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CORPORATE VISION AND ITS INFLUENCE ON MOTIVATION IN R&D ORGANIZATION: CASE STUDY

Master's Thesis in
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ABSTRACT:

In the case company X it had been found in a working climate survey that the corporate vision had not been understood by the employees of the R&D organization although the personnel have relatively high work motivation levels. Previous studies have pointed out some special features in an R&D organization, the importance of learning and innovation in R&D organizations, what motivates and how to motivate R&D personnel, etc. However, these studies could not explain the previous contradiction that had been noticed in the case company.

This study aims to describe the theoretical linkages between the corporate vision and the motivational issues of R&D personnel. The role of the corporate vision in the case R&D organization has been analyzed. The issues that have more potential to motivate the R&D personnel than the corporate vision are reviewed. Furthermore, this study also attempts to give practical implications for management on these aspects.

This case study uses the qualitative method to answer questions that were left open by the quantitative survey study and to deepen and give a more detailed understanding of the mentioned contradiction. This study could be said to have an abductive research methodology approach, and the researcher had some leading theories ready to be tested during the research. Considering the research objectives, the most suitable research method to collect data was the general interview guide approach.

This study revealed that motivating R&D employees by a corporate vision is far-fetched. The motivation for R&D employees was coming from other substantially more important sources. On the other hand, there could be some connections between the corporate vision and motivation, that appear, e.g., in projects and organizational culture. In this study it was found that, if the corporation did not establish a R&D vision, then R&D employees practiced visionary leadership themselves to construct a realistic, believable vision for the future of their organization. It was also found that the invented personal R&D vision was based on mainly unofficial information sources and second hand rumors. If an R&D employee sees the future as unfavorable, this deteriorates the working climate and lowers motivation and output levels. Technology leadership had a mental effect on R&D employees by raising their self-esteem as engineers, and it had a positive effect on employees' long term motivation in the case R&D organization.

The issues that were related to the research process in this study were discussed with senior researchers who have generally agreed on the achieved results. Also, the key informants had reviewed the draft and agreed on the results of this study.

KEYWORDS: corporation, vision, motivation, R&D, technology, organization, strategy, innovation, technology leadership

1. INTRODUCTION

On national economy scale the status of (Research and Development) R&D is growing. R&D investments in western countries have already become or growing larger than traditional investments to machinery, equipment or buildings. The aim of R&D is to develop new products and to make improvements on present products on the basis of accumulated knowledge or new research results so that the end products can better meet customers' demands. Traditionally, R&D has concentrated on concrete products, but now it also includes development of software programs, services, etc. In smaller companies, R&D is done by a special department but corporations have a bigger R&D organization.

An R&D organization is characterized by innovative activities. It is common that these R&D activities are specialized to functional and professional groups, the work contains uncertainty, both knowledge and innovativeness are cumulative, and people are differentiated by specific skills in different fields. These characteristics are related to the contents of technological strategies, to processes and to institutional continuity in the face of technological discontinuity. (Pavitt 1990: 18 – 19)

Organizations that are trying to cope with the future have two potential and opposite problems: some managers may be wedded to one view of the future, which leads to a rigidity of views and, on the other hand, some managers may pay too little attention to the future, which results in chaos with no view at all. To prevent this, there are three things that are important: an adaptive business idea with flexible vision, constant scanning and experimentation. (Johnson, Scholes & Whittington 2005: 230)

Multinational corporations with multi-business organizations could be viewed as two parts: a corporate parent and the business units. A corporate parent contains levels of management above the business units without direct contacts to customers, buyers or competitors. (Johnson et al.: 281) The role of a corporate parent is to add value rather than destroy it. The primary role of a corporate parent in value-adding activities is, by envisioning the overall role and expectations of the organization, to create clear corporate level strategic intent. This clarity is important because of three main reasons: focus – if clarity is absent there will be activities that hold costs that do not add value; clarity to stakeholders – investors can become confused about what the corporation as a

whole is about; and clarity to business units – clear expectations and standards should be set so that business units know what is expected of them and they do not become demotivated. (Johnson et al.: 303 – 304)

The HR manager of the case company X had informed about an interesting contradiction that was found in a working climate survey. This survey revealed that the corporate vision has not been understood by the personnel of the R&D organization, but a peculiar finding was that the R&D personnel show relatively high work motivation levels.

1.1. The purpose of the study

Previous studies have pointed out some special features in an R&D organization (e.g. Kressens-van Drogelen 2001; Ojanen 2003; Ulrich & Eppinger 2000; Cusumano & Nobeoka 1998; Brown & Svenson 1998; Kilpinen 1995; Porter 1985; Pavitt 1990; Roberts 2001; Arthur 1996; Kim & Mauborgne 1997; Bartlett & Ghoshal 1995; Goss, Pascale & Athos 1993; Hope & Hope 1996), the importance of learning and innovation in R&D organizations (e.g. Amabile 1997; Leonard-Barton 1998; De Geus 2002; Bartlett & Ghoshal 2002; Drucker 1995; Stewart 1994; Argyris 1994), what motivates and how to motivate R&D personnel (e.g. Manners, Steger & Zimmerer 1997; Katz 2005; Judge, Fryxell & Dooley 1997), etc. However, these studies could not explain the previous contradiction that had been noticed by the HR manager in the case company X. If the R&D organization is creating and making a way to the future of the corporation, should not every member of the R&D organization know in what direction they should go and why? This dilemma leads to forming the following theoretical and empirical objectives:

1) *To describe the theoretical linkages between the corporate vision and the motivational issues of R&D personnel.*
2) *To analyze the role of the corporate vision in the case R&D organization.*
3) *To analyze why the R&D personnel in the case R&D organization have a high work motivation while at the same time, they do not understand or appreciate the corporate vision of the case company.*
4) *To describe the issues that have more potential to motivate the R&D personnel than the corporate vision.*

This study also attempts to give practical implications for the management of these issues.

1.2. The scope of the study

The scope of this study is to analyze how corporate vision is treated and processed in a R&D organization of a large corporation. Members of the R&D organization and senior management of the corporation are interviewed for their opinions on how the corporate vision has been understood and implemented. This study reviews the possible gaps or different views in understanding these terms and how these visionary v. motivationary processes could be improved.

1.3. The structure of the study

This study includes five chapters. The structure of the study is illustrated in figure 1.

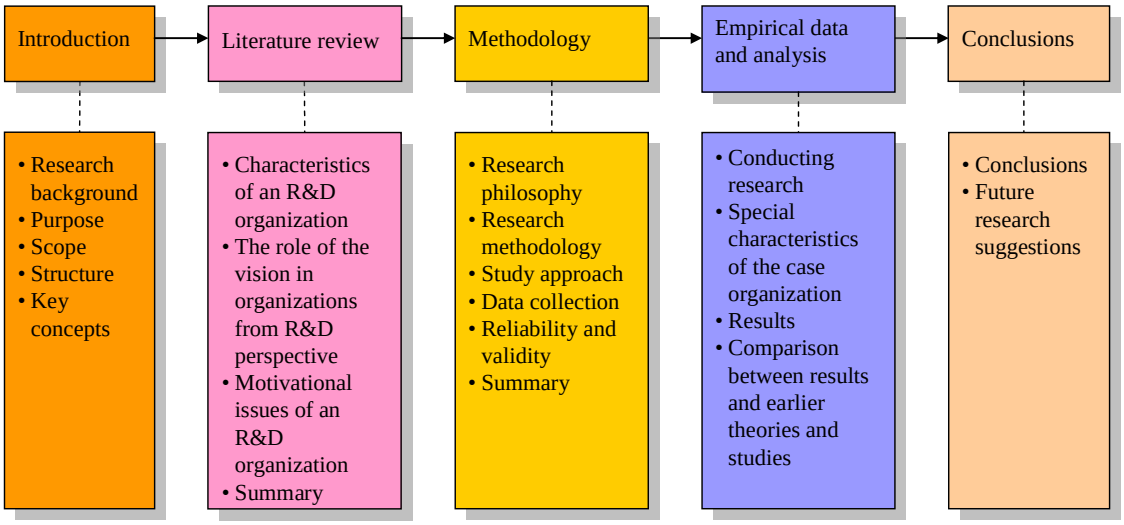

Figure 1. The structure of this study.

The first chapter contains an introduction to the study, covering the research background, purpose, scope, structure, and key concepts of this study.

The second chapter contains a literature reviews on existing studies and theories that cover the scope of this study. This chapter is divided into tree subsections: special

features of R&D organization, role of vision in the organization from R&D perspective, and motivational issues in the R&D organization. Each of these sections has a concluding summary in the end of the subsections.

The third chapter is about research methods. This chapter contains information about research philosophy and methodology, study approach, data collection, reliability and validity and, finally, a summary.

The forth chapter contains the empirical part of this study. The chapter has been divided into four subchapters: conducting research, special characteristics of the case organization, the results, and, a comparison between results and earlier theories and studies.

Finally, the fifth chapter of this study contains conclusions and suggestions for further study.

1.4. The key concepts of the study

The most important terminology that is used in this study is collected here to make it easier to read this paper. Later in this study, there are more detailed explanations given for these terms.

R&D is an abbreviation that comes from the two words research and development. Five main types of R&D are

- ***"Basic research**: Directed to the search of fundamental knowledge.*
- ***Exploratory research**: To determine if some scientific concept might have useful application.*
- ***Applied research**: Directed to improving the practicality of a specific application.*
- ***Development**: Engineering improvement of a particular product or process.*
- ***Product improvement**: Directed to changes for a product or process that can increase its marketability, and reduce its costs or both.*"

  (Ojanen 2003: 9)

R&D work can be evaluated on five organizational levels: individual, group, major design, project, or on a larger organizational segment level. (Kressens-van Drogelen 2001: 53)

Innovation means introducing a new or improved product, process of service into the marketplace. (Ojanen 2003: 9)

Invention is the creation of a functional way to do something like an idea for a new technology. (Ojanen 2003: 9)

Productivity is simply formulated as follows:

$$Productivity = \frac{Output}{Input}$$ (Ojanen 2003: 9)

The efficiency and effectiveness of the innovation process – Efficiency is "*how well companies translate technological and commercial inputs into new products, processes and services*"; Effectiveness is "*the sense of how successful such innovations are in the market and their contribution to financial performance.*" (Ojanen 2003: 9)

Creativity is a noun that could be either the quality of being creative or the ability to create. (Merriam-Webster on line dictionary)

Motivation is willingness to act in a order to satisfy some personal need (See Figure 2). A need, on the other hand, is a psychological or psychological deficiency that makes some outcome seem to be attractive. An unsatisfied need creates tension and excites drive. Dive evokes search for goals that could satisfy needs and reduce tension. A motivated employee is under tension. (Robbins 2003: 43)

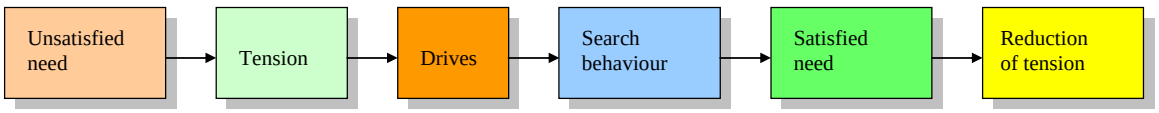

Figure 2. Basic motivation process. (Robbins 2003: 43)

A **Vision** is "*the desired future state of the organization. It is an aspiration around which a strategist, perhaps a chief executive, might seek to focus the attention and energies of members of the organization.*" A personal example of vision is "*to run the London marathon*". (Johnson et al. 2005: 15)

A **Strategy** *"is the long-term direction of the organization. It is likely to be expressed in broad statements both about the direction that the organization should be taking and the types of action required to achieve objectives*." A personal example of strategy could be "*exercise regularly, compete marathons locally, stick to appropriate diet."* (Johnson et al. 2005: 15 - 16)

Mission is "*a general expression of the overall purpose of the organization, which, ideally, is in line with the values and expectations of major stake holders and concerned with the scope an boundaries of the organization.*" (Johnson et al. 2005: 13)

Word **goal** is "*a general aim in line with the mission. It may well be qualitative in nature*." (Johnson et al. 2005: 13)

Environment – "*The organization exists in the context of a complex political, economic, social, technological, environmental and legal world.*" (Johnson et al. 2005: 17

Organizational culture is "*the basic assumptions and beliefs that are shared by members of an organization, that operate unconsciously and define in a basic taken-for-granted fashion an organization's view of itself and its environment*." (Johnson et al. 2005: 47)

Strategy in a corporation exists on a number of levels of the organization.

Corporate level strategy is "*concerned with the overall purpose and scope of an organization and how value will be added to the different parts of the organization. This could include issues of geographical coverage, diversity of products/services of business units, and how resources are to be allocated between the different parts of the organization.*" (Johnson et al. 2005: 11)

Business level strategy is *"about how to compete successfully in particular markets. This concerns which products or services should be developed in which markets an how advantage over competitors can be achieved in order to achieve the objectives of the organization – perhaps long term profitability or market share.*" (Johnson et al. 2005: 11)

Operational strategies are "*concerned with how the component parts of an organization deliver effectively the corporate and business level strategies in terms of resources, processes and people.*" (Johnson et al. 2005: 12)

Leadership is "*the ability to influence a group toward the achievement goals.*" (Robbins 2003: 141)

Visionary leadership is "*the ability to create and articulate a realistic, credible, and attractive vision of the future for an organization or organizational unit that grows out and improves on the present.*" (Robbins 2003: 142)

Visionary company is linked to the term visionary leadership, and it has the same characteristics as a visionary leader.

Transformational leaders or **Charismatic leaders** "*inspire followers to transcend their own self-interests for the good of the organization; capable of having a profound and extraordinary effect on followers.*" (Robbins 2003: 286)

Visionary charismatic leader combines characteristics of visionary leadership and a charismatic leader.

Technology S-curve is a figure that displays resolution, speed, reliability or performance, etc. as a function of time. In figure 3 are two technology S-curves, illustrating how Xerox believed that digital copiers are emerging and eventually would outperform light-lens copiers in the future. (Ulrich & Eppinger 2000: 43) (It is irrelevant for understanding technology S-curve to know details about what is light-lens or digital technologies – they are some technologies that have been used in copiers.)

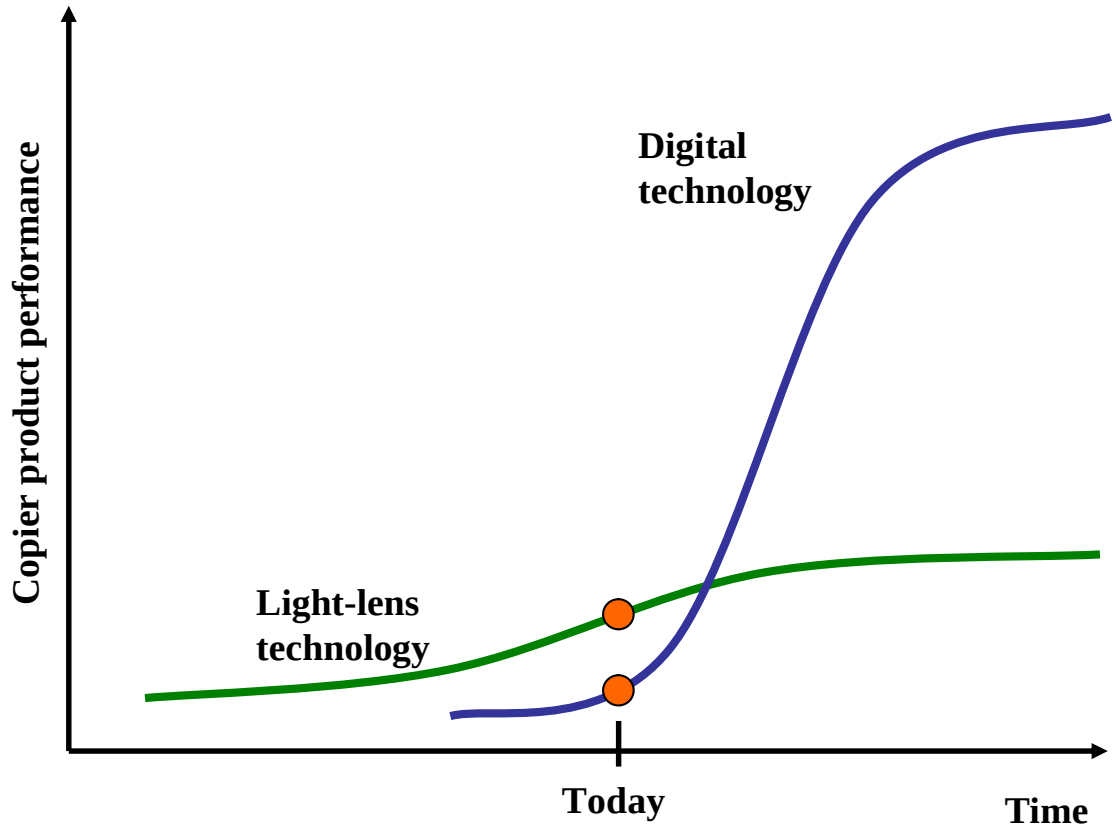

Figure 3. An illustration of technology S-curves. (Ulrich et al. 2000: 43)

Learning curve is in principal similar to the technology S-curve. Learning is a function of time on a learning curve.

Paradigms are "*basic belief systems based on ontological, epistemological, and methodological assumptions.*" (Guba, Lincoln 1994: 107)

Ontology tells "*what reality is like and basic elements it contains.*" (Silverman 2006: 13)

Epistemology tells "*what is the nature and status of knowledge.*" (Silverman 2006: 13)

Methodology refers to "*the choices we make about cases to study, methods of data gathering, forms of data analysis etc in planning and executing a research study.*" (Silverman 2006: 15)

Model is overall the framework for looking at a reality that should be useful. (Silverman 2006: 13)

Concept is a useful idea deriving from a given model. (Silverman 2006: 13)

Theory is a set of useful concepts that are used to define and / or explain some phenomenon. (Silverman 2006: 13)

Hypothesis is a valid testable proposition. (Silverman 2006: 13)

Method is a special research technique that should be in line with the model, theory, hypothesis and methodology. (Silverman 2006: 13)

Functional structure consists of the primary activities in an organization, such as production, finance and accounting marketing, human resources, and research and development. (Johnson et al. 2005: 398)

Multidivisional structure consists of "*separate divisions on the basis of products, services and geographical areas.*" (Johnson et al. 2005: 399)

Corporate parent is a management level above business units and without direct interaction with customers and competitors. (Johnson et al. 2005: 281)

2. LITERATURE REVIEW

The following chapter contains reviews about three subjects: special roles and characteristics of an R&D organization, its strategy planning procedures, vision, organizational role, and, finally, issues that are related to motivation in an R&D organization.

2.1. Characteristics of the R&D organization

The following chapter presents the function of an R&D organization and what have been stated about strategy building for R&D organization.

2.1.1. Function of the R&D organization

In the past, the R&D function had to carry out technological activities as an independent stand-alone department. Now the R&D function has widened to be multifunctional, containing:

> "*The set of activities necessary to effectively and efficiently initiate, co-ordinate and accomplish the product and related production process development activities of a company*."
> (Kressens-van Drogelen: 51)

In other words, the R&D function and the R&D department are not synonyms any more. (See Figure 4)

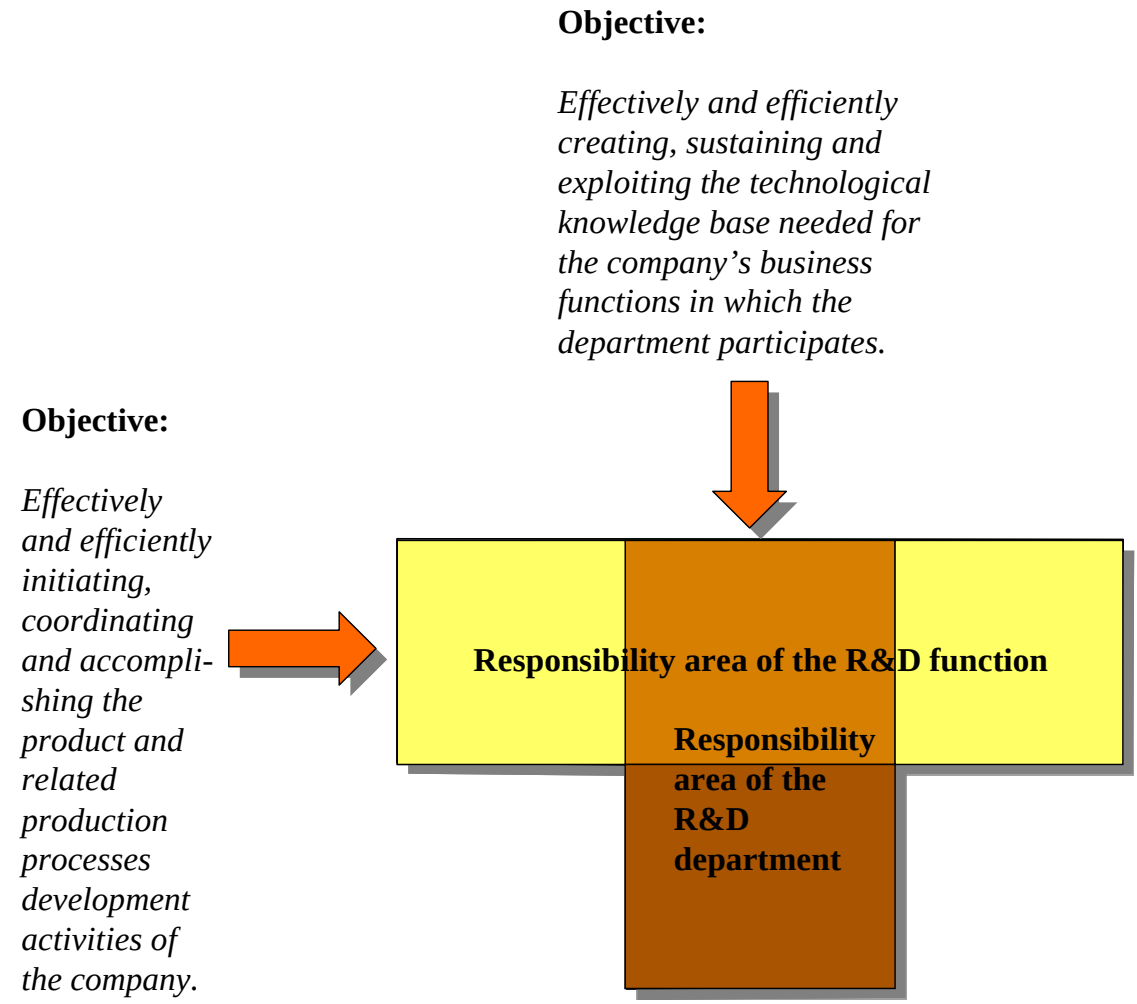

Figure 4. The responsibilities of the R&D function and the R&D department. (Kressens-van Drogelen: 52)

One significant difference in R&D activities is related to the business field of the company.

> "*The strategic and operative management of R&D are considered as very challenging tasks because of the several special characteristics of R&D that make the R&D a functional area of business differing significantly from other functional areas of business i.e. a significant amount of industry specific knowledge is needed to manage R&D effectively.*" (See Figure 5)
> (Ojanen 2003: 1)

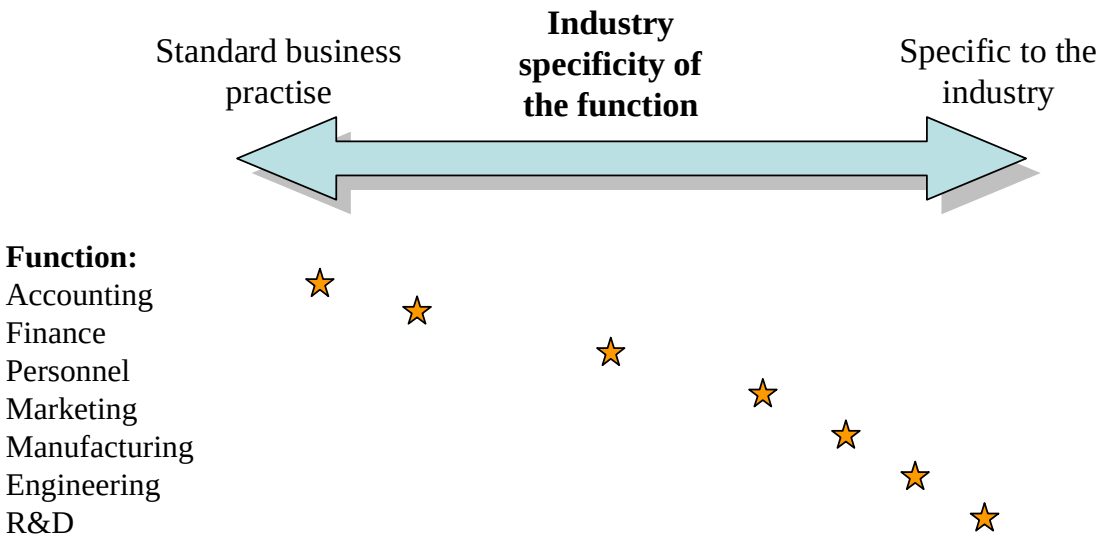

Figure 5. Industry specificity of some organizational functions. (Ojanen 2003: 1, original Burgelman, Maidique & Wheelwright: 2001)

An R&D work process is illustrated in figure 6 as an example of R&D laboratory processes. This picture could present any other R&D team's procedures: how they work, what they deliver, and to whom they deliver. People, ideas, equipment, facilities, funds, information, etc., are used to researching, developing, testing and reporting to deliver patents, products, processes, publications, knowledge for marketing people, business planners, manufacturing and other receiving organizations so that the company can benefit by, e.g., cost reduction, sales improvement, product improvements, capital avoidance, etc.

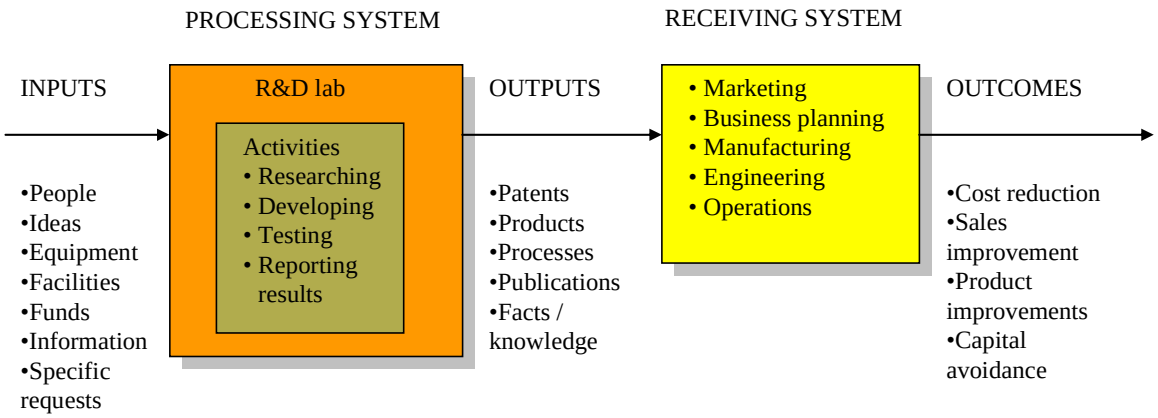

Figure 6. An R&D laboratory as a system. (Figure is modified from Brown & Svenson 1998: 31)

The actual R&D work and challenges in it could be described by characteristics of commercial uncertainty and technological uncertainty. (See Figure 7) (Kressens-van Drogelen 2001: 70)

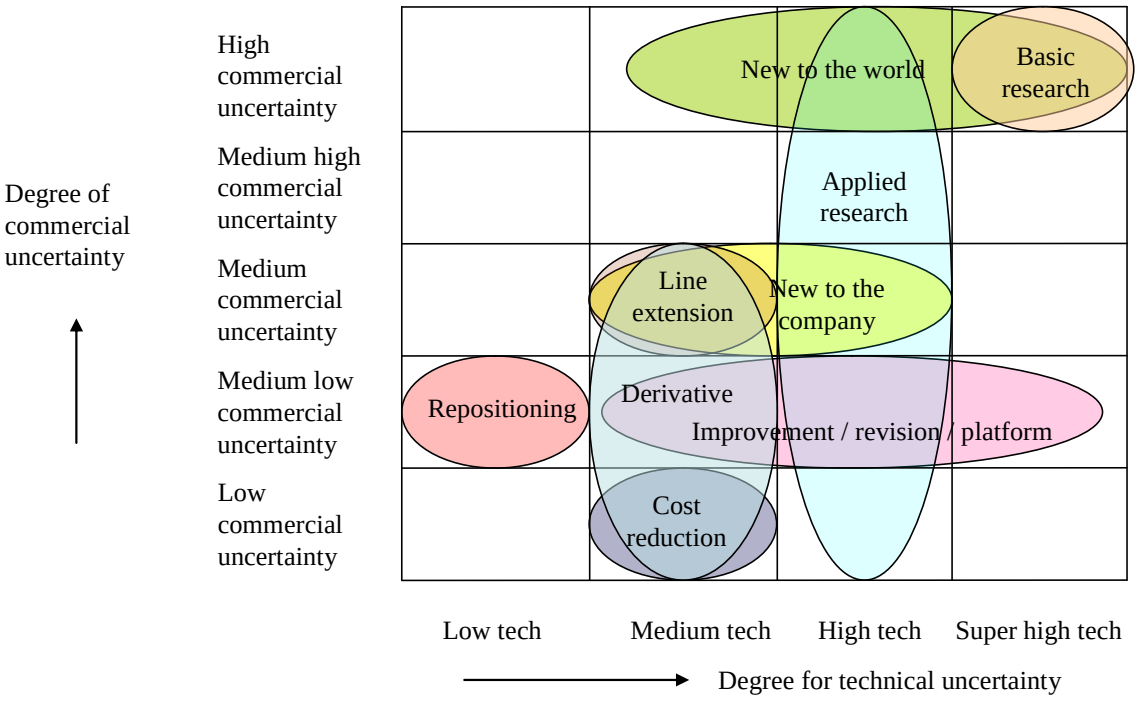

Figure 7. Work categories in R&D identified by degree of commercial and technical uncertainty. (Kressens-van Drogelen 2001: 72)

Terminology in figure 7:

- *Basic research* is original investigation to gain new scientific and / or technical knowledge and understanding.
- *New to the world* is establishing entirely new market.
- *New to the company* is entering to established market for the first time.
- *Cost reduction* is creating a product with same performance as existing but with lower cost.
- *Line extension* is a supplement to an existing product line.
- *Applied research* is original investigation to gain new scientific and / or technical knowledge and understanding towards specific aim or objective.
- *Derivative projects* are incremental changes of products and / or processes that are aiming to a cost reduction or a new feature.
- *Platform projects* are fundamentally improved products compared to pervious generations.
- *Break through projects* are aiming at a totally new product category that has fundamentally different core products and processes compared to previous generations.
- *Product repositioning* is entering a new market with targeted existing product.

(Kressens-van Drogelen 2001: 68 - 69)

Figure 7 presents also all kinds of challenges and activities that R&D personnel are facing in their work. Successful R&D work must fulfil both commercial and technical requirements. One can also see from figure 7 that development work contains different amounts of commercial and technical requirements. When starting a development project, there is always some uncertainty, and some simple-looking medium-technology cost reduction project could turn out to be for developing something that is high or even super-high technology.

Four types of product development organizations can be observed in the automotive industry, depending on the size and scope of the company product range (See Figure 8). In a *matrix* organization, engineering teams work on several projects simultaneously. In a *product team* organization, the company has independent projects that build one product at a time. *Semi-center* and *center organizations* have many product lines, but they cluster similar projects together and have also duplicate functional departments. (Cusumano & Nobeoka 1998: 52 – 54)

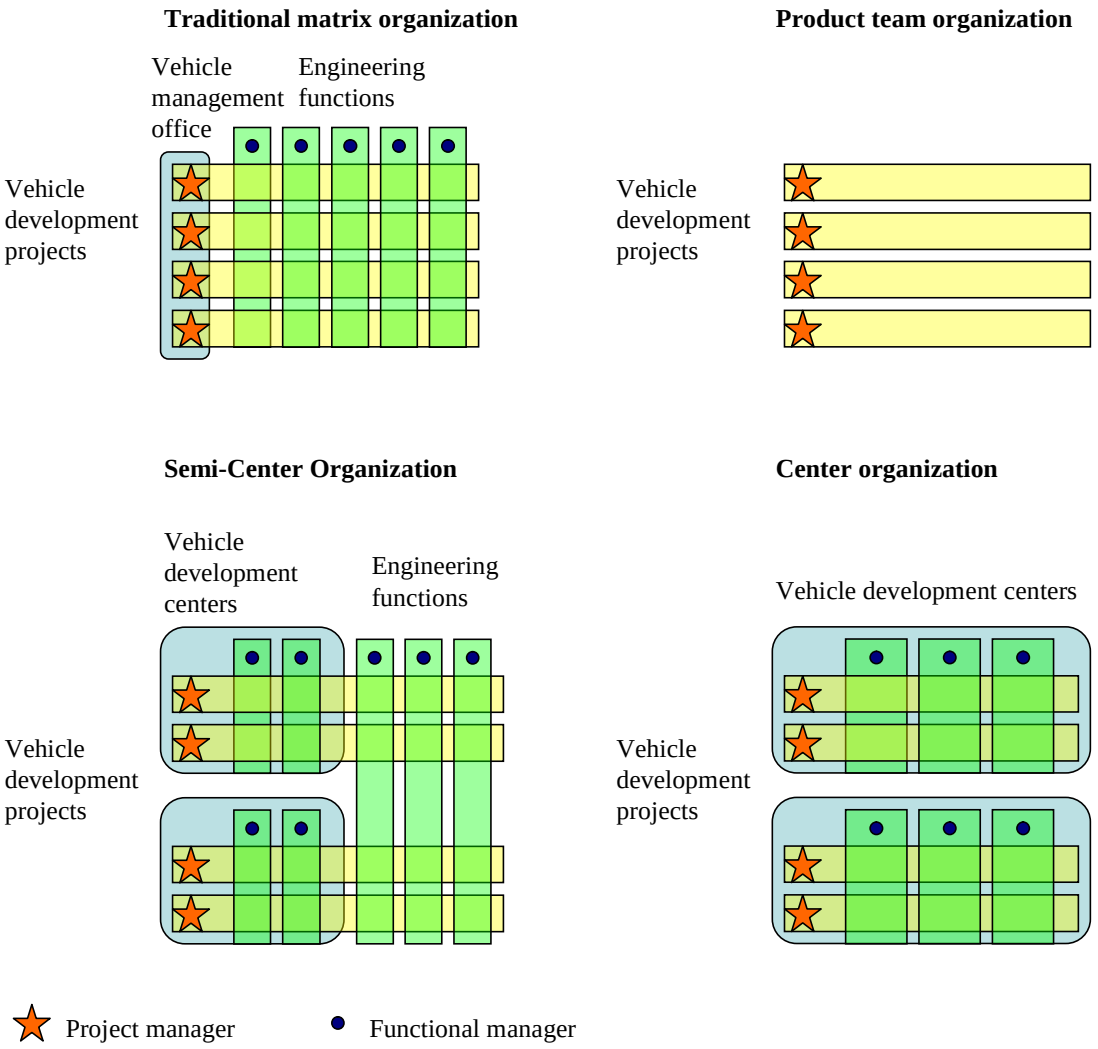

Figure 8. Four types of product development organizations. (Cusumano et al. 1998: 53)

The organization structures presented in figure 8 are typical in R&D organizations. The matrix structure is quite popular in R&D organizations. The organization structure has an impact on how people are working. The main difference comes in reporting: people are reporting to one manager, two managers or several managers.

On the other hand, business environment is becoming globalized. Companies themselves could have a global organization or they have global suppliers, partners or customers. How does this globalization influence the R&D activities of a company? The global R&D management trend has been studied in Europe, US and Japan and five trends have been found:

- "*While markets have become global, the technology development has still remained local. Therefore, "pockets of innovation" around the world are needed;*
- *despite decentralization of R&D, "critical mass" of technology development in one location is a key success factor;*
- *external relationships in different forms are becoming more important;*
- *research becomes more productive when it is linked to the market needs;*
- *"global network" model, where core technology groups in each market are managed effectively*."

  (Kilpinen 1995: 27, original Perrino, Tipping 1991)

If these are general trends for R&D management, what kind of management practices are needed in the R&D function? It has been suggested that the following practices should be applied in the global management of technology:

- *"A coherent 5 to 10 year vision of key business segments;*
- *a proactive program to identify "pockets of expertise";*
- *continuous access to evolving technologies;*
- *effective communication and integration of resources;*
- *R&D function should be a part of formal multi-disciplinary team;*
- *implementation of the above global network model is a long term (10 – 20 year) process*."

  (Kilpinen 1995: 27, original Perrino & Tipping 1991)

In other words, global influence on the R&D function could be summed up as follows: markets could be global but the implementation of technology local; critical mass of people, skills and other resources are needed for upcoming global challenges; technology should flow freely inside the company; and a long term vision would help global coordination of R&D activities.

2.1.2. Creating a strategy for the R&D organization

2.1.2.1. Competing interests between the R&D function and other functions in the corporation

The marketing function, as well as the R&D function, aims far in the future. A modern marketing function tries to cooperate with every other department of the company and wants that all other departments would cooperate with each other. The marketing function points out that each department needs to appreciate the operating logic of other departments. Here is one marketing generalization of an R&D function:

> "*R&D is staffed with scientists and technicians who pride themselves on scientific curiosity and detachment, who like to work on challenging technical problems without much concern for immediate sales payoffs and prefer to work without much supervision or accountability*."
> (Kotler 2003: 676)

Just to understand the R&D function role more deeply, let us pose a question and then try to answer it. Is there any truth in this Kotler's view?

The main task of the R&D personnel is to master technology, not marketing ambitions. When the R&D personnel are working with challenging new technology, there are always commercial and technological risks. Sometimes the R&D work succeeds but mostly it does not. Ericson and Jacobson (1992) found that only increasing expenditures does not alone give any answers. R&D work will not secure a competitive advantage because it can always be copied by competitors. A sustainable advantage can only be created by a creative content of R&D. Kilpinen (1995: 29) has stated about successful innovations, markets and technology that

> "*Successful innovations require a combination of "market pull" and "technology push" approaches"*

A previous generalization by Kotler hinted that R&D personnel are irresponsible and concerned only about themselves. As a comment to this view, Kerssens-van Drongelen

has pointed out that it is not impossible but hard to measure and evaluate the R&D organization outputs. The first problem comes literally from the difficulty to isolate R&D's contribution to the company's success from other business activities. The second problem comes in matching R&D inputs (e.g. money or man-hours) and outputs (e.g. research findings, new technologies, materials) to the final outputs (e.g. new or improved products and processes). Also there is a time lag between R&D efforts and earnings on the market. Then there are evaluation and comparison problems of outputs because usually outputs are unique and the process that produce them are non repeatable. (Kerssens-van Drongelen 2001: 9-10)

In large corporations, there are conflicting interests between different organizational functions. Some people in the organization want the top manager of the company to come from the same interest group, and this person would be preferred as "one of us". From the R&D point of view, is it in anyway any significant if the Chief Executive Officer CEO has or has not technical education? According to Roberts (2001: 27) no correlation had been found in the company's performance with the CEO's having or not having a technical background. What has been found is that the technical and overall superior performance is linked to a strong integration between business and technology strategies. This integration effect is concentrated on a few leaders, like the CEO, the senior technology executive and division general managers. (Roberts 2001: 35 - 36)

2.1.2.2. Creating a competitive advantage by technology

When creating a strategy for the R&D organization, the first decision is to answer the questions how to build competitive advantage for the company. For a technology-oriented company, this decision has remarkable long-term consequences for the R&D function, and according to Porter (1985) technology-oriented companies can choose either to be or not to be technological leaders.

Technological change drives competition, plays a major role in structural changes of industry, and creates new industries. Technological change is in itself not valuable, but it is important for competitive advantage and industry structure. All technologies of the company have potential competitive impacts. The value of technological activities is in combining purchased input with human resources to produce some output. (Porter 1985: 60 - 61) Table 1 presents the technologies typically represented in the value chain of the company.

Table 1. Technologies and their focuses in the value chain of a company. (Porter 1985: 61)

	Cost leadership	***Differentiation***	***Cost focus***	***Differentiation focus***
Product technological change	▪ *Product development to reduce product cost by lowering material content, facilitate ease of manufacture, simplify logistical requirements, etc.*	▪ *Product development to enhance product quality, features, deliverability, or switching costs*	▪ *Product development to design in only enough performance for the target segment's needs*	▪ *Product design to meet the needs of a particular segment better than broadly targeted competitors*
Process technological change	▪ *Learning curve process improvement to reduce material usage or lower labor input* ▪ *Process development to enhance economies of scale*	▪ *Process development to support high tolerances, greater quality control, more reliable scheduling, faster response time to orders, and other dimensions that raise buyer value*	▪ *Process development to tune the value chain to a segment's needs in order to lower the cost of serving the segment*	▪ *Process development to tune the value chain to segment needs in order to raise buyer value*

Porter suggests that technological change will lead to a sustainable competitive advantage only if the following four factors come true at the same time:

- The technological change itself lowers costs or enhances differentiation and the technological lead is sustainable.
- The technological change shifts cost or creates uniqueness drivers in favour of a company.
- Pioneering translates into first-mover advantages.
- The technological change improves overall industry structure.

  (Porter 1985: 64)

A company must make a decision on their technology strategy to seek either technological leadership or technological followership (See table 2). This decision, to become a technological leader or follower, should be based on either low cost or differentiation evaluation. (Porter 1985: 68)

Table 2. The technological strategy and the competitive advantage for a technological leader or follower. (Porter 1985: 68)

	Technological leadership	***Technology followership***
Cost Advantage	• *Pioneer the lowest-cost product design.* • *Be the first company down the learning curve.* • *Create low-cost ways of performing value activities.*	• *Lower the cost of the product or value activities by learning from the leader's experience.* • *Avoid R&D costs through imitation.*
Differentiation	• *Pioneer a unique product that increases buyer value.* • *Innovate in other activities to increase buyer value.*	• *Adapt the product or delivery system more closely to buyer needs by learning from the leader's experience.*

The choice of the important technology should be based on three factors: sustainability of the technological lead, first-mover advantages, and first-mover disadvantages. The technological lead can be sustained for two reasons: (1) competitors cannot duplicate the technology, or (2) the company innovates as fast as or even faster than the competitors and the competitors cannot catch up. (Porter 1985: 68 - 70)

According to Porter if a company is the first to adopt a new technology, then the first-mover advantages are

- *Reputation* - that followers have difficulty to overcome.
- *Preempting a positioning* – may attain an attractive product or market position that force competitors to adapt to less desirable one.
- *Switching costs* - may lock later sales if switching costs are present.
- *Channel selection* - may gain a unique channel with the best brokers, distributors or retailers while followers must accept the second best.
- *Proprietary learning curve* - may establish a durable cost or differentiation advantage if it can keep its learning in the house.
- *Favourable access to facilities, inputs or other scarce resources* - may enjoy a temporary advantage in access to resources before market forces reflect with full impact.
- *Definition of standards* - may define technology standards that force followers to adopt them.
- *Institutional barriers* - may secure patents or by being the first in a country may gain a special status by the government.
- *Early profits*- may enjoy temporarily high profits.
  (Porter 1985: 70 - 71)

However, Porter points out that if the first mover does not have resources, then another early mover with sufficient resources can gain and enjoy the benefits of the first mover advantages. (Porter 1985: 71)

First-mover disadvantages become from the cost of pioneering and the risk that conditions might change. According to Porter the first-mover disadvantages are

- *Pioneering costs* – costs that come from gaining regulatory approvals, achieving code compliance, educating buyers, developing infrastructure for service and training, investments to complementary products, the high costs because of scarcity of available early recourses.
- *Demand uncertainty and changes in buyer needs* – must accept risk of uncertainty over future demand and technology has no value if buyer needs change.
- *Specificity of investments to early generations or factor* costs - if investments are made for the current technology and cannot be easily modified for later product generations.
- *Technological discontinuities* – "*Technological discontinuities are major shifts in technology that a first mover may be ill prepared to respond to given its investment in the old technology*."
- *Low-cost imitation* - followers may be able to imitate the innovation at lower cost without the cost of innovating.

  (Porter 1985: 73 - 74)

Porter states that, when turning technology into a competitive weapon, the following steps should be applied:

(1) "Identify all the technologies and sub technologies in the value chain"

- A company must also gain an understanding of the technologies of their suppliers and also of their customer value chains.

(2)" Identify potentially relevant technologies in other industries or under scientific development."

- Information systems, new materials and electronics have had a revolutionary impact in creating new technologies or when combined with old technologies.

(3) "Determine the likely path of change of key technologies."

- "*No technology should be assumed to be mature*."

(4) "Determine which technologies and potential technological changes are most significant for competitive advantage and industry structure."

- The significant technological changes have to meet these four tests: (1) lower cost or raise differentiation directly and change is sustainable; (2) shift cost or uniqueness drivers in favour of a company; (3) lead to first-mover advantages; and (4) improve overall industry structure.

(5) "Assess a company's relative capabilities in important technologies and the cost of making improvements."

- Pride should not be a value or the company will destroy valuable resources in an area where it does not contribute competitive advantage.

(6)"Select a technology strategy encompassing all important technologies that reinforce the company's overall competitive strategy."

- Should include a ranking of R&D projects by competitive advantage, no approval without investigating its effect on cost and/or differentiation, decisions about technological leadership or followership in important technologies, policies toward licensing that stresses the overall competitive position rather than reflect short-term profits, and the ways of gaining the needed technology externally if necessary.

(7) "Reinforce business unit technology strategies at the corporate level."

- The corporate section can strengthen a company's overall technological position by the following actions:
  - by identifying core technologies that impact on many units,
  - by ensuring active and coordinated research efforts and that technology is distributed among business units,
  - by funding corporate research in important technologies to create a critical mass of knowledge and people, and
  - by using acquisitions or joint ventures to introduce new technological skills to the corporation.

(Porter 1985: 77 - 78)

According to Porter's view, technological change is not always beneficial. Technology exists in every value activity of the company, and technological change influences competition through those activities. For the R&D function, this requires answers to two important questions: (1) "What technologies should R&D master?" and (2) "Which of these technologies are so important that a technological leadership should be striven?" Then the rest is avoiding disadvantages and using advantages of the technological leadership as Porter has stated.

2.1.2.3. Process issues for creating strategy for the R&D function

From the manufacturing point of view the product life cycle is a valuable tool with five different stages: embryonic stage, rapid growth stage, shake out stage, maturity stage and, finally, renewal or decline stage. (Kilpinen 1995: 19) But the key for product planning in a technology-oriented business is to decide when to apply new technology to products. For this type of planning, a technology S-curve is useful (See Figure 3). The technology S-curve represents technology developments with four identified stages: (1) slow in emergence, (2) then a fast grow, (3) at the maturity stage development slows down to some natural limit, and (4) in the very last stage technology becomes outdated. The technology S-curve works in many industries, but it is still hard to predict the future. An important feature of the technology S-curve is that learning or technical development can not be ramped up to the maturity stage. All these frustratingly slow stages have to be pulled through if one wants to master new technology.

One technique to control and plan technology is to use a technology roadmap where the expected availability and use of different technologies could be considered regarding different products. A technology roadmap could be used for timing and utilizing technology development projects. This is also useful for creating joint strategies where technology development and product development are combined. (Ulrich et al. 2000: 44 – 45)

Because a company has limited resources, development and implementation of new technologies is always risky. New and old products should be evaluated by market size, market growth, competition intensity, status of knowledge about market and technology, other possible substitute products, a company's capabilities, and patents, trade secrets or barriers that influence competition. (Ulrich et al. 2000: 46) When a company has too many development projects and limited resources, pipeline management could be used to control timing of product introductions, technology and market readiness, and competition status. (Ulrich et al. 2000: 49 – 50)

After a project has been approved, pre-project planning can start by making a product vision statement. The objective of this statement is to provide guidance for the whole organization. This guideline should contain information about the specified target market and also general assumptions about operations. These decisions are written into a mission statement, giving a brief description of the product, key business goals, target markets for the product, assumptions and constraints that guide development efforts and

stakeholders. The mission statement should go through a “reality check”. This should be done before proceeding further because, in early stages, it is easies to correct and later consequences become more severe and expensive when the development progresses. (Ulrich et al. 2000: 50 - 54)

When a technology is linked to the corporate strategy, these linkages work in both ways because technology opens opportunities and constraints regarding the corporate strategy. When shaping innovation strategy - which should be a part of corporate strategy – the R&D function should play the main role by giving overall technical awareness about the operations in the company. This role should contain providing a window for the external world of technology, securing enough technology know-how to maintain or raise market status, giving information on new business opportunities, and, at last, giving feedback ensuring the technological strategy is in line with the corporate requirements. (Tidd, Bessant & Pavitt 2005: 223 – 224)

From one viewpoint, the corporate strategy should define both organizational and technological strategies. But does that mean some operational and technological opportunities are not fully exploited? This problem could be stated, from the technology point of view, as the balance between entrepreneurial and administrative functions. The financial control strategy has a strong administrative monitoring status, and technological investments in knowledge building and strategic positioning will then be neither understood nor encouraged. The financial control strategy could be appropriate for a low-tech industry. Strategic planning strategy has a strong entrepreneurial status where the corporate headquarters encourage investing knowledge building and strategic positioning. This strategy planning strategy could be useful for a high-tech industry, like automobile or drugs industry, where experimentation is expensive and the markets clearly defined. The strategic control strategy points out entrepreneurial technological investments, but it weights more the shaping and execution of strategies than any special interests of a division or business units. This type of strategies could be best suited for high-tech consumer electronics industry with pervasive technologies and diversified markets, having quite inexpensive experimentation. “*Corporate strategy should be in line with the nature of technological opportunities, if these are to be effectively exploited*.” (Tidd et al. 2005: 225 – 232)

2.1.2.4. Strategic issues that inspire creativity and innovation in the R&D organization

If the surrounding organization is not favorable for defining and developing, innovative products and processes are unlikely to evolve. Employee involvement in innovation could be seen as marginal changes. However, in the long run they are a significant factor in strategic development of the whole organization. This can be seen in quality management and employee innovations. Performance increase by increased innovation involvement can be measured in terms of HII - “High-involvement innovation”. (Tidd et al. 2005: 473 – 492)

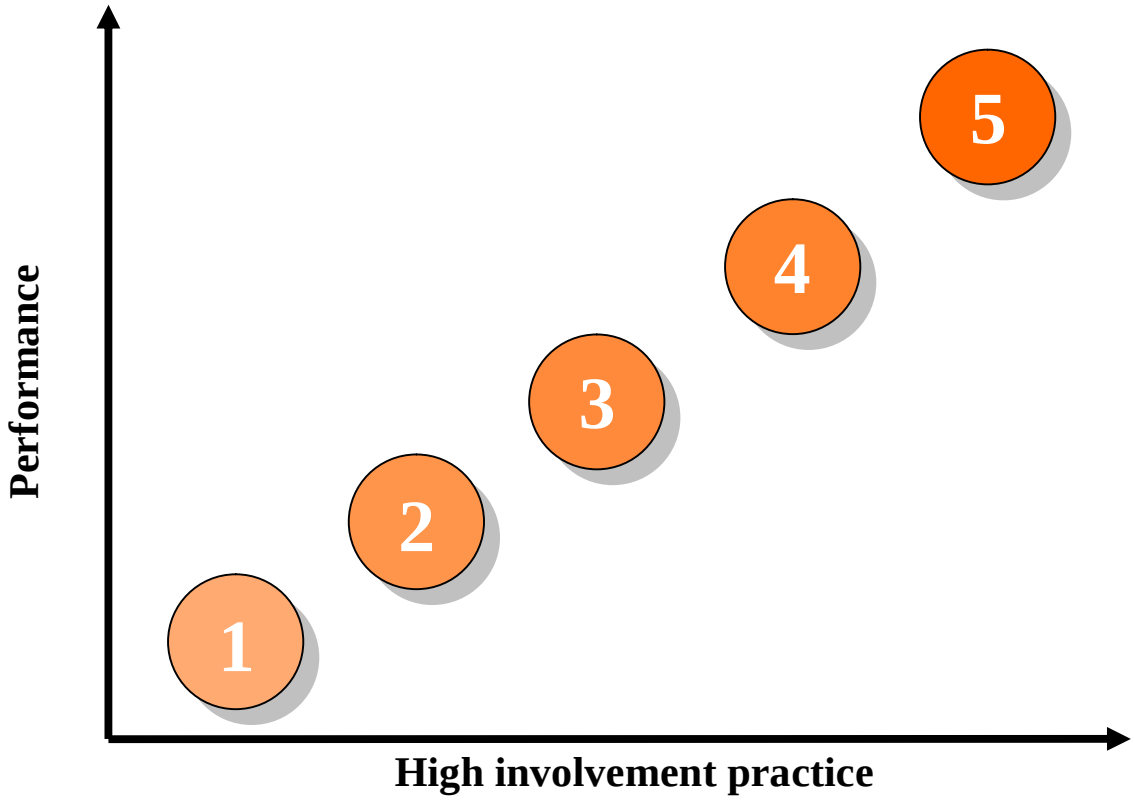

Figure 9. Five stages of high-involvement model. (Tidd et al. 2005: 492)

There are five stages in HII (See Figure 9). The first level could be stated as the “unconscious HII” where people work together removing obstacles, but there are no supporting attempts to mobilize or build this ability. On the second stage, the organization tries seriously to mobilize HII by rewarding, training, and is trying to motivate, but nothing happens because the management is not supporting and

committed to give resources. On the third level strategic goals of organization are aligned with improvements of teams and individuals, and HII can be seen on the bottom line, but external controlling and measuring sets limits for HII. The “internally directed” principle of HII comes true on the forth level where the new element of “empowerment” allows individuals and teams to experiment and innovate on their own initiative. The final stage is the end of the journey where the whole personnel are completely involved in experimenting and improving, sharing knowledge to create an active learning organization. (Tidd et al. 2005: 492 - 494)

Creativity is an essential part of the work in an R&D organization. Individual creativity requires *expertise*, *creative-thinking skills*, and *intrinsic task motivation*. (See creativity intersection in figure 10.) *Expertise* is the foundation of creative work, and it includes the memory of real knowledge, technical competence, and special talents in the target area. *Creative thinking* means “something extra”. It is linked to the ability to use also analogies and to see things from a new point of view. Creative thinking depends on personal characteristics that are related to independence, self-discipline, orientation towards risk taking, tolerance to complexity, persistence against frustration, and to lack of need for social approval. *Motivation* is the drive to work when it is interesting, involving, exiting, gives pleasure, or is just individually challenging. (Amabile 1997: 42 - 44)

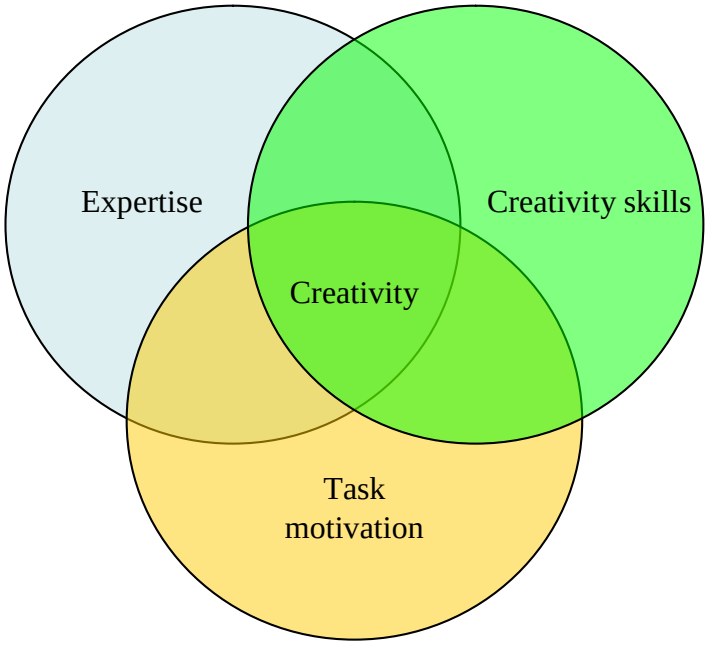

Figure 10. Three components of creativity. (Amabile 1997: 43)

Individual and team creativity is linked with the organizational work environment (See Figure 11). Innovation in work environment consists of three components:

- *Organizational motivation* means that higher level of management must generate orientation towards innovation but lower levels of management can communicate and interpret that vision.
- *Recourses* contain all elements in the organization that can enhance innovation.
- *Management practices* include the management's ability to create functional groups that contain people who have the necessary skills, who trust and communicate, who challenge ideas constructively, who give mutual support and show commitment.

(Amabile 1997: 52 - 54)

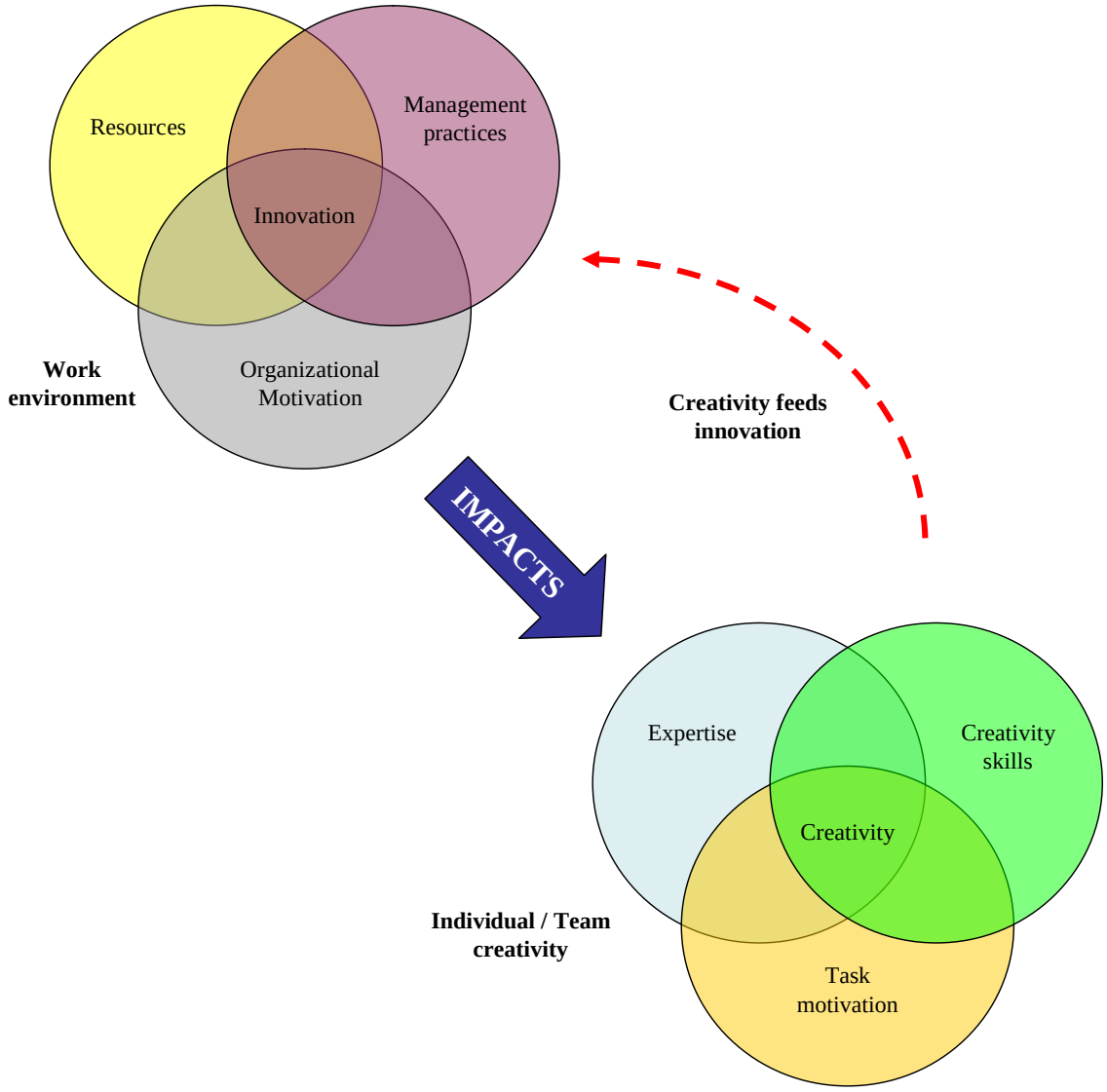

Figure 11. Impact of the organizational environment on creativity. (Amabile 1997: 53)

Figure 11 illustrates how complicated the linkages and elements are that have an impact on individuals' or teams' creativity in a work environment (See the blue arrow in Figure 11). Creativity produced by individuals or teams is the source for innovation also for the organization (See the dotted arrow in Figure 11). Social or work environment influences creativity by influencing individual components. This impact on task motivation appears to be the most instant and direct. "*Organizational leaders and managers must begin to think of human motivation at work as a complex system where it is possible to achieve synergy between persons and their work environments and between the different types of motivation. The system is complex, but it is not unknowable*." (Amabile 1997: 52 – 55)

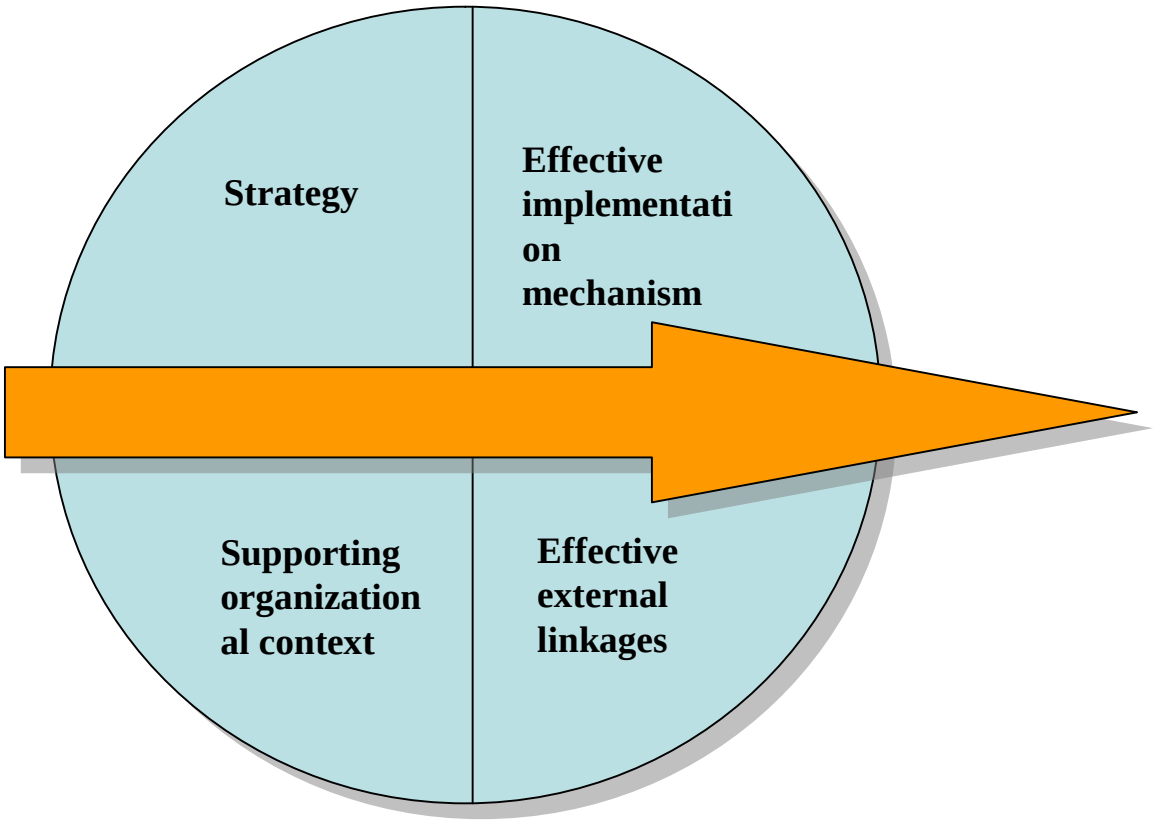

Figure 12. Four elements for successful innovation routines. (Tidd et al. 2005: 560)

Learning and adaptation are essential in preparation for the future, but innovation is the most essential part in this process. Successful innovation is about collaboration between technology, market and organization. Innovation should be found in the generic processes of the company, but there are no general recipes for how to implement innovation into these processes. A company must customize this implementation according to their organization structure, technology and products. Innovation

management is the tool for finding more effective routines for innovation processes. Four elements have been found for successful innovation routines (See Figure 12): *"Successful innovation is strategy based, successful innovation depends on effective internal and external linkages, successful innovation requires enabling mechanisms for making change happen and successful innovation only happens within a supporting organizational context."* (Tidd et al. 2005: 492 - 494)

2.1.3. Summary of the R&D organization role

The R&D organization has distinct characteristics that separate it from other organizations in the company. The R&D function contains all R&D activities in the company, not only the work done in the R&D department itself. If these activities are compared to other functions in the company, the R&D is the most specific one for the industry. The R&D work is diversified by the degree of commercial and technical uncertainty demands. The matrix organization is the most popular organization structure in R&D organizations. One disadvantage of the R&D function is that it is more interested in technical problems at expense of commercial concerns. Learning and technical development have been found to follow an S-curve that has a frustratingly slow development in the early stages and at the maturity stage. Technological change could create competitive advantage if it reduces costs or promotes differentiation, and if the change is sustainable, if it shifts costs or creates uniqueness drivers in favour of a company, if it leads to first-mover advantages, and if it improves the overall industry structure.

Controlling the actual R&D work is problematic when trying to balance between the entrepreneurial innovative and organizational administrative demands. If the surrounding organization does not encourage innovation, it is unlikely that the R&D personnel will create innovative products or processes. Motivating and creating an innovative environment for the R&D personnel is a complex system where a synergy should be achieved between personal interests and organizational environment.

Successful innovation means implementing innovation to technology, market and organizational processes, and innovation management could be a useful tool in improving theses processes. Evaluating R&D work is difficult because any contribution is hard to isolate and the time lag between the effort and output is unique and unrepeatable.

2.2. The role of vision in organizations from R&D perspective

The previous chapter gave an introduction to the R&D function. This section presents three topics about the vision in an organization from an R&D perspective. The first one is a review of how vision is presented in charismatic leadership literature. The aim in this study is not to analyze leadership but the work in the R&D organization, being under continuous change, in which a leader with a strong vision could be helpful.

Then follow reviews of visionary leadership and the challenges in building a visionary organization. Finally this chapter contains a summary of how the vision is analyzed in literature from the R&D perspective.

2.2.1. The role of a vision that is linked to charismatic leadership

An R&D organization expects its personnel to become specialised in certain fields that are given to each of them. If a person is responsible for research and development of a certain field, this field becomes personalized by this person. It is in the company's interest that, even though the person has no managerial status in the organization, he or she has the ability to inspire others in the organization. In this role, personal charisma could be helpful.

In history of engineering there have been several charismatic engineers who have been responsible for visionary technical masterpieces. One of the most famous charismatic engineers was automotive designer Alec Issigonis (1906-1988) who is best known as the creator of the Mini (See Figure 12). He has been described as

> "*An uncompromising individualist, Issigonis is credited with having said: 'a camel is a horse designed by a committee.' He was an independent thinker, who despised convention and would not take advice gladly; believing that what he designed was good enough for everybody*."
> (Design Museum London 2006)

Figure 13. Alec Issigonis at his retirement party in 1971. (Design Museum London 2006)

The term "vision" is linked to charismatic leadership. A charismatic leader has five attributes that seem most important: self-confidence, a vision, strong convictions in that vision, extraordinary behavior, and an image as a change agent. The effect on followers is described as follows:

> "*Followers of charismatic leaders were more self-assured, experienced more meaningfulness in their work, reported more support from their leaders, worked longer hours, saw their leaders as more dynamic, and had higher performance ratings than the followers of noncharismatic but effective leaders.*"
> (Robbins 2003: 141)

A charismatic leader influences followers and social systems by transforming needs, values, preferences and aspirations of the followers into a collective interest defined by the charismatic leader. Charismatic leadership is effective because followers show commitment to the leader's mission with emotional attachment. (Shamir, House & Arthur 1993: 577) Charismatic leadership has linkages to transformational and visionary leadership because:

- *People are not pragmatic and goal-oriented but also self-expressive we "do" things because of what we "are", because by doing them we establish and affirm an identity for ourselves;*
- *People are motivated to maintain and enhance their self esteem and self-worth;*

- *People are also motivated to retain and increase their sense of self-consistency;*
- *Self-concepts are composed of identities – In addition to values, sometimes to role-identities, and also to the self-concept of society; and*
- *Humans may be motivated by faith because being hopeful in the sense of having faith in a better future is an intrinsically satisfying condition.*

  (Shamir et al. 1993: 580)

Charismatic leaders motivate their followers by

- increasing the value of the effort by pointing out symbolic and expressive factors of the effort;
- increasing the expectancy of attaining effort by emphasizing self-esteem and self-worth of followers;
- increasing the value of goal accomplishment by articulating vision and mission, i.e. the leader gives goals and meaningfulness;
- promoting faith for a better future with extrinsic rewards and related expectancies, justification or behaviors;
- creating personal commitment, i.e. internalized "personal" or "moral" commitment.

  (Shamir et al. 1993: 581 - 583)

The motivational processes of a charismatic leader have positive effects when the charismatic leader applies role modeling to the followers and frame alignment to the task. These positive effects require especially links between the leader's and followers' interests, values and beliefs. (Shamir et al. 1993: 584)

But there can be negative aspects in visionary charismatic leadership. The birth of successful visionary companies has been studied by Collings & Porras (1995). Bill Hawlett and Dave Packard decided to start a company, and after that they thought what to do. Masary Ibuka, the founder of Sony, had no specific product idea either when he started the company. Sam Walton started Wall-Mart without any great idea. Negative correlation has been found between early entrepreneurial success and building a visionary company. It is found that a leader with charismatic qualities and great visionary ideas could be profiled as a "time teller". On the other hand, a characteristic of leaders that have built a prosperous company, creating products cycle after cycle, is a "clock builder". Instead of building traits of a "time teller", visionary "clock builder" leaders concentrate on building the organization – building a ticking clock. "Clock building" is not hitting the market just with a visionary product idea and / or by riding

on attractive product cycles, but it is concentrating on traits that take an architectural approach to build the company itself and what it stands for. Business schools had the myth of both a great idea and a great charismatic leader, but it has been found that building a visionary company does not require either. The great ideas brought by charismatic leaders might have a negative effect on this process. The great idea view diverts attention from the company as the main creation. A company is not a vehicle for products, but products are vehicles for the company. “Luck favors the persistent” is a cornerstone of successful company – kill an idea but never give up the company. (Collings & Porras 1995: 80 - 87).

All products, services, and great ideas go out of date, but a visionary company has the organizational ability to improve existing products and generate new product cycles. Visionary charismatic leaders eventually die, but visionary companies do not necessarily die because they are not tied to one leader and they have the ability to remain visionary through multiple generations. This does not mean that architects of visionary companies are poor leaders. Building a visionary company does not require a high-profile charismatic style. Jack Welch, a high-profile CEO at General Electric, had a huge role in revitalizing GE. But his leadership style came from growing in a company that had prospered before Welch with the good architectural approach, and he is not going to be the last excellent CEO in GE. It should be noted, that according to this reference, shifting from “time telling” to “clock building” and building a visionary company can be learned. (Collings et al. 1995: 87 – 97)

2.2.2. Visionary leadership and a vision

The term “visionary leadership” is defined as the ability to construct and articulate a realistic, believable, and attractive vision for the future of an organization or a department of an organization. Visionary leadership grows up and improves from the present. In visionary leadership, the term “vision” differs from “direction-setting” by its elements that are inspirational, linked to value-setting, and realizable by its superior imagery and articulation. A vision has a grater possibility to fail if it does not have a clear view of the future and if there is no demonstration of a better future for the organization or its members. (Robbins 2003: 142).

The vision must change when the world changes. There are examples of whole industries ruined by large changes. Visioning should contain monitoring change,

making necessary changes, and readiness to create a new vision. Visionary organizations have the characteristic capacity to learn and adapt changes. Open environment, with mutual trust that allows people to change and experiment without threat, assists organizational learning. Making the vision and reviewing it has a few pitfalls for the management: do not do it alone; do not be too idealistic; try to avoid possible surprises; check that the organization has the necessary inertia; beware of other things than the bottom line; implementing should be flexible and patient; and, finally, never be complacent. (Nanus 1992) Success and failure are not related to radical, revolutionary or disruptive technologies, but they are probably more a result of cultural aspects like visionary leadership. This underlines the willingness to change but also the willingness to cannibalize present assets to serve a customer with new technology. (Tellis 2006: 38)

There has been a trend to decentralize R&D. Companies are trying to develop new products through entrepreneurship. A success is depending on the cycles between effective entrepreneurial and efficient bureaucratic modes to deliver quality products on schedule. (Kilpinen A 1995: 24) Workers have been encouraged to be internal entrepreneurs like in figure 6 employees in an R&D laboratory where members of a processing system internal receiving systems. This role requires selling their ideas inside the organization, searching funding for their ideas, and, finally, implementing them by themselves or as a part of a task force. Without training to this entrepreneur role good ideas could be left without proper investigation.

Venture growth success had been studied, and the role of vision in this process is pointed out by Baum, Locke & Smith (2001: 299 - 301). Individual, organizational, and environmental factors predict the success of venture growth and the complex indirect relationships that are attached to them. Venture growth success cannot be explained from any single perspective. Internal factors of performance - strategic choices, leadership, and entrepreneurship - are more relevant than external factors a like structure / performance / economics paradigm, the population ecology theory, or recourse dependency theories. Technical and industrial competencies help implementing the entrepreneur’s vision and strategy.

The entrepreneur’s goals and self-efficacy has a direct effect on the venture growth. Sometimes, if the goals contain foolish risks, a disaster might come, or overconfidence could be harmful if circumstances change and assumptions are not true anymore. A vision is independently and quantitatively related to performance and has positive self-

efficacy effects. Self-efficacy is best developed by training and experience – visioning and goal-setting skills can be trained. (Baum & Locke 2004: 595 – 596)

2.2.3. Visionary organization

Some organizations have a vision but can not see it. Some organizations extend their death throes for years in a visionless condition and very often can not live with a vision that masquerades as a guide to the future. (Luccas 1998: 23)

By reading corporate visions, one comes to the conclusion that an ideal vision should read like this:

> "*We are a terrific organization made up of terrific employees who provide our terrific customers with terrific products and services. God bless us everyone.*" (Luccas 1998: 24)

This type of a statement tells that the core values of the company are missing. Crudely, values are to deliver long term growth in earnings per share and shareholder value. It would be questionable if people would scarify themselves to make this dream come true and if the company needs a vision anyway. Managers usually avoid creating a vision because their vision is too narcissistic, they know what they want, they are just doing business and a vision is not needed, or their company has too many rival interests that a common vision is out of reach. Even an autocrat needs a plan to follow in dictating the company's future. A unifying and clarifying vision is especially needed in interdependent organizations where people are expected to take part in delivering the vision. (Luccas 1998: 24)

A vision is needed

- *To guide us* – like sailors have been guided by stars to a destination:
- *To remind us* – like Declaration of Independence to give "whys";
- *To inspire us* – people are not inspired by work itself, they are inspired by purposes, results and goals;
- *To control us* – not to wonder unrelated business;
- *To free us* – a living vision loosens from the past and opens the door to the future. (Luccas 1998: 24)

Unfortunately, in most organizations, people do not know the vision of their own organization or do not understand, accept or believe in it. "*In such companies, the corporate vision plays little, if any, role in guiding people's daily efforts. Instead, they squander that energy on "doing their jobs", playing organizational politics, covering up their mistakes, fixing blame rather than problems and, in general, trying to stay out of trouble.*" If the vision is an illusion, sings can be seen. If it has not been brought up in strategy or planning meetings, even the old employees can not tell what the vision means to them or how it influences their way of working. Absence of dialogue about the vision in employee training or in anonymous surveys tells that the vision sounds good but it is considered useless or meaningless. If the vision feels like fiction, this can lower the morale and long run effectiveness of the company. (Luccas 1998: 22 – 25) Differences between good and bad visions are collected in table 3.

Table 3. What a vision is and what it is not. (Luccas 1998: 25)

What vision is	***What vision is not***
An organizational character of core values and principles	*A "high concept" statement, motto or literature*
The headwater for our priorities, plans and goals	*An advertising slogan*
A puller (not pusher) into the future	*A strategy or plan*
Determination and publication of what makes us unique	*A view from the top*
A declaration of interdependence	*A history or our proud past*
	A "soft" business issue
	Passionless

The critical parts of a visioning process is knowing who we are before we can decide where we want to go. An input must come from consultants or benchmark organizations but also from own people. The vision should be detailed so that people can be held accountable. Finally, support is needed in the implementation of the vision. (Luccas 1998: 25 – 26)

In their minds, visionary companies have a bedrock faith in and an uncommon passion for how they are doing their business. These companies navigate successfully through problems by adapting their strategies, operating goals, and culture to the circumstances while not compromising with their set of values. To become a visionary company, people at all levels must take part in visioning workshops to gain trust, involvement, and commitment. There should be sufficient time for this process. When implementing the vision, the highest levels of the organization work as a facilitator helping to

articulate what the company vision really is. When distributing the vision downwards in the organization, there should be a different focus. Project teams should be helped to develop their implementing blueprints. Finally, managers and teams should be helped to create practices, processes, technology, and to charge the vision operational. Success depends on how people are engaged in these discussions, how openly people express themselves, how conflicts are reconciled, how raised problems are taken into account in reframing the vision, and, at last, how team members are helped to find an agreement on how the vision should be put into operation. When preparing a vision, it is an important tool to analyze the business environment on technology, economical, political, and finally cultural / customer / consumer key areas. (Yearout, Miles & Koonce 2001: 32 - 37)

Lots of R&D work is done in the form of projects. On the project level, it is stated about vision that "*An important issue in running effective innovation projects is to make sure everyone on the team is working towards the same clear goal. Whilst this sounds obvious it is easy to lose the sense of direction on commitment in large and often dispersed teams; conversely being able to provide clear policy deployment can help focus even multiple parallel incremental innovation activities. … One important way of providing this is to involve them* (team members) *in the process of vision-building, evolving the product concept in the context of a clear understanding of underlying business drivers and completive realities.*" (Tidd et al. 2005: 390) On a project level, the vision helps the project team to focus on the same goal. The project success increases if the project team members are participating in visioning processes.

2.2.4. Summary about the role of the vision

By linking the values and expectations of leaders and followers together, a visionary charismatic leader could have a positive effect on work motivation. A visionary leader should use his charisma not on his own account but for building a company that has the ability to improve the existing products and generate new product cycles.

Visionary leadership is ability to construct and articulate a realistic, believable, and attractive vision for the future of the organization or a department of an organization. Visionary leadership grows up and improves from the present.

There has been a trend to decentralize R&D. Companies are trying to develop new products through entrepreneurship. The entrepreneur's goals and self-efficacy has a direct effect on the venture growth. A vision is independently and quantitatively related to performance and has positive self-efficacy effects.

Vision is needed to guide, remind, inspire, control and free us. Visionary companies navigate successfully though problems by adapting their strategies, operating goals, and culture to the circumstances while not compromising with their set of values.

2.3. Motivational issues in general and in the R&D organization

The previous chapters gave insights into the R&D function and into the vision in an R&D organization. They are useful for understanding the topic of this chapter, which is a review of motivational issues connected with the R&D activities.

The following sections present the early theories of motivation, contemporary theories of motivation, individual sources, individual v. management perspective, upper management perspective of motivation in an R&D organization, and, finally, a discussion about the role of motivation.

2.3.1. Basic sources of motivation

2.3.1.1. Early theories of motivation

One of the early motivation theories was *Maslow's hierarchy of needs theory* that stated five needs: physiological, safety, social, esteem, and self actualization (See Figure 14). Maslow's order contained lower and higher needs hierarchy; when a lower need like the physiological or safety need is satisfied, then a higher, social need becomes dominant. (Robbins 2003: 43 – 44, original Maslow 1954)

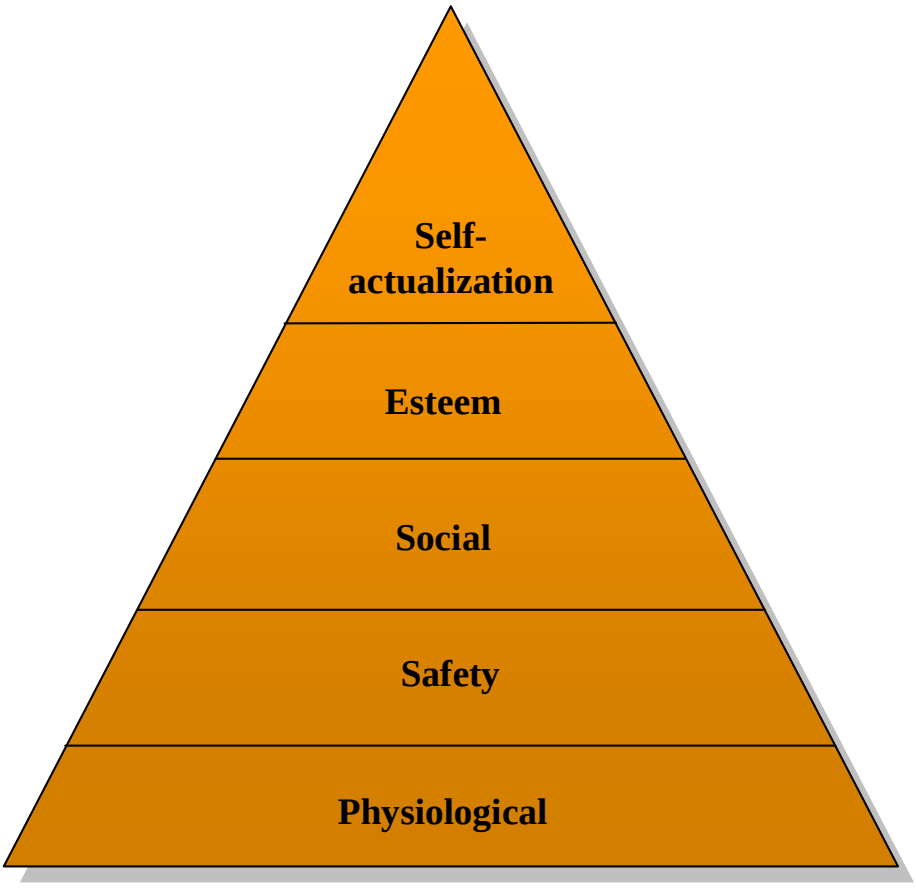

Figure 14. Maslow's hierarchy of needs. (Robbins 2003: 44)

According to *Theory X* and *Theory Y*, there are two kinds of people: negative and positive. Theory X claims that people are innate lazy and should be watched. They should be controlled by intimidation and rewards. They avoid responsibility and value

safety more than ambitions. On the other hand, theory Y claims the opposite. People like to work, show discipline and commitment when working towards objects they approve. They would like to have more responsibility, and also others than managers can be innovative. (Robbins 2003: 45, original McGregor 1960)

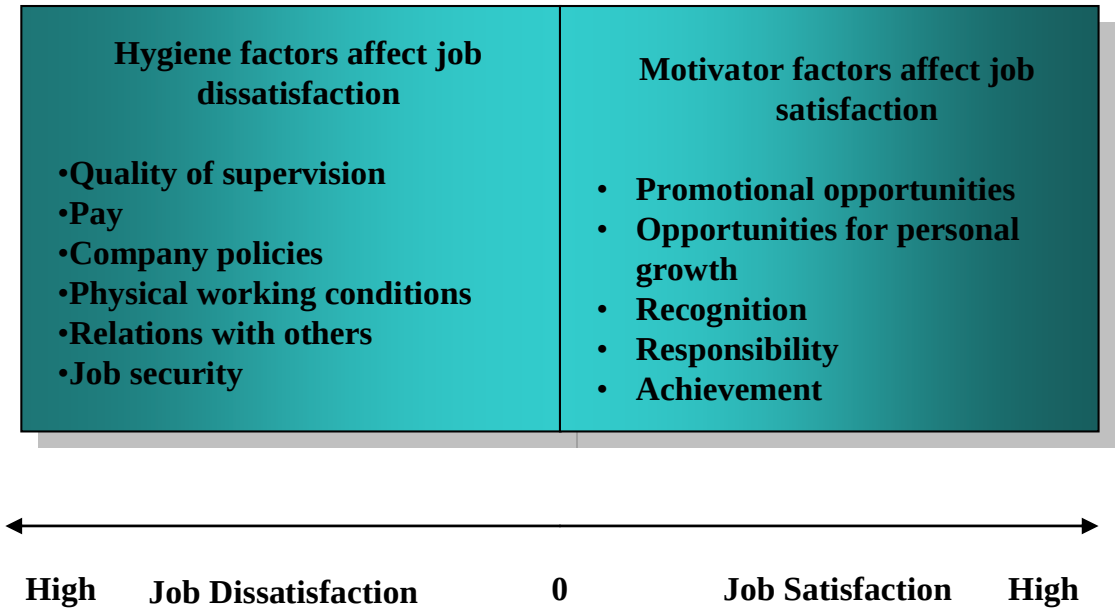

Figure 15. Hertzberg's two-factor theory. (Robbins 2003: 46)

The last early motivation theory in this paper is *Herzberg's two-factor theory* (motivation-hygiene theory). It divides work into relating factors which create satisfaction and others that create dissatisfaction (See Figure 15). According to Herzberg, the contrast of "*Satisfaction*" is "*No satisfaction*" and also the contrast "*Dissatisfaction*" is "No *dissatisfaction*". This means that, to motivate people, the work itself and the outcomes of the work should be weighted and no weight should be put on eliminating job dissatisfaction. (Robbins 2003: 44 – 45, original Herzberg, Mausner & Snyderman 1959)

2.3.1.2. Contemporary theories of motivation

Previous motivation theories have not stood up to a close examination. The first contemporary motivation theory is *McClelland's theory of needs*. According to McClellan, there are three major relevant needs or sourced of motivation: (1) *the need for achievement* – acts to exceed and strive to succeed; (2) *the need for power* – make

others act against their own will; and (3) *the need for affiliation* – create friendly close human relationships. McClelland stated that high achievers seek to do things better, prefer challenging problems and accept responsibility for success or failure, perform best with a 50-50 chance of success and dislike higher odds because luck has a bigger role than abilities during success. The need for power with high achievers shows of a drive to earn prestige and influence over others. High achievers wish friendly relationship with collaboration and not by competition. According to this theory, high achievers have good entrepreneurial skills but would not necessarily be good managers in a large organization. This is because good managers do not have to have a high need for achieving. Also the need for affiliation and for power are linked to managerial success. (Robbins 2003: 47 – 48, original McClelland 1961)

The *goal-setting theory* claims that goals could be an important source of motivation in work. If a difficult goal is accepted, a better performance follows than in an effortless goal situation. Resistance is the highest when a goal is difficult to achieve but advantage is in acceptance of the goal. It should be noted that participation in goal-setting is not always desirable, but it is desirable when resistance is probable. An interesting question could be raised: "*Why by goal-setting motivation is inspired by a difficult task and at the same time McClelland's theory hinted that only modest in a difficult task is motivating*?" An answer to this question is that the goal-setting theory covers personnel and not only the high achievers that make 10 – 20 % of the personnel. (Robbins 2003: 48 – 49, Original Locke 1968, Locke & Latham 1990)

The reinforcement theory states that reinforcement influences behavior. Reinforcement controls behavior by increasing the likelihood of repeating behavior. This theory is not focusing on an inner state of an individual. It emphasizes behavior as a function of consequences; that people will work harder on assignments that are reinforced than on assignments that are not reinforced. This theory states that personnel want into put more effort to assignments that are influenced by the results of their behavior. (Robbins 2003: 49 – 50, original Luthans & Kreitner 1985)

The *equity theory* claims that personnel compare their work efforts and outcomes with others, and then they adjust their inputs. This comparison is made between three groups: (1) "*others*" – persons that have similar jobs in the organization and also friends, neighbors, and so forth; (2) "*system*" – organizational pay policies and their superiors; and (3) "*self*" – own personal efforts that are related to former assignments and family engagements. If the personnel feel inequity, they act in five alternative ways: (1) view

differently their own or others' work efforts or results, (2) act to change the work efforts or results of others, (3) change their own work efforts or results, (4) change to an other reference of comparison, or (5) they just resign. The result of this theory is that the personnel motivation is influenced by both relative and absolute rewards. (Robbins 2003: 52, original Adams 1965)

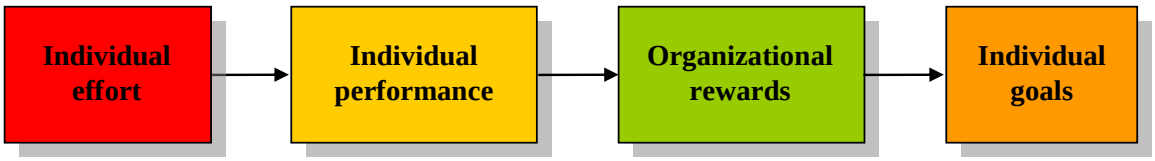

Figure 16. Simplified expectancy model. (Robbins 2003: 52)

The *expectancy theory* (Figure 16) states that the intensity of action depends on the expected reward and how attractive this reward is. This theory includes three variables: (1) *attractiveness* – individual importance of reward; (2) *performance / reward connection* – the trust that act will lead to wished result, and (3) *effort / performance connection* – the trust that extra effort will lead to wished results. The result of this theory is that it points out two things: first, the importance of rewards and that these rewards are in line with what the person wishes, and, secondly, the importance of the actions a person knows are expected by the organization. (Robbins 2003: 52 – 53, original Vroom 1964)

These early theories and contemporary theories of motivation are for universal use. They do not cover all motivational elements of R&D organization, which is the topic of next chapter.

2.3.2. Motivation in the R&D organization

In the beginning, there is a review of sources of motivation from the perspective of an individual person in the R&D organization. Then motivation perspective in the R&D organization is raised to an individual - management level. Finally there is a review of upper management perspective of motivation in the R&D organization.

2.3.2.1. Individual sources for motivation in R&D organization

Ten sources of motivation here have been found in individual R&D personnel level:

- *Difficulty* generates incremental excitement for R&D personnel.
- Then *Fat happy rats* never run mazes. Hungry research personnel should be kept hungry to sustain excitement.
- *Low intellectual content* means that emotions have no intellectual meanings and it makes R&D personnel feel good, no matter what the content is, and they like their work when emotions are pushed aside.
- *Hedonism* is common to all people: “see pleasure and avoid pain”. This means that management should know personnel’s individual tastes because one’s pleasure could be another’s pain, and if the management looses control over individual rewarding, they have to rely only on a person’s self motivation.
- *Protection of self* is common to all individuals as a desire to “save face”. Especially R&D personnel like to protect themselves because they have built their whole career on technical competence self-esteem. Therefore, this protection is an imperative for motivational R&D programs – “take some risk and the organization will protect you if you fail”.
- *Enhancement of self* means that R&D personnel seek for status symbols with the expense of taking risks. There should be some protection against failure and incremental rewards because there is a conflict between the desire for protection and the desire for enhancement. A part of self enhancement is the fact that R&D personnel like to plays solo by creating some recognizable contribution for their group effort.
- *Social relativity* means that all results and rewards of the work are relative and relative also to what others are getting. Satisfaction is not motivating because high performers always want more and are never satisfied. Even then this ungratefulness of the best performers should be recognized and rewarded publicly because artists rarely first create an artwork and then hide it.
- *Satiation vs. Variability* states that too much of change makes numb but a correct amount of change creates excitement, shapes expectations for the future. It is a development process where management should create a motivational climate of supporting growth for their R&D personnel.
- *Juxtaposition* means that the system of delivering financial rewards is usually not motivational. Because of the human short memory of the excitement that financial reward brings, these types of formal rewards should be given in a timely manner.
- *Expectations* are the heart of motivation and related to the managerial credibility to deliver rewards, managerial objectivity to research goals and, on

> the other hand, to the evolution of people. "*Credibility is hard to establish, easy to lose. If the subordinate does not believe in you, you can not motivate him or he. … The manager creates motivations about work goals by holding great expectations.*" Finally, rewards should be used before punishments as a source of motivation.
>
> **(**Manners, Steger & Zimmerer 1997: 29 - 33)

Motivating R&D personnel should start by understanding the individual person. These ten factors should be applied when considering the needs and expectations of the person and also the specific situation. Motivation does not succeed if the manager is not able to make an offer that is in line with the individual expectations. **(**Manners et al. 1997: 33) Managing in R&D organization is a demanding task if the output of each individual has to be optimised.

Individual recognition cannot be applied into extremes because R&D work is mostly cooperation. Motivational effects of *skill-based pay*, *job-based pay* and *performance-based* pay systems were compared in Taiwan's high-tech organizations by Uen & Chien (2004). All these pay systems have positive effect on to the distributive and procedural equity, but the performance-based pay system showed the lowest correlation of these compensation structures. A probable reason could be that R&D activities in high-tech organizations were carried out in groups where individual performance is pointed out and, secondly, the R&D contribution accumulates over a long period of time and short term performance is difficult to specify.

2.3.2.2. Individual v. management perspective for motivation in R&D organization

Katz (2005: 19 - 20) has pointed out that scientists and engineers should have an ambidextrous environment with a sort of motivational dualism. He then emphasizes that the creative work environment is truly motivational if the personnel feel it is fun to work. Individualism is the prevailing idea during universities studies. But in business world personnel should interact with others and get excitement of the team effort. From the organizational point of view, it does not enhance a person's excitement if the CEO congratulates the boss and not the player. Katz's five motivational dimensions with organizational and personal orientations are collected in table 4.

Table 4. Multi-dimensional framework for work motivation. (Katz 2005: 24)

Task dimension	***The organization's orientation priority***	***The professional's orientation priority***
Skill variety	*To utilize one's skills and abilities.*	*To learn and develop new skills and abilities.*
Task identity	*To become a contributing member of the organization.*	*To become a contributing member of the profession.*
Task significance	*To work on projects that are important to the organization.*	*To work on projects that are exciting within the profession.*
Autonomy	*Strategic clarity.*	*Operational autonomy.*
Feedback	*Subjective data and information processes.*	*Objective data and information processes.*

R&D people are motivated when a job requires *skills variety***.** Technical professionals become frustrated when their assignments are narrowly specified and only a minor portion for their capabilities and education is used or when the given tasks are linked to everyday technology instead of something completely new where they can expand their capabilities. If viewpoints, credibility and feeling of success are linked to the organization's aims, the culture becomes effective and person becomes a contributing member of the organization. (Katz 2005: 20)

Task identity and *task significance* mean that assignments are more enjoyable and motivating if a complete figure is given for the personnel and they are sensing a feeling of contribution to the organizational goals. People observe task identity and task significance, how communication, involvement and reward systems are linked to the task. The real driving force for R&D personnel is enthusiasm in their work, pride for their outputs, and recognition from those they value. (Katz 2005: 21)

Autonomy means freedom to execute work assignments. As autonomy grows, the R&D personnel put more effort and initiative into the work. Management should have strategic autonomy to make decisions on goals, expectations, aims, and limitations. It is important to leave operational autonomy to personnel so that they can make decisions about how these strategic goals are accomplished. (Katz 2005: 22)

Feedback means that maintenance of motivation is linked to people's need to witness the results of their work. Personal achievement and colleague's recognition are major sources of motivation. There is no foundation to make improvements if the personnel cannot define whether they are performing well or badly. There are three reasons why feedback is hard to give to R&D personnel: first, when something is done for the very first time, there is no base for comparison and even the most ingenious ideas might look stupid at early stages; secondly, technical professionals are not comfortable giving constructive feedback; and, thirdly, technical personnel have a deficiency in accepting feedback. (Katz 2005: 22)

The most motivating factor is *task significance*, and the next effective motivating factor is *autonomy*. The Effectiveness of the autonomy factor is linked to task significance by previous dissatisfying and frustrating work experiences. (Katz 2005: 23) A *skill variety* problem arises if the personnel and management have different opinions about skill utilization and skill extensions. A *task identity* and *significance* problem emerges when technical professionals want to create a breakthrough or an elegant solution within their professional field and, on the other hand, the management prefers a just "good enough" solution. The problem with *autonomy* arises when personnel have gained deep knowledge on some area and they would like to make a contribution for the organization but the management does not value their knowledge, support their technical intensions, provide best tools and information for the assignment, or loads them with hierarchic or inflexible bureaucratic assignments. A solution for this *autonomy* problem is that, while the organization empowers personnel, the management takes care of the strategic focusing so that the personnel have clear objectives and boundary conditions for their work. The feedback at a university is based on clear problems, it is objective, and professors know much more than students about the problem. In the business world, assignments are not clear, feedback is connected to history, politics and attitudes, and, finally, the management knows less about the task than the personnel. (Katz 2005: 23 - 25)

There might be individual v. managerial R&D-level motivating problem that come from HRM - Human Resources Management. Usually HRM supports only some on-going R&D operations like providing forms for recruitment advertisements and keeping track of summer holidays. This assistance is viewed in R&D as soft, irrelevant, naive and unrealistic. From the R&D point of view, HRM should learn to appreciate differences between management and personnel, to help building creativity and inventiveness, to

grow and destroy competences, to appreciate split personalities, and to assist creating a strong cohesive R&D organization culture. (Katz 2005: 25 - 26)

2.3.2.3. Upper management perspective for motivation in the R&D organization

There are few means to manage technological innovation as global competition has shortened product life cycles. The innovative organizational culture is the source for innovation in an R&D department. It has to be simultaneously loose and tight. Highly innovative departments are aimed towards community, while the less innovative are bureaucratic departments. Community itself is not the goal. The most innovative communities are goal-directed: the management generates strategic goals, and they empower personnel by giving freedom within context issues. The management role in these innovative communities has changed from a commander to a community-builder. (Judge, Fryxell & Dooley 1997: 72 – 76)

In innovative goal-directed R&D units, four managerial working methods are found: balanced autonomy, personalized recognition systems, integrated sociotechnical systems, and continuity of slack. (Judge et al. 1997: 76) These terms are clarified in table 5.

Table 5. Managerial working methods in innovative goal-directed R&D units. (Judge et al. 1997: 76 – 81)

Balanced autonomy	Is linked to the previously explained separation between strategic autonomy and operational autonomy. A new point is that, if too much autonomy is given to researchers, goals are not reached and the unit becomes less innovative. On the other hand, if management over-defines timing and goals, work becomes boring for R&D personnel.
Personal recognition	Is divided into intrinsic rewards which excite internal feelings and to extrinsic rewards which are externally defined and given. Less innovative units used extrinsic rewards and more innovative units trusted highly in personal intrinsic rewards for both individual and groups success. Extrinsic rewards have been found to provide temporary satisfaction, erode work relationships, suffocate organizational learning, and weaken attention to the work.
Integrated sociological system	Points out the importance of sharing and togetherness in R&D units. Less innovative units were not interested in social fit in their requirement processes and placed more interest to individual abilities and motivation. Over-ambitious goals and tight deadlines reduce interaction and coherence in units. Highly innovative units have reasonable goals and deadlines.
Continuity of slack	Is defined as a resource potential that can be used when the work load is more demanding. The slack itself is not associated with innovativeness. Less innovative units had suffered considerable disorder on amount of slack resources in the past or they are going to have changes in the future.

The size of the R&D unit is not important, but its subculture is. Most large and mature organizations are run like machine bureaucracies, which kills creativity and innovativeness. (Judge et al. 1997: 81 – 82) This means that, for the innovativeness of an R&D unit, quantity is not a substitute for quality.

2.3.3. Summary about the role of motivation

Two early motivational theories, Maslow's hierarchy of needs and Herzberg's hygiene theory, could merge to sources of motivation in an R&D organization. Personnel in an R&D organization will advance to the highest stage of Maslow's hierarchy. If the organization does not pay attention to this development, it could lower work motivation.

Herzberg's theories could be a useful tool when individual motivational packages are shaped. According to Herzberg's theory, job pressure should be put to creating satisfaction and not to eliminating dissatisfaction.

Theory Y has more linkages to R&D motivation factors and to special characteristics of the R&D function. Theory X is, from the motivation perspective, a waste of valuable recourses of the R&D function.

When adapting McClelland's theory of needs to R&D personnel motivation issues, R&D personnel have high needs for achievement and affiliation but less need for power. In the goal-setting theory, motivation could be linked to task importance and task difficulty issues, which are important sources of motivation for R&D personnel. Reinforcement, equity and expectancy theories have direct relationship with hedonism, social relativity, and expectancy elements that are sources of motivation for R&D personnel.

Figure 11 could be an approach to illustrate the complexity of motivational issues in an R&D organization. There have been found as many as ten sources of motivation at the individual R&D person level. For a positive effect, these sources should be practiced individually. On the other hand, the individual recognition can not be followed to extremes because the team effort could be endangered.

A R&D manager could motivate followers by giving a task that varies by skill; by emphasizing task identity and significance to organization; by involvement and reward systems; by giving autonomy to work assignments; and by giving feedback. It would be helpful for an R&D function if the HRM could appreciate differences between management and personnel, value creativity and inventiveness, grow and destroy competences, appreciate split personalities, and help the R&D function to create strong cohesive organization culture.

The upper management should generate the strategic goals but empower personnel by giving freedom in the context. Innovative goal-directed R&D units have balanced autonomy, personalized recognition systems, integrated sociotechnical systems, and continuity of slack.

Sources of motivation in the R&D function differ from other functions in the company. These main motivational differences are as follows: *Difficulty* generates incremental

excitement; *Low intellectual content* - people like their work when emotions are pushed aside; *Protection of self* - desire to “save face”; *Enhancement of self* - seek status symbols with the expense of taking risks; *Satiation vs. Variability* - too much change makes people numb but the correct amount gives them excitement; *Task significance* - important to the organization and to colleagues with the same profession; and, finally, *Autonomy* - strategic clarity of the organization with operational autonomy for executing assignments.

2.4. Summary

The R&D function contains all R&D activities in the company and not only the work done in an R&D department. Activities of the R&D function are the most specific to the industry and diversified by the degree of commercial and technical uncertainty demands. Management has to balance between entrepreneurial innovative and organizational administrative demands. If the surrounding organization does not encourage for innovation, it is unlikely that R&D personnel will create innovative products or processes. Innovation in the R&D function means implementing innovation on technology, market and organizational processes, and innovation management could be a useful tool for improving theses processes. Evaluating the R&D activities is difficult because of the R&D contribution is hard to isolate from other activities and the time lag between efforts and output is unique and unrepeatable.

A visionary charismatic leader could have a positive effect on work motivation by linking leaders’ and followers’ values and believes together. A visionary leader should use his charisma, not on one's own account, but for building the company. Visionary leadership is stated as the ability to construct and articulate a realistic, believable, and attractive vision for the future of an organization or a department. Visionary leadership grows up and improves from the present. There has been a trend to decentralize R&D, and companies are trying to develop new products through entrepreneurship. Vision is independently and quantitatively related to performance and has positive self-efficacy effects. Vision is needed to guide, remind, inspire, control and free us.

It could be in the companies’ interest that personnel in an R&D organization would advance to the highest stage of Maslow’s hierarchy. If the organization does not pay attention to this development, it could reduce work motivation. Herzberg’s theories could be a useful tool when individual motivational packages are shaped. McClelland’s

theory of needs could be applied to R&D personnel motivation issues because R&D personnel have high needs for achievement and for affiliation but have less need for power. In the goal setting theory, motivation could be linked to task importance and task difficulty issues that are important sources of motivation for R&D personnel. Reinforcement, equity and expectancy theories have a direct relationship to hedonism, social relativity and expectancy elements that are sources of motivation for R&D personnel. Motivational issues are complex in the R&D organization. It would be helpful for the R&D function if the HRM could appreciate this complexity.

These existing studies and theories left an open question: How the corporate vision should be applied to the R&D organization? Following chapters will answer this question by covering the role of a corporate vision in a real-life corporation and how it is processed in an existing R&D organization.

3. RESEARCH METHODOLOGY

This chapter presents the research methodology of this study. At first it describes how research philosophies and methodological challenges have been handled during this qualitative case study. After this comes a section about the data gathering process, an analysis of the reliability and the validity of this study and, finally, a summary.

3.1. Research philosophy

According to Guba & Lincoln (1994: 107 - 108), paradigms are basic belief systems based on ontological, epistemological and methodological assumptions. A paradigm stands for a worldview that defines the nature of the "world", the individual's place in it, and the range of possible relationships to that world and its parts. Questioning paradigms define for a questioner what it is they are about, and what falls within and outside the limits of legitimate inquiry. The basic beliefs of questioning paradigms can be summarized by responses given to any given paradigm by three fundamental questions:

(1) *Ontological* question:
- What is the form and the nature of reality and what can be known about it? If a "real" world is assumed, then only those questions that relate to matters of "real" existence and "real" action are qualified. Other questions fall outside the realm of legitimate scientific inquiry.

(2) *Epistemological* question:
- What is the nature of the relationship between the knower and what can be known? The answer is constrained by the answer already given to the ontological question. Not just any relationship can be assumed. If a "real" reality is assumed, then the knower must have at least one objective detachment to discover "how things really are" and "how things really work."

(3) *Methodological* question:
- How can the questioner determine whatever he or she believes can be known? The answer is constrained by the answer already given to the first two questions. Not just any methodology is appropriate. A "real" reality that an "objective" questioner is reaching for, defines control of possible confounding factors, whatever the research methods are.

These questions and assumptions are interconnected in such a way that the answer given to any question has an affect on how the others may be answered (Guba & Lincoln 1994: 107 - 108).

Table 6. Basic beliefs of alternative questioning paradigms. (Guba & Lincoln 1994: 109)

Item	***Positivism***	***Postpositivism***	***Critical theory et al.***	***Constructivism***
Ontology	*Naive realism - "real" reality but apprehendable*	*Critical realism - "real" reality but only imperfectly and probabilistically apprehendable*	*Historical realism - virtual reality shaped by social. political, cultural, economic, ethnic, and gender values; crystallized over time*	*Relativism - local and specific constructed realities*
Epistemology	*Dualist / objectivist; findings true*	*modified dualist / objectivist; critical tradition / community; findings probably true*	*Transactional / subjectivist; value mediated findings*	*Transactional / subjectivist; created findings*
Methodology	*Experimental / manipulative; verification of hypotheses; chiefly quantitative methods*	*modified experimental / manipulative; critical multiplism; falsification of hypotheses; may include qualitative methods*	*Dialogic / dialectical*	*Hermeneutical / dialectical*

Table 6 consists of three rows that represent the ontological, epistemological, and methodological questions, and four columns corresponding to the four paradigms *positivism, postpositivism, critical theory* and *constructivism*. (Guba, Lincoln 1994: 108) *Positivism* means that "what we see" is true because it can be seen (Metsämuuronen 2000, 11). *Postpositivism* is a response to the criticisms of *positivism*. A postpositivist thinks that there are also events that are sometimes hard to outline or control and this incompetence does not prevent them from making observations. (Metsämuuronen 2000, 11 - 12) *Critical theory* contains several alternative paradigms, including neo-Marxism, feminism, materialism, and participatory inquiry (Guba, Lincoln 1994: 109). The common assumption of all critical theorists is that reality is shaped by social, political, cultural, economic, ethnic, and gender values. *Constructivism* is an alternative paradigm and the difference is that constructionists assume reality to be relative as others assume it to be real. (Metsämuuronen 2000, 12) This study is using the qualitative research methodology, and a qualitative method could be related to the *critical theory* and to the *constructivism* paradigms. The other alternative research methodology, quantitative, is based more on the *positivism* and *postpositivism* paradigms. (Metsämuuronen 2000, 14)

In this study, an effort is made to justify and explain conclusions holistically, to focus the research to the target organization, to find out how things really are, how things really work, and, finally, objectively confront confounding factors of the research

methods. It is always possible that the interviewer could know the interviewees better in order to get more deeply into the interviewee's world. The interviewees were all engineers as well as personalities. Most of them tended to have a little Alec Issigonis (See Figure 13) within, telling others how the world should be and how the company should be led. The interviewees answered to questions that were based on the review of existing studies and theories on the scope of the study. The best available literature sources were used in order to understand the scope of the study better and, also, to get inside the interviewee's realism as objectively and as accurately as possible.

3.2. Research methodology

There are two different methods to collect data and perform a research inquiry: quantitative and qualitative methods. Evaluation of these methods should be based on considering the relative strengths and weaknesses. The quantitative method requires standardized measures so that varying perspectives and experiences could be fitted into limited predefined categories. On the other hand, with qualitative method it is possible to study selected issues in depth and detail and it permits approach fieldwork without constraining categories. Advantages of the quantitative approach is that it allows the measuring of the reactions of many people with a limited set of questions and it gives a broad generalizable set of findings. By contrast, the qualitative research approach will give detailed information about a smaller number of people, and this gives a better understanding of the case but looses the generalizability. Because qualitative and quantitative approaches have different exclusive strengths and weaknesses, these methods could be combined to collect data in the same study. (Patton 1990: 12 – 14) This study was based on the findings that had been based on a quantitative survey previously conducted in the case corporation (See Chapter 1). This survey revealed that the corporate vision has not been understood by the personnel of the R&D organization, but a peculiar finding was that the R&D personnel show relatively high work motivation levels. This quantitative survey was not able to explain these findings, and questions were left open. This study approach uses the qualitative method to answer questions that were left open by the quantitative study and to deepen and give more detailed understanding of these findings exactly as Patton (1990) has recommended.

According to Hirsjärvi & Hurme (2008, 25) and Patton (1988, 15) quantitative and qualitative methods differ in how they analyze information. The quantitative method is using a deductive process where the process starts from general matters and continues to

individualized forms. This means that categories have been decided according to assumptions or theories before study. During the study these assumptions are tested if they are true or false. On the contrary, the qualitative method is using more an inductive process where analyzing starts from individual findings and continues to generalizations. The qualitative method tries to find out if there could be found some of factors during the study that are congruent. Then theories are built from these concurrent findings. Finally, the theories are tested if they are true or false by verifying these findings with new studies. Glaser & Strauss (1967) have stated that, because evaluation of findings is grounded on particular context then theories are grounded on real world patterns. An abductive approach combines the deductive and the inductive approaches. As mentioned earlier, the inductive reasoning is focusing on handling research material that has come up during the research. In the abductive reasoning approach, before the research, the researcher has some leading theories ready to be tested during the research. (Hirsjärvi & Hurme 2008, 136) This study could be said to have an abductive research methodology approach.

3.3. Study approach

As mentioned earlier, this study uses the qualitative case study research method. In the qualitative case study it attempts to describe one singe case deeply and in detail. (Patton 1990: 89) The case study research strategy is used for acquiring knowledge of individual, group, organizational, social, political and related phenomena. It has been a common research strategy in psychology, sociology, political science, social work, business and community planning. (Yin 2003: 1) With the case study method it is possible to investigate and gather the holistic and meaningful aspects of real events like individual life cycles, organizational and managerial processes, neighborhood change, international relations, and the maturation of industries. (Yin 2003: 2) The case study is an appropriate approach if the research question is about “how” or “why” certain things happen or have happened in a set of events “*over which the investigator has little or no control*.” This study is a qualitative case study research. With the case study approach it is possible to get a detailed view by analyzing the case R&D organization. Yin (2003: 9)

3.4. Data collection

Patton (1990, 10) has categorized qualitative study methods into three data collection methods: in-depth, open ended interviews; direct observation; and written documents. In this study data is collected with interviews that consist of direct notions about peoples feelings, experiences, opinions, and knowledge. The validity and reliability of qualitative data depends on "*the methodological skill, sensitivity, and integrity of the researcher. … Skillful interviewing involves much more that asking questions.*" (Patton 1990, 11) The purpose of interviews is to find out what is on someone else's mind. Open ended interviewing is not putting things into someone's mind but accessing the perspective of the interviewee. We can not detect feelings, thoughts, intentions, observe behaviors at previous point in time, observe how people have organized the world – "*we have to ask people questions about those things*". Qualitative interviewing has an assumption that the perspective of others has a meaning; it is knowable and able to be made explicit. The quality of the information attained during an interview is largely dependent on the interviewer because the person being interviewed has to bring the interviewer into his or her world. (Patton 1990: 278 - 279) There are three approaches to collect data with open ended interviews:

- informal conversation – the interviewer relies on spontaneous generalization of questions in the natural flow of interaction,
- general interview guide approach – issues are outlined before an interview begins in an interview guide, and the interview guide is a checklist to make sure that all relevant topics are covered,
- standardized open-ended interview – consists of a carefully planned and standardized set of questions that is appropriate to minimize variation when a large number of people are interviewed
  (Patton 1990, 280 – 281)

Considering the research objectives, the most suitable research method to collect data was the general interview guide approach. This approach allows the interviewer to collect data on the relevant research topics without loosing flexibility in interaction. This flexibility was needed especially when inquiring the issues that have more potential to motivate the R&D personnel than the corporate vision.

3.5. Analyses of the data

E.g. Yin (2003), Hirsjärvi & Hurme (2008) and Patton (1990) had pointed out that the analysis of qualitative data is a creative process, the analysis will vary for different people, and, foremost, there is no one right way to organize, analyze and interpret qualitative data. In this study, the first interview questions were based on a literature review of the best available scientific articles, studies, doctoral theses, and report papers within the subject of this study. On the other hand, before the first interview questions had been tested by preliminary interviews of some members of the case R&D organization. During the actual interviews, the researcher was open to negative cases, alternative and rival explanations, instead of focusing on confirming the initial ideas of the literature review. For example, an additional interview had to be made to cover a finding that had previously come up.

This study tries to describe how the corporate vision and the motivational processes are treated and processed in an R&D organization of a large corporation by interviewing members of the case R&D organization. In order to attain a holistic view of these processes, the first gathered data was organized into patterns, categories, and basic descriptive units. Secondly, in order to attach meaning and significance to the analysis, the gathered data was interpreted by explanation patterns, searching for relationships and linkages between these dimensions. The following chapter will describe the guidelines used in data collection, composition, research design, and data analysis of this study more in detail.

3.6. Reliability and validity

Yin (2003: 33) has stated that research design is supposed to have a logical set of statements, and, to test the quality of these statements, four tests are commonly recommended: construct validity, internal validity, external validity, and reliability. Table 7 presents explanations for these four quality tests that are applicable to all social science methods, and an appropriate study tactics for these tests.

Table 7. Summaries of four quality tests and applicable study tactics for the case studies. (Yin 2003: 33 – 39, 67, 97 - 105, 109 - 128)

Test	Problem	Study tactic
Construct validity	There is a danger, when operational measures for the concepts of the study are used and created, that they might lead to subjective judgments.	In data collection: • Use multiple sources. • Allow external observer to follow research from research questions to conclusions. (*Chain of evidence*) In composition: • Let key informants review draft of study report.
Internal validity	There is a danger, when creating causal relationship, to get false relationships by other factors and conditions that are not distinguished.	In data analysis: • Use logic that compares empirical findings to predicted one. (*Pattern matching*) • Use pattern matching analyzing when building analysis. (*Explanation building*) • Be aware and address rival explanations. • Use repeated cause-effect-cause-effect patterns to increase understanding. (*Using logic models*)
External validity	There is a danger that the domain, to which a study's findings are based, is used and created in a way that the findings can not be generalized beyond the immediate case study.	In research designing: • Use theory in single case study. • Use replication logic in multiple case studies.
Reliability	There is a danger that the data collection procedures could be not repeated and the later investigator will not get the same results as the earlier investigator by following the same procedures as described.	In data collection: • When using survey questionnaire, create protocol that contains a overview, field procedures, study questions and guide for reporting of the study. (*Case study protocol*) • Create database for notes, documents, tables and narratives. (*Case study database*)

It is important to notice that each item in table 7 deserves special attention throughout the study process (Yin 2003: 35). The issues of reliability and validity have been found important for the objectivity of this research. An attempt was made to pay attention to all four quality tests presented in table 7, and these study tactics have been used to

enhance the reliability and validity of this research. For example, the issues that were related to the research process in this study were discussed with senior researchers who have generally agreed on the achieved results. Also, the key informants had reviewed the draft and agreed on the results of this study.

3.7. Summary of the research methodology

Paradigms are basic belief systems that are based on ontological, epistemological, and methodological assumptions. The paradigm stands for a worldview that defines the nature of the "world", the individual's place in it, and the range of possible relationships to that world and its parts. Questioning paradigms define for questioner what falls within and outside the limits of legitimate inquiry. Questioning paradigms could then apply to the four paradigms: positivism, postpositivism, critical theory, and constructivism. This study is using a qualitative research methodology, and it is related to critical theory and to constructivism paradigms.

There are two different methods to collect data and perform research inquiry: quantitative and qualitative. Evaluation of these methods should be based on considering their relative strengths and weaknesses. With the qualitative method, it is possible to study selected issues in depth and detail and it permits approach fieldwork without constraining categories. The quantitative method requires standardized measures so that varying perspectives and experiences could be fitted into limited predefined categories. This study was based on the findings of a quantitative survey conducted previously in the case corporation. This study approach uses the qualitative method to answer questions that were left open by the quantitative study and to deepen and give more detailed understanding to these findings.

The quantitative method is using a deductive process where the process starts from general matters and continues to individualized forms. On the other hand, the qualitative method is using an inductive process where analyzing starts from individual findings and continues to generalizations. An abductive approach combines the deductive and inductive approaches. This study could be said to have an abductive research methodology approach.

This study uses the qualitative case study research method. A qualitative case study attempts to describe one single case deeply and in detail. The case study is appropriate if

the research question is about “how” or “why” certain things happen or have happened in a set of events. With the case study approach, it is possible to get a detailed view by analyzing the case organization.

The qualitative study methods have been divided into three data collection methods: in-depth, open-ended interviews; direct observation; and written documents. The purpose of interviews is to find out what is in on someone else’s mind. Open ended interviewing is not putting things in someone’s mind but to access the perspective of the interviewee. Quality of the information attained during interview is largely dependent on the interviewer because the person being interviewed has to bring interviewer to into his or her world. There are three approaches to collect data with open ended interviews: informal conversation, general interview guide approach, standardized open ended interview. This study had been conducted with general interview guide approach.

Research design is supposed to have a logical set of statements and there have been commonly recommended to test the quality of all social science methods with four tests: construct validity, internal validity, external validity and reliability. There are some study tactics for these case studies, and, each tactic deserves special attention throughout the study. The researcher has tried to pay attention to the four quality tests and to the tactics in order to enhance reliability and validity of this research.

4. EMPIRICAL DATA AND ANALYSIS

This chapter presents the empirical findings with an analysis. The chapter has been divided into four subchapters. The first subchapter covers details of conducting this research. The second subchapter covers special characteristics of the case organization, and it assists the reader to follow the last chapters of this empirical analysis. The last chapters contain the findings of the interviews and a discussion where the findings are compared to the earlier theories and studies.

4.1. Conducting research

4.1.1. Selecting research target

As mentioned earlier, a contradiction was found in the working climate survey of the case company X. The results of this survey showed, the corporate vision had not been understood by the personnel of the R&D organization, but the R&D personnel show relatively high work motivation levels when compared to other personnel groups in the case company. Consequently, this research had a target with the research questions from the start.

On the other hand, the case company was selected because of its experience and knowledge. The R&D organization of the case company was found to be appropriate for the population of the results of the study to other companies that have R&D organizations. Also, the case company gave an open access to interview its R&D personnel and openly offered its strategic documents to the interviewee for review. Furthermore, the case company was in interested finding causes for the mentioned contradiction. As a result, the case company X offered a favorable contribution to the validity and reliability of this study.

4.1.2. Interviews

The data for this study was collected through interviews. The interviewees were all engineers. The R&D employee interviewees were closely selected to avoid sampling

error in data collection (See Patton 1988: 162). They had all different educational backgrounds, and they were working in different types of R&D teams and organizations. On the other hand, the interviewees were chosen from vertically different organization levels in order to review if there are any gaps or different views on how the corporate vision or motivational processes had been understood and implemented in the case organization. Timetable, durations, locations, etc., for the interviews are collected into table 8.

Table 8. Timetable and other details of the interviews.

Person	Date	Duration	Location of interviewee	Method	Language
A	30.3.2008	53 min 46 s	Vaasa	In person	Finnish
B	30.3.2008	41 min 12 s	Vaasa	In person	Finnish
C	7.4.2008	30 min 6 s	Vaasa	In person	Finnish
D	14.4.2008	40 min 32 s	Vaasa	In person	Finnish
E	21.4.2008, 30.4.2008	44 min 51 s, 11 min 47 s	Vaasa	In person	Finnish
F	29.4.2008	36 min 37 s	Vaasa	In person	Finnish
G	26.5.2008	49 min 36 s	Switzerland	On telephone	English
H	3.6.2008	1 h 9 min 24 s	Helsinki	In person	English

All interviews, for this study, were carried out between March and June 2008 by the researcher. These interviews were done mainly by personal contact, and they lasted from half an hour to over an hour. The first six interviews were held in Finnish but the last ones in English. The times and duration of interviews were strongly constricted by the timetables of the interviewees. Because of this, the interviews were designed to last less than one hour. This did not limit the duration of an interview, and the interviews lasted as long as the interviewees had something to say about the subject. All interviews were made in conference rooms in order to avoid disturbance and interruptions. One interview had to be made by phone because the interviewee had a busy timetable. After the interviews, there have been some e-mail correspondences to re-examine and deepen the understanding of the issues that had been raised by the interviewees. An additional interview was conducted to cover new topics that had been raised during other interviews later on. In an appendix of this study, there is an example of framework for interview questions and the given material that was used when interviewing a senior manager. For preserving the anonymity of interviewees, citations have been indentified only to employee, superior or senior management reference groups.

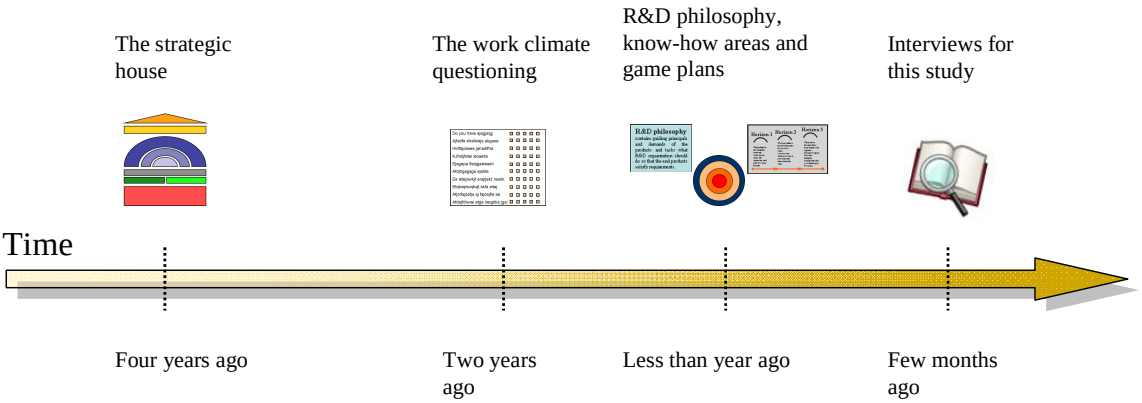

Figure 17. Illustration of the time of interviews at a continuum of strategic development of the case company.

When conducting this research, a time dilemma was found that could have affected the validity and reliability of the results of this study is illustrated in figure 17. The strategy house, that will be presented later, was introduced four years ago. There are also additional components, which will be also presented later, like R&D philosophy, know-how areas, and a game plan. These additional components clarify the strategy house and were introduced less that year ago. At the time when the R&D personnel answered to their work climate questioning, two years ago, the strategy house was ready but not the clarifying additional components. One topic of this study was to find an explanation why the R&D personnel did not understand the corporate vision as revealed by the work climate survey. This raises a question for the reliability or validity of the results presented in this study. Is it possible that the interviewees could have understood the corporate vision better with these additional components, and this might have influenced the interviewee's views and interpretations about the corporate vision, and, finally, during the interviews, there would not have been any misunderstandings left. Some interviewees who were aware of both the strategy house and the additional components commented that the additional components had not had any affect on their views about the corporate vision and how they were motivated by it. Those interviewees who were not aware about the strategy house and the additional components were especially contacted about this time dilemma. They informed that if they had been aware of the strategy house and the additional components, they would have answered again the same as they did during interviews. As a conclusion, this time dilemma did not affect reliability or validity of the results presented in this study.

4.2. Special characteristics of the case organization

This chapter introduces special characteristics of the case organization. This introduction should help reading of next chapters of the empirical analysis.

4.2.1. Role of the case organization in a larger organization structure

Fifteen years ago the case company had been a local manufacturing company. Now the case company is an international company but it is in the process of becoming a global company. During these fifteen years, the shape of the R&D activities has changed from a department to an organization, and it is in a process to be a global function. Now the R&D activities and manufacturing activities form one internal division that supplies services and products to other divisions that are in contact with the customer. In figure 18 is illustrated the organization structure of the case corporation. One senior manager explains this intent "*We don't see it separate R&D and manufacturing - they intervene*."

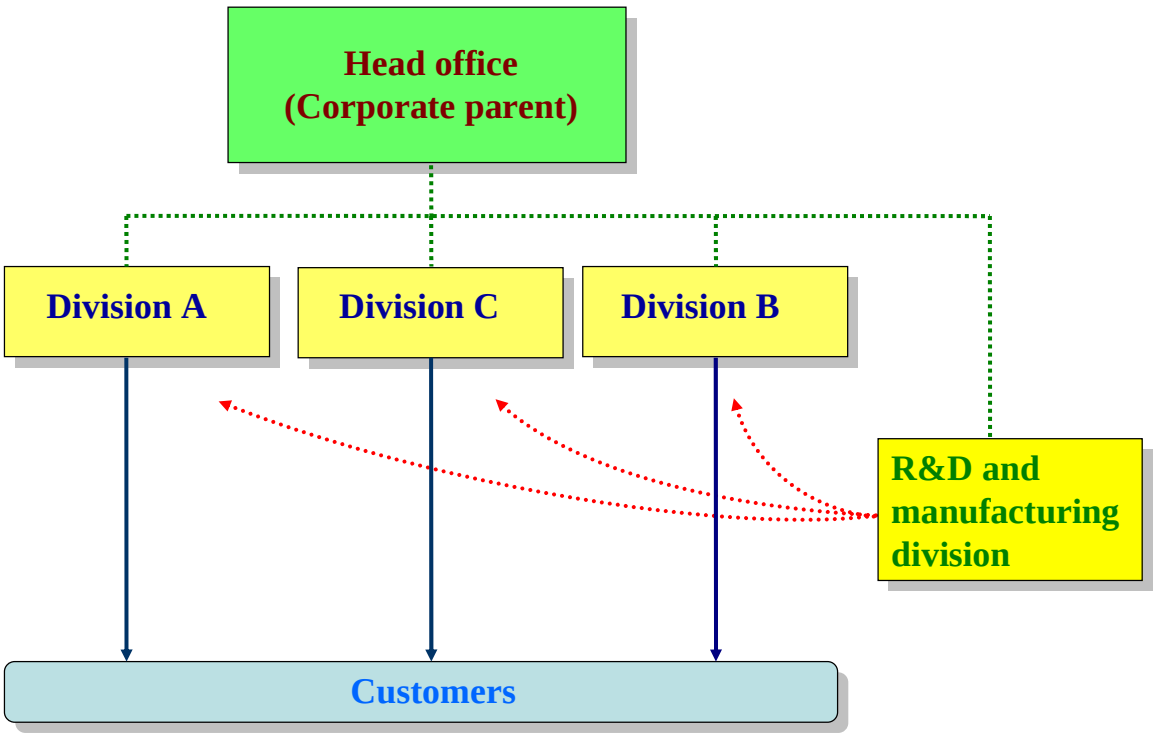

Figure 18. Illustration of the R&D organizations role in the multidivisional structure of the case corporation.

As mentioned earlier, the R&D activities and the manufacturing activities have been joined to one division (On the right in Figure 18). This division supplies services and products (Red dotted curves in Figure 18) to other divisions that are in contact with the customer (At the bottom in Figure 18). The role of the head office (Upper part in Figure 18) is like a corporate parent, and it coordinates activities of these four divisions.

The case corporation had formed their perception of the world business environment that contains analysis about global economy and financial ambitions, innovation and R&D, competitors and competitive landscape, customer behaviour and regulations and environment. This scenario is not that far-reaching. It is only for seven years, but the analysis contains in-depth and detailed predictions. From this scenario, a R&D strategy and a role as a part of a larger corporation are constructed. In the next chapter, this role is examined in detail.

4.2.2. Strategy construction for the case R&D organization

As mentioned, the case corporation had formed their perception of the business environment. From this scenario, a R&D strategy and a role of the case R&D organization as a part of a larger corporation was constructed. The case corporation had made a strategy construction that has the visual appearance of a house – a “strategy house”. (See Figure 19)

(In figure 19, the original “house” of the case company is modified to be more understandable. It is advised to start examining the content of figure 19 from the bottom part and then continue to the upper parts.)

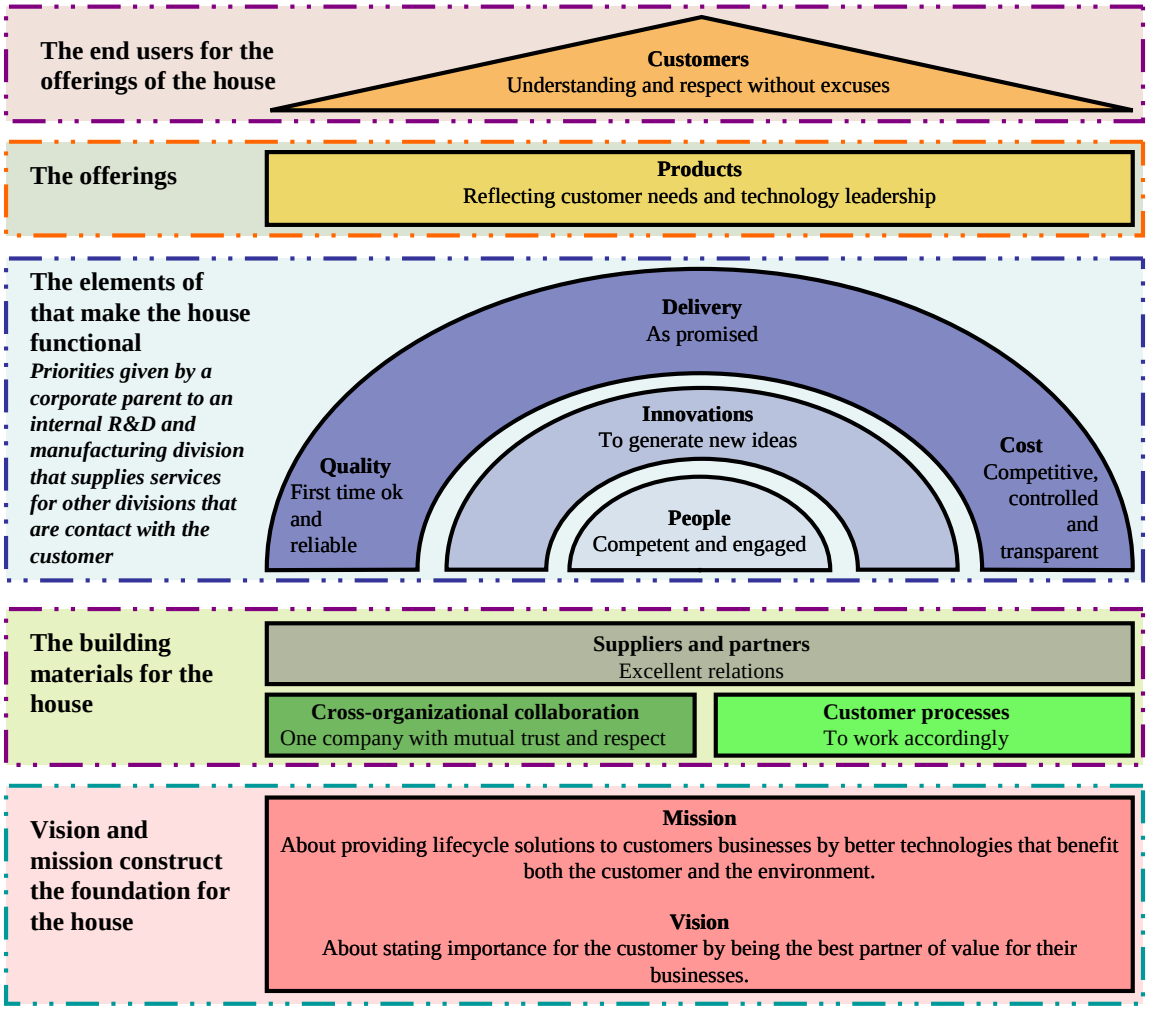

Figure 19. Strategy house for R&D activities in the case company.

The strategy house in figure 19 was based on benchmark research. In this research, it was explored how similar industries have built their visions, missions and strategies. Then the best practices, especially from car industry, were copied. Another factor that gave a shape to the strategy house were linkages to brand management. A senior manager explained this

> "*At the same moment as this* (the strategy house) *was done, we used at the first time brand management. … What is the history of the company? What are our roots? And what we want to do in future? How we want the customers to see us around the globe.*"

There had been many local brands in the company that had been left in existence after several acquisitions. Now these various local brands were pulled out and a corporate brand was brought out globally to the front. As the case company started to use brand

management that was based on one single corporate brand then the company head office took also more control of the global R&D activities –

> *"This is house* (the strategy house). *When you build a house you need a foundation* – a *company vision. … Because we do it on behalf of the company, not on behalf of technology or R&D* (organization). *And then* (upwards the strategy house). … *We build up here and … then we get products out here. … We say* (that the) *products are reflecting customer needs and technology leadership."*

The case company had increased the spending on R&D activities so global monitoring is needed.

> "*R&D is an investment for us. And we need to make sure we get return on investment. … "*

On the other hand, global coordination of investment in people and resources could help to accelerate R&D, as one senior manager stated about the current situation:

> *"And it takes, ... it has taken too many years into use, because we have not been focusing. We had small team working with new technology up and down in time."*

All in all, the corporate vision of the case company is a part of a larger strategic construction that had been shaped to look like a house (figure 19). The corporate parent had created the corporate vision to satisfy both internal and external needs globally. The corporate vision and the mission form together the foundations of the house (pink ground in figure 19). From this foundation, suppliers and partners, cross-organizational collaboration and customer processes are then forming building materials for the house (grey ground in figure 19). People, innovation, delivery, quality and cost are the elements that make the house functional (blue ground in figure 19). Products present the offering of the house that the customers are using (top of figure 19).

This strategy house is displayed by posters on the walls of hallways so that the personnel and also visiting customers can see them. This visualization requirement is giving the final shape, length and content of this type of strategy forming. One senior manager explained this

> "*People should not spend too much time to read it. … It is one thing, to sell it out as a document. … We actually display it* (the strategy house) *in different locations and so*

> *on. And also when we have visitors, they should be able to read it. And,* (in) *very short moment, so to say, understand what is the vision and the mission* (of the company)."

In addition to the strategy house, there are additional components: R&D philosophy, product portfolios, know-how areas, and a game plan for the next five years. The R&D philosophy contains the guiding principles and requirements regarding the products and the tasks that the R&D organization should carry out in order to ensure that the end products satisfy the requirements. The know-how areas are the general development fields assigned to the case R&D organization. The know-how areas contain technical knowledge and skills, and they have been divided in the core know-how area and supporting know-how areas. Game plans could be interpreted as strategies. These strategies contain detailed strategic descriptions for the case R&D organization. Depending on the company, some can successfully work on ten years and some only in a five year horizon. The case company has three horizons for next five years: for the next year, for tree years, and over than four years. These three horizons have been named with separate descriptive words that describe what the strategic objectives are for this time span. On the whole, the case company strategic horizon is stretched up to five years, not more.

4.2.3. Role of mission in the case corporation's strategy of construction

The status of the case company's vision, mission and overall strategy has shaped three elements:

- global coordination and control issues,
- all issues should be understood and absorbed easily by personnel and customers, and
- the strategic planning horizon is not far-reaching.

Because of this the company vision is short-spoken and stating the importance of the customer and being the best partner of value for the customer's businesses. That is to say, the target group for this vision is not only the R&D organization but all the personnel in the company and the customers. A senior manager explains this

> "*It is a slightly different way of dealing with compared to if you make each* (division has their own vision). *I mean, I have worked in companies where each unit makes their mission and vision and everything. But the end of the story, when you start to bring all together, when you have this wide number of missions and visions, and you bring them together, it is very hard to find back to the company vision and mission* (the original

> corporate vision), *because there everyone has made their interpretations of it. So it starts, if you know, to go around. … That we have now only one. And form there, build a foundation which is … coming back to this technology leadership.*"

The corporate vision of the case company was not meant to have motivational meanings. It just states that the ultimate target is serving the customer

> "*It is the really thing* (serving the customer), *what should be the ultimate target … In order to be the best in our business.*"

The case company had stated the importance of their corporate mission to be more important for motivation than the corporate vision. A senior manager explains this from the R&D organization point of view

> "*Because we are building on vision and mission. And, we say that, if everyone should start to make own statements and interpretations of it. Because we are now rely on this mission. You have … correct on vision and mission. We are more. Mission is more for me telling, much more for me. And, this* (corporate vision) *the most valuable business partner is perfect. But in mission, it talks* (about) *environment. It talks about our customers. And it talks about technology leadership and that we are solution provider. …*
>
> *In mission you get the ingredient if you talk about R&D* (organization). …
>
> *Most valuable in the business partner - I think R&D as it is little bit … it is too, say, … high flying. …*
>
> *If you, instead* (of using vision), *go to the mission where technology leadership is and so on. … Then you are more motivated than* (with mission than with vision). …
>
> *What I heard from R&D people that they want to have more precise plans what to do. They wanted to know more in detail* (what to do). *And, this is always an issue with R&D and engineers. They want to have facts and figures.* (They want to) *understand exactly they expected to do. And for them, when they read vision and mission it's too high flying, so to speak.*"

Summing up the previous citation, the case company tries to motivate their R&D personnel by the mission because of two reasons: first, one can put more specific items in the mission that interest and motivate the R&D personnel, and, secondly, the vision is, in general, rhetorical for all the R&D personnel, because they need more detailed plans.

The role of innovation, in the strategy house, is to motivate the R&D personnel to be creative (See Figure 19 in the middle). Just recently, innovation has been planned to have also a strategic role. Now the personnel is given freedom to work a certain period of time, off their current duties, on potential innovations or technologies. After this period, the organization decides what the potential business is for the innovation. Strategically, it gives to the case R&D organization possibility to work on their ideas and bring new ideas from the bottom to the top.

4.3. Findings

In this subchapter, the empirical findings that are related to the objectives and purposes of this study are presented.

4.3.1. Technology leadership and the R&D organization

The case corporation is striving to be a technology leader in its industry sector and this decision has remarkable long-term consequences for the case R&D organization. The term "technology leadership" was mentioned in the corporate mission to satisfy customer needs by creating better technologies. In a R&D philosophy, which is covering a long-term strategic role of the case R&D organization, the technology leadership was prioritized as the first on the list. On this philosophy technology leadership was the most important element that R&D organization should commit to satisfy the customer requirements. All interviewees were positively aware of that their company was seeking technology leadership. One senior manager stated the connection between investment on R&D and motivation of R&D personnel:

> "*Which means that if we see our resources in engineering today, you have to see a doubling* (in spending). …. *And this is of course a very good motivator also*."

Especially for the R&D employees, the technology leadership gave a rise for their self esteem as engineers at the case company because not all companies continuously strive for the technology leadership. In the end, this has a positive influence on their motivation. One younger R&D employee stated that the only thing in the R&D organization that prevented his self-fulfillment as an R&D engineer was not the

shortage of resources and encouragement but that he did not have time any more to start new interesting development projects. And this interviewee continued that this situation is almost a dream come true for a young R&D engineer.

There were found some differences in how employees and their superiors understood the importance of technology leadership in the case R&D organization. The R&D employees tended to understand that technology leadership would cover all the R&D activities, but their supervisors pointed out that it meant only a few key technologies. Also the R&D employees considered that technology leadership was the biggest reason to their being with the R&D organization of the case company and was one reason why they applied to the case company. On the other hand, their supervisors did not recall that in the employment interview situations, the engineers would have applied to the case company just because it was a technology leader.

On the individual level some R&D employees stated that the technology leadership is a tool to set priorities for their own daily work. Instead of just using their own personal persuasive skills to present their concerns, they use the technology leadership to justify their doings to their superiors and upwards in the organization.

4.3.2. The role of the corporate vision in the case R&D organization

Three topics came up during interviews when covering the role of the corporate vision in the case R&D organization: issues how the corporate vision was marketed in the case R&D organization, effects of a visionless strategy on the case R&D organization, and the time of charismatic leadership in the case R&D organization.

4.3.2.1. Marketing the corporate vision for the case R&D organization

Interviews show that the definition and meaning of the terms vision and mission are not a part of engineering studying. Therefore R&D personnel might have a tendency to perceive these issues as of minor importance because they are not a part of their studying programs. Only one interviewee remembers that strategic plans were a part of engineering studies. This concludes that it is the company’s responsibility to communicate what the terms vision and, especially, mission means. Some companies have invested in internalizing the meaning for these terms, but in some companies these

processes are seen as of minor impotence. An alternation in management practices at the case R&D organization was found in how much time and effort individual superiors and their superior spend stressing these issues. One R&D employee made a comment that if someone sends the vision in e-mail attachment then:

> ”*You briefly make a glance. Then you remember the content a while. You don't study it. Your superiors don't go through that. … How these affect your daily work? Well, some five minute glance to the power point slides will not leave traces to your long memory. … And I had this information* (about vision, mission and strategy of the company) *session a few months ago. Well, I don't remember a thing. … Now they have these other business units in there. It's just one mess*.”

Afterwards this R&D employee continued that this type of presentation, with all kinds of discrepancies, does not help the daily work. The employee gave an example, if strategy shouts out demand to use low-cost-country suppliers and at the same time strategy and the organization demands quality and delivery accuracy. Of course, these demands will never materialize at the same time, but this confrontation “*should not be the headache of the R&D organizations.*” This type of decision-making increases their work load a lot. Furthermore, these so-called low cost suppliers will not contribute to their R&D work as the higher-price quality suppliers do.

R&D employees and their superiors complained about growing bureaucracy. Increasingly, their time is taken from actual R&D work for filling all sorts of papers that follow some “fancy” processes. Especially the older R&D employees and their superiors, who had been in the company when the company was smaller, told how certain things now take five to ten times more time to complete. One interviewee raised the question:

> *“Which is more necessary - getting things done or just filling documents correctly?”*

Many interviewees regarded the strategy house construction as bureaucratic - difficult to understand and to memorize.

This study shows that, once R&D employees had read and learned the company vision and mission, then that image tends to stick in their memory for a long time. Usually the R&D employees just examine that if something is changed. One R&D employee explains this:

> "*One year some new sentence, section or phrasing in the power point presentation will not be noticed. Customer-orientation, being better than competitors, being reliable and environmentally friendly,* (etc.) … *These things have always been there.*"

In summary, if something has not had any affect on the R&D employee's daily work, then it probably never will. For R&D employees, the corporate vision meant that those things that had been assigned to them will be done and they will be done well. One R&D employee clarifies this attitude

> "*The company can be happy and make new sales. It doesn't tell how to do things - just that do it well.*"

R&D employees do understand that market leadership, technological leadership and customer satisfaction are all good aims and they should be mentioned in the company presentations, but they are on a too general level. Developing new technologies or solving technological problems can take a very long time - as much as five to ten years or even more. R&D personnel would like to know backgrounds and motives for these strategies because just blindly executing the strategies is not very motivating. In this type of cases, a vision for the future would be helpful, for both the R&D personnel and for the company, to get the optimum results for the effort.

On the top of the R&D organization, views were positive about HR activities in the case company. But on the other hand, the role and activities of the HR function were considered invisible by the R&D employees. R&D superiors felt that HR activities were more focused on guiding and controlling unrelated matters than inspiring and freeing them to execute their role of setting targets, inspire and motivate their subordinates. The senior R&D managers were pleased with how well HR activities were progressing and how they supported their efforts like a strategic partner.

4.3.2.2. Visionless strategy and the case R&D organization

R&D employees considered that their organization has been visionless with a negative tone. This is understandable because the head office does not consider it appropriate that the R&D organization would have their own vision. On the other hand, the R&D strategy can not contain everything, and often even superiors can not help R&D employees in the decision making. Consequently, R&D employees have to make decisions that might have some long term strategic impacts for the hole case company.

It was found in this study, that if the company does not make a vision for the R&D organization, then R&D employees themselves make one. Employees collect this personal R&D vision from hidden messages, e.g., from CEO's newspaper interviews, from some official internal company news bulletin, interpreting behaviors in info meetings if the senior management seams to be irritated to meet R&D personnel, or from unofficial second-hand rumors that they hear at coffee tables, etc. Then R&D employees compare their imaginary corporate vision to their personal vision for their own future. From this comparison they get - or do not get - motivation, commitment and energy. Some R&D personnel do have husbands, wives and family that are fighting to share their limited time and effort. For them there is a continuous battle between different interests. After the interview was done, one R&D employee reflected on this battle like this:

> *"Should I go to work on weekends? Should I stay later at work to check or double check potential troubles? Should I simply just plan ahead or prepare upcoming assignments?"*

R&D employees wished that they would have a long-term visionary plan for their personal development. This type of discussions has been a part of the annual individual performance review sessions where employees meet their superiors, but the planning time span for personal development is only two or three years at the maximum. On the other hand, all interviewed employees had been given certain responsibility areas for the time being. This type of work load distribution, where R&D employees are accountable for the R&D of the technological field, has a long-term influence on the R&D organization. For performing this particular role, R&D employees demanded that there should be a long-term visionary plan for the R&D employee's personal development.

Innovativeness was mentioned only briefly by R&D employees and not in a positive context. R&D employees demanded more communication to distribute knowledge about new innovations around the R&D organization, that employees could encourage each other to share knowledge and be innovative. Currently, supporting this kind of an activity did not have a strategic status in the case R&D organization.

4.3.2.3. Charismatic leader in the case R&D organization

Some time ago the case R&D organization had a leader who had led the organization with a strong hand. This leader had lots of visions, and the role of the R&D organization was to execute them. R&D employees and their superiors remember this time with diverse memories. There was a wide consensus among interviewees that the case company's success was partly due to personal inventiveness, charisma, and the leader's vision eventually came true. Especially those R&D employees who could be characterized as McClelland's high achievers found that a strong leader got in the way of their own creativity and ideas. These high achiever individuals felt that the time that was spent in changing the leader's mind was very frustrating and un-motivational. On the other hand, after the leader's mind was turned around, things went on nicely – for some time.

Many R&D employees and their superiors found that at the times of the charismatic leader the R&D organization was smaller and local, and this would not work anymore when the organization is larger and global. It would be impractical today to have one person telling what to do in the smallest details. As one interviewee summarized:

> "… *Strong leaders … which is* (principally) *also working. From global point of view … we had been a national company and we are currently an international company. And, we want to be a global company. And,* (if) *you are a national company then you take the decision much more on local like* (leadership style). …. *If you are a global company, then you always work with global perspective - when you create products and so on*."

There were also R&D employees and their superiors who had good memories of the time of the charismatic leader. The R&D employees who were doing routine assignments or serving internal R&D functions had lots of good memories from this particular period of time. They remembered that their superiors and certain key individuals in the R&D organization were not performing solos that disturbed the work of others. These R&D employees with routine assignments found this time motivational because the organization had clear goals and they got clear assignments, everybody knew what was expected from them and, in the end, if they were working on successful projects, they also got noticed and credited for their work by this strong leader.

4.3.3. Motivational effects of the corporate vision and the case R&D organization

The corporate vision could have motivational effects on R&D employees, but the interviewees commented that motivating R&D employees by a corporate vision was simply far-fetched. Motivation for R&D employees was coming from other substantially more important sources. Nonetheless, some connections could be detected between the corporate vision and motivation. First, the sources of R&D employees' motivation will be reviewed. Then the connections found in the case R&D organization will be presented.

4.3.3.1. Sources of motivation in the case R&D organization

Interviewees were asked to give their opinion about how reasonable or realistic they considered the ten R&D individual employee motivation factors listed by Manners et al. (1997) (See Chapter 2.3.2.1). In general, the ten motivation factor list was accepted positively, and R&D employees found it familiar to them.

To understand the sources of motivation in the case R&D organization more deeply, the R&D personnel interviewed were asked to point out the three most important motivation factors out of these ten. All R&D employees chose the three most important motivation factors differently. For some employees, the three most important motivation factors were easy to pick, but for some selecting was hard because all of them seamed to be equally important. One conclusion might be that this outcome was dependent on the traits of an individual employee and what kind of a job description this employee had.

Also R&D supervisors and senior management were asked what they think would be the three most important motivation factors for their R&D employees. In all, R&D employees, their superiors and senior managers

- chose *difficulty* and *expectations* factors to their list, with one exception,
- all of them chose different three motivation factors, and
- *juxtaposition* was the only one that nobody chose.

This may lead to the conclusion that, in the case R&D organization, managers and senior management did not have wide gaps in the knowledge about what motivates their R&D employees.

4.3.3.2. Linking the corporate vision to projects

In May 25 1961 U.S. President John F. Kennedy gave a speech to the Congress. He challenged the nation to land a man on the Moon and return him safely to Earth before the end of the decade. Kennedy's vision was presented as an example to interviewees. Then they were asked to comment and compare Kennedy's vision to the corporate vision of the case company. In consequence, this inspired interviewees to evaluate their corporate vision. All interviewees agreed that their corporate vision was missing the motivational and inspirational characteristic that Kennedy's "*man in the moon*" vision had. Senior management argued that

> "*But that* (Kennedy's 'man in the moon') *was very specifically also towards task - project mode. And, when we created our vision here, we did not like to put* (any) *kind of timeframe on it. Because if we could have said that we want to be* (something) *specifically for 2010 or -12 or something, we should be in this kind of company. But we choose to make a lean "the most valued business partner", giving us any timeframe. It just shows that we* (all) *should be very appreciated by the customers side, and we are weighted to be appreciated* (by) *of course what we have in our mission. … That we need to provide solutions, life time solutions, technology leadership - once again and so on.*"

This senior manager's comment, that Kennedy's vision was actually a project vision, was also recognized and valued by other interviewees. But the comment that an R&D organization should have only a mission and that R&D needs just "*to provide solutions*" was not shared by others. One R&D employee stated that on the project level

> "*A vision would not be that 'High flying' and would gain the best properties, like in Kennedy's vision, with concrete goals and a timetable. In general, R&D personnel feel that the corporation should have visions but that they* (visions) *don't have much meaning in an R&D organization's daily work. And, for R&D personnel, motivation comes from other sources. If the vision had motivational effects, it should be sensible and the personnel should be able to accept it. Now there is problem that the case company should be a technological leader, but does that mean that the case company should be the cheapest or the most technically advanced producer? If the R&D strategy contains both conflicting demands, of then a vision would be helpful* (together) *with a discussion what these demands actually mean.*"

In all, interviews show that R&D employees would like to be motivated with visions. They would like to have visions at least on the project level, at least for the most important projects.

4.3.3.3. R&D vision generates positive organizational culture

R&D employees complained that their R&D organization has a shortage of the feeling of togetherness. If they are, blindly like a machine, executing assignments that have been discussed and decided on a higher level in the organization, then they do get a feeling that they are a part of a larger group that is contributing to the future of the company. R&D personnel and especially R&D employees are rarely in direct contact with the customers. In larger R&D organizations, like in the case company, the products that R&D employees deliver are going to internal clients, like other divisions, that are in contact with the end customers. If supervisors give assignments without informing how these assignments are a part of a larger effort to serve the customers, if the only feedback that R&D employees get from the organization is negative, if their supervisor or supervisors get benefits of R&D employees hard work, if R&D employees are not allowed to tell their own success stories to other R&D employees, then the only thing that organization can rely on is employee self motivation.

On the other hand, R&D employees pointed out that some individual R&D employees obtain scarce knowledge or skills, having a potential to help other employees in the R&D organization. If the R&D organization is preventing of sharing scarce knowledge and skills, then this type of hindrance might prevent organizational learning, innovations that would need organizational co-operation between employees, just helping other employees to perform their assignments better, etc.

R&D employees in the case company suggest that, for this type of situations, a common inspiring R&D vision, that raises a feeling of togetherness, would be in the company's interest.

4.3.4. Summary of the findings

The case corporation is striving to be a technology leader in its industry sector and this has remarkable long-term consequences for the case R&D organization. Technology leadership was mentioned in the corporate mission of the case corporation: to satisfy customer needs by creating better technologies. All interviewees were positively aware of that their company was seeking technology leadership. For R&D employees, technology leadership gave rise to their self esteem as R&D engineers of the case company, because not all companies continuously strive for it. Employees tended to

understand that technology leadership would cover all R&D activities, but their supervisors pointed out that it meant only few key technologies. For R&D personnel technology leadership is a tool for prioritizing they own daily work and justifying their doings to their superiors and to the organization.

It was found that the definition and the meaning of vision and mission are not included in engineering studies. This means that it is the companies' responsibility to communicate what the vision and, especially, the mission means. R&D personnel might see these issues also as minor importance because it is not a part of their studying programs.

R&D employees and their superiors complained about growing bureaucracy. Current strategy construction was seen bureaucratic, difficult to understand and to memorize. When R&D employees had understood and learned the vision and the mission of the company, then that image tends to stay in their mind for a long time. They usually just check if something is changed. If something has not had effect on their daily work, then it probably will do so in the future either.

Developing new technologies or solving technological problems can take a very long time, as much as five to ten years or even more. R&D employees would like to know the backgrounds and motives for the strategies because just blindly executing these strategies is not that motivational.

On the top of the case R&D organization, there ware a more positive view on the HR function. The role and activities of the HR function were invisible for the R&D employees, but the senior managers were pleased with how the HR function were progressing and how it supports their work like a strategic partner.

R&D employees told that their organization has been visionless with a negative tone. If the company does not make a vision for R&D organization, then the R&D employees themselves make one. Employees collect this personal R&D vision from hidden messages from CEO's newspaper interviews, from some official internal company news bulletin, interpretation of senior management behavior in info meetings or from unofficial second-hand rumors that they hear at coffee table, etc. R&D employees compare their imaginary corporate vision to their personal vision for their own future. From this comparison they get or do not get motivation, commitment and energy to work.

R&D employees, of the case R&D organization, wished that they would have a long-term visionary plan for their personal development. R&D employees had been given certain responsibility areas for the time being and they are accountable of the R&D within the technological field. This empowerment has a long-term influence on the R&D organization. There should be a long-term visionary plan for the R&D employee's personal development for performing this long-term role.

Some time ago the case R&D organization had a leader with lots of visions, leading the organization with "a strong hand". Interviewees recognized that the case company's success was partly a result of personal his inventiveness, charisma and vision that eventually came true. At the time, the R&D organization was smaller and local, and this would not work today when organization is larger and global that there is one leader telling what to do in smallest details. There were some personnel who had good memories of this charismatic leader. R&D employees, who were doing just routine assignments or they were serving internal R&D functions, found this time motivational because organization had clear goals and they got clear assignments, everybody knew what was expected from all of them and if they were working on fortunate projects also they got noticed and credited for their work by the strong leader.

Corporate vision could have also motivational effects, but interviewees commented that motivating them by a corporate vision was far-fetched. Motivation for R&D employees was coming from other substantially more important sources. On the other hand, there could be some connections between the corporate vision and motivation like to projects and organizational culture.

Interviewees were asked to give their opinion about how reasonable or realistic these ten R&D individual employee motivation factors by Manners et al. (1997) were, and asked to point out three most important ones from these factors. R&D employees, their superiors and senior managers accepted positively the ten motivation factors list, choose difficulty and expectations factors as the most important ones and all of them choose different motivation factors.

The corporate vision could have motivational effects on R&D employees, but interviewees commented that motivating R&D employees by a corporate vision was simply far-fetched. Motivation for R&D employees was coming from other substantially more important sources. Nonetheless, there could be detected some

connections between the corporate vision and motivation. In this study, R&D employees would have liked to be motivated with visions. They would have liked to have visions at least on project level for the most important projects. Also R&D employees complained that their R&D organization has shortage of a feeling of togetherness. If they are, blindly like a machine, executing assignments that had been discussed and decided on the higher level of the organization, then they do get a feeling that they are a part of larger group that is contributing the future of the company. Some individual R&D personnel do have some scare knowledge or skills that have potential to help others in the R&D organization. Hiding aims, knowledge and skills might prevent organizational learning, it might prevent innovations that would need organizational co-operation between employees, it might prevent just helping other employees to perform their assignments, etc. For this type of situations, a common inspiring R&D vision, that raises a feeling of togetherness, would be in the company's interest.

4.4. Comparison between findings and earlier literature

Kressens-van Drogelen (2001) had presented the challenges and activities that R&D personnel are facing in their work, that is to fulfil both commercial and technical requirements (See Figure 7). Equally, the case R&D organization had a wide range of development projects from medium-technology cost reduction projects to high or even super-high technology projects. Also, the case R&D organization had to manage with competing interests between the R&D function and other functions in the corporation (See Chapter 2.1.2.1). Moreover, R&D employees were wondering that, if their own superiors and senior managers can not measure and evaluate their outputs, then how they could get appreciation from the other business divisions. Cusumano & Nobeoka (1998) presented (See Chapter 2.1.1) that four types of product development organizations can be observed in the automotive industry, depending on the size and scope of the company product range. The case R&D organization is joined, with the manufacturing organization, a structure that is closest to a semi-center product development organization type, where similar projects are clustered together and also duplicate functional departments exist. This type of an organization structure shapes the daily activities in the case R&D organization. As mentioned earlier, in the matrix organization structure, employees have to report to one manager, two managers or several managers.

The case corporation has formed their perception of the world business environment. This scenario is not that far-reaching, only up to five years, but the analysis contains in-depth and detailed predictions. From this scenario, both a R&D strategy and an organizational role of R&D in the larger organization structure ware constructed. If this role is compared to recommendations by Kilpinen (1995) and Perrino & Tipping (1991) (See Chapter 2.1.1) about global coordination of R&D activities, there are similarities. The R&D activities in the case corporation were treated globally, but the implementation of technology is local, and the critical mass of people, skills and other resources needed for upcoming global challenges are taken into consideration. Also, the time spans that the case company is using in steering business units strategies fits into these recommendations by Kilpinen and Perrino & Tipping. However, global technological communication for best practices inside the corporation and a long term vision for R&D were missing. Ulrich et al. (2000) have recommended using technology roadmaps, for timing and utilizing technology development projects, and pipeline management to control timing of product introductions, technology and market readiness, and competition status (See Chapter 2.1.2.3). To steer R&D activities, the case company used similar elements. The case company is not using the same terminology as Ulrich et al. (See Chapter 4.2.2), instead it uses terms like R&D philosophy, product portfolio, and game plan.

The case corporation's corporate vision was short-spoken and it mentioned just serving customer and being the customer's first choice. On the other hand, the head office (the corporate parent) had given a kind of a long term role to the R&D organization to follow. For this role, a R&D mission was put to the front to be more important than a R&D vision. The reasons for this type of practice were:

- Need for global coordination for R&D activities. If all divisions and organizations were allowed to generate their own sub-visions based on the corporate vision there would bee a danger that divisions would make interpretations that were not in line with the original corporate vision and mission.
- The case corporation could forecast the future up to five years which does not meet the time span requirements for a vision.

All in all, the corporate vision of the case company was not leading to a long term R&D vision for the case R&D organization, only to a long term organizational role behavior and a long term R&D mission. According to Luccas (1998) (See Chapter 2.2.3), if people do not know the vision of their own organization or do not understand, accept or believe in it, they squander that energy on "doing their jobs", playing organizational

politics, covering up their mistakes, fixing blame rather than problems and, in general, trying to stay out of trouble. In addition to that Luccas continues, if the vision feels like fiction, this can lower the morale and long run effectiveness of the company. With this decision the case company might loose all the benefits of good vision and exposes the organization to all disadvantages that Luccas (1998) had stated. Yearout et al. (2001) stated (See Chapter 2.2.3) that visionary companies navigate successfully through problems by adapting their strategies, operating goals, and culture to the circumstances while not compromising with their set of values when people at all levels take part in visioning workshops to gain trust, involvement, and commitment. With this decision these long term benefits of visionary company will also be lost.

On the other hand, the case corporation had made a long term decision when it had decided to strive for technology leadership in its industry sector. Nonetheless, R&D employees and their managers' views on how technology leadership could be used or should be used in competition is faraway from what Porter (1985) had stated (See Chapter 2.1.2.2). R&D employees and their superiors were not familiar with the reasons why they actually had to be technology leaders. R&D employees and their superiors could not articulate, e.g., why it is important for competitive advantage and industry structure to be a technology leader, how technology leadership could lead to a sustainable competitive advantage, is their technological leadership based on either low cost or differentiation, how their daily work is connected to sustaining the technological lead and first-mover disadvantages, what kind of steps are needed to turning technology into a competitive weapon. Technological leadership was not turned into a competitive weapon in the case R&D organization, as Porter (1985) had stated. If technology leadership has been highlighted globally in the corporate communications for internal and external interest groups, then R&D employees should be able to break down how it influences their daily work.

However, in this study it was found that technology leadership had some kind of a mental effect on employees of the case R&D organization that Porter (1985) did not refer to. Technology leadership raised R&D employee's self esteem as R&D engineers. They believed that they could be able to execute their ideas better than engineers in other companies that were following technological development. In this way technology leadership had a positive effect on employee's long term motivation in the case R&D organization.

Furthermore, a R&D organization which strives for technology leadership may offer also demanding engineering challenges. In this study, the R&D employees could be characterized according to McClelland's high achievers (See Chapter 2.3.1.1). Some employees were more, some seeking to do things better, preferring challenging problems and accepting responsibility for success or failure, performing best with a 50-50 chance of success and disliking higher odds because luck has a bigger role than abilities during success, wishing for friendly relationships with collaboration and not by competition, having good entrepreneurial skills but not necessarily being good managers in a large organization because good managers do not have to have a high need for achieving. These favorable conditions might have assisted to attract high achiever engineers more than normally (High achievers portion is 10 – 20 % of all personnel) into the case R&D organization.

In this study, R&D employees wished that they would have a long-term vision for their careers. In annual individual performance review sessions, the planning time span for personal development is only three years at the maximum. R&D employees had certain responsibility areas for the time being. This type of empowerment, where R&D employees are accountable for R&D in the technological field, has a long term influence on the R&D organization. In this role they are as internal entrepreneurs. Baum & Locke (2004) had stated that an entrepreneur's goals and self-efficacy has a direct effect on the venture growth and a vision is independently and quantitatively related to performance and has positive self-efficacy effects. If the R&D organization does not have R&D visions that employees can use to create a vision for their entrepreneur role, then good ideas could be left without proper investigation, employees could not be able to sell their ideas inside the organization, search funding for their ideas, and, finally, implement them. A vision might be beneficial in a semi-center organization like the case R&D organization (See Figure 8). A common vision would be helpful when R&D employees are reporting to more than one manager because of many product lines and duplicate functional departments.

R&D employees complained that their R&D organization has a shortage of the feeling of togetherness. If they are, blindly like a machine, executing assignments that have been discussed and decided on a higher level in the organization, then they do get the feeling that they are a part of a larger group that is contributing to the future of the company. On the other hand, R&D employees pointed out that some individual R&D employees obtain scarce knowledge or skills that have a potential to help other employees in the R&D organization. These comments support the findings of Yearout

et al. (2001) about how visionary companies gain trust, involvement, and commitment. (See Chapter 2.2.3). For this type of situations, a common inspiring R&D vision that raises a feeling of togetherness among R&D employees would be in the company's interest.

A large amount of R&D activities in the case R&D organization are carried out in the form of projects. Tidd et al. (2005) have pointed out (See Chapter 2.2.3) that a vision is an important component in running effective innovation projects and the project success increases if the project team members are participating in the visioning processes. R&D employees stated that developing new technologies or solving technological problems can take five to ten years or even more. They would like to know the backgrounds and motives for the strategies because just blindly executing these strategies is not that motivational. There may be occasions when, without guarantees of corporate commitment, they have to start projects to solve technological problems on their own in the case R&D organization. Because of the visionless environment, this type of unsupported activities might have negative consequences for innovativeness, motivation and organizational culture like Amabile (1997) has stated (See Chapter 2.1.2.4).

In this study it was found that, if the corporation didn't make a R&D vision, then R&D employees practiced visionary leadership and constructed themselves a realistic, believable, and attractive vision for the future of their organization. R&D employee's R&D vision was based on mainly unofficial information sources and second hand rumors. The employees' action is congruent with what Luccas (1998) has stated. Even an autocrat needs a plan to follow in dictating. Employees need something to believe in if they sacrifice themselves to make this dream come true. Ojanen (2003) has pointed out that R&D function is the most industry-specific when it is compared to other organizational functions (See Figure 5). Hence, if R&D employee would like to change employer there could be substantially more friction compared to e.g. accounting or finance employees. According to the equity theory, if personnel feel inequity, they act in five alternative ways: they view differently their own or others' work efforts or results, they act to change the work efforts or results of others, they change their own work efforts or results, they choose another reference of comparison, or they just resign. If changing an employer is not attractive, then the other four alternatives of the equity theory might become more attractive to R&D employees. Consequently, this might encourage unfavorable working climate and lower outputs for the whole R&D organization.

Ten individual sources of motivation for R&D personnel have been found by Manners et al. (1997): *difficulty, fat happy rats, low intellectual content, hedonism, protection of self, enhancement, social relativity, satiation vs. variability, juxtaposition,* and *expectations*. (See Chapter 2.3.2.1) R&D employees recognized their own individual sources of motivation from this list, and the ten sources of motivation are scanning R&D employees' motivation relatively extensively and accurately. This study supports the ten sources of motivation on individual R&D personnel level found by Manners et al. (1997). When R&D employees were asked to point out three most important ones among these factors, each of them chose different factors like Manners et al. (1997) had predicted. R&D superiors were well aware of the needs and expectations of their employees. R&D superiors highlighted that the specific situation has to be taken into account if the output of each individual has to be optimized as Manners et al. (1997) had recommended. In addition to that, R&D superiors were well aware of that the individual recognition cannot be applied in the extreme because it deteriorates willingness to teamwork, like Uen & Chien (2004) had stated.

The only major difference between the empirical findings of this study and the Manners et al. (1997) paper is found in how the expectation factor had been valued. According to the Manners et al. paper expectations were "the most pervasive" and "the essence of motivation". In this study, interviewees chose expectations to be the second most important motivation factor. Why difficulty was chosen instead of expectations? One explanation could be that technology leadership attracted high-achiever engineers to the company and high-achiever engineers might prefer difficulty as the most important motivation factor of all. On the other hand, R&D employees informed about problems believing in their superiors and the organization to deliver rewards.

When studying the definitions of the terminology, direct links between the corporate vision and these personal motivation sources of Manners et al. (1997) are difficult to find. But linkages might be led to two personal motivation factors: *social relativity* and *expectations* (See Figure 20). These linkages are not direct, and to become true managerial intervention is needed. Management could try to make personal assignments interesting by linking the corporate vision to these assignments. The empirical findings of this study support these conclusions. It was found that motivating R&D employees by a corporate vision is far-fetched. Motivation for R&D employees was coming from other substantially more important sources.

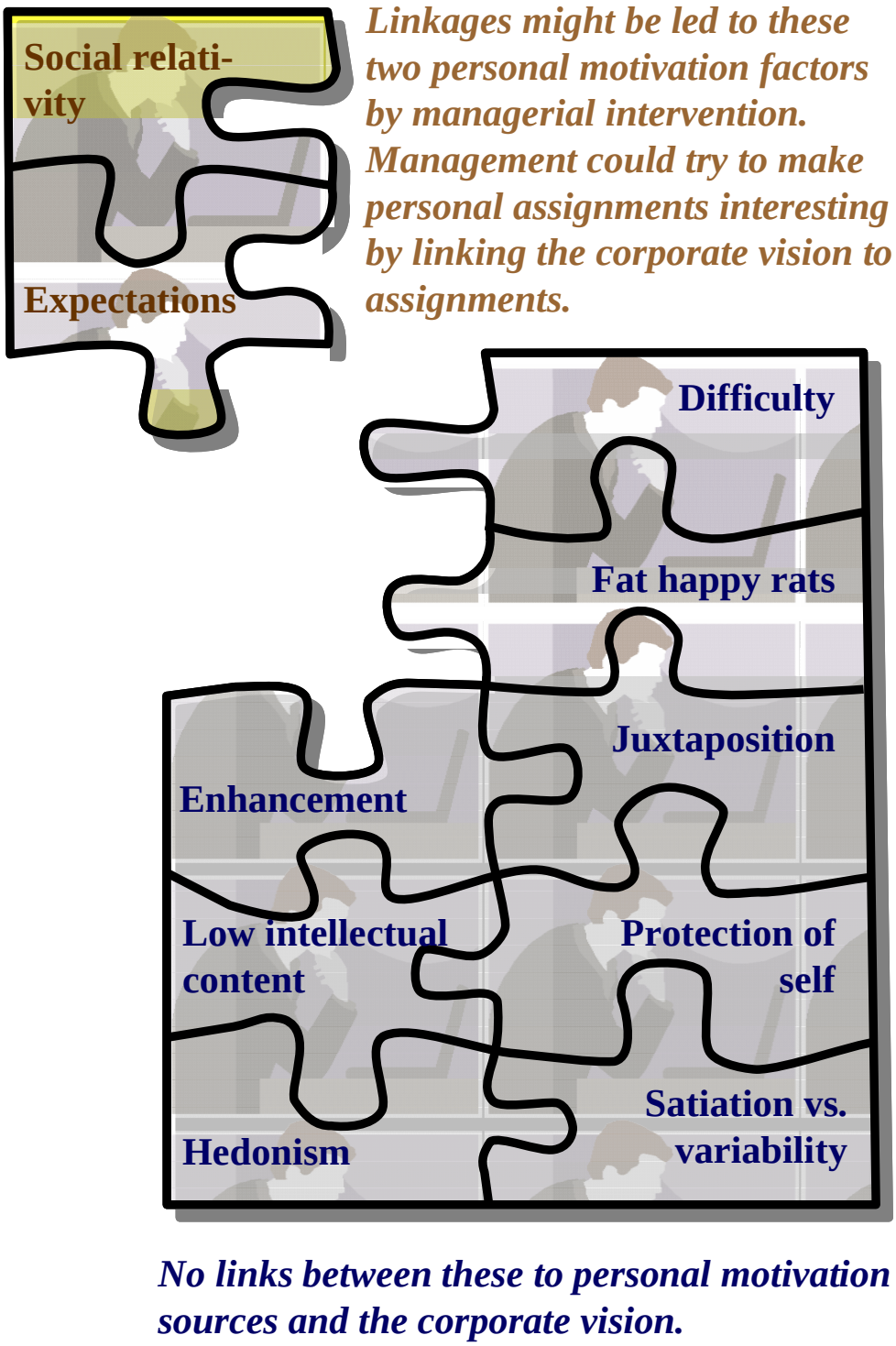

Figure 20. A jigsaw puzzle illustration of the links between the corporate vision and personal motivation in an R&D organization.

According to Katz (2005), there are five motivational dimensions where managerial intervention could be used to link organizational and personal orientations: *skill variety*,

task identity, task significance, autonomy, feedback (See Chapter 2.3.2.2). Two of these motivational dimensions could be able to create a link between the corporate vision and personal motivation: *task identity* and *task significance*. These two dimensions make the assignments more enjoyable and motivating if a complete picture of the assignments is given to the personnel and they have a feeling of contributing to organizational goals. Communication, involvement and reward systems should be linked to the task if these two dimensions are to be used.

Upper management role for motivating the R&D organization has been studied by Judge et al. (1997) (See Chapter 2.3.2.3). Upper management could support the manager's role by linking the corporate vision to *task identity* and *task significance* and also by creating *personal recognition programs* and *integrated social systems.* Personal intrinsic rewards should have a positive effect on both individual and group success. Sharing and togetherness could be attained by common goals. On the other hand, an upper manager could have a negative effect. Extrinsic rewards give only temporary satisfaction because they erode work relationships, suffocate organizational learning, and weaken attention to the work. If these goals of upper management are over-ambitious or have too tight deadlines, interaction and coherence reduces in units. Strategic autonomy and operational autonomy should be separated. If too little operational autonomy is given by over defining timing and goals, the work becomes boring for R&D personnel. In figure 21, there is an illustration of ineffective and effective routes that link the corporate vision and motivational issues of R&D personnel that have been derived from papers Manners et al. (1997), Judge et al. (1997) Katz (2005). The figure 21 also presents the roles of the actors that are linked to these routes.

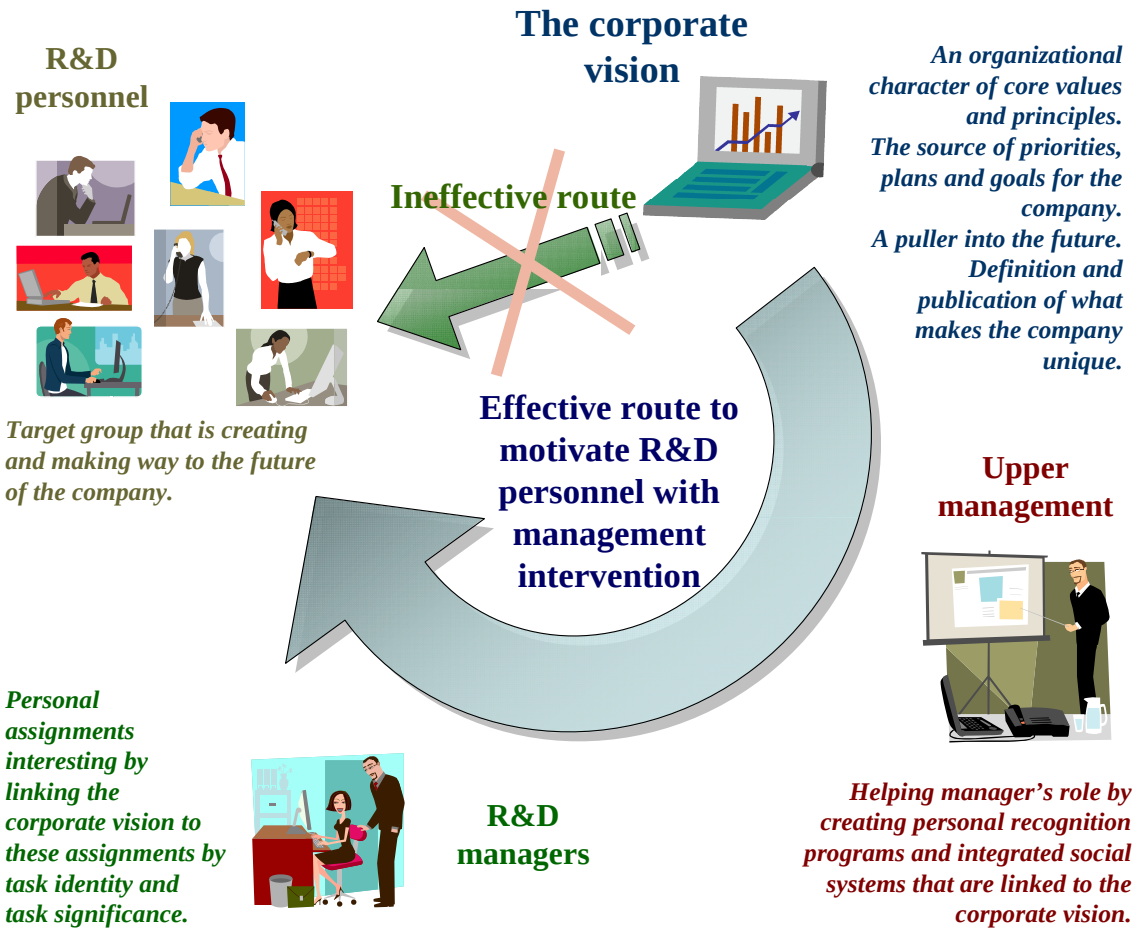

Figure 21. Ineffective and effective route of motivating R&D by the corporate vision.

All motivational issues and recommendations for R&D managers and senior management, by Katz (2005) and Judge et al. (1997), are realized in the management practices and processes in the case R&D organization. R&D superiors told that they tried to motivate their subordinates by giving tasks that vary by proficiency, by emphasizing task identity and significance to organization, by involvement and reward systems; by giving autonomy to work assignments, and, finally, by giving feedback. Senior management told that they were generating the strategic goals and empowering personnel by giving freedom in the context issues, were worried about balancing autonomy, had created personalized recognition systems, recognized integrated sociotechnical systems, and worried about continuity of slack. R&D employees commented that there were no serious deficiencies in these management practices and processes in the case R&D organization. On the other hand, they were complaining about practical details in the realization of these practices and processes. However, these complaints are not within the scope of this study.

When inquiring about the ten sources of motivation, an effect was found that might lead to managerial consequences. Firstly, R&D employees gave positive feedback to the ten sources of motivation by Manners et al. (1997). Secondly, the ten sources of motivation for R&D employees did not have corresponding conventional counterparts at the early or the contemporary theories of motivation that were both meant to motivate employees in general (See Chapter 2.3.3). In other words, R&D employees have unique motivational characteristics compared to other employees in the company. Therefore companies should recognize the special characteristics of the R&D organization and special management practices should be applied motivating their R&D employees.

In this research, it was found that the definition and meaning of vision and mission are not a part of engineering studies. Therefore, it is companies' responsibility to communicate what the vision and especially the mission mean. If meanings of these terms are not understood or appreciated in the organization, eventually all the efforts and investments spent on shaping the exact formulation of the company vision and mission is wasted and, of course, there can not be any positive motivational effects either.

Currently, a possibility has been created for R&D employees to work for some time period off their current duties with potential innovations or technologies in the case R&D organization. The intension is to motivate all R&D personnel to be creative and move new ideas from the bottom to the top of the organization. Tidd et al. (2005) had stated (See Chapter 2.1.2.4.) that successful innovation is strategy-based, requires enabling mechanisms and only happens within a supporting organizational context, and synergy should be achieved between the personal entrepreneurial innovative and the organizational administrative environmental interests. This managerial initiative could raise the organizational innovation involvement rating HII - "High involvement innovation" - from the first stage to the third or fourth stage. Tidd et al. (2005) had stated that the R&D function should provide a window for the external world of technology, obtaining information on new business opportunities, and giving feedback ensuring the technological strategy is in line with the corporate requirements. Learning and technical development have been found to follow an S-curve. As Katz (2005) has stated (See Chapter 2.1.2.2), when something is done for the very first time, there is no base for comparison and even the most ingenious ideas might look stupid at early stages. Is the mentioned possibility effective enough to allow the new ideas move from

the bottom to the top, and are all operational and technological opportunities fully exploited?

The role of the HR function was discussed by R&D employees and their superiors. The case R&D organization was not exception, and their opinions were similar to statements and generalizations by Katz (2005) (See Chapter 4.3.2.1). That is, the human resources management should help building creativity and inventiveness, help to grow competences, learn to appreciate the eccentricity of R&D, and assist to create a positive R&D organization culture. Finally, merely providing forms for recruitment advertisements and keeping track of summer holidays is viewed in R&D as irrelevant, naive and unrealistic.

Previously some time ago in the case R&D organization there was a leader who can be described as a visionary charismatic leader. When the company had a local charismatic R&D leader with strong visions, he indeed did motivate the personnel by promoting meaningfulness in their work, enhancing their self esteem and creating personal commitment by promoting faith for a better future like Shamir et al. (1993) had stated (See Chapter 2.2.1). Collings & Porras (1995) described about the how visionary charismatic leadership style should be like an “architect” that concentrates on building an organization and not like a “time teller” (See Chapter 2.2.1). Interviewees also believed that the “time teller” leadership style, where one leader is telling everybody what to do in smallest detail, would not be any more appropriate in the R&D organization of a large global corporation. Many R&D employees and their superiors were longing for the inspiring visions and personality of this leader, in spite of the previous statements about global “time telling” problems. The time of the visionary charismatic leader in R&D was found motivating for employees, who were especially doing routine assignments. This linkage between a visionary charismatic leader and routine assignments was not detected by Shamir et al. (1993).

5. DISCUSSION, CONCLUSIONS AND SUGGESTIONS FOR FURTHER RESEARCH

In the case company X, a working climate survey revealedthat the corporate vision had not been understood by the employees of the R&D organization although the personnel have relatively high work motivation levels. The aim of this paper was to study the corporate vision and its influence on motivation in the case R&D organization. Members of the case R&D organization and their management were interviewed to have a deeper understanding of their opinions on how vision has been or should have been understood and implemented.

This study is using the qualitative research methodology, which can be related to the critical theory and to the constructivism paradigms. With the case study approach it is possible to get a detailed view by analyzing the case R&D organization. This study approach uses the qualitative method to answer questions that were left open by the quantitative survey study and to deepen and give a more detailed understanding of these findings. This study could be said to have an abductive research methodology approach, and the researcher has some leading theories ready to be tested during the research. Considering the research objectives, the most suitable research method to collect data was the general interview guide approach because it allowed the interviewer to collect data on the relevant research topics without loosing flexibility in interaction.

In order attain a holistic view on these processes, first the gathered data was organized into patterns, categories, and basic descriptive units. Secondly, in order to attach meaning and significance to the analysis, the gathered data was interpreted by explanation patterns, searching for relationships and linkages between these dimensions. An attempt was made to pay attention and enhance the reliability and validity of this research. The issues that were related to the research process in this study were discussed with senior researchers who have generally agreed on the achieved results. Also, the key informants had reviewed the draft and agreed on the results of this study.

This final chapter contains the conclusions of the main empirical findings, and it also discusses how these findings support and contribute to the existing theories and studies, and, finally, some suggestions for further research are presented.

5.1. The theoretical linkage between the corporate vision and the motivational issues of R&D personnel

Ten individual sources of motivation for R&D personnel have been found by Manners et al. (1997): difficulty, fat happy rats, low intellectual content, hedonism, protection of self, enhancement, social relativity, satiation vs. variability, juxtaposition, and expectations. When studying the definitions of the terminology, direct links between the corporate vision and these personal motivation sources of Manners et al. (1997) are difficult to find. But linkages might be led to two personal motivation factors: social relativity and expectations (See Figure 20). These linkages are not direct, and, to become true, managerial intervention is needed (See Figure 21). Management could try to make personal assignments interesting by linking the corporate vision to these assignments. The empirical findings of this study support these conclusions. It was found that motivating R&D employees by a corporate vision is far-fetched. Motivation for R&D employees was coming from other substantially more important sources.

According to Katz (2005), there are five motivational dimensions where managerial intervention could be used to link organizational and personal orientations: skill variety, task identity, task significance, autonomy, feedback. Two of these motivational dimensions could be able to create a link between the corporate vision and personal motivation: task identity and task significance. These two dimensions make the assignments more enjoyable and motivating if a complete picture of the assignments is given to the personnel and they have a feeling of contributing to organizational goals. Communication, involvement and reward systems should be linked to the task if these two dimensions are to be used.

Upper management role for motivating the R&D organization has been studied by Judge et al. (1997). Upper management could support the manager’s role by linking the corporate vision to task identity and task significance and also by creating personal recognition programs and integrated social systems. Personal incentive rewards should have a positive effect on both individual and group success. Sharing and togetherness could be attained by common goals.

5.2. The role of the corporate vision in the case R&D organization

The case corporation had formed their perception of the world business environment. From this scenario a R&D strategy was constructed and the organizational role of R&D in the larger corporate structure was defined. The case corporation had a short-spoken corporate vision including the ideas of serving the customer and being the customer's first choice. On the other hand, the corporation had given a detailed long-term organizational R&D role to follow. For this role, a R&D mission was given priority to be more important than a R&D vision.

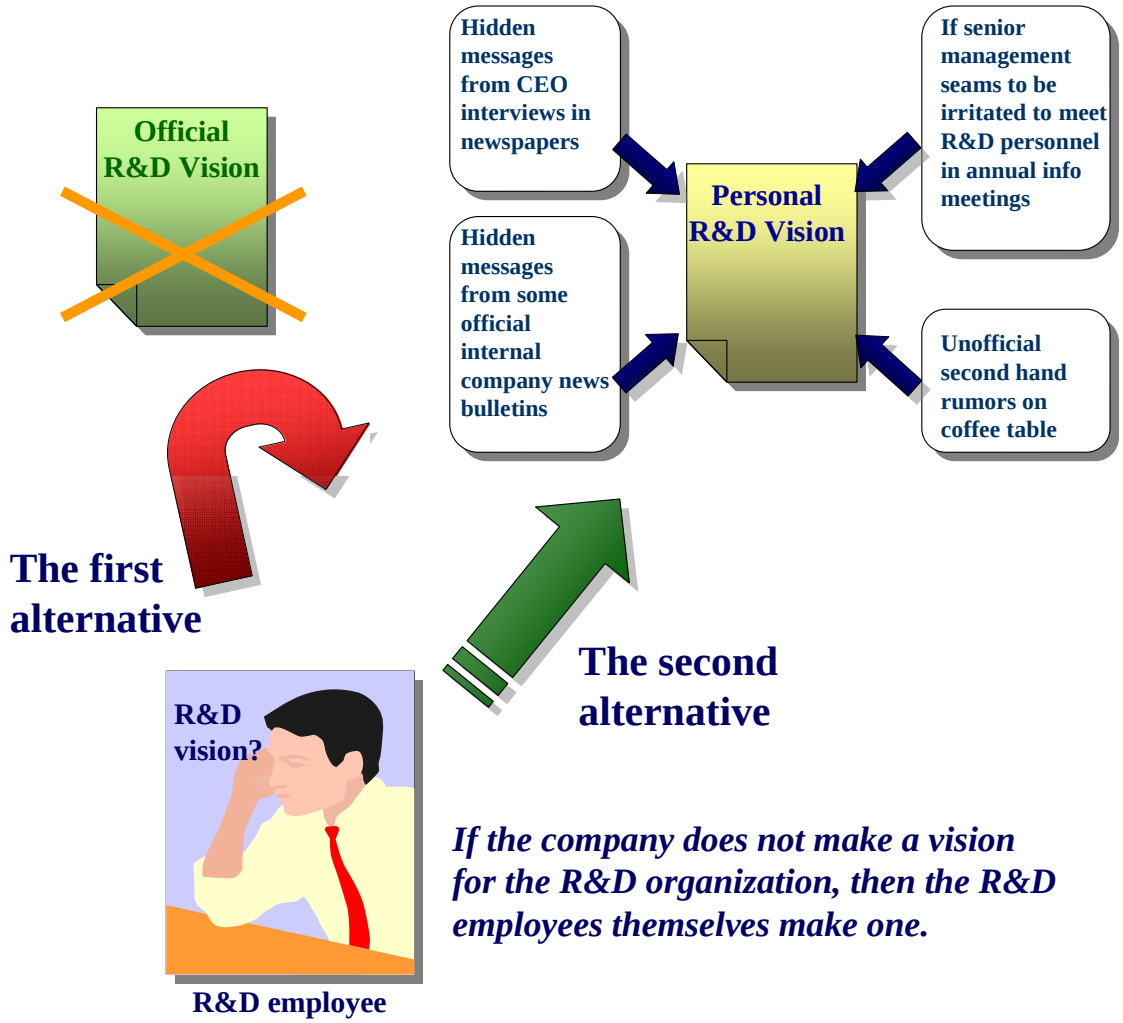

Figure 22. Illustration of response by R&D employees if the company is not presenting vision for the R&D organization.

In this study it was found that, if the corporation did not establish a R&D vision, then R&D employees practiced visionary leadership to construct and articulate a realistic,

believable, and attractive vision for the future of their organization. In this study it was also found that this R&D vision invented by employees was mainly based on unofficial information sources and second-hand rumours. (See figure 22).

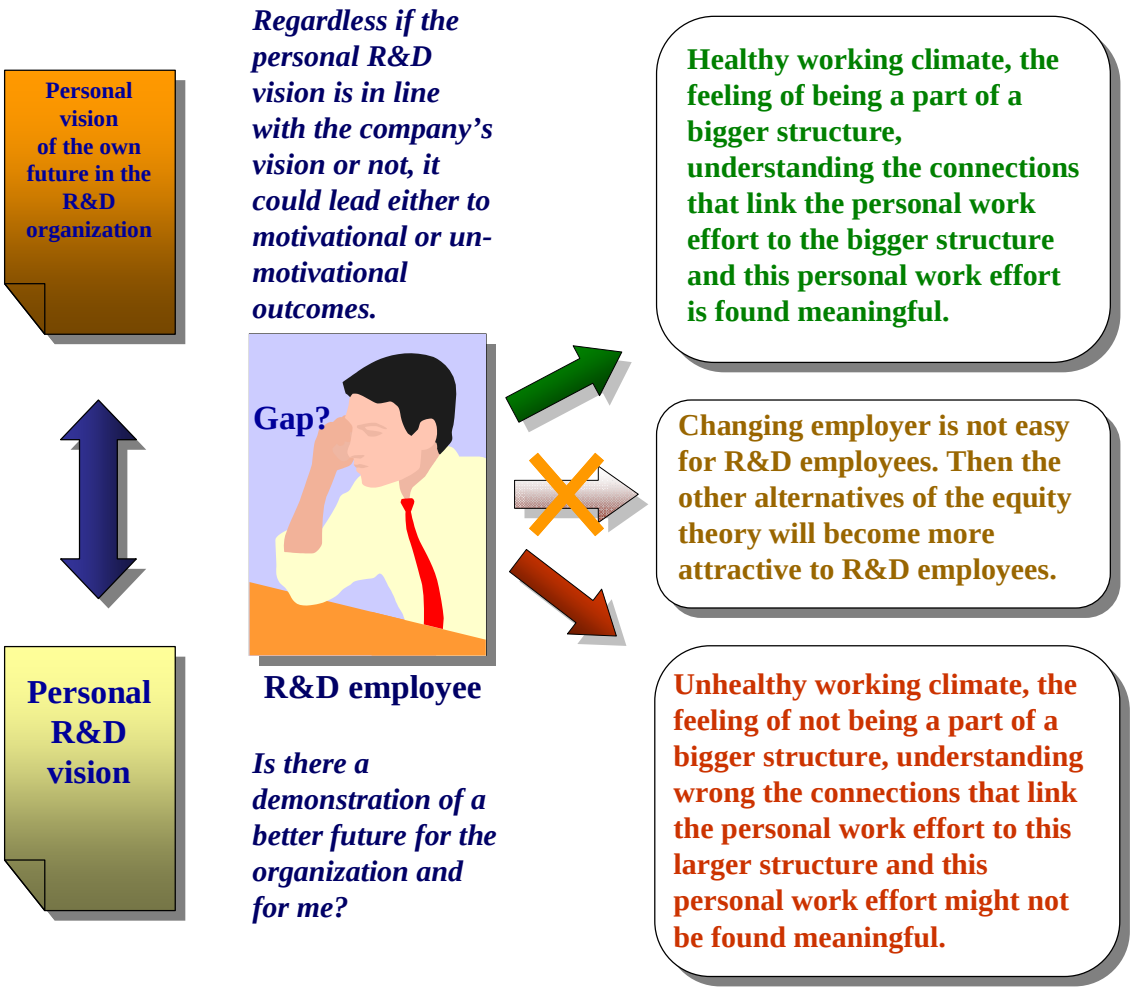

Figure 23. R&D employee's personal vision and its potential impacts on motivation and organizational culture.

To understand the consequences of this invented R&D vision, let us pose a question: What happens if the employees see that there is no demonstration of a better future for the organization or its members and their own future is in conflict with their prediction of the R&D vision? (See Figure 23) For R&D employees changing an employer is difficult. If R&D employee would like to change employer there could be substantially more friction compared to, for instance, accounting or finance employees. Therefore, if a R&D employee sees that the future is unfavorable and changing employer is not an attractive alternative, eventually the other alternatives of the equity theory (See Chapter

2.3.1.2) will come more attractive to R&D employees. In the worst case, this could lead to a deterioration of the working climate and decreasing outputs for the whole R&D organization.

5.3. Motivating R&D employees by a corporate vision in the case R&D organization

R&D employees commented that motivating R&D employees by a corporate vision was simply far-fetched. However, there could be detected some connections between the corporate vision and motivation.

Firstly, R&D employees hoped that they would have a long-term vision for their careers. R&D employees were accountable for R&D within a certain technological field. This has a long-term influence on the R&D organization. In this role R&D employees are as entrepreneurs, like Baum & Locke (2004) had stated, but working inside the organization. R&D employees stated that developing new technologies or solving technological problems can take from five to ten years or even more and that they would like to know the backgrounds and motives for the strategies because just blindly executing these strategies is not that motivational. In other words, there will be times when, without guarantees of corporate commitment, they had to start projects for solving technological problems on their own in the case R&D organization. If the R&D organization does not have sufficient R&D visions that employees can use to create a vision for their entrepreneur role, then good ideas could be left without proper investigation, employees could not be able to sell their ideas inside the organization, search funding for their ideas, and, finally, implement them.

Secondly, R&D employees complained that their R&D organization has a shortage of the feeling of togetherness. If they are, blindly like a machine, executing assignments that have been discussed and decided on a higher level in the organization, then they do get a feeling that they are a part of larger group that is contributing to the future of the company. On the other hand, R&D employees pointed out that some individual R&D employees possess scarce knowledge or skills that have a potential to help other employees in the R&D organization. These comments support the findings of Yearout et al. (2001) about how visionary companies gain trust, involvement, and commitment by, e.g., encouraging people to discuss, to openly express themselves, and to reconcile conflicts, and how the vision is put into operation. For this type of situations, a common

inspiring R&D vision that promotes the feeling of togetherness among R&D employees would be in the company's interest.

5.4. The issues that have more potential to motivate the R&D personnel than the corporate vision

The case corporation had one special characteristic: it had made a long-term decision to strive to be a technology leader in its industry sector. The role of technology leadership has been highlighted in the corporate communication for internal and external interest groups. R&D employees and their superiors are not familiar with the reasons why they actually had to be technology leaders. However, technology leadership had a mental effect on employees that Porter (1985) did not mention. Technology leadership raised R&D employees' self esteem as engineers as they felt that they could be able to execute their ideas better than engineers in other companies who were just following technological development. In this way, technology leadership had a positive effect on the employees' long-term motivation in the case R&D organization.

Perhaps an organization which strives for technology leadership could offer demanding engineering challenges and attract high-achiever type employees. In this study, the R&D employees could be characterized as McClelland's high achievers - some employees more, some less. Normally the high-achiever portion of the total personnel is 10 – 20 %, but these favorable conditions might have assisted to attract more high-achiever engineers than usual to join the case R&D organization.

5.5. Managerial implications

Ten individual sources of motivation for R&D personnel have been found by Manners et al. (1997): *difficulty, fat happy rats, low intellectual content, hedonism, protection of self, enhancement, social relativity, satiation vs. variability, juxtaposition,* and *expectations*. R&D employees recognized their own individual sources of motivation from this list, and these sources of motivation are scanning R&D employees' motivation relatively extensively and accurately. The conclusion that this study supports the ten sources of motivation found by Manners et al. (1997) on the individual R&D personnel level. Because R&D employees have unique motivational characteristics compared to other functions in the company, companies should recognize the special characteristics

of an R&D organization and different management practices should be applied to motivating their R&D employees. Katz (2005) and Judge et al. (1997) had recommendations for management practices to motivate employees in an R&D organization. In the case R&D organization no serious deficiencies were found in these management practices and processes. On the other hand, R&D employees were complaining about the practical details in the implementation of these practices and processes. However, these issues are outside the scope of this study.

It was found in this study that the definition and meaning of vision and mission is not a part of engineering studies. This means that it is the company's responsibility to teach what the terms vision and mission mean. If these terms are not understood or appreciated in the organization, eventually all the efforts and investments spent on shaping the exact formulation of the company vision and mission are wasted and, moreover, there can not be any positive motivational effects either.

5.6. Recommendations for further research

The case corporation had developed strategy processes according to a benchmark survey. As a conclusion, a mission was given priority as more important than a vision. Because the case company had copied the best practices of other companies, this could lead to a conclusion that there would be more companies where the R&D mission was considered to be more important than the R&D vision. Further research could be conducted in other visionless R&D organizations to look for similar findings in the employees' motivation and organization culture.

The study raises other questions that might be looked more closely into in future research. Further research could cover similar questions in different types of organizational functions, like accounting, finance, personnel, marketing, manufacturing, etc. Finally, applying a multiple case study approach might provide a better understanding of the studied issues.

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APPENDIX

This is an example of the framework for interview questions and given material. This framework was used when interviewing a senior manager.

VISION

- **How you define the term vision?**
- **What is your corporate vision?**
- **What is the vision for the R&D organization?**
- **What is the strategy for the R&D organization?**
- **Should R&D groups have a vision?**
- **Should R&D employees have long term plans?**
- **Where have you learned the definition of the term vision?**
- **What does the vision mean to you and for your R&D employees?**
- **In what way have you stated the importance of the corporate vision?**

MOTIVATION

- **What are your sources of motivation?**
- **How do you believe that your employees get motivated and how do you motivate your employees?**
- **How does your motivation disappear and how do your employees loose their motivation?**
- **How would you define the importance of the corporate vision for your motivation and for the motivation of your employees?**
- **What would be the situations where the corporate vision would have an influence on motivation?**

Could your comment on the motivation factors for R&D personnel and pick the three most important ones?

[The table below was given to each interviewee. Each factor in the table was explained to each interviewee by the interviewer so that each interviewee understood the meaning and terminology that was used in the table.]

Ten sources of motivation have been found on the individual R&D personnel level.

Difficulty	**Difficulty generates incremental excitement for R&D personnel.**
Fat happy rats never run mazes	**Hungry research personnel should be kept hungry to sustain excitement.**
Low intellectual content	**Emotions have no intellectual meanings. When emotions are pushed aside, it makes R&D personnel feel good, no matter what the content is, and they like their work.**
Hedonism	**Common to all people: "see pleasure and avoid pain". This means that management should know personnel's individual tastes because one's pleasure could be another's pain.**
Protection of self	**A desire to "save face". Especially R&D personnel like to protect themselves because they have built their whole career on technical competence self-esteem. "Take some risk and the organization will protect you if you fail".**
Enhancement of self	**R&D personnel seek for status symbols with the expense of taking risks. There should be some protection against failure and incremental rewards because there is a conflict between the desire for protection and the desire for enhancement.**
Social relativity	**All results and rewards of the work are relative and relative also to what others are getting.**
Satiation vs. Variability	**Too much of change makes numb but a correct amount of change creates excitement, shapes expectations for the future.**
Juxtaposition	**The system of delivering financial rewards is usually not motivational. Because of the human short memory of the excitement that financial reward brings, these types of formal rewards should be given in a timely manner.**
Expectations	**Managerial credibility to deliver rewards, managerial objectivity to research goals and, on the other hand, to the evolution of people.**

(Manners, Steger & Zimmerer 1997: 29 - 33)

- **Have you thought that the HR function would support your role as a motivator, stating the corporate vision?**

In the end

- **Could you explain why the motivation level in the R&D organization was high but, at the same time, the corporate vision is not understood or appreciated? Could you find an explanation for this finding?**
- **Vision could be challenging and motivating as "Man in the moon before the end of the decade." Could you comment this?**
- **Do you have other thing that you want to say or correct on something else that has been said?**