took place as soon as possible after each interview. Materials were written into texts selectively according to the themes of the interview, each interview separately. Later on, main findings were combined into one document that was structured according to the themes of the interviews. As such, the material was analysed already alongside the transcription process. In the final phase of the analysis, the essential findings of the interviews were combined with the results of the innovation audit tool. Results of the analysis were reflected to create a comprehensive description of innovation culture in the case organization and finally, based on the synthesis, conclusions for improvement actions were made.

5 ANALYSIS

The innovation audit tool was used in the empirical research to develop a profile for innovation culture in the case organization, the front end of innovation in Ruukki Metals' research and development function, Hämeenlinna. The output of innovation audit is a diagram that depicts the profile for common innovation culture in the case organization and each dimension separately. Findings of the themed interviews were combined with the results of innovation audit tool. Consequently, a comprehensive description of innovation culture in the case organization was created. The answers to the questions of both audit tool and interviews describe "the way we do things around here". The results of the assessment help recognizing the areas of innovation culture where there is need for improvement and how to start with improving the case organization's innovativeness.

5.1 Results of the empirical research

Based on the results of the innovation audit, profile for common innovation culture in the front end of Ruukki Metal's research and development function in Hämeenlinna is described in Figure 14 below.

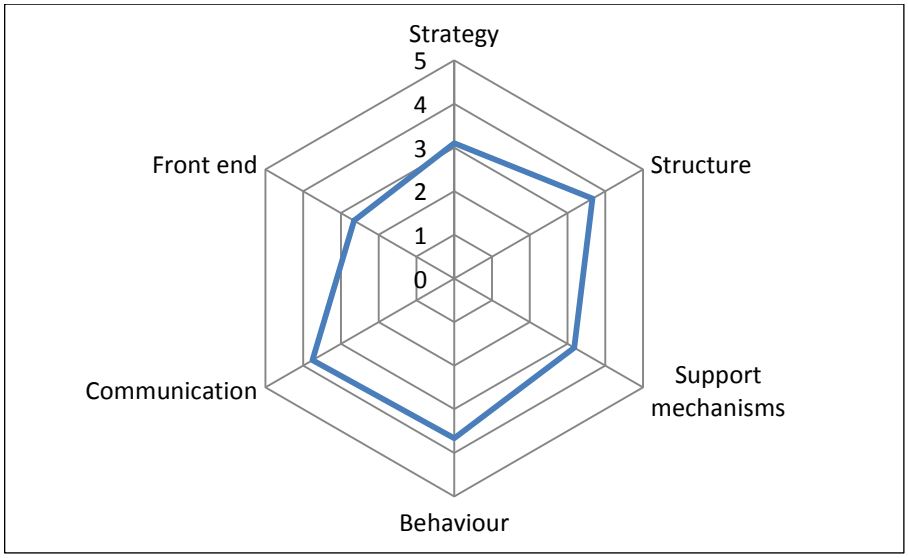

Figure 14 Profile for common innovation culture in the case organization.

The profile reveals a common innovation culture that is rather balanced. The results indicate that the primary focus for improving innovation culture in the case organization should be in dimensions front end, strategy, and support mechanisms. The difference between the average scores of dimension strategy and dimension support mechanisms was very minor. The results for dimensions communication, behaviour, and structure were the highest and the average scores in these dimensions were very close to each other. Still, there are certain elements in many of the dimensions that could be improved in the aspect of innovation culture.

The results of innovation audit tool and interviews are analysed in the following subchapters dimension by dimension, in ascending order based on the average scores of each dimension.

5.1.1 Front end

Innovation profile for dimension front end is described in Figure 15 below. The average score of the dimension was 2.7.

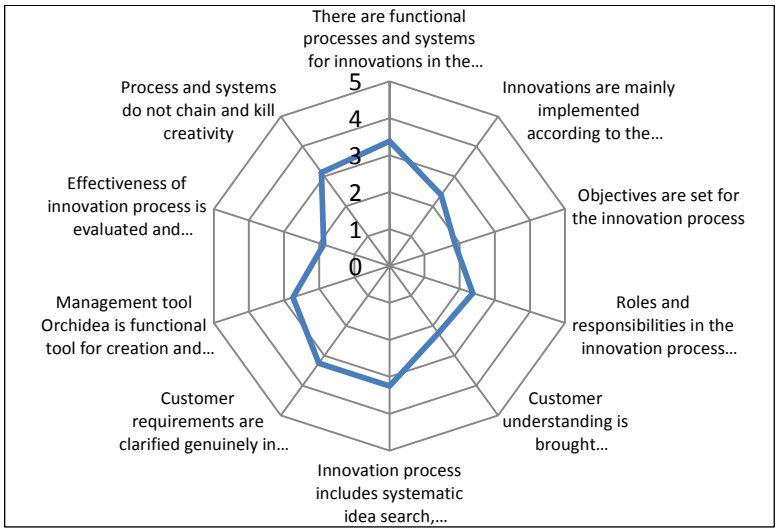

Figure 15 Innovation profile for dimension Front end.

The results of innovation audit tool reveal that the processes and systems for innovations are fairly functional and that innovation process is arranged quite systematically. On the other hand, according to the results of the interviews, the processes and systems are also considered as quite slow and somewhat rigid. Another question raised in the interviews was if the current processes and systems actually support innovations or do they rather restrict innovation. Still, stages and gates of SPM process are regarded clear. According to some respondents, steering group work has brought methodical way to SPM process. The roles and responsibilities in innovation process are also quite well-defined. As one of the respondents mentioned, SPM process has brought systematic way to work. However, innovations are not always implemented according to the process. Smaller projects have their own process model, so called project charter. Also in order to achieve quick decisions SPM is not utilized. Processes and systems are regarded to be in relatively good balance with creativity which is also important for innovation.

Management tool Orchidea is basically regarded as a quite appropriate tool for creation and management of ideas but in practice usage of it is not very active because it is regarded as quite a slow and bureaucratic way to manage ideas, and that causes frustration among the users. There are more fluent ways to get an idea through in the organization and for example steering groups do not require the usage of Orchidea. If the tool was used more actively, it could offer a great opportunity to spar and develop ideas together with colleagues. It is also common opinion among the respondents that forcing to use a certain systems does not support innovations, or

working in general. Orchidea system was renewed recently but that has not increased activity substantially.

Shortcoming is regarded in setting goals for the innovation process. The respondents feel that genuine, concrete targets are not set. Those could be for example certain numerical amount of accepted ideas or proposed innovations annually.

The biggest contradictory in the results is in customer understanding: on one hand customer requirements are clarified well in the front end, on the other hand the flow of customer knowledge is not systematic from customer interface to research and development function. The results of the interviews reveal that understanding customer requirements is an essential part of product development work. All the work is based on customer requirements, and requirements are clarified in the beginning of each development process as well as possible. The biggest challenge is how to bring customer understanding and customer information to research and development function from the customer interface. The sales persons active in the customer interface do not necessarily have enough professional skills to find out development targets and new ideas. They may have time only for ‘rare’ selling. Another issue is that when information comes through intermediaries, that are sales, technical customer service, or process development, it is not necessarily accurate anymore when arriving to the front end. One solution could be that product development experts were more closely related to customers and active in customer interfaces, having direct contacts with customers. As one of the respondent said, that would be like “having one finger on the pulse all the time”.

The results show also that improvement is needed in continuous evaluation and development of the effectiveness of innovation process. That is partly because resources for developing the process have been cut recently. The average score is affected by relatively many “cannot say” answers (three out of eight answers), and this element is thus non-relevant for improvement actions in this research.

5.1.2 Strategy

Innovation profile for dimension strategy is represented in Figure 16 below. The average score for the dimension was 3.1.

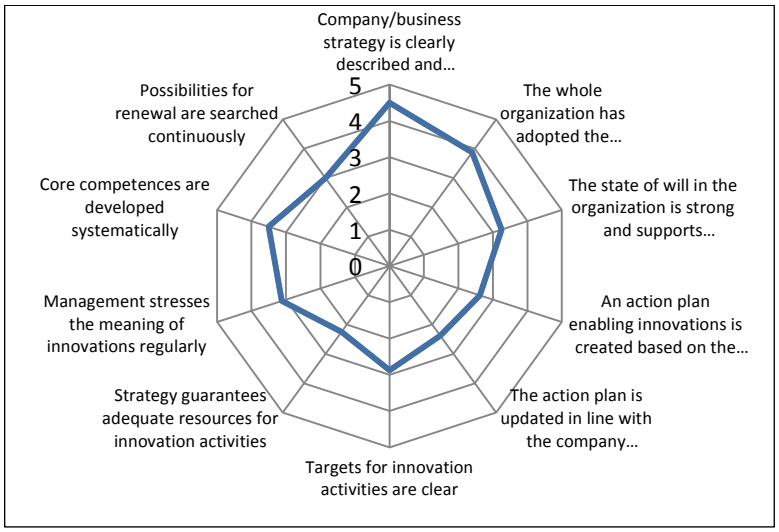

Figure 16 Innovation profile for dimension Strategy.

The company does not utilize any specific innovation strategy, but corporate's business strategy is clearly described and communicated in the front end. It is also adopted well in the organization. Also the state of will for supporting innovations is regarded as fairly good. Ruukki's strategic focus is in special steels and construction business, and the aspect of special steels is implemented in everyday work and in own development projects. Strategy is communicated clearly in top management level but the purpose of it in local Hämeenlinna level is not so clear. Common view is that despite clear communication corporate strategy stays quite distant. It is somewhat dim among the respondents how the business strategy truly actualizes in everyday work in the organization. At grassroots people concentrate on their daily work without specially thinking of the strategy.

Improvement is also needed in a clear action plan for innovations that is updated in line with corporate strategy continuously. All product development groups in the case organization have a product development strategy called roadmap 2020 that includes future vision and future products. In interviews it occurred that roadmap 2020 is not clearly perceived as an action plan for innovations and that may have an effect on the results of the research. That also affects the fact how clearly personnel perceives the clarity of innovation targets. The results reveal that in general the targets are not very clear at the moment. On the other hand, the teams that are familiar with their own roadmap 2020 also regard that innovation targets are well-defined. Overall, the daily work is focused on short term projects rather than long-term action plans and future products.

Core competences of the personnel are developed fairly well, even though consistency in the form of systematic development plans for experts are questioned to some extent. In common, special skills and expertise of personnel is supported and exploited. Additional education is available and even tailored courses are possible to a certain extent, but naturally the costs set the limits. Education is arranged both internally and externally. Participation in conferences and seminars is regarded as an important way to develop experts' core competences and it is supported to a certain extent.

Management or superiors emphasize the meaning of innovations quite regularly. Innovativeness is emphasized in development discussions and some of the closest superiors tend to stress the meaning of innovations by supporting innovativeness and encouraging for thinking, ideating, and innovating. Recent organizational changes affect the answers because quite many superiors have changed and the last few months have been quite unorganized. History with some of the current superiors is short. Possibilities for renewal are searched relatively well but that could be on more regular basis also.

The biggest challenge is seen in regard to resources: strategy cannot always guarantee adequate resources for innovation activities. On the contrary, resources have been cut in almost all functions lately. Lack of personnel, time, and monetary resources is seen as restrictive for innovations. For example the important outputs from seminars, conferences, and trainings are not distributed sufficiently in own organization due to lack of resources. Like one of the respondents commented, 'innovation need time and collaborative activities instead of time pressure and lack of hands'. Lack of resources also affects the radicality level of ideas and how actively the ideas are taken onwards, at least the wildest ones.

5.1.3 Support mechanisms

Innovation profile for dimension support mechanisms is depicted in Figure 17 below. The average score for the dimension was 3.2.

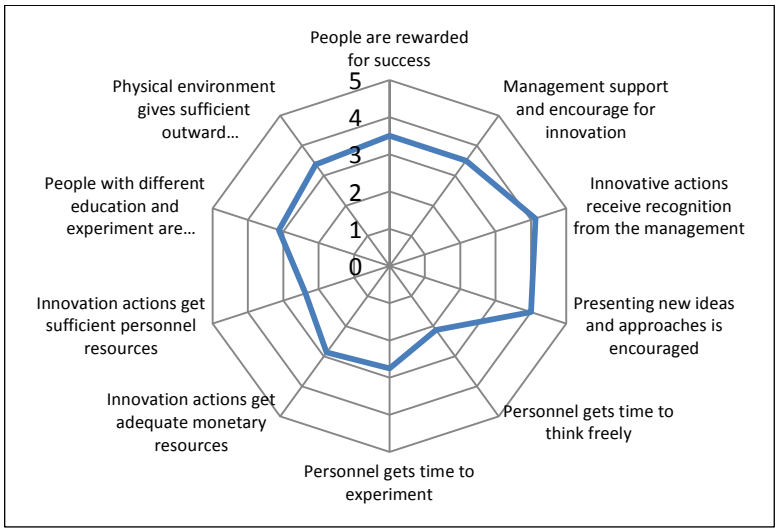

Figure 17 Innovation profile for dimension Support mechanisms.

The results reveal that innovativeness is recognized by management and superiors, and presenting new ideas and approaches is supported in the organization. Management's and superiors' overall support and encouragement for innovative actions are on a good level. In common, rewarding and recognition is relatively good. There is some dispersion concerning the adequacy of monetary rewards, like monthly salary, bonus matrix, and rewards for patents. On the other hand, other ways of recognition are considered to be on a good level, for example career opportunities, job itself, together with recognition and feedback from work. Especially positive feedback-giving is considered as a good support mechanism. The closest superiors support and encourage for innovations but recognition and support from superior managers is missing quite considerably.

Physical environment is considered as sufficient for innovativeness. Coffee machines, sofas, coffee tables, and having personal office rooms instead of an open-place office were mentioned as supporting elements for innovations. Common view was that considering the traditional nature of the industry, any specialities or extras in the environment are not necessarily needed but encouragement and open discussions are more important for innovation.

The biggest shortcoming is regarded in overall resource allocation: time, personnel, and money. The strongest improvement is needed for time to think, and time to think freely. Experts are so overloaded with on-going projects and routine work that there is not enough time to stop and think and just incubate ideas. Also time to experiment and try different things is

rather limited. Even searching information on interesting issues suffers from the lack of time, and it is commonly done in spare time if it is done at all. More time for collaborative ideating with colleagues and inspiring each other is needed both within own team or departments as well as with neighbouring departments. Also common events together with other Ruukki's development specialists and also with external experts are needed. Events should be organized so that they are genuinely useful and interesting for the experts, not just wasting time in pointless workshops. Lack of time is closely linked to personnel resources that are strongly affected by current economic situation. Nowadays human resources are strictly limited in development and research function due to personnel negotiations, after which a new organization model was implemented. As one of the respondents commented, "The way we are appreciated becomes evident also in the way resources are allocated to us".

5.1.4 Behaviour

Innovation profile for dimension behavior is represented in Figure 18 below. The average score for the dimension was 3.7.

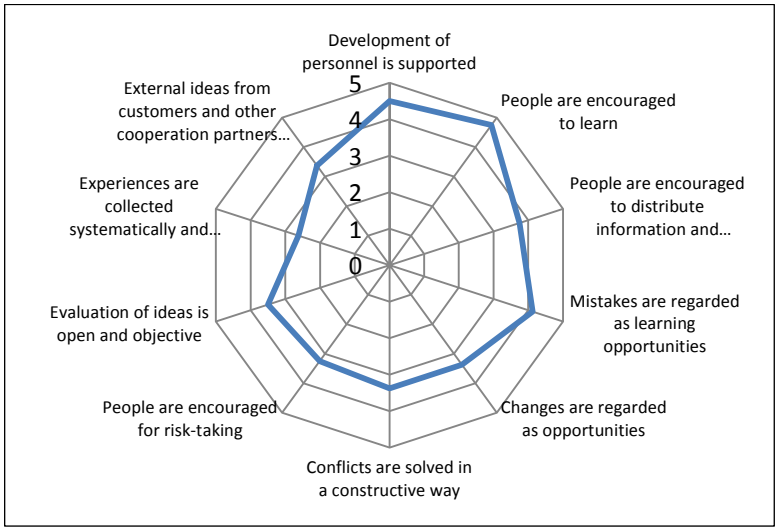

Figure 18 Innovation profile for dimension Behaviour.

People are strongly encouraged to learn and continuous self-development of personnel is highly supported in the organization. Both internal and external education is available fairly well. That is quite much dependent on own activity, but once you find proper education or course and argue it, superior grants permission for participation. Also part time studies alongside work are strongly supported in the company by a separate study grant system. Common viewpoint among the respondents is that education and development benefit also the employer, so it is a win-win situation for both of the parties. On the other hand, learning and self-development could be supported in more systematic way for example in the form of

personal development plans supplied by the human resources department. Dissemination of own knowledge and know-how is encouraged, although it depends also on personal characteristic if people are willing to do that, or if they appreciate their own knowledge highly enough and consider it is valuable and worth sharing with the others.

Mistakes are regarded as learning opportunities in the organization. Mistakes are allowed and people are very motivated to do things well and check their mistakes in order to learn from them. Experts themselves tend to be the greatest critics for their own errors. Common climate in the organization is that if you do not do anything, you do not make mistakes either. So, tolerance of mistakes is high. Also conflicts are handled fairly well by discussions. In common, it is the matters that disagree, not people.

External ideas from customers and other cooperation partners are utilized fairly well if they fit into company's strategy. The biggest challenge is how to get this external information to research and development function so that it remains accurate. Product development experts do not necessarily have direct contacts with customers, universities, or competitors.

Risk-taking, which is very important for new ideas and innovations to evolve, could be encouraged more strongly in the organization. It is encouraged on fairly good level especially on behalf of the closest superiors, but it suffers from tight time scales in projects. Usually there is no time for extra risk taking and experimenting, projects just have to be carried out. If new ideas do not fit into company's strategy they are often forgotten quickly. Cost efficiency is often prioritized before new ideas that require investments and risk taking.

The biggest contradictory in the results is how systematically experiments are collected and utilized in future projects. Some of the respondents regard that development projects are reported and then utilized later on. Others state that collection and exploitation is more random, depending on if the same persons happened to be involved in the previous projects also. All in all, improvement is needed how to collect experiences more systematically and also how to take advantage of them in future projects.

5.1.5 Structure

Innovation profile for dimension structure is described in Figure 19 below. The average score for the dimension was 3.7.

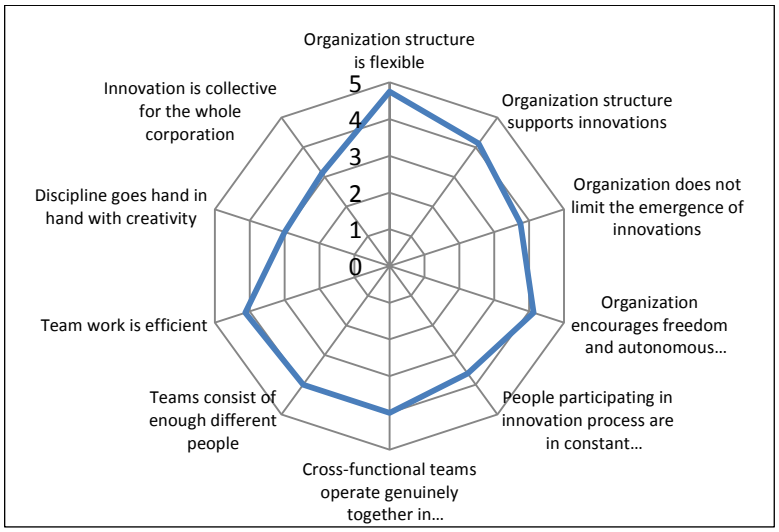

Figure 19 Innovation culture for dimension Structure.

Common organizational structure is regarded flexible and supportive for innovations. Organizational structure in own team and department is very flexible. Specified teams concentrate on development of certain product groups and cooperation is fluent between the teams and also with process development department. Structural barriers do not exist. Many people are familiar with each other from a long time and as one of the respondents commented, “Flexibility does not arise only from the organization structure but also from the people inside it”. On the other hand, it is understood that certain hierarchy is also needed to guarantee functionality in a larger company. In this organization, structure does not chain creativity.

Freedom and autonomous working are encouraged to a great extent in the case organization. Certain goals for projects are set and among those guidelines people can decide independently how to arrange their everyday work. Freedom and responsibilities are in good balance, in the way that it should be in expert organizations. Freedom enhances innovation and on the other hand support from superior is available when needed.

Co-operation between cross-functional teams in innovation projects is good. Different product development teams collaborate with each other when required and also co-operation with process development department is functional. An important factor for active co-operation is physical vicinity. People are located in proximity to each other and thus it easy just to drop by and have face-to-face conversations. Connections and their functionality with personnel in Raahe unit are somewhat questioned just because of the physical distance between the two locations.

Team work is considered efficient, and teams consist of sufficiently different persons. People have relatively different educational and experimental backgrounds, and some have longer history with Ruukki when others are quite newcomers. Working habits and personal characteristics vary from person to person, but people get along with each other very well. All that is considered as richness in the work community.

5.1.6 Communication

Innovation profile for dimension communication is depicted in Figure 20 below. The average score for the dimension was 3.8, the highest one in the audit.

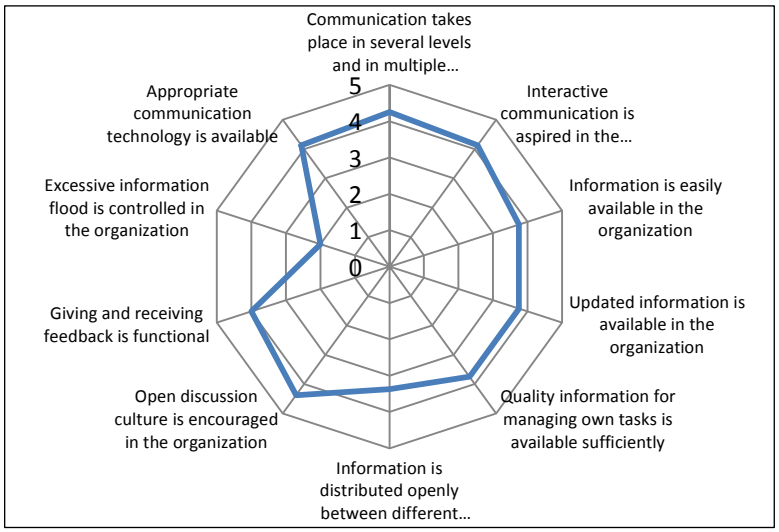

Figure 20 Innovation culture for dimension Communication.

Overall, communication in own teams and department is considered open. Interactive communication is aspired in own teams and immediate surroundings. The recent organizational changes are an exception: it took a long time before information of new organization (organization charts, etc.) was published. That is bound with corporate's internal communication policy. For example intranet is considered quasi-communicative, which means there is quite much news flow but really important matters concerning own work are not covered there or they vanish in the information flow.

Conversation culture is very open in the organization and the superiors encourage into it. Teams have own monthly meetings where important issues are discussed and experiences are exchanged. Free discussion is also included the meetings. However, limited time often hinders deeper discussions in regular meetings. Important matters are also often discussed informally with superiors and colleagues, and intercourse is spontaneous. Coffee table conversations are open and frequent, and people participate in

them actively. Also free conversations in corridors take place. Physical vicinity is an important factor supporting open discussion culture.

Information is quite easily available and superiors tend to disseminate information fairly well. Availability of information depends partly on own activity also, how actively one is seeking answers for questions. Information needed for conducting own work is available sufficiently, but own networks and personal contacts are of high importance: information is available if you know whom to ask and if you dare to ask. Despite appropriate technology, information is still partly in scattered places around the organization, in people's computers or heads, et cetera. Situation can be quite challenging for newcomers and trainees. The company has a separate information service department that serves also the research and development function. Information is also quite freely disseminated between teams and departments when needed, but then again that also depends on own activity and personal networks. All in all, despite generally open communication, certain kind of systematic way is lacking in collecting and distributing information, in order to guarantee that all necessary people receive and utilize it.

Appropriate communication technology is considered to be available in the organization, but respondents' opinions on the level of technology are contradictory. Intranet, collaboration rooms, and different communication tools are basically functional but recent changes in communication systems and operating systems caused problems that are still in fresh memory. Intranet is also experienced as unstructured and tangled system with a massive flow of information, which is not necessarily relevant for person's own work.

Improvement is needed in how to control excessive information flow by the corporation, in order to avoid so called information bloat. At the moment excessive information flow is not controlled very well by the corporation. For example in intranet there is so much information that important issues easily drown there. Currently, control of information flow is on everybody's own responsibility.

5.2 Reliability and validity of the research

It is important in all research to avoid mistakes in order to attain reliable and valid research results. In practice, mistakes often occur and thus it is essential to evaluate reliability of each research. Traditionally, reliability in research means that the results are accurate and that the same results would be attained if the same research was conducted in another occasion. Validity means that the research assesses exactly what it was supposed to assess. These definitions derive traditionally from quantitative research. In qualitative research the concepts of reliability and validity are not unambiguous, but there are several interpretations for them. Still, it is essential

to evaluate trustworthiness and credibility in qualitative research. (Hirsjärvi et al. 2009, 231−232)

Validity of qualitative research is based on appropriate research strategy, on how well the research approach and selected methods respond to the phenomenon under examination. The purpose of the research guides strategic choices for the research. (Hirsjärvi et al. 2009, 137) Qualitative approach together with themed interviews as a method aim comprehensively to understand the quality, features, and meanings of the research subject, and can thus be considered as suitable ways for surveying innovation culture an explaining the phenomenon. In order to assure that research studies exactly what it is supposed to study, clear objective setting is required. In this research, the objectives were defined more precisely alongside the process of becoming acquainted with the existing literature. Based on the objectives, themed interview was selected as the research method. Themed interviews conducted individually gave the researcher a possibility to interact directly with the interviewees and let respondents to express their viewpoints and opinions as well as possible. The researcher was able to clarify the questions and to verify misunderstandings. If something was done differently, some of the questions were reconsidered in order to avoid overlapping and to achieve more accurate results in some of the examined themes.

It has to be taken into account that results of interviews are always a consequence of collaboration between the researcher and the respondent, and that researcher bias always affect the interpretation of the results (Hirsjärvi & Hurme 2010, 189). Reliability and validity in qualitative research can be proved by transparent and public reporting on how the research was conducted, describing thoroughly the researcher's actions during the process (Hirsjärvi et al. 2009, 233). In chapter 4.3 of this study the different phases and actions of the research are described in detail. The research could be conducted again by following the description. The questions of innovation audit tool and themed interviews are attached in the appendices of the research. Research material was analyzed and is available in chapter 5 of the research for the readers to examine and comment.

Reliability and validity of qualitative research is grounded on its total results. In this research, a synthesis was created by interpreting the results of the analysis and as a conclusion answers for the research questions were found. The conclusions and basis for them are depicted in chapter 6 in this study. An important part of trustworthiness of qualitative research is to evaluate if the objectives of the research were reached. This research identified clearly the areas of innovation culture that are in need for improvement in the case organization and gave improvement ideas how to improve innovativeness in the organization. A concrete tool for assessing innovation culture was created. Overall, the objectives were reached fairly well.

When discussing the reliability of this particular research results, it has to be taken into account that the case organization has experienced large and thorough organizational changes including personnel negotiations just recently. Such circumstances inevitably affect the results of the research. Also the researcher's objectivity has to be discussed in the aspect of trustworthiness (Tuomi & Sarajärvi 2009, 136). In this research the objectivity perspective was achieved because the author worked in a different function in the company with different occupational title than the persons interviewed in this study.

6 CONCLUSIONS AND REFLECTIONS

6.1 Conclusions

The main objectives of the study were to define the areas of innovation culture requiring improvement in the case organization and to provide ideas how to improve innovation culture. The main areas in need for improvement are defined based on the findings of the empirical research described in chapter 5 in this study. In conclusion, suggestions on how to start improving the case organization's innovativeness are made based on the results. Summary of the improvement ideas is available in Table 1 below.

Table 1 Summary of improvement ideas for innovation culture.

Dimension	Average scores	Current condition	Improvement ideas
Front end	2.7	fair	- Direct, regular contacts between front end experts and customers - Knowledge gained is stored and utilized systematically - Cooperation with CI function concerning customer knowledge - Setting clear goals for innovation process
Strategy	3.1	fair	- Strategy more clearly communicated to the personnel by the managers, emphasizing the local aspect and targets - Communication and implementation of Roadmap 2020
Support mechanisms	3.2	fair	- Arranging adequate resources: people, money, time - Time to think: - Ideating with colleagues - Special events - Personal time to think
Behavior	3.7	good	- Experiments collected and utilized systematically - Encouraging risk-taking - Personal development plans created and updated regularly by HR function
Structure	3.7	good	– –
Communication	3.8	good	- Systematic way to collect and utilize information in order to decrease dependency on personal networks

Front end

The average scores for dimension front end were the weakest in the innovation audit. Based on the research results, the element that is most critical in improving innovation culture is how to bring customer understanding more systematically from customer interface to the product development

organization. This element did not score the weakest, but due to its essential nature in the work of front end experts it is emphasized. Product development work is totally based on customer requirements. A systematic and direct way to get customer understanding and information to the front end is required in the case organization. In order to improve innovation culture in the case organization, front end experts are more actively involved in customer interface having direct, regular contacts with customers. Knowledge gained is then stored systematically for the usage of front end experts and other colleagues in the organization. Cooperation with corporate's competitive intelligence (CI) unit can be deepened in storing, diversifying, and utilizing customer knowledge. Thus, quality of customer information is improved.

Based on the research results, there is also need for clarifying the goal setting for innovation process. Objectives derive always from the strategy. Clarity of goal setting can be improved by setting genuine and concrete targets in the form of for example certain numerical amount of accepted ideas or proposed innovations annually.

The results reveal also that improvement is needed in continuous evaluation and development of the effectiveness of innovation process. The average score is affected by relatively many "cannot say" answers (three out of eight answers), and thus this element is non-relevant for improvement actions in this research.

Strategy

Based on the research results, overall implementation of strategy in the grass-roots level need to be improved in order to support the innovation culture in the case organization. For the implementation of strategy, it needs to be clearly communicated to the personnel. Communication is essential in order for the people to know what they are expected to do for the strategy to actualize. Basically, experts in the front end require concrete goals and tools in order to identify new opportunities and create innovations. Role of managers is emphasized in the communication and implementation of strategy. Managers are especially needed for informing what the strategy means in local Hämeenlinna level and to commit people to the common objectives. As a part of improvement actions, roadmap 2020, an action plan tailored for each product development group in the case organization, is more clearly communicated in the organization and thus also targets for innovation activities are clarified. All these activities have positive impact on organization's state of will as well.

The results reveal also that strategy cannot always guarantee adequate resources for innovation activities. This critical area of innovation culture, adequate resources, is discussed closely under the next dimension (support mechanisms).

Support mechanisms

In order to improve innovation culture in the case organization the most critical element is overall availability of resources in the front end. The research results revealed that there is lack of time, personnel, and monetary resources in the case organization. The strongest improvement in the case organization is needed for time to think. Time to think and experiment is highly emphasized in the front end because ideas do not evolve into innovations if there is no time to stop thinking and exploring if the idea is already mature, in other words to have so called incubation periods. Time to think is naturally promoted by adequate personnel and monetary resources, and all the resources in question are closely connected to each other. Extremely tight resources make employees to channel their innovativeness into finding additional resources, not developing something new. Based on the research results, in addition to adding monetary and personnel resources, innovativeness can be promoted by arranging time for front end experts to collaborate and ideate together with colleagues. That can take place alongside daily work, but also special events for bigger groups need to be organized regularly. Participation of external experts in the events is also recommended. Such events should be organized so that they are genuinely useful and interesting for front end experts and give opportunities for free discussion and for inspiring each other. Alongside collaboration and events a possibility to take time and refine ideas personally, just to sit and think in privacy, is important in the front end.

Behaviour

The results reveal that the way how experiments are collected and utilized in future projects need to be improved in order to promote the innovation culture in the case organization. A systematic method for collection, distribution and especially utilization of information and experiments is needed for the organization to benefit the most from the projects.

Encouragement for risk-taking in the organization scored fairly well in the audit, but due to its essential nature for ideas and innovations to evolve the meaning of it is emphasized in improving innovation culture. If risks are not taken, novelty does not arise. Thus, the role or management is very important in further improving an atmosphere where risk-taking is allowed and ideas can be presented freely, even though tight time scales in projects tend to restrict that kind of activity.

Based on the results of the research, personnel are strongly encouraged to learn and continuous development of personnel is highly supported in the case organization. These elements scored very well, but in order to improve their input in innovativeness even further, a more systematic way for supporting personal development is needed. Today, self-development is quite much dependent on people's own activity. In order to increase me-

thodicalness in the process, personal development plans for front end experts are created and updated by corporate's human resource department.

Structure

Based on the results of the research, the case organization has found the appropriate balance between structure and flexibility that is needed for innovations. Organizational structure is considered flexible, co-operation both within own teams and between cross-functional teams is on a good level, people are encouraged for freedom and autonomous working, and teams consists of sufficiently diverse persons, among others. Thus, based on the results, any specific element for improving innovation culture in the case organization from the aspect of structure did not emerge.

Naturally all the dimensions of innovation culture overlap and interact with each other, and thus some of the improvement ideas presented under the other five dimensions support the elements of this dimension also.

The results also reveal that the last two questions in this dimension, "Discipline goes hand in hand with creativity" and "Innovation is collective for the whole company" scored the weakest (3.0 and 3.1 respectively). Due to the question setting that might have left the questions unclear for the respondents and thus affecting the results, and also the fact that these two elements are not the most essential ones when improving innovation culture in the aspect of structure, these elements are restricted from the improvement suggestions in this research.

Communication

The overall score of dimension communication was the highest in the audit. Overall, communication in own teams and departments is considered open, interactive communication is aspired, and people are encouraged for open discussion culture. Still, based on the research results, there are certain elements that still can be developed in order to improve innovation culture in the case organization. Information is quite easily available in the organization and it is disseminated reasonably freely between departments, but own networks and personal contacts play a critical role in achieving information: if you know whom to ask you will get it. Despite appropriate information technology, knowledge is still in scattered places around the organization. A systematic way to collect, distribute, and also to utilize information around the organization is required in order to strengthen innovation culture in the organization. That is also a partial solution for the question of how to control excessive information flow in the organization, an element that scored the worst in this dimension.

Eventually, it is not the question of how well the organization scored in innovation audit or assessment but more of utilizing the information to help improving innovation culture in the organization. A perfect innovation culture does not exist, but there will always be opportunities for continuous improvement.

6.2 Reflections

The main objectives of the research were to 1) identify the areas of innovation culture in need for improvement in the case organization, 2) make suggestions how to improve innovation culture in the case organization, and 3) define how innovation culture can be assessed in general. The research questions were answered based on thorough investigation of existing literature and research. It was essential to examine the current state of the industry in order to be able to plan the empirical research and specify the correct themes for innovation audit tool and interviews.

The first research question, identifying areas of innovation culture that require improvement in the case organization, was answered fairly well. Such areas of the case organization were clearly identified as an outcome of the results of innovation audit tool and themed interviews. In fact, it occurred that almost all the dimensions of innovation culture in the case company need at least some kind of improvement, even if they scored very well in the audit tool alone. When going deeply into the answers of interviews, the author was able to identify the genuine improvement needs behind the dimensions. Throughout the analysis, the basic principle was to consider the improvement needs in the aspect of innovativeness. If the author were to do something differently here, some of the questions in audit tool were defined more exactly in order to be able to recognize the improvement needs even more precisely. In retrospect, some of the questions were overlapping to some extent. The second research question, providing propositions on how to improve innovation culture in the case organization, was answered based on the conclusions of the result analysis. The author managed to give direct and practical improvement ideas deriving from genuine needs in the case organization, and it is up to the client organization if the results are taken full advantage of. The purpose was to keep the improvement ideas on a practical level so that they are as easy as possible to implement. If something was done differently here, the improvement ideas were examined with an external expert to obtain outside evaluation before submitting the results to the case organization. The third research question, defining a general way to assess innovation culture, was covered very well in the research. The author created a concrete tool for evaluating innovation culture that includes an innovation audit tool and themed interviews. In addition to the front end, the assessment tool can be utilized more widely in the research and development function of the case organization.

Considering further research possibilities, due to the general nature of the innovation assessment tool it can be utilized not only in the research and technology function, but it can be transferred with applicable parts in other functions and business areas in the case company. Based on the results of the research, an important element also for the front end is customer knowledge, how to bring valuable information from customer interface to the front end and how to utilize it. Since customer interactions are fundamental for the whole business, the company lives from and for its customers, the next target for innovation audit could be case company's sales department. Then, the audit tool would be tailored to specific requirements of sales department, and for example dimension 'front end' would be replaced by dimension 'sales'. Innovation audit could start from domestic sales department and later on to be extended to international sales. Improving innovation culture in the sales department can have an extensive positive impact on several other functions of the company.

From the viewpoint of learning and self-development, the project of Master's thesis was very rewarding. The difficult part in the beginning was to limit the topic sufficiently. Innovation as such is a very wide subject and familiarizing herself with the topic led the author to very winding paths. With the guidance of thesis' supervisor and experts in the case organization the topic was delimited to concern innovative organization culture. Since the topic was not very familiar for the author beforehand, it was necessary in the beginning to ponder what really is essential in innovation culture to create an extensive conception of it, which was very time-consuming. If the topic was limited earlier it would have saved time for this phase of the project. Alongside the reading process author's knowledge increased and the topic became even more interesting to the author. That interest motivated the author in creating the assessment tool and conducting the empirical research. In the beginning interviewing was exciting but it was fine to notice how author's own interviewing skills improved alongside the process. Material analysis was very fluent due to author's strong experience in such a consistent and systematic work. Overall, author's diligence and analytical nature contributed to conducting the whole Master's thesis project and reaching the objectives set for it. Possessing good writing skills was of advantage throughout the process. Considering author's full-time job and simultaneously ongoing Master's degree courses, the author can be very satisfied with the results of the research. The objectives were met and the project provided the author with plenty of new experiences strengthening her professional skills. All in all, this journey was worth making.

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Appendix 1

INNOVATION AUDIT TOOL

	Strategy
1	Company/business strategy is clearly described and communicated in the organization
2	The whole organization has adopted the company/business strategy
3	The state of will in the organization is strong and supports innovations
4	An action plan enabling innovations is created based on the state of will
5	The action plan is updated in line with the company strategy continuously
6	Targets for innovation activities are clear
7	Strategy guarantees adequate resources for innovation activities
8	Management stresses the meaning of innovations regularly
9	Core competences are developed systematically
10	Possibilities for renewal are searched continuously
	Structure
1	Organization structure is flexible
2	Organization structure supports innovations
3	Organization does not limit the emergence of innovations
4	Organization encourages freedom and autonomous working in order to achieve innovation targets
5	People participating in innovation process are in constant interaction with each other
6	Cross-functional teams operate genuinely together in innovation projects
7	Teams consist of enough different people
8	Team work is efficient
9	Discipline goes hand in hand with creativity
10	Innovation is collective for the whole corporation
	Support mechanisms
1	People are rewarded for success
2	Management support and encourage for innovation
3	Innovative actions receive recognition from the management
4	Presenting new ideas and approaches is encouraged
5	Personnel gets time to think freely
6	Personnel gets time to experiment
7	Innovation actions get adequate monetary resources
8	Innovation actions get sufficient personnel resources
9	People with different education and experiment are recruited
10	Physical environment gives sufficient outward circumstances for innovation
	Behaviour
1	Development of personnel is supported
2	People are encouraged to learn
3	People are encouraged to distribute information and know-how
4	Mistakes are regarded as learning opportunities
5	Changes are regarded as opportunities
6	Conflicts are solved in a constructive way
7	People are encouraged for risk-taking
8	Evaluation of ideas is open and objective
9	Experiences are collected systematically and utilized in future projects
10	External ideas from customers and other cooperation partners are utilized
	Communication
1	Communication takes place in several levels and in multiple directions
2	Interactive communication is aspired in the organization
3	Information is easily available in the organization
4	Updated information is available in the organization
5	Quality information for managing own tasks is available sufficiently
6	Information is distributed openly between different departments and teams
7	Open discussion culture is encouraged in the organization
8	Giving and receiving feedback is functional
9	Excessive information flood is controlled in the organization
10	Appropriate communication technology is available
	Front end
1	There are functional processes and systems for innovations in the organization
2	Innovations are mainly implemented according to the innovation process
3	Objectives are set for the innovation process
4	Roles and responsibilities in the innovation process are well-defined
5	Customer understanding is brought systematically from customer interface to product development organization
6	Innovation process includes systematic idea search, evaluation and refining
7	Customer requirements are clarified genuinely in the front end
8	Management tool Orchidea is functional tool for creation and management of ideas
9	Effectiveness of innovation process is evaluated and improved continuously
10	Process and systems do not chain and kill creativity

Evaluation:	
5	I totally agree
4	I partially agree
3	I sometimes agree
2	I partially disagree
1	I totally disagree
0	Cannot say

Appendix 2

INNOVAATIOKULTTUURIN ARVIONTITYÖKALU

	Strategia
1	Yritys/liiketoimintastrategia on selkeästi kuvattu ja viestitty organisaatiossa
2	Koko organisaatio on omaksunut yritys/liiketoimintastrategian
3	Organisaatiolla on vahva tahtotila, joka kannustaa innovoimaan
4	Tahtotilan perusteella on laadittu toimintamalli/toimintasuunnitelma, joka mahdollistaa innovaatiot
5	Toimintamallia/toimintasuunnitelmaa päivitetään jatkuvasti yritysstrategian kanssa samassa linjassa
6	Innovaatiotoiminnan tavoitteet ovat selkeät
7	Strategia takaa riittävät resurssit innovaatiotoimintaan
8	Johto painottaa säännöllisesti innovaatioiden merkitystä
9	Ydinkompetensseja kehitetään suunnitelmallisesti
10	Uusiutumismahdollisuuksia etsitään jatkuvasti
	Rakenne
1	Organisaatiorakenne on joustava
2	Organisaatiorakenne tukee innovatiivisuutta
3	Organisaatio ei aseta rajoja innovaation syntymiselle
4	Organisaatiossa kannustetaan vapauteen ja itsenäiseen työskentelyyn innovaatiotavoitteiden saavuttamiseksi
5	Innovaatioprosessiin osallistuvat ovat jatkuvassa kanssakäymisessä keskenään
6	Poikkifunktionaaliset tiimit toimivat aidosti yhdessä innovaatioprojekteissa
7	Tiimit koostuvat riittävän erilaisista ihmisistä
8	Tiimityöskentely on tehokasta
9	Kurinalaisuus ja luovuus kulkevat käsi kädessä
10	Innovointi on koko yrityksen yhteinen asia
	Tukimekanismit
1	Menestyksestä palkitaan
2	Johto kannustaa ja rohkaisee innovointiin
3	Innovatiivinen toiminta saa tunnustusta johdolta
4	Uusien ideoiden ja lähestymistapojen esittämiseen kannustetaan
5	Henkilöstölle järjestetään aikaa vapaaseen ajatteluun
6	Henkilöstölle annetaan aikaa kokeilla erilaisia asioita
7	Innovaatiotoiminnalle ohjataan riittävät rahalliset resurssit
8	Innovaatiotoimintaan ohjataan riittävät henkilöstöresurssit
9	Rekrytoidaan erilaisen koulutus- ja kokemustaustan omaavia henkilöitä
10	Fyysinen ympäristö tarjoaa riittävät puitteet innovointiin
	Käyttäytyminen
1	Henkilöstön jatkuvaa kehittymistä tuetaan
2	Oppimiseen kannustetaan
3	Tiedon ja osaamisen levittämiseen kannustetaan
4	Virheet nähdään organisatiossa oppimisen mahdollisuuksina
5	Muutokset nähdään organisaatiossa mahdollisuuksina
6	Ristiriitatilanteet ratkaistaan rakentavasti
7	Riskinottoon kannustetaan
8	Ideoiden arviointi on avointa ja puolueetonta
9	Kokemukset kerätään systemaattisesti ja hyödynnetään tulevissa projekteissa
10	Organisaatio hyödyntää myös talon ulkopuolisia, yhteistyöverkostojen ja asiakkaiden ideoita
	Viestintä
1	Kommunikointia tapahtuu usealla tasolla ja moneen suuntaan
2	Organisaatiossa pyritään vuorovaikutteiseen viestintään
3	Informaatiota on helposti saatavilla organisaatiossa
4	Organisaatiossa on tarjolla ajantasaista tietoa
5	Omien tehtävien hoitamiseksi tarvittavaa laadukasta tietoa on tarjolla tarpeeksi
6	Tietoa jaetaan avoimesti eri osastojen ja tiimien välillä
7	Organisatiossa kannustetaan avoimeen keskustelukulttuuriin
8	Palautteen antaminen ja saaminen on luontevaa
9	Organisaatiossa kontrolloidaan liiallista tietotulvaa
10	Organisaatiossa on käytössä asiaankuuluva viestintäteknologia
	Front end
1	Organisaatiossa on toimivat prosessit ja järjestelmät innovaatioille
2	Innovaatiot toteutetaan pääsääntöisesti innovaatioprosessin mukaisesti
3	Innovaatioprosessille on asetettu tavoitteet
4	Innovaatioprosessin roolit ja vastuut ovat selkeät
5	Asiakasymmärrys tuodaan systemaattisesti asiakasrajapinnasta tuotekehitysorganisaatioon
6	Innovaatioprosessi sisältää uusien ideoiden systemaattisen etsimisen, arvioinnin ja jalostamisen
7	Asiakastarpeet selvitetään aidosti innovaatioprosessin alussa
8	Ideointityökalu Orchidea on toimiva työkalu ideointiin ja ideoiden hallintaan
9	Innovaatioprosessin tehokkuutta arvioidaan ja kehitetään jatkuvasti
10	Prosessit ja järjestelmät eivät kangista ja tuhoa luovuutta

Arviointi:	
5	täysin samaa mieltä
4	osittain samaa mieltä
3	joskus samaa mieltä
2	osittain eri mieltä
1	täysin eri mieltä
0	en osaa sanoa