The determinants of radical innovation

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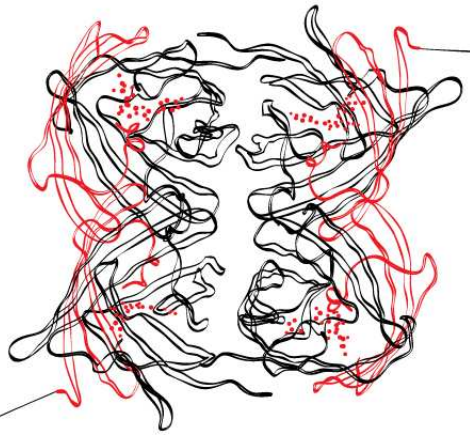

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I hope you enjoy reading my masterthesis.

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Abstract

This study is aimed at describing which team aspects are important determinants for good radical innovation outcomes of a company.

With the aid of the article of Montes, Moreno & Morales (2005) and other academic literature I describe that team climate, teamwork cohesion, support leadership and team learning are important factors for delivering a positive radical innovative capability and in this way also good radical innovation outcomes.

Based on this variables I developed hypotheses. These hypotheses are tested with the aid of data conducted with questionnaires in HR departments of innovative companies. Besides collecting data with the aid of questionnaires, also interviews with HR managers are used to collect the necessary data. The aim of these interviews is conducting data which can be used to explain why certain hypotheses are supported or not.

One of the conclusions of my research is that team learning plays a very important part in the determination of the radical innovative capability. Support leadership is the most important variable for developing good team learning within your company. The leader shouldn't try to influence team climate too much with his way of leadership, because when support leadership influences team climate, the influence of team climate on team learning will decrease. Team climate is the second most important variable for developing good team learning within your company. A very interesting conclusion of this research is the fact that teamwork cohesion absolutely shouldn't be too high. When this is the case, it has a direct negative influence on team learning and ergo an indirect negative influence on the radical innovative capability.

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1. Introduction and objective of the research

Innovation is a strategic option for improving the organization and making it more competitive. At the same time, it opens the doors to competitive advantage both in global and international markets (Hitt et. al., 1997; Tidd, 2001). This is done by offering new and unique products and services to the market. Innovation also creates entry barriers for the market. You must have more to offer than your competitors to be able to enter the market. In order to achieve this a learning organization that develops each time is very important. It is important that organizations work at the development of new valuable aspects constantly, so that they can keep up with the competition (Montes, Moreno & Morales, 2005).

In recent years the ability of organizations to respond suitably to changes in the external environment has been a central topic of organizational sources. Having the right capacity to adapt your organization to changes in the environment is very important. If you can organize this well you will survive in the long run and you may compete efficiently and have the ability to adapt to the environment. To tackle the changes in the close environment, organizations should also develop specific capabilities and reorganize their essential competences. Organizational learning is one of these very important competences. When an organization adapts organizational learning they could become an intelligent organization. The forming of these organizations is very important, because people within those organizations can develop personally and professionally in such a climate. This has the effect that a lot of new knowledge is gained, which delivers a great contribution to the development of radical innovations.

Besides this gaining of new knowledge support leadership and teamwork cohesion are very important for achieving an organization with good learning conditions.

Support leadership means having a flexible leader. When an organization wants to improve, the leader must support and encourage innovation and individual initiatives. This could be done by the development of competences which focus on learning and on open communication. Good competences in these areas minimize the cost of internal changes and create a better cohesion in the teamwork.

This teamwork cohesion should be seen as the cohesion among a group of people, who all have a series of complementary capabilities and are responsible and committed to a cause. The approach they use and the objectives they have are common to all. When the teamwork cohesion within an organization is o.k. it could lead to the fact that organizational learning becomes valuable for the whole organization and not only to individual people. Because this teamwork cohesion is so important the management should encourage cooperation and the creation of cohesive work teams that promote the learning organization (Montes, Moreno & Morales, 2005).

A report about the effects of organizational learning and teamwork cohesion on organizations' capacity to use innovation to meet the changing needs of their environment has written by Montes, Moreno and Morales (2005). The paper describes how certain characteristics of the firm, in this case support leadership and teamwork cohesion, significantly affect both learning and innovation, as well as showing the implications of these in an organizational outcome.

The results of the investigation of Montes, Moreno and Morales (2005) reveal the need for a proactive vision when managing innovation and the creation of learning organizations as alternatives to achieve a sustainable competitive advantage that allows us to, among other things, improve organizational performance and create greater organizational wealth. Using empirical data gathered from 202 Chief Executive Officers in Spanish firms, the findings of Montes, Moreno and Morales (2005) support the hypotheses that (1) support leadership encourages teamwork cohesion, organizational learning, and technical and administrative innovation; (2) teamwork cohesion promotes organizational learning and this, in turn, encourages technical and administrative innovation; and (3) organizational performance is improved through teamwork cohesion, organizational learning and technical and administrative innovation.

The results of their research show that there are significant and positive correlations among support leadership, teamwork cohesion, organizational learning, technical gap and administrative gap constructions, and also between these constructions and performances. In order to improve profits and obtain competitive advantage, companies should direct their strategic planning toward improving organizational learning, creating a work environment based on support leadership and teamwork cohesion and obtaining high levels of innovation in comparison to other firms in the environment.

In the last part of their research Montes, Moreno and Morales (2005) describe that they in their research analysis, among other, teamwork cohesion and support leadership as variables that affect the capacity to learn and innovate. However, other factors should be analyzed and discussed in relation to learning and innovation, such as organizational climate, the implementing of Total Quality Management, or sorts of organizational structures.

Although the relation between leadership and work has been studied intensively, much less research has been focused on the processes through which this relationship is realized. The climate within an organization is one of the factors through which leadership may affect work results. Climate could be defined as a summary of values, attitudes and behaviors shared by employees. It shows how the work conditions are and may be a reflection of the standards and values expressed by the leader of the company (Schneider 1990; Patterson et al. 2005). The leadership's profile of a manager and the process that follows on this are primary determinants of the climate of the organization and are a basis for the social and motivational processes affecting individual behavior (e.g., Likert, 1976; McGregor, 1960). This indirect conceptual relationship has been recognized by climate researchers who have typically regarded leadership as an important system factor in the determination of climate. Although this conceptual relationship is recognized, there is done little research on the precise relationship between the constructions.

Apart from the influence of team climate on teamwork cohesion, the team climate is also an important factor for the determination of team effectiveness. Teams are essential when you have to do complex work which require a variety of knowledge and skills. Working in a team will also stimulate creativity and innovation and empower workers (Loo, 2013). Much organizational research has paid attention to the aspects required for effective teams, for example, the success factors for cross-functional teams (Bishop, 1999) and team commitment (Rossy & Archibald, 1992). Unfortunately, the project management literature has somewhat neglected the important factor of

team climate as a contributor to team effectiveness. Based on this aspect and the fact that little research attention has been spent on the fundamental relationship between climate and leadership and moreover that Montes, Moreno and Morales (2005) describe that climate needs further research and that this research will focus on the influence of climate on teamwork cohesion, supportive leadership, learning and innovation. To give enough focus to the research and to avoid that I lose the overview I will only focus on the R&D* department and innovational teams of an organization, instead of the whole organization. This means that I will look to team learning instead of organizational learning and will focus on team climate instead of organizational climate.

When you are doing research it is crucial to clearly state the perspective from which you are considering innovation and to clearly identify the level and unit of analysis to study (Linton, 2009, 730 – 731). There is a lot of knowledge about how incremental innovation occurs within stable partnerships (Sivadas & Dwyer, 2000), but it is difficult to translate these insights to radical innovation (Birkinshaw, Bessant & Delbridge, 2007), which relies upon more fluid, emergent and ambiguous networks (Tushman & Anderson, 1990). Radical innovations are innovations with a high level of complexity and uncertainty, which increase the need for learning, flexibility and adaptability. Indeed, Möller (2010) describes that we lack frameworks that allow us to understand how firms can make sense of and navigate in radical innovation networks. The difficulties associated with understanding how to facilitate radical innovation are complicated by the fact that identifying and defining radical innovations in the market is difficult (Story, O'Malley & Hart, 2011). Based on this deficiency in research in the field of radical innovations, I decided to focus this research on radical innovations and to develop a model that describes how radical innovation is related to teamwork cohesion, supportive leadership and team learning.

So, this paper examines on the one hand what the influence is of team climate on teamwork cohesion, support leadership and team learning. On the other hand the paper tries to find out a framework that is suitable for developing a good radical innovative capability. The basis of this framework that we are developing is taken from the framework of Montes, Moreno and Morales (2005).

** R & D = Research & Development*

1.1 Research question:

To find out what the relations are regarding the problem of identification described above I have formulated a research question.

My research question is:
What are important determinants for the development of a good radical innovative capability?

With the help of hypotheses, described in paragraph 2.7, I come to the answer of this research question.

1.2 Research approach:

This research will be partly qualitative and partly quantitative.

The qualitative part consists of interviews with (innovation) managers of R&D departments. These interviews are used to collect the necessary information. The aim of these interviews is to identify how R&D managers notice the concepts described in my model within their company and what aspects in their eyes are very important to give these concepts a good interpretation. In addition, the aim is to analyze how the managers perceive the different relationships that I have described within my model. A summary of the opinion of the managers is displayed in the results section.

The quantitative part consists of questionnaires with statements about the different concepts. These questionnaires are send to the employees of the R&D departments to collect the information needed. Also the interviewed R&D manager will fill out the questionnaire. This information is analyzed using SPSS and smart PLS. Conclusions about the relation between the various concepts are drawn.

1.3 Scientific and practical relevance:

The scientific relevance of this research is mainly based on the fact that the literature about this subject describes that much is known about how incremental innovation occurs within stable partnerships (Sivadas & Dwyer, 2000), but that it has been proven difficult to translate these insights to radical innovation (Birkinshaw, Bessant & Delbridge, 2007). Möller (2010) describes that we lack frameworks that allow us to understand how firms can make sense of and navigate in radical innovation networks. We will find out which aspects need a lot of attention to develop a good model for the development of radical innovations within a company.

On the other hand the scientific relevance is based on the aspects that were discussed in the research of Montes, Moreno and Morales (2005). They wrote a report about the effects of organizational learning and teamwork cohesion on organizations' capacity to use innovation (technical and administrative) to meet the changing needs of their environment. They describe that climate should be analyzed and discussed in relationship to learning and innovation. Leadership

researchers have similarly regarded climate as an important situational restriction on leadership processes. Yet, despite general recognition of this conceptual linkage, little research attention has been devoted to the fundamental relationship between these constructed domains (Kozlowski and Doherty, 1989).

The practical relevance of this research is focused on the fact that companies can use the findings to see which aspects need attention to ensure a good radical innovation capacity within their company and team.

2. Literature review and research model:

Within this chapter the theoretical aspects described in the introduction will be deepened and relationships between the different aspects will be described. First we will look at innovation in general, then we will look at radical innovation and finally we will look at the various determinants of radical innovation which are included in this research.

2.1 Innovation

Innovation is about growth, about recognizing opportunities for doing something new and implementing those ideas to create value within an organization. This value could be either business growth or social change. The core of this value creation lies in the creativity of the people. People have an urge for making changes in their environment.

Innovation is also a way to survive. If a company doesn't adapt to the changes in a modern world they could be in trouble. The result will be that they fall behind the competition. Innovation contributes to competitive success in many different ways:
- It is a strategic resource to get the organization where it is trying to go
- It is delivering shareholders value for private sector firms
- Innovation contributes to competitive success because you can provide better public services
- Innovation is a great contribution to the growth of new enterprises (Bessant & Tidd, 2011, p. 38).
Innovativeness is one of the fundamental instruments of growth strategies to enter new markets, to increase the existing market share and to create a competitive edge for your company.

Through the increased competition in global markets companies become more aware of the importance of innovation. Rapidly changing technologies and a strong global competition quickly reduce the added value of existing products and services. So innovations are an essential part of business strategy, because manufacturing processes will do better through innovations, through innovation you can reach a positive reputation in the eyes of the customer and innovations could be used to construct competitive advantage (Gunday, Ulusoy, Kilic & Alpkan, 2011, p. 662).

Innovation is driven by the ability to see connections, to spot opportunities and to take advantage of them. Most of the definitions of innovation share the idea that innovation implies the adoption of a new idea or behavior (Jiménez-Jiménez & Sanz – Valle, 2010) and most of the time this takes place within clear guidelines. Often innovations involve players to do what they did, but better . This is called incremental innovation (Bessant & Tidd, 2011, p. 34). Sometimes innovation is about completely new possibilities, for example by exploiting radical breakthroughs in technology. This is called radical innovation (Bessant & Tidd, 2011, p. 7).
This research focusses on this last type of innovation.

2.2 Radical innovation:

Valle & Vázquez – Bustelo (2009) describe that radical innovation is characterized by a high level of complexity and uncertainty, which increases the need for learning, flexibility and adaptability. Incremental innovations are based on knowledge, experience and capabilities which have been present in the company for a long time.

The fact that radical innovation increases the need for learning is one of the reasons we choose to focus on this type of innovations in relationship to team learning. We want to check if this is true and if there is really a positive relationship between team learning and radical innovation.

Besides this aspect, another reason for our focus on radical innovation is the fact that the scientific theory describes that we lack frameworks that allow us to understand how firms can make sense of and navigate in radical innovation networks, which are characterized by uncertainty and flux (Möller, 2010).

Based on a series of studies of the Radical Innovation Research Program, conducted in the US, Leifer et al. (2000) defined radical innovation as "involving commercialization of products based on significant leaps in technological development, with the potential for entirely new features and improvement in performance or cost, compared with the existing substitutes". This definition is in agreement with that of Linton (2009), that the radical innovation should involve two dimensions: a significant leap in technological development (technical dimension) and a potential for entirely new features and improvement (social dimension). A radical innovation should not be a "new-to-the-firm" innovation, but rather a "new-to-the-world" innovation (Chang, Chang, Chi, Chen, & Deng, 2012). Radical innovation leads to new products for both the company and the market. The consequence of this is a technological revolution which changes the whole competitive game (Song and Montoya – Weiss, 1998).

2.3 Radical innovative capability:

Firms who focus on radical innovation should give attention to exploration, flexibility – enhancing, and adapting activities (March, 1991). When a firm uses the concept of innovation capabilities, the organizational capabilities necessary for radical innovation are a firm's ability to look for, integrate, tolerate and experiment with new products, processes and services.

Radical innovation capabilities consist of a firm's ability to explore, adapt, tolerate and experiment with new products, processes and services for non-mainstream businesses. By combing the findings of organizational innovation capability studies done in the past, we can divide radical innovation capabilities into four types of capabilities: searching openness capability, strategic integration capability, tolerating and cultivating (e.g. autonomy) capability and experimentation capability (Chang et. al., 2012)

The openness capability describes that it is necessary to collect ideas and competencies from many different sources when you want to be successful with your innovation. When you speak of radical innovations the latter is particularly important (McLaughlin et al, 2008). Phene et al. (2006)

suggested that this external knowledge determines how big the chance is of creating a breakthrough innovation.

A firm's competitive advantage not only depends on R&D from inside the organization, but is also increasingly dependent on external technology sources. Due to the increasing complexity of technology and its shorter life cycle, not every firm can develop all the important technologies itself. Firms that want to remain competitive in the market need to integrate internal technologies rapidly with external available technologies and launch the product on time (Lansiti, 1997). Managing innovation as an opening in a firm's limits is the key (Chesbrough, 2003a).

When looking at the integration capability Cabrales et al. (2008) suggested that the use of long-term and short-term incentives together, based on results, is positively associated with more radical innovation. Kanter et al. (1991) found that R&D alignment and integration between corporate R&D centers and mainstream businesses may improve a firm's radical innovation results.

Radical innovation activities should be tightly linked in with each other (Kanter et. al., 1991), or should work as an integrated system (O'Connor and Ayers, 2005; Kelly, 2009) between corporate R&D and lines of businesses. When this isn't the case the radical innovation results will be sub-optimal. The fine integration and alignment of corporate R&D units and existing lines of business is crucial when you want to commercialize radical innovation in a good way. It is a crucial to transfer radical innovation from the R&D stage, generally in corporate research labs, to the manufacturing and marketing stages, in existing and new businesses (Kanter et al., 1991; O'Connor and Ayers, 2005).

The autonomy capability describes that an autonomous culture, which stimulates individuality, as well as creativity and tolerance of failure, supports the creation of radical innovation (O'Connor and McDermott, 2004). Besides that aspect, Stringer (2000) suggested that firms could hire more creative and innovative people, to improve their innovativeness. Ekvall (2000) found that a creative climate, with autonomy and resources, could lead to higher organization innovativeness. A not very detailed project specification is also likely to facilitate radical innovation (Mc Laughlin et al, 2008; Philips et al., 2006). An organizational culture which stimulates risk-taking, freedom and self-management is also important for the creation of radical innovations (McLaughlin et al., 2008).

Regarding the experimentation capability it is well documented that when a firm's ability to learn, to probe and to experiment with new ideas, new R&D, manufacturing/ marketing tools, new disciplines and territories is good as well. This should lead to more easy introduction of radical innovations in established firms. Companies should develop their products by probing potential markets, learning from the research and probing again (Lynn et al, 1996).

From the organizational cultural view, McLaughlin et al. (2008) argued that supporting experimentation is one of the key cultural elements necessary for the support of radical innovation in established firms. Lynn et al. (1996) found that probing and learning are two crucial ingredients to the introduction of radical innovation. Probing means a firm's ability to experiment, with the aid of an introduction of an early version of radically innovative products to an initial market. Learning is a firm's ability to learn about technology and determine whether and how it can be scaled up for the market and how you could use it. Development of radical innovation is a process where you learn at

each stage that takes place. Each stage you strive to become one step closer to a winning combination of product and market (Lynn et al., 1996, 19).

With regard to the impact of radical innovation on current mainstream business, Kanter et al (1991) suggested that successful radical innovations should not only create new businesses, but it also contributes to the revival of current mainstream businesses.

2.4 Determinants of the radical innovative capability

2.4.1 Learning within a team:

To strengthen the ability to spot new innovation, creativity and to inject new ideas into the organization most studies see learning as a useful aspect (Damanpour, 1991). Organizational learning can be defined as the multilevel process of change in cognition and action, embedded in and affected by the institutions of the organization (Crossan et al. 1999; Vera and Crossan, 2004). Cognition and action have a strong relationship to each other in the processes of organizational learning (Edmondson, 2002). To deal with changes in the environment, organizations should also develop specific capabilities to regenerate their essential competences. From all the resources and capabilities that are specific to the firm, a key role in achieving competitive advantage is played by the untouchable capabilities. From all these untouchable aspects, learning is one of the most important (Montes, Moreno & Morales, 2005). Organizational learning is a very important aspect for the survival and change of organizations (Bapuji & Crossan, 2004).

In this research I will focus on learning within the team, instead of learning within the whole organization. A team is a group of two or more individuals whose work is related to each other and who socially interact with each other to achieve a common goal (Hackman, 1992; Kozlowski & Ilgen, 2006). Team learning is a key process through which useful knowledge is developed and shared within the organization. With the aid of team learning people could deal with complex issues and improve their performance.

Team learning is seen as a process with constantly reflection and action. Asking questions, seeking feedback, experimenting, reflecting on results, and discussing errors are key elements of the learning process (Edmondson, 1999, p. 353). The learning processes within an organization are dependent on the capacity of a group to interact with each other.

Learning occurs through a process in which groups interact with each other and a the same time transfer information through these interactions. The degree of learning depends on the knowledge they possess and the feedback that is provided (Schramm, 1954). Team learning takes place in work teams. The members of the team constantly reflect on work experience and actions (Edmondson, 1999). Collective team knowledge is acquired, shared and combined (Argote, 1999; Gruenfeld & Naquin, 2001) through a process of frequently seeking new information, speaking up to test the validity of work assumptions, and spending time to describe how to improve the work processes. Learning is a dynamic behavioral process of interacting and exchanging ideas between members of the team (Kozlowski & Bell, 2008; Kozlowski & Ilgen, 2006). Besides exchanging ideas with members within the team, sharing ideas with people outside the team (Uzzi & Lancaster, 2003). Knowledge will

be created when people interact with each other, share their expertise and ideas, and find unique ways to integrate these experiences and knowledge (Carmeli & Azerual, 2009).

Today, learning isn't a choice, but a must for a company. The management should give a lot of attention to learning within the company. When organizations ignore learning it would be the beginning of the end. Learning is a response to environmental changes and a excellent basis for obtaining competitive advantage (Holt, 1999). A positive learning environment is very important for a company to develop a good innovative process within it. A lot of companies see innovation as a process of learning. Innovation allows organizations to change in line with the change in their environment. With the help of innovations, organizations can react well to challenges in the environment (Montes, Moreno & Morales, 2005). Team learning allows the company to develop capabilities that enhance innovation, because higher levels of innovativeness are associated with cultures that emphasize learning, development, and participative decision making. This will positively affect the performance of the organization (Hurley and Hult, 1998). The basic assumption is that learning plays a key role in enabling companies to achieve speed and flexibility within the innovation process (Brown and Eisenhard, 1995).

When you want to develop innovations within your company individuals should acquire existing knowledge and share this knowledge within their team. The acquisition of knowledge depends on:
A: knowledge which is already available within the company (Salavou & Lioukas, 2003).
B: on the acquisition of external information and knowledge (Change & Cho, 2008). The acquisition of knowledge from outside the company depends on the capacity of the firm to absorb new ideas. To achieve this, organizations should record external knowledge within the company and commercialize this knowledge effectively (Cohen & Levinthal, 1990). As Nonaka (1994) suggests, innovation occurs when employees share the knowledge they have collected with their team and this shared knowledge generates new and common insights. Team learning is the process used by firms to develop these new knowledge and insights from the common experiences of people in the organization. The result of this is that a company is able to influence behaviors and improve the firm's capabilities. Following Huber (1991) this team learning process consists of four sub processes. These sub processes are knowledge acquisition, knowledge distribution, knowledge interpretation and organizational memory.
More about the differences between this sub processes In the following chapter.

Team learning is a basis for achieving competitive advantage with a company and a key variable in the enhancement of a good organizational performance. Learning has been acknowledged as an important capability for achieving competitive advantage (Brockmand and Morgan,2003). Firms that are able to learn have a better chance of recognizing important events and trends in the market. The result of this is that learning organizations are usually more flexible and faster in responding to new challenges than their competitors (Day, 1994; Slater and Narver, 1995) When you are faster than your competitor, you can build a competitive advantage (Dickson, 1996).

Companies that want to set up a good team learning process require a number of important characteristics. With the help of this team learning process companies can become intelligent organizations. Intelligent organizations differ from ordinary organizations by the fact that they have some structural, strategic, human-resource-related and general aspects which ordinary organizations don't have (Montes, Moreno & Morales, 2005).

2.4.2 Teamwork cohesion:

When the idea of the organization is that organizational learning is an important aspect for the whole organization and not only for some specific people, the organization needs teamwork cohesion to achieve this. The whole team focusses on the same goal, approach and objectives when there is teamwork cohesion (Montes, Moreno & Morales, 2005). The ability of a firm to ensure that the people working together within the team have complementary skills and interactions is a predictor of how easy a firm can obtain planned objectives and create a team spirit with cohesion (Edmondson, 1999; Offermann and Spiros, 2001). With the help of teamwork cohesion organizations may achieve that organizational learning is valuable to the whole organization and not only to some specific individuals. To achieve this, the management should give a lot of support. Through this support, collaboration and cohesed work teams arise. These cohesive work teams promote the development of a learning organization (Montes, Moreno & Morales, 2005).

A team can be described as a small number of people with complementary skills who work together to achieve a common purpose. They are together responsible for achieving this goal (Katz, 1997, p. 158). They are trying to achieve their shared goals on the one hand through differentiation of roles and on the other hand good communication systems (West & Markiewicz, 2004, p.1). Their work considerably affects others within the organization. Team members are dependent on each other in the performance of their work. This dependency leads to the fact that they are recognized as a group by themselves and by others. Team members should work closely together and support each other to achieve the goals of the team together (West, 2012, p.27).Teams enable organizations to learn and keep learning more effectively. When one team member leaves, the learning of the whole team is not lost. Team members also learn from each other while work in the team (West, 2012). Collaborative learning is important for an organization, because it also has a positive influence on developing good relationships within the organization, the improvement of social, communication and conflict management skills of the employees (Colbeck, Campbell, and Bjorkland 2000; Krause, Stark and Mandl 2009). Developing all these aspects has a positive influence on the team results. Collaborative learning groups make it possible for students to train their collaborative and social behaviours, creating which should be maintained over a longer period of time (Gillies, 2000).

The basic reason for teams in organizations is the experience that they will carry out some tasks more effectively than individuals. In fact, some tasks can only be carried out by teams of people working together rather than individuals working alone. So, through the creation of teams, an organization will be more effective. What does 'team effectiveness' mean? Team effectiveness involves performing well on five main areas:

1. Task effectiveness. This is the extent to which the team is successful in achieving its objectives which are related to their tasks.
2. Team member well-being. This refers to factors such as the well-being or mental health, growth and development of team members.
3. Team viability. This is the chance that a team will continue to work together and function effectively.
4. Team innovation. This is the extent to which the team develops and implements new and improved processes, products and procedures.

5. Inter-team cooperation. This is the extent to which the team works together with other teams in the organization. The aim of this cooperation is delivering products or services together (West, 2012, p.7).

Working with teams has a positive influence on the development of creativity and innovation, because teams take care of bringing together people with different knowledge, skills, experiences and attitudes. This diversity within a team is very helpful for the development of rich sources of creativity and innovation (West & Markiewicz, 2004, p. 113).

Team innovation is the introduction of new and improved ways of doing things by teams. Creativity and innovation are related to each other, but they are different things: creativity refers to new ideas; and innovation (were creativity is a part of) also requires creative ideas are being put into action, within a team, organization or society. Creativity is the development of ideas; innovation is making them happen in practice. So innovation includes both creativity and implementation of these ideas in the real world (West, 2012, p. 156).

2.4.3 Support of the leader:

Besides the importance of teamwork cohesion, when the organization tries to manage organizational learning into an aspect that is valuable to the whole organization, support leadership is also an important aspect of an organization to become intelligent. Support leadership means having a leader who possesses some specific characteristics. These characteristics include being a good designer, master, mentor, challenger, catalyzer and integrator. In addition to that it is also important to have a clear uniting vision(Montes, Moreno & Morales, 2005).

The support leader of a company gives, plays a key role in the development of innovations (Stata, 1989; Tushman and Nadler, 1986). Besides this, the support of a leader is also important for the creation of a climate which is supportive for the development of innovations (Kanter, 1983). Personal characteristics of the leader and the leadership style they use are a good predictor of the innovation capability of a company. Leadership styles who focus on collaboration and participation are important for the development of innovations within a company (Kanter, 1983; Larsen et al., 1991). Leaders who focus on these aspects could create the ideal conditions for innovation by bringing together innovative people. The leaders also focus on the creation of an environment where there is a lot of confidence between the employees (Tushman and Nadler, 1986).

2.4.4 Climate within the team:

When working with teams within your organization it is important to look at the emotional state of the members of the team. In most cases there is a good atmosphere between team members when a new work team is formed. When a new employee is introduced to their work team, team members should give this person a warm welcome using some welcome rituals. These activities are related to the team climate within an organization. Managers and researchers describe that such rituals and the climate within a company has a valuable effect on the performance of the company (e.g., Ashkanansy, Wilderom and Peterson 2000; Schneider 1990).

Based on Kopelman, Brief & Guzzo (1990) we could describe five essential elements of climate within an organization: goal emphasis, means emphasis, reward orientation, task support and socio-emotional support. These climate elements are applicable to multiple work environments. Additionally, all these five dimensions are important when you are looking from an HR-perspective. I'll discuss these five core elements of climate in the following chapter.

Climate within an organization should be a multidimensional concept. When this is the case, this should have a positive influence on the distribution of information within the organization. Employees of an organization should transfer their knowledge through many activities. The aim of this is to achieve a much smaller gap between research and practice.

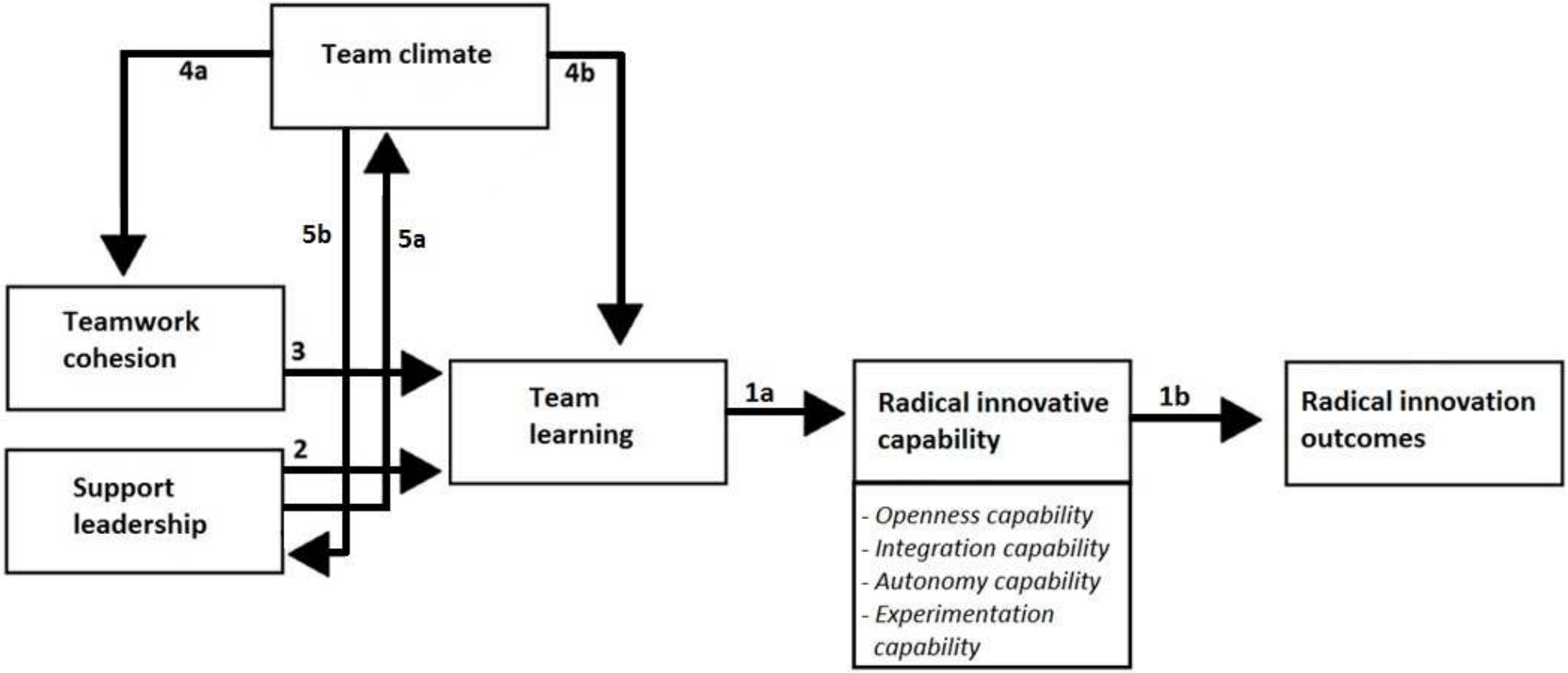
2.5 Radical innovation outcomes

Organizational innovativeness is defined by Wang & Ahmed (2004) as an organization's overall innovative capability of introducing new products to the market, or opening up new markets, by combining strategic orientation with innovative behavior and process.

Henderson and Clark (1990) describe that radical innovation creates a new dominant design within an organization. In other words, when a radical innovation takes place both the components and the links between the components have changed. Verganti (2008) also described that radical innovations change technological and socio-cultural meanings of products.

2.6 Research model

Based on theoretical insights described above and taking into consideration which aspects according to the articles are not sufficiently highlighted in the scientific world I have developed the following research model:



2.7 Hypotheses:

The following hypotheses are related to my research question and the research model described above and are based on a literature review:

1a. Team learning positively affects the radical innovative capability.

1b. The radical innovative capability positively affects the radical innovation results.

2. Support leadership positively affects team learning.

3. Teamwork cohesion positively affects team learning.

4a. Team climate positively affects teamwork cohesion.

4b. Team climate positively affects team learning.

5a. Support leadership positively affects team climate.

5b. Team climate positively affects support leadership.

3. Research methodology

3.1 Research type

This research can be described as a cross – sectional study. A cross – sectional study involves observations of a sample, or cross – section, of a population or phenomenon that are made at one point in time (Babbie, 2007). This research focuses on the employees and managers from R&D departments of eleven different companies at a specific time.

3.2 Source of empirical data

We collect the necessary information at the R&D departments in two different ways:
1. An interview with the (innovation) manager of the R&D department. The elaboration of these interviews can be found in appendix 1. R&D managers and the R&D department have been chosen because this department is directly involved in innovations. The interviews are focused on getting a picture of the research model and investigates if the relationships described within the research model are correct. I also try to generate understanding into how the different variables described in the research model are expressed within the company and which aspects are important to give these variables an accurate interpretation.

The interviews have taken place within the following eleven types of business:

Company number:	Industry in which the company operates:	Function of the interviewed company:	Size of the company (number of employees):
1	Automotive	Head R&D, department testing	1501 - 2000
2	Beer industry	Innovation project leader	500 - 1000
3	Low voltage electricity	Manager R&D low voltage department	1.200
4	Medium voltage electricity	Manager R&D medium voltage department	1.200
5	Motion control	R&D manager new product development team	400
6	Global water, fluid, thermal management, and equipment protection	Head of the R&D department	400
7	Sensors and controls	R&D Director Sensor Products Europe	251 - 500
8	Compressors and pumps for the oil and gas industry	Head of department Technology & Innovation	501 - 1000
9	Thermo Plastic Composites	Research associate	17
10	Textile technology market	Manager Business Development	501 - 1000
11	Development, production and sale of semi - finished products	Manager R&D department	700

Table 1: Description of the interviewed companies

Besides the qualitative data facts the managers gave in the interviews, we also asked them to give a score of importance of the different determinants of each variable. They could choose to give a score between 1 and 10.

1 means that the concerning determinant isn't important.
10 means that the concerning determinant is really important.
This quantitative data is summarized in a table which is shown within the results.

2. A topic list with a lot of different items has been completed by the employees and the manager of the R&D department. This topic list can be found in appendix 2. R&D managers have been asked to give their opinion to complete the overall picture. This questionnaire is a pilot study to see whether the model established is correct and to show how the relationships between the different variables are.

3.3 Operationalization

The different variables of the research are operationalized below. They show which constructions were used to measure them. The use of constructs has played an important role in designing a survey instrument in management research. In any research concerning behavioral elements, there is no device that can precisely produce measurement through a single metric unit, and researchers usually employ two or more measures to gauge a construct or scale. Given that developing new constructions or scales of measurement is a complex task, I followed the suggestion made by Montes, Moreno & Morales (2005) and, wherever possible, used pre-tested constructions from different past empirical studies to ensure their validity and reliability.

For every different concept a Likert – type 5-point scale *(1 totally disagree, 5 totally agree)* is used for the respondents to express or not express their level of agreement.

3.3.1. Radical innovation outcomes:

The dimensions used to measure the results are based on earlier research of Wang & Ahmed (2004). They define organizational innovations as 'an organization's overall innovative capability of introducing new products to the market, or opening up new markets, through combining strategic orientation with innovative behavior and process'.

3.3.2. Radical innovation capability:

Radical innovation capability can be regarded as a firm's ability to explore, adapt, tolerate and experiment with new products, processes and services within a company. As described in the previous chapter, we divided radical innovation capabilities into four types of capabilities: searching openness capability, strategic integration capability, tolerating and cultivating (e.g., autonomy) capability and experimentation capability. These four types of capabilities measure conditions that must be met with successful radical innovation capacity.

The openness capability describes that successful innovation requires collecting ideas and competencies from a lot of different sources. It is very important to have diverse sources of innovative ideas when your aim is to develop radical innovations (McLaughlin et al, 2008).

When looking at the integration capability Cabrales et al. (2008) suggested that the combined use of long-term and short-term incentives has a positive influence on the development of radical innovations within a company.

The autonomy capability describes that it is important that you have an autonomous culture when your aim is to develop radical innovations (O'Connor and McDermott, 2004).

Regarding the experimentation capability it is described that a firm's ability to learn, to probe and to experiment with new ideas, new R&D, manufacturing/ marketing tools, new disciplines and territories facilitates the introduction of radical innovation in established firms (Lynn et al., 1996).

The questionnaire used focuses on the extent to which a company has the necessary conditions/ determinants available to come to a good radical innovative capacity. It is an adaptation of the Canada MINE Innovation Management Survey. This consisted of the four parts described above: openness capability, integration capability, autonomy capability, experimentation capability and company information. In this research I use the first four parts of the questionnaire. These different capabilities are described above. There are three different statements for each capability to measure them (Chang et. al., 2012).

3.3.3. Team learning:

Team learning is a key process through which useful knowledge is developed and shared. With the aid of team learning companies can deal with complex issues well and improve its performance. Team learning is seen as an ongoing process of reflection and action. This process consists of asking questions, seeking feedback, experimenting, reflecting on results and discussing errors or unexpected outcomes of actions (Edmondson, 1999).

Team learning is the process used by firms to develop new knowledge and insights from the common experiences of people in the organization, and has the potential to influence behaviors and improve the firm's capabilities. This process consists of four sub processes. The first is knowledge acquisition, which is the process the company uses for obtaining new information and knowledge. The second is knowledge distribution, the process by which employees share information within the firm. The third is knowledge interpretation. At this sub process employees give their view on the external knowledge they collected and transform this knowledge into common team knowledge. Finally, the fourth sub process is organizational memory, which is the process of storing information and knowledge for future use (Huber, 1991)

This Huber's model of organizational learning is used to measure team learning. This model is related to the four sub processes described above(Jiménez – Jiménez & Sanz – Valle, 2011).

3.3.4. Support leadership:

Having a good supportive leadership means having a leader who supports innovation and individual initiative of their employees. This should happen through the construction of competences that focus on learning and on open communication. The aim of this is to minimalize the costs of internal change (Montes, Moreno & Morales, 2005).

A review of past empirical studies tells us that there are numerous works analyzing support from management, establishing different items that enable us to measure specific aspects that characterize this support (Montes, Moreno & Morales, 2005). One of the researches that attempts to improve our ability to understand leadership effectiveness is the approach that focuses on the identification and examination of those leader behaviors that influence the values and aspirations of their followers (Bass, 1985; Yukl, 1989a, 1989b). These transformational or charismatical behaviors have a positive influence on the performance of employees, because the employees feel trust and respect towards the leader and they are motivated to do more than they are expected to do' (Yukl, 1989b, p. 272). By articulating a vision of the future of the organization and providing a model that is consistent with that vision, fostering the acceptance of group goals, and providing individualized support, practical leaders change the basic values, beliefs, and attitudes of their employees in such a way that they are prepared to perform above the minimum level (Podsakoff, MacKenzie & Bommer, 1996). Ten items from Podsakoff et. al.'s (1984) contingent reward behavior scale were used to measure transactional leader behavior. Contingent reward behavior captures the exchange notions fundamental to transactional leader behavior, and is the principal behavior identified by Bass (Avolio & Bass, 1988; Bass, 1985) to represent this category. Performance contingent reward behavior

measures the degree to which a leader administers positive reinforces such as recognition, acknowledgement, commendations, etc. (Podsakoff, Todor, Grover & Huber 1984).

3.3.5. Teamwork cohesion:

Teamwork cohesion can be described as the cohesion between a group of people who have some complementary capabilities and show responsibility. Besides these aspects they share the same objectives (Montes, Moreno & Morales, 2005).

Teamwork cohesion has been reflected and measured in various ways in past empirical research (Wagner, 1995; Clugston et. al., 2000). I used in my research parts of the concept of Wagner (1995) to measure it. He defined cooperation, which might seem similar to cohesiveness within this research, as the willful contribution of personal effort to the completion of interdependent jobs and as an essential aspect whenever people must coordinate activities among differentiated tasks. Barnard (1938), who was one of the first modern organization theorists to recognize this requirement, described that it is crucial to the survival of a social unit that the members are focused on creating an environment which is focused on cooperation.

Research suggests that differences between people at a level of individualism or collectivism are likely to affect their cooperation in groups. It is the case that greater collectivism stimulates greater cooperation (Wagner, 1995).

Individualism – collectivism is a dimension that looks at the importance people give to personal interest and to shared pursuits. Wagner and Moch (1986) define individualism as a situation in which a person thinks that his personal interests are more important than the needs of groups thy belong to. Individualistic people look at their own interests and tend to ignore group interests if this conflicts with their personal wishes. The opposite of individualism, collectivism, occurs when the demands and interests of groups are seen as more important than the needs and wishes of individuals. Collectivists look at and take care of the well-being of the groups to which they belong, even if such actions sometimes have a negative impact on the individual wellbeing (Wagner, 1995). Collectivism as defined in this research might seem similar to cohesiveness, commitment or conformity, so to measure the degree of cohesion within a team I used some items of the factor analysis of individualism – collectivism described by Wagner (1995).

3.3.6. Team climate:

Team climate within a company can be described as employees' shared perceptions of the types of behaviors and actions that are rewarded and supported by the organization's policies, practices and procedures (Schneider, 1990). Shared perceptions of employees refers to the fact that there is consensus between the opinions of individual employees (Patterson et. al. 2005).

Based on Kopelman, Brief & Guzzo (1990) I defined five core elements of the climate:
1. Goal emphasis: the extent to which management informs their employees about standards they are expected to achieve.
2. Means emphasis: the extent to which management informs their employees about the methods

and procedures that they employees are expected to use in performing their jobs.
3. Reward orientation: the extent to which various organizational rewards are perceived to be shared on the basis of job performance.
4. Task support: the extent to which employees notice that they are being supplied with the materials, equipment, services and resources necessary to perform their jobs.
5. Socio-emotional support: the extent to which employees perceive their personal welfare is protected by a kind, considerate and generally humane management.

Within this research I will focus on the measurement of these different elements. I used parts of the Focus – questionnaire to measure these different elements. The reason to use parts of this questionnaire is the fact that this questionnaire is tested very well and constructed in a very good way. The development of the questionnaire started in 1989, when researchers from Europe and the United States came together with the plan of developing a research group to study organizational culture and organizational climate. The aim of the Focus-group was the development of an instrument which measures organizational climate as part of organizational culture, as well as other aspects of organizational culture. The researchers of focus'91 used a pilot study. The results of this pilot study got from nine countries. Based on the fact that these questions are properly tested for their effectiveness, I have decided to use them partly for measuring our variable team climate. I have linked some statements of the Focus-questionnaire to the five different global dimensions of team climate.

3.4: Statistical programs for data analyses

I do the first part of my quantitative analyses with the aid of SPSS. For the second part of our quantitative data analyses I use the program Smart PLS.

The most frequently used reasons to use Smart PLS are related to data characteristics. These are analyses of non-normal distributed data, analyses of data with small sample sizes and the formative measurement of latent variables (Hair, Sarstedt, Ringle & Mena, 2012). The first and the second reason are also the case within our research, because three of our six variables aren't normally distributed and our number of observations is limited, namely 38.

The codebook of our SPSS – data file is in appendix 3.

3.5: Normal distribution:

When you collect data, it is very valuable to plot a graph of how many times each score occurs. Plotting such a graph is called a frequency distribution or histogram. In an ideal situation, data are distributed systematically around the center of the scores. When you draw a vertical line in the center and conclude that both sides of this line look the same you can say that the data is normally distributed. To describe if a certain variable is normally distributed we use skewness and kurtosis. It is necessary to look to those both when you want to check if scores are normally distributed. Positive values of skewness describe too many low scores in the distribution. The opposite, negative values, describe a build-up of high scores. Positive values of kurtosis describe that there is a pointy and heavy-tailed distribution. Negative values of kurtosis describe that there is a flat and light-tailed

distribution. The further the values of these two indicators are from zero, the more chance that the data isn't normally distributed. Skewness and kurtosis are often used within research with small data samples. When you have a large sample it isn't necessary to use them, because they are likely to be significant even when skewness and kurtosis are not too different from normal (Field, 2009).

The following table describes the skewness and kurtosis of our data:

Variable:	Skewness	Kurtosis
Radical innovation outcomes	0,307	0,201
Radical innovative capability	-0,472	-0,531
Team learning	-1,049	1,191
Support leadership	-0,369	1,229
Teamwork cohesion	0,232	-0,918
Team climate	0,030	-0,864

Table 2: skewness and kurtosis of each variable (n = 38).

The skewness of the variables radical innovation outcomes, teamwork cohesion and team climate are positive. This describes that the data of these variables has too much low scores in their distribution. The skewness of the other variables, radical innovative capability, team learning and support leadership, are negative. This tells us that the data of these variables has a build-up of high scores.

The kurtosis of the variables radical innovation outcomes, team learning and support leadership are positive. This means that these variables have a very sharp distribution. The kurtosis of the variables radical innovative capacity, teamwork cohesion and team climate is negative. This means that there is a flat distribution of the data.

When looking at the variable team learning both the skewness and the kurtosis are far from zero. This tells us that the data of the variable team learning isn't normally distributed. Also the kurtosis of the variable support leadership and teamwork cohesion is far from zero, so this variable is also not really normally distributed. The values of the other three variables are relatively close to zero, so we could say that these variables are normally distributed.

To display normal distribution, normal distribution graphs and P-P plots (probability – probability plot) are a good tool. The normal distribution graphs and the P-P plots of the variables with an explanation are displayed in appendix 4. We could see that the variable radical innovative outcomes have a very good normal distribution. Within the P-P plot the points are located on or very close to the diagonal line. The variables team climate and radical innovative capability have a reasonably normal distribution. The variables team learning, teamwork cohesion and support leadership don't have a good normal distribution, because within the P-P plot the points aren't close to the diagonal line .

3.6 Description of the way analyzing quantitative data:

As also mentioned previously I analyzed the first part of our findings of the questionnaires with the aid of SPSS. The second part of my findings is analyzed with the aid of Smart PLS.

I will use the following statistical analysis methods of SPSS to analyze the data:
- Descriptive statistics
First I will describe some demographic characteristics. After that I will describe the mean of each variable. Besides that we also describe the normal distribution with the aid of skewness, kurtosis and histograms which display the normal distribution. You can find these histograms in appendix 4.

- Correlation coefficient
I will use the Spearman correlation coefficient to describe the correlation between some different variables. This correlation coefficient is widely used for ordinal variables. Besides this correlation coefficient can be used when the data is non-normally distributed (Field, 2009). Based on the fact that our variables team learning, teamwork cohesion and support leadership didn't have a good normal distribution we concluded that this correlation coefficient is very suitable to use in our situation.

A model that tests a directional hypothesis is called a one – tailed test. A model that tests a non – directional hypothesis is known as a two – tailed test (Field, 2009). My hypotheses are all one – directional, so I used the one – tailed test.

- Multicollinearity
There should be no perfect linear relationship between two independent variables, so the correlation between two independent variables should not be too high. One way of identifying multicollinearity is to scan a correlation matrix of the independent variables and see if any correlates very high. A correlation is ranked as high when it is higher than 0,8 / 0,9. Multicollinearity between independent variables makes it difficult to describe how important and big the influence of one individual variable is on other variables (Field, 2009).

- Cronbach's alpha
When you are doing research, it is important to look at the reliability of your research. Reliability means that data consistently reflect the variable that it is measuring (Field,2009). Cronbach's alpha is widely used in social science research to estimate the internal consistency of reliability of a measurement scale (Sun, Chou, Stacy, Ma, Unger & Gallaher, 2007).

The most commonly used measure for realiability is Cronbach's alpha. A value of 0,7 or higher is an acceptable value for Cronbach's alpha, values substantially lower indicate an unreliable scale (Field, 2009).

- Regression analyses.
As described by Field (2009) with the help of a regression analyses I fit a model to our data and use it to predict values of the dependent variable from one or more independent variables. Regression analyses is a way of predicting an outcome variable from one predictor variable (simple regression)

or several predictor variables (multiple regression). This tool is incredibly useful because it allows us to go a step beyond the data that I collected. The value of R represents the simple correlation between the independent and dependent variable. The value of R square (R^2) tells us which part of the variance of the dependent variable is explained by the independent variable (Field, 2009).

I use the program Smart PLS to do the regression analyses.

3.7 Description of the way analyzing qualitative data:

The aim of collecting qualitative data with the aid of interviews with R&D managers is to obtain information on the determinants and try to collect information into why certain relations are weak and other relations are strong. This means that the qualitative data is directed at obtaining a deeper understanding of the hypotheses.

The qualitative data is collected during eleven interviews with R&D managers of innovative companies in Twente (the east of the Netherlands).

The quantitative data is reported and analyzed as follows:
- A complete elaboration of the eleven interviews can be found in appendix 1.
- I asked the managers during the interviews to rank the different elements of each variable in order of importance. A table with an overview of the score of importance the eleven managers gave to the different elements of each variable can be found in the chapter on the results. Also a short analysis of this data is displayed here as well.
- A summary of the information of each variable the managers gave to me during the interviews can be found in the chapter on the results.
- Within the conclusion the qualitative data will be used to explain the quantitative data.

4. Results

This chapter consists of two different parts.
The first part focusses on the results of the interviews with the R&D managers. The aim of this part is more understanding of radical innovations and the determinants of radical innovation within our model using information from the work field. A table with the scores of importance the managers gave to the different elements of each variable, is displayed.
The second part focusses on the results of the questionnaires and describes the relationships of the different variables to each other.

A complete elaboration of the interviews of the eleven different companies can be found in appendix 1.
A summary of the scores of importance the managers gave each element of the different variables is in the results chapter.
The questionnaire with a lot of items I used to collect the data within the different companies is in appendix 2.

Below, you can find the first a summary of each different variables and besides that information about the relation between the different variables.

After that, the method of analyzing the data found with the questionnaires and the results and the conclusions linked to these results, are displayed.

4.1 The interviews

4.1.1 Summary of the findings

4.1.1.1. Various concepts within the companies

Radical innovative capability:

A manager describes radical innovative capability as the capability to develop complete new products (interview 2, 2013).

When a company wants to have a good radical innovative capability it is important that their employees should have time to develop new things. Employees of a company also have their daily work which asks a lot of time and attention. To solve this time problem, companies should set up project teams for the development of radical innovations (interview 1, 2013). The formation of such teams can sometimes change when specific expertise is required (interview 10, 2013). When these teams are set up, employees have time to develop their creativity (interview 2, 2013). Besides creativity, also daring to experiment, having people with different disciplines within your company (interview 4, 2013) and having enough budget available is very important when you want to develop radical innovations (interview 7, 2013). Also, the people of a company should be trained for the development of radical innovations. It is important for companies to invest in their people (interview 8, 2013). It is important that people have the right qualifications (interview 11, 2013). This could be achieved either with the aid of external training and education or with internal training (interview 8,

2013). Having very good people in your company will ensure that the company survives (interview 9, 2013).

To collect new ideas sometimes 'design bursts' should be organized at R&D departments. This is a brainstorming session with the entire department. The aim is to keep people sharp and to trigger them (interview 4, 2013). These meetings could also create a good internal cooperation, which is important for the development of radical innovations (interview 6, 2013).

To judge which idea is very good or even excellent, companies should use a kind of 'idea funnel' . This is a stage-gate model (interview 2, 2013). At every gate, there is a go/ no-go moment. At such a go / no – go moment they look at the practability of the project in different areas. These areas are financial, marketing and technical / economic (interview 4, 2013). It is also important find potential customers and competitors in an early funnel. In this way you test your idea on the market. After testing your idea on the market you should develop a concept and plot this concept on the market (interview 5, 2013).

Besides creating radical innovations with the aid of people who are working in your company it is recommended to work together with people from outside your company. When using external input the company will not be hindered by knowledge that the company already has. When a company uses external input you will get a different climate in the company, allowing people to open up more and become more developed (interview 6, 2013). Sometimes this cooperation with other companies is necessary for the development of radically new technologies (interview 10, 2013)

Team learning:

Team learning means that employees learn a lot from each other (interview 3, 2013). People should share knowledge, for example about problems they face, and learn from each other in this way (interview 4, 2013). Team learning is something that happens much on-the-job (interview 8, 2013). To optimize team learning it is necessary to combine people with different work experiences within a team (interview 6, 2013).

To ensure a good team learning effect it is very important that the management gives attention to team learning and provides good opportunities to develop a good team learning climate. E.g. the management can organize meetings on specific topics (interview 3, 2013).

To create a good learning environment in a team, it is important that the department is transparent. Everyone should be open and ask each other's for help when necessary. Then, colleagues like to share their experiences with each other and so can learn from them (interview 11,2013). For the manager, the challenge is that workers with the identical problems cooperate with each other. He could achieve this by organizing a work meeting monthly. At these meetings workers tell each other which problems they meet. When more employees face the same problem they can share knowledge and learn from each other in this way (interview 4, 2013).

To reach a good education and good learning effect in an organization a certain awareness among the employees is also important. Employees must consciously think about their development and also engage in areas in which they are not experts (interview 6, 2013). Companies should give custom

– made trainings that fit in with each employee. Managers should make curricula for each function. Some of these courses are provided by an internal agency, others by an external agency (interview 7, 2013). Companies should give a lot of attention to such career guidance. You can never do this enough as a company, but the problem is the fact that there isn't always enough time and money available. Another good method for learning is the 'young professional' programs. This is a training program for higher graduated people. These people work in a relatively short time in a lot of departments within the company. The advantage of this is that these people collect a lot of knowledge in each department. Another advantage is the fact that the coherence between different departments increases through working in this way (interview 11, 2013). Another way to collect knowledge is for example visiting suppliers and attending workshops at your suppliers. These workshops could focus on process development and development of new machines (interview 5, 2013).

What should be taken into consideration is the fact that people within teams often work at a certain position for a long time and work according to fixed patterns. When people work according to a fixed and structured pattern, the ability to develop innovations is declining sharply (interview 10, 2013). A good way to prevent this is working within project teams. Then employees work within different project teams each time. These project teams are multi – disciplinary. People from different disciplines come together in a team, which enhances the learning effect (interview 1, 2013; interview 2, 2013). In project teams it is customary for employees to learn from each other (interview 8, 2013). It is also important to have a mix of junior and senior within all kinds of teams. Seniors often are the leader of the project teams and must therefore encourage juniors to develop new innovative products. A senior employee who is the leader should also work within the team daily. Through his daily attendance within the team he gets a very good picture of what is happening. To give a junior staff an opportunity to learn how to deal with being leader of project teams they should sometimes function as a leader in smaller projects (interview 6, 2013).

Support leadership:

Support leadership means that there is much support from above and assistance in various activities, for example with making a planning (interview 3, 2013). In most cases, support leadership happens from the side. A manager determines the direction of a project. The manager is not constant at the workplace involved in a project.

To offer a good supportive leadership it is important that the leader gives responsibility to his employees. This is called empowerment. Besides this a manager should work from the principle of trust, this means giving confidence to your employees (interview 1, 2013), creating an open relationship and listen very well (interview 8, 2013). Another important aspect is that employees need space to be innovative which the leader should provide (interview 1, 2013). The manager should frame the innovation process. Higher educated employees are not very keen on guidance (interview 11, 2013). The leader must ensure that people can do their work undisturbed (interview 4, 2013) and employees should be allowed to make a mistake sometimes. The leader should not bee to strict with his employees (interview 5, 2013). But besides some working space, it is also important that a leader is accessible and that he/she has time for his employees (interview 2, 2013). Having time is especially important when employees have a problem. Employees must feel that they can go

to their superior when they have a problem (interview 3, 2013). It isn't necessary that the manager is always on the work floor (interview 5, 2013), but having an office close to the workplace is valuable. When this is the case the company can work with short lines and promote informal contact (interview 9, 2013). When a project is likely to escalate the manager must intervene (interview 5, 2013). Then a leader should always explicitly demand employees must put differences that hinder the development asides. Developing new products is associated with highs and lows. This is mentioned the 'hype curve'. A leader must help his employees with the lows. It is important for a leader to talk to his employees then and that he, when necessary, looks for additional help. This could be a student or an external company (interview 10, 2013).

A leader ought to have a kind of overview. Having a helicopter view of a department ensures that you always know where the big things occur (interview 6, 2013). A good supportive leader should also have time available to challenge his employees and ask critical questions when people come up with new ideas. It is important to see whether a new idea is practicable every time it comes up (interview 5, 2013). A leader must ought to function as a coach for his employees (interview 8, 2013) and should feel responsible to help his employees getting the most out of them (interview 7, 2013).

It is also important that a leader is clear about who plays which role and what is everyone's responsibility (interview 2, 2013). When working with different roles and specialisms, you should as a leader/ manager, accept that your employees know more than you in certain areas (interview 5, 2013).

Teamwork cohesion:

One manager describes that teamwork cohesion means that teams formed inside the company have a strong bond with each other and that colleagues help each other any time (interview 4, 2013). Besides that, everyone understands the field of study when there is teamwork cohesion (interview 2, 2013).

Important to ensure a good team cohesion is the fact that a leader should formulate a clear project goal in the beginning and should communicate these clearly with all employees (interview 11, 2013). This provides support within a team. The management should also value and back up the object of a specific team (interview 6, 2013).

Apart from this project goal also attention should be given to what an employee must achieve in his own department in the short run. To have a clear project goal and a clear department goal and communicate these in a good way, conflicts could be prevented (interview 11, 2013).

Positive for the cohesion within a team is to record when something was successful. Celebrating team successes is very gratifying (interview 11, 2013). Within a company there should be time and money available for organizing activities for the team (interview 9, 2013). Such things are valuable for the informal contact between team members. Managers should stimulate continuing informal contact (interview 11, 2013). To achieve this a coffee / lunch room in the company-building, where employees can have their breaks together (interview 9, 2013) and a kind of 'living room' where colleagues can brainstorm face-to-face with each other is almost necessary. Besides sharing ideas in

real life, sharing ideas with the aid of an online sharing point may also increase the team cohesion. In this way you can work together and share information with each other when you're not in the same room (interview 8, 2013). These things are essential, because regular consultation within an open culture is essential for a good teamwork cohesion. Employees ought to have freedom of speech (interview 3, 2013). When employees have a say in decisions the manager may achieve that his workers more often support the choices made and that they are open to cooperation (interview 1, 2013).

Another notable thing for achieving good team cohesion is a good assumption policy. When new people are appointed, it is very important to chart if this person fits in the team. To do this, a company should have several interviews and an assessment. It is also of great importance to know how open a person is for change. This may be an indication of how he is in dealing with other people (interview 7, 2013). Cooperation with other people is essential. Team members who always 'want to shoot at the target' should be slowed down. They have to learn to be more of a team player (interview 5, 2013). An individual team-member could contribute to achieve good team cohesion and a good relationship between the various people in a team by accepting each other, be open to cooperation and by having sufficient time available to think about innovations (interview 2, 2013).

When a team with a good cohesion is formed, it is important that this team continues together throughout the whole lifetime of a project, because people know each other well when they have worked together for a long time and understand each other (interview 4, 2013).

Team climate:

One manager describes that having a good team climate means that people enjoy working (interview 2, 2013). A good team environment is the most important ingredient for a company. The company's success depends on it (interview 10, 2013).

The core conditions for a good team climate are openness in the team, honesty between the workers within the team and having a heart for the company and not minding extra working hours (interview 11, 2013). Openness is very important, because employees should dare to fail (interview 8, 2013). Have employees with a heart for the company ensures that you have a 'staff-to-win'. When companies who have these workers make the choice to do something, they have the right resources available and can make any effort to achieve their goal (interview 7, 2013). It is important that this goal is very clear (interview 6, 2013) and that there is sufficient focus to achieve it (interview 4, 2013). Everyone should pursue the same end goal (interview 2, 2013).

To achieve these core aspects, working in an informal way is important. There must be sufficient space for an informal talk and discussion. Employees should also be involved in the status of the company. It is very important that employees feel that they are involved and that they are taken seriously (interview 9, 2013). To achieve this, correct communication is important (interview 6, 2013). A company may have a plain process as well as purpose very bright, but if it does not know how to communicate, it will reach nothing (interview 4, 2013). And moreover a transparent decision – making process which is in line with the strategy is important (interview 7, 2013). Besides that, the manager is involved in the decision process. He should create an atmosphere of trust and stimulate creativity (interview 8, 2013).

Also important for a good team climate is a good balance in the work that must be performed and having some deadlines. For the development of innovations, limitations in time, money and space are needed. If there aren't restrictions, there will be too little creativity (interview 1, 2013).

Besides this, some material aspects are important for reaching a good team climate, such as a central computer disk. People can use this to easily share data of projects (interview 11, 2013).

4.1.1.2 Relationships between the different concepts

Two issues related to the research model are listed numerous times:
- Support leadership could have, apart from its influence on team learning, also influence teamwork cohesion.
- The relation between support leadership and team climate is two – directional. More managers expect that the influence of support leadership on team climate is huge and that the influence of team climate on support leadership is very limited or even none.

Some other things that were mentioned about the relation between the different concepts:
- Teamwork cohesion may also have an influence on team climate.
- Maybe the variable 'company culture' or 'trust – eco system' should be added to the model. The R&D manager assumes that the corporate culture is important for how the team works and how it is prepared.
- Support leadership may also have an influence on teamwork cohesion.
- Team climate, teamwork cohesion or support leadership may also have a direct influence on radical innovative capability. As a manager it is possible to directly indicate the ability for radical innovations. That managers indicate this basically says that all variables are important for a good radical innovative capability.

4.1.1.3 Scores in order of importance for the different elements of each variable

Overview of the scores for each item which the managers gave within the interviews:

1 means: the determinant isn't important for that variable.
10 means: the determinant is really important for that variable.

Variable:	Determinant:	Com-pany 1	Com-pany 2	Com-pany 3	Com-pany 4	Com-pany 5	Com-pany 6	Com-pany 7	Com-pany 8	Com-pany 9	Com-pany 10	Com-pany 11	Total score
Radical innovative capability	Experimentation capability	10	8	8	9	8	9	8	8	9	7	7	91
	Autonomy capability	8	9	7	10	7	8	7	9	8	9	7	89
	Openness capability	6	8	10	7	10	8	8	7	8	10	9	91
	Integration capability	4	9	9	8	6	7	9	7	7	7	8	81
Team learning	Information interpretation	10	8	9	7	9	9	9	7	9	10	8	95
	Knowledge acquisition	9	8	10	8	10	9	8	8	8	8	8	94
	Information distribution	9	9	8	10	7	8	9	7	8	9	10	94
	Organizational memory	8	8	7	9	6	8	9	8	9	7	10	89
Support Leadership	Give positive appreciation to the employees	10	9	9	9	8	8	9	9	8	9	7	95
	Giving positive feedback to the employees	8	9	10	10	10	8	9	9	8	10	7	98
	Giving an additional reward to employees when they perform well.	6	8	8	8	6	6	8	6	6	7	4	73
Teamwork cohesion	Team members must be willing to sacrifice for the team, they should be open for business cooperation.	10	10	9	8	8	9	8	9	8	-	10	89
	Team members must follow the group perspective and	8	9	10	10	6	9	9	7	7	-	6	81

	not do what they want themselves.												
Team climate	Focus on the target	10	9	10	10	10	9	7	9	8	10	10	102
	Social – emotional support	9	9	7	6	8	8	7	8	9	8	6	85
	Task support	8	8	9	8	9	9	9	8	8	7	6	89
	Emphasis on the resources	7	6	8	10	7	7	5	7	7	8	4	76
	Guidance on an extra pay	5	7	6	7	6	7	6	6	5	7	6	68

(Interviews 1 – 11, 2013)

When looking at these data I can conclude, based on the interviews with managers, that the experimentation capability and the openness capability are both very important determinants for the development of a good radical innovative capability as a company. When you want to develop a good team learning environment, the information interpretation needs enough attention. For offering a good supportive leadership as a manager the most important aspect is giving positive feedback to your employees. When a company wants to reach a good teamwork cohesion, it is important that team members are willing to sacrifice for the team. They should be open for business cooperation. To reach a good team climate within your company, the most important aspect is having enough focus at the target.

4.2 The questionnaires

4.2.1 Missing values

As was the case in many studies, in our research there were questionnaires with some missing data as well. We have ignored these propositions that had not been filled in some questionnaires.
In appendix 4 you can find the normal distributions of each variable. Within SPSS we have cells that show a value of a specific questionnaire that has not been filled out assigned with the value '0'. Within SPSS we indicated that cells containing the value '0' should be ignored in the analyzes. If we would not ignore these missing values the calculation of an average value off a variable would give an incorrect image.

4.2.2 Processing the results

4.2.2.1 Demographic characteristics:

We describe within these results how the eleven companies collectively score on the variables we measured with the help of our questionnaire.

Some (demographic) characteristics of the population we tested are described in the following table:

Gender	Percentage
Man	92,1 %
Woman	7,9 %

Table 3: Gender (n = 38).

Function	Percentage
Manager	26,3%
Employee	73,7%

Table 4: Function (n = 38).

Age	Percentage
21 - 30	15,8%
31 - 40	26,3%
41 - 50	36,8%
51 - 60	18,4%
61 - 70	2,6%

Table 5: Age (n = 38).

4.2.2.2 Cronbach's alpha:

For the reliability analysis, I used the Cronbach's alpha. I calculated the overall Cronbach's alpha for the variable which form together the model. Besides that, I calculated the Cronbach's alpha for each group of items that form a variable together.

Cronbach's alpha for each group of items that form a variable together:	
Radical innovation outcomes	.707
Radical innovative capability	.781
Team learning	.750
Support leadership	.851
Teamwork cohesion	.744
Team climate	.619

Table 6: Cronbach's alpha (n = 38).

The Cronbach's alpha's of most of our variables are positive, because the values are above 0.7. Only the variable team climate shows a downward blip with a value of 0.619. This means that this variable isn't really reliable.

Based on the fact that the variable team climate isn't reliable I looked more specifically at the different items of this variable. For all 14 items of the variable 'team climate' I calculated the Cronbach's alpha 'scale if item deleted'. This option provides a value of Cronbach's alpha for each item of the variable. It tells us what the value of Cronbach's alpha would be if that item were deleted. Through analyzing this we could find which item should be removed from the questionnaire to improve the Cronbach's alpha to a reliable value (Field, 2009).

Removing the item 'employees are very infrequently treated impersonal' provides the greatest increase in Cronbach's alpha: from 0.619 to 0.649. This is the first item I removed from the questionnaire. After having removed this item the Cronbach's alpha of the variable team climate is still lower than 0.7, so I calculated the Cronbach's alpha 'scale if item deleted' again. The result was that having deleted the item 'the leadership style let freedom in the work' delivered the biggest contribution to the Cronbach's alpha: an increase from 0.649 to 0.681. This is the second item I took away from the questionnaire. After having removed this item the Cronbach's alpha wasn't high enough, so I chose to remove a third item. To do this, I calculated the Cronbach's alpha 'scale if item deleted' for the third time. After having removed the item 'The management show interest in personal problems of employees', this time the result led to the biggest increase in Cronbach's alpha: from 0.681 to 0.712. This means that the Cronbach's alpha, after having been deleted these three items, have a reliable value. I calculated in SPSS a new variable 'team climate' without these three items described above.

I use this new calculated variable team climate for the following analyses, because this variable has a Cronbach's alpha which is reliable. This makes my whole research more trustworthy.

4.2.2.3 Means:

The mean of each variable is described in the following table:

Variable:	Mean	Standard Deviation
Radical innovation outcomes	2,8063	0,57
Radical innovative capability	3,5717	0,489
Team learning	3,3176	0,531
Support leadership	3,5194	0,569
Teamwork cohesion	4,0461	0,51
Team climate	3,2026	0,428

Table 7: Mean and standard deviation of each variable (n = 38).

All the statements of our questionnaire were positively formulated. So: a higher score on certain statements tells us that this variable gets better contours within the company. A value above 3 describes that the relevant variable in the companies we have tested is positive or above neutral.

I can see that the variable radical innovation outcomes scores under neutral with a value of 2,8063. All the other variables scored above or far above neutral in the companies we tested. Especially the variable teamwork cohesion scored very high in the companies we tested with a value above 4.

The standard deviation gives an estimation of the average variability (spread) of a set of data (Field, 2009). I could see that the variability of all our variables, excluding team climate, is relatively high.

I also calculated the mean and standard deviation of each different item of the variables. The table in appendix 5 shows these values. When I look at these values, I can draw some conclusions.
Firstly I could see that the two items of the variable radical innovative capability 'we apply the knowledge gained in previous projects to new projects' and 'we commercialize proven concepts into market' have a relatively high mean value. This means that this items gives major contribution to the development of a good radical innovation capability. When looking at the variable team learning I could see that the item 'employees share knowledge and experiences by talking to each other' scores relatively high. This indicates that this happens a lot in the interviewed companies and delivers a good contribution to the team learning within the companies. When looking at the variable teamwork cohesion, the items 'I prefer to work with others in a team rather than working alone', 'people should be made aware that if they are going to be part of a team then they are sometimes going to have to do things they don't want to do' and 'people in a team should realize that they sometimes are going to have to make sacrifices for the sake of the team as a whole' have the highest means with a value of respectively 4.30, 4.22 and 4.19. For a good team cohesion, it is therefore important that workers in the team thought it pleasant to work together.

4.2.2.4 Correlation coefficient

The Spearman correlation coefficients between our variables are as follows:

Correlation – Spearman's rho (r_s)						
	RIC	RICO	TL	SL	TCO	TCL
RIC	-					
RICO	0,439**	-				
TL	0,469**	0,331*	-			
SL	0,387**	0,141	0,579**	-		
TCO	0,092	- 0,034	0,134	- 0,56	-	
TCL	0,147	0,058	0,472**	0,341*	0,191	-

* = correlation is significant at the 0.01 level (1-tailed)

** = correlation is significant at the 0.05 level (1-tailed)

Table 8: Spearman correlation coefficients (n = 38).

When a correlation coefficient is zero, there is no relationship. The further, the stronger the relationship (Field, 2009). The correlation coefficients described in the table above give an indication of the strength of the relationship between the different variables within my research. The significant value is used to express that relation was accidentally. When the probability of obtaining the value of our test statistic by chance is less than 0.05 then we generally accept the relation as true (Field, 2009).

In the table above we see that some of the variables we measured didn't have a significant relationship to each other. Radical innovation outcomes (RICO) don't have a significant relation with support leadership (SL), teamwork cohesion (TCO) and team climate (TCL). Radical innovative capability (RIC) doesn't have a significant connection with teamwork cohesion and team climate. Team learning (TL) doesn't have a significant affinity with teamwork cohesion. Support leadership doesn't have a significant relationship with radical innovations outcomes and teamwork cohesion. Teamwork cohesion doesn't have a significant relationship with radical innovation capability, radical innovation outcomes, team learning and support leadership. Team climate is the only variable with which teamwork cohesion has a significant relation. The variables with which team climate doesn't have a significant relationship are radical innovation capability and radical innovation outcomes.

Based on the correlation table above I conclude that support leadership and team learning have a significant and very strong correlation with each other (r_s = .579, p (one-tailed) < .05). Team learning also has a reasonably strong and significant correlation with team climate (r_s = .472, p (one-tailed) < .05). Also the variable radical innovative capability has a strong and significant correlation with the variables radical innovation outcomes (r_s = .439, p (one-tailed) < .05) and team learning (r_s = .469, p (one-tailed) < .05).

4.2.2.5 Multicollinearity:

When looking at our correlation table (table 7) I conclude that the highest correlation we measured between independent variables is the correlation between team learning and support leadership. This correlation has a value of 0,579. So, I can conclude that multicollinearity between independent variables isn't a problem.

4.2.2.6 Bootstrapping analysis

To look at the significance and regression in our model, we used the program smart PLS.
The first analysis I did is a bootstrapping analysis. With the aid of this analysis, it is possible to say if relationships are significant or not. The value which represents this is the T-value.

Significance level (all two – tailed)	Significant at this T-value or a higher T-value
10%	1.65
5%	1.96
1%	2.58

Table 9: The T-values and significance

The first seven relationships are measured with hypothesis 5b (team climate has a positive influence on support leadership) within the model. The last relationship is measured with hypothesis 5a (support leadership has a positive influence on team climate) in the model. The reason for this is that it isn't possible to measure hypotheses 5a and 5b at the same time.

Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	Standard Error (STERR)	T – statistics
Team learning → Radical innovative capability	0.8211	0.8279	0.0299	0.0299	27.4824
Radical innovative capability → Radical innovation outcomes	0.6769	0.6860	0.0514	0.0514	13.1645
Support leadership → Team learning	0.5365	0.5415	0.0937	0.0937	5.7224
Teamwork cohesion → team learning	-0.0750	-0.0564	0.0967	0.0967	0.7751
Team climate → teamwork cohesion	0.3593	0.3922	0.1021	0.1021	3.5176
Team climate → team learning	0.7278	0.7247	0.0596	0.0596	12.2060
Team climate → Support leadership	0.6666	0.6524	0.0924	0.0924	7.0738
Support leadership → team climate	0.6666	0.6572	0.0978	0.0978	6.8164

Table 10: Bootstrapping results: path coefficients

No sign changes

Cases: 100

Samples: 200

I can conclude that all relationships, excluding 'teamwork cohesion → team learning' are significant at 1% significance level, because the T-values are bigger than 2.58. The relationship 'teamwork cohesion → team learning' has a T-value of 0.7751. This value is lower than 1.65. This means that this relationship isn't significant at a significance level of 10%, and additionally not on significance levels of 5% or 1%.

4.2.2.7 Regression analyses

We did the analyses in different parts and each time added, removed or changed some elements. We did seven times a regression analyses, using the different models described below:

* Regression analysis 1:
The variables radical innovation outcomes and radical innovative capability with hypothesis 1b has been tested.

After regression analysis 1 I let the variable 'radical innovation outcomes' and hypothesis 1b out, because this connection is the same in each case.

* Regression analysis 2:
The variables radical innovative capability, team learning, teamwork cohesion and support leadership with hypotheses 1a, 2 and 3 have been tested.

* Regression analysis 3:
The variables radical innovative capability, team learning, teamwork cohesion, support leadership and team climate with hypotheses 1a, 2, 3 and 4a have been tested.

* Regression analysis 4:
The variables radical innovative capability, team learning, teamwork cohesion, support leadership and team climate with hypotheses 1a, 2, 3 and 4b have been tested.

* Regression analysis 5:
The variables radical innovative capability, team learning, teamwork cohesion, support leadership and team climate with hypotheses 1a, 2, 3, 4a and 4b have been tested.

* Regression analysis 6:
The variables radical innovative capability, team learning, teamwork cohesion, support leadership and team climate with hypotheses 1a, 2, 3, 4a, 4b and 5a have been tested.

* Regression analysis 7
The variables radical innovative capability, team learning, teamwork cohesion, support leadership and team climate with hypotheses 1a, 2, 3, 4a, 4b and 5b have been tested.

My reason to work in such a way is to check what the influence of adding or removing the variable team climate is.

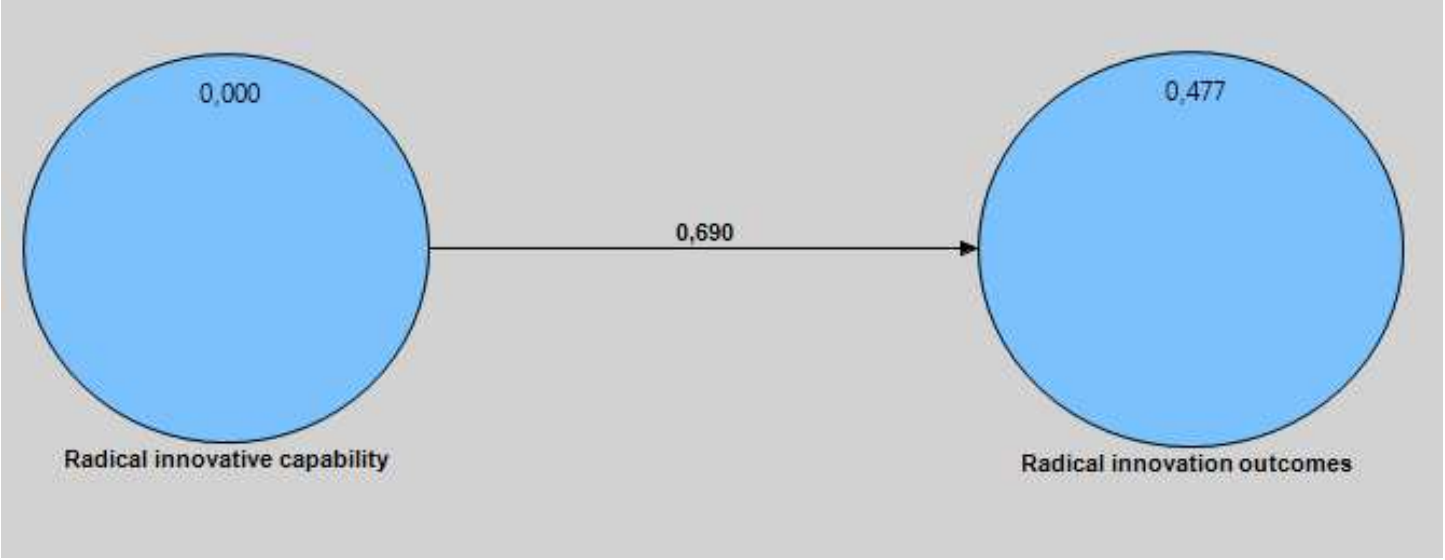
In smart PLS this regression analysis is called path analysis. When we do a path analysis within smart PLS a path weighting scheme is the result. Standardized regression weights are shown near the arrows which show the relationships between the different variables. These standardized regression weights show the effect of the independent variable on the dependent variable. The values near the arrow between the variable and the indicator are the factor loadings. The values within the circle of the variable itself is the R^2 (R-square). This R^2 is the percentage variance of the respective variable

explained by the explanatory variable(s).

When doing the seven different analyses described above, the following path weighting schemes are the result. To keep the images clear and understandable the indicators of each variable are not displayed.

*** Regression analysis 1:**

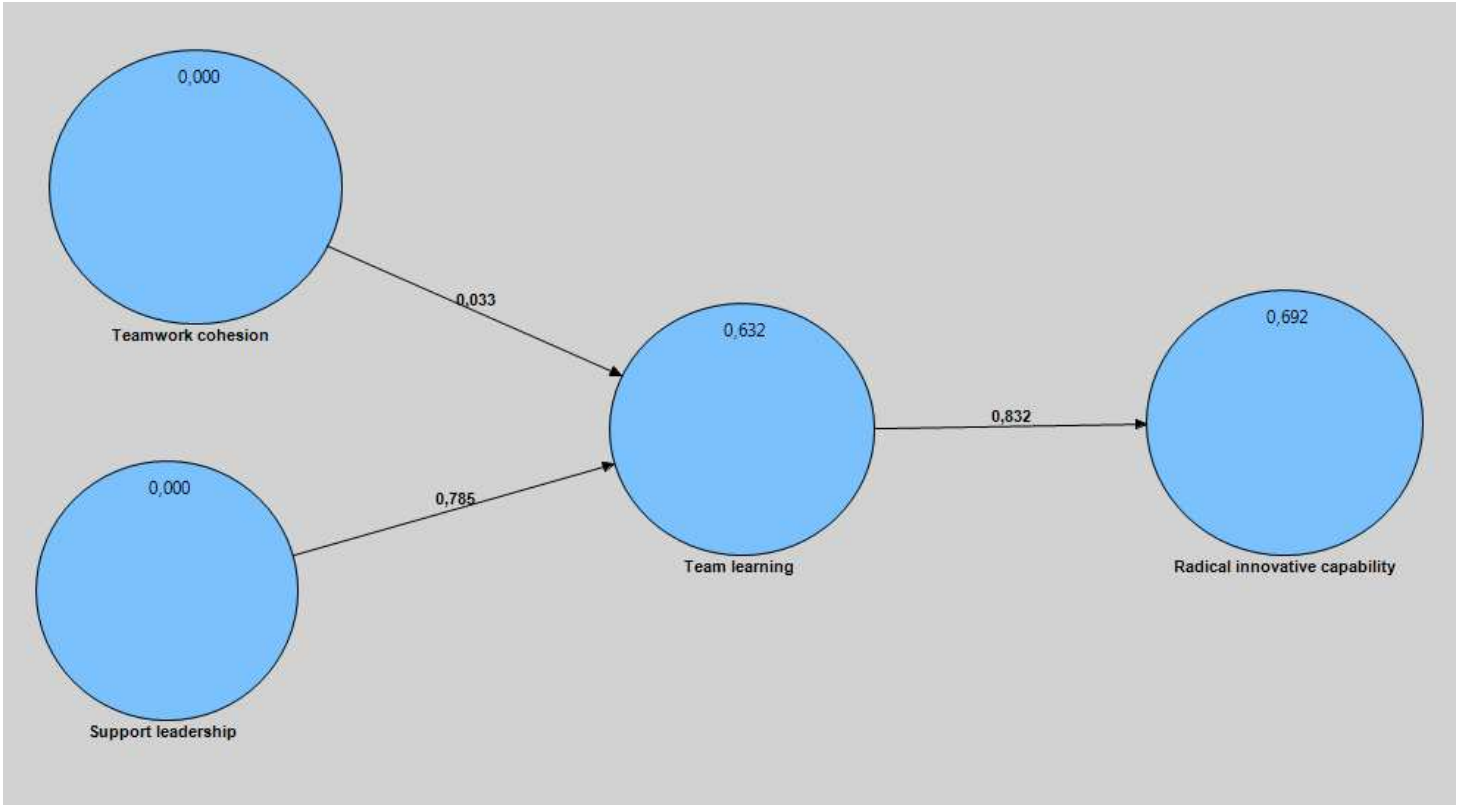
Radical innovative capability has a large influence on the radical innovation outcomes of a company, because radical innovative capability describes 47,7% of the variance within the variable radical innovation outcomes.



*** Regression analysis 2:**

When we look at this path weighting scheme it is striking that team learning has a large effect on radical innovative capability. The standardized regression weight is 0.832 and team learning describes for 69,2% of the variance within the variable radical innovative capability.

To reach a good team learning within your company, support leadership is important. This is described by the fact that the standardized regression weight is 0.785 between support leadership and team learning. This shows us that support leadership has a relatively large effect on team learning. Teamwork cohesion isn't important for reaching good team learning within your company. The standardized regression weight between teamwork cohesion and team learning is 0.033. This means that the influence of teamwork cohesion on team learning is very limited. Important to take in mind is the fact that the relationship between teamwork cohesion and team learning isn't significant. So, chance can play a big role.

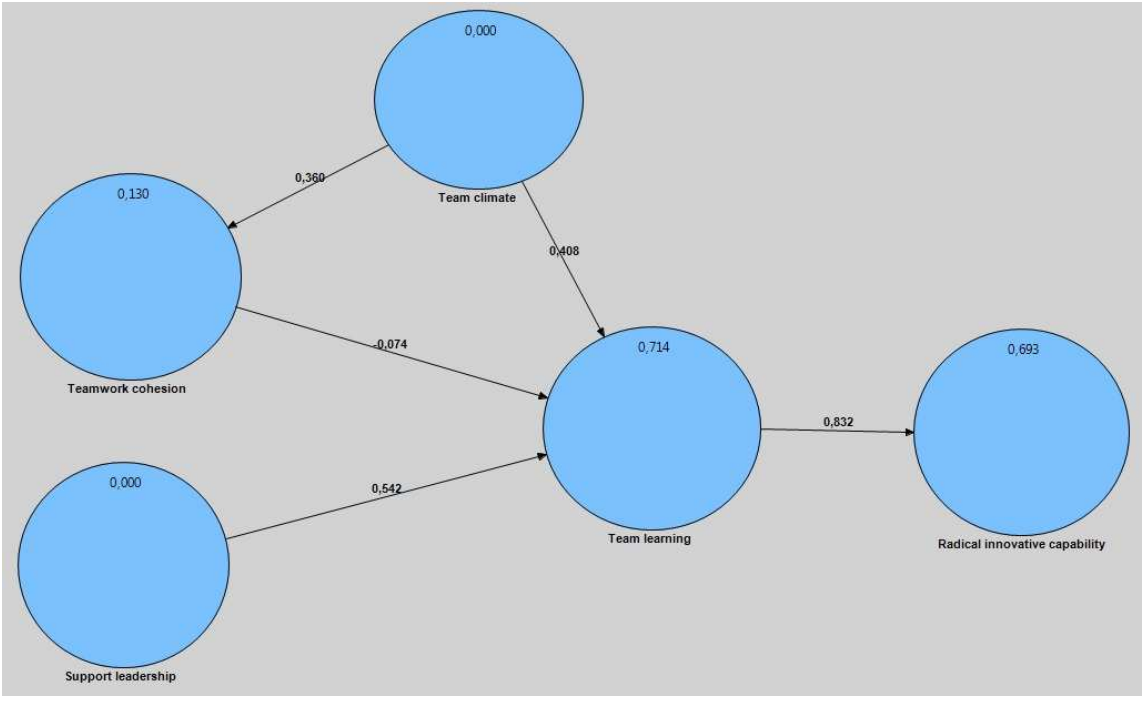


*** Regression analyses 3, 4 and 5:**

When team climate only has a direct influence on teamwork cohesion (hypothesis 4a), this doesn't make a really big difference for the rest of our model. The other standard regression weights and R-squares both have almost all exactly the same values as regression analysis 2. The difference within the variable teamwork cohesion is described for 15,4% by the variable team climate when team climate only has a direct influence on teamwork cohesion (hypothesis 4a). The standard regression weight between both variables is 0.393.

When team climate has a direct influence on team learning (hypothesis 4b) and team climate isn't linked to teamwork cohesion (hypothesis 4a), I could conclude that the influence of team climate is bigger than is the case in the previous regression analyses. When team climate has a direct influence on team learning 71,4% of the variance within the variable team learning is explained by the three present variables: team climate, teamwork cohesion and support leadership. In regression analysis 3, with only an indirect influence of team climate on team learning, 63,2% of the variance within team learning is described by the three present variables. So, when team climate has a direct influence on team learning instead of only an indirect influence 8,3% more of the variance within the variable team learning is described by the present variable. This means that, when you want to achieve a good team learning environment as a company, it is important to focus on a good team climate.

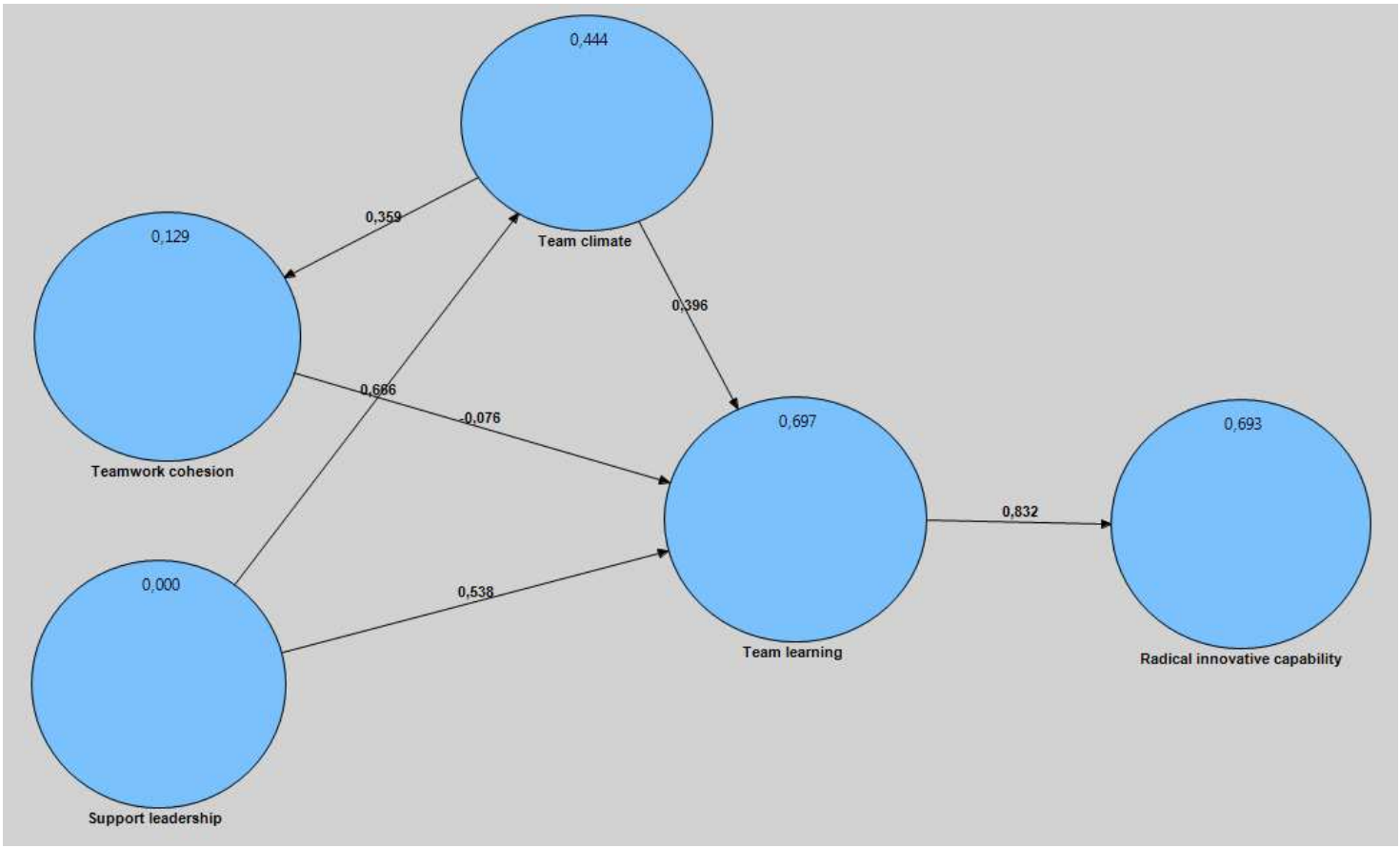
When I measured hypothesis 4a (the influence of team climate on teamwork cohesion) and hypothesis 4b (the influence of team climate on team learning) together the relationship between teamwork cohesion and team learning becomes negative here, because the standard regression weight which shows the influence of teamwork cohesion on team learning is -0.074.This is shown in the figure below. This means that a high teamwork cohesion has a direct negative influence on team learning and therefore also an indirect negative influence on radical innovative capability. The variance of team learning which is explained by the present variables (in this case 71,4%) is almost exactly the same as is the case when team climate has a direct influence on team learning (hypothesis 4b) and team climate isn't linked to teamwork cohesion (hypothesis 4a). So, I can conclude that team climate only has a direct influence on team learning. Team climate doesn't have an indirect influence on team learning through its influence on teamwork cohesion.



*** Regression analysis 6:**

In this regression analysis I added the influence of support leadership on team climate (hypothesis 5a). This is shown in the figure below. The standardized regression weight from the influence of support leadership on team climate is 0.666. It is striking that through the adding of this relationship the percentage variance of team learning that was explained by its present variables decreases. This variance of team learning explained by its present variables was 71,4% without the influence of support leadership on team climate and 69,7% with the influence of support leadership on team climate. So, I can conclude that the influence of support leadership on team climate has a negative influence on the variance of the variable team learning explained by his present variables, because this value decreases with 1,8%.

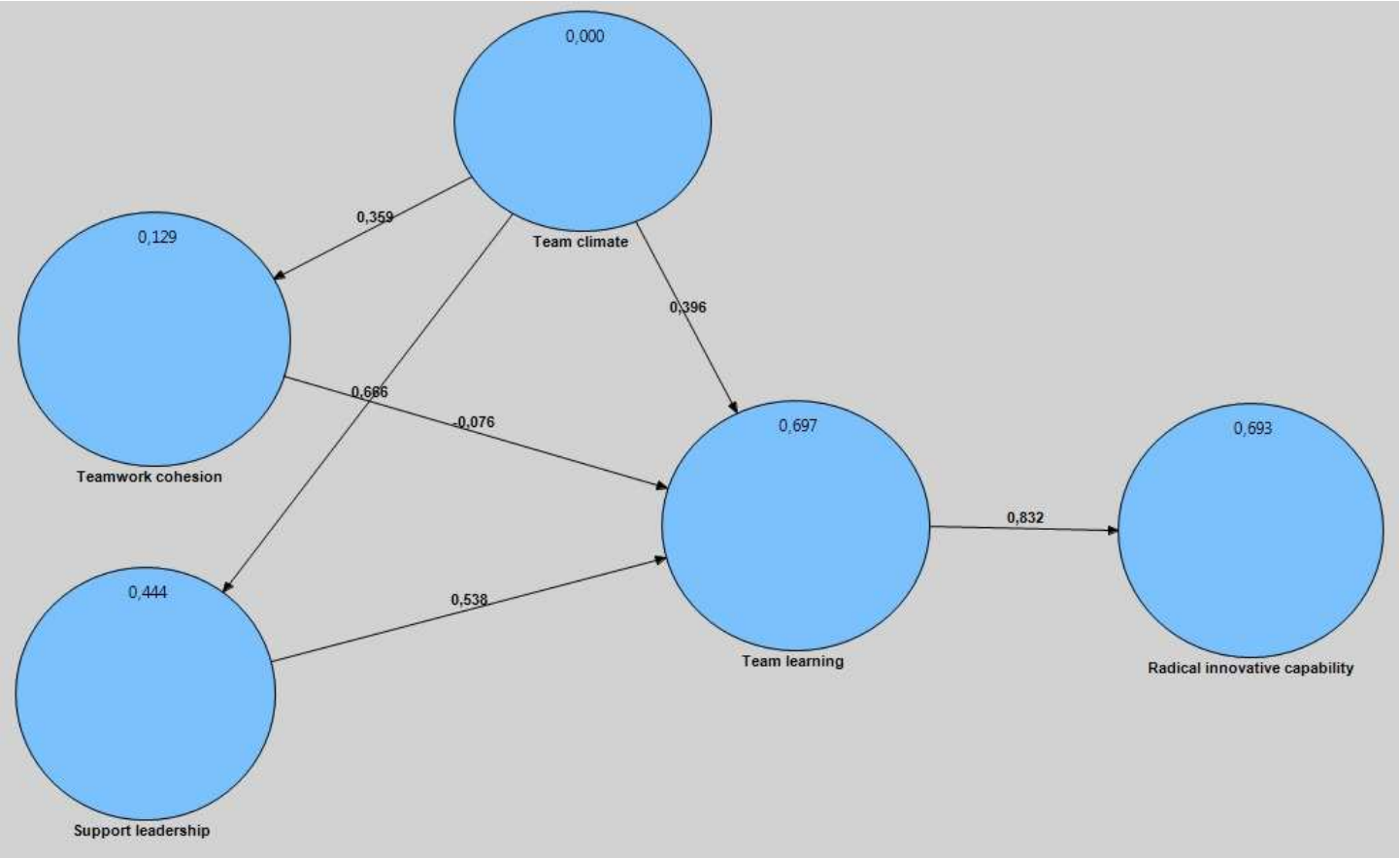
Also striking is the fact that the relationship between teamwork cohesion and team learning stays negative, because the standard regression coefficient remains -0.076.



*** Regression analysis 7:**

Noticeable when we look at the regression analysis 7 is the fact that it doesn't matter which direction the relationship between support leadership and team climate has, because in the previous analyses the relationship between support leadership and team climate went in another direction (hypothesis 5a), than was the case in the regression analysis (hypothesis 5b). Regardless of the direction of the arrow the standard regression weight between support leadership and team climate will be 0.666.

In addition the percentage variance of the variable team learning explained by its present variables remains the same as within regression analysis 6, the same counts for the variance of this variable explained by its present variables it doesn't matter which the direction is of the relationship between support leadership and team climate. This variance of team learning explained by his present variables is in both cases 69,7%.



4.2.2.8 The difference between employees and managers

In the interviews managers described on the one hand that in their opinion the influence of support leadership on team climate (hypothesis 5a) is big and substantially present within the company. On the other hand they described that the influence of team climate on support leadership (hypothesis 5b) is very limited or even none.

When we combine this with the results of our questionnaire data we see a clear difference in perception, because the questionnaire data shows that the influence of team climate on support leadership is exactly the same as the influence of support leadership on team climate. In both cases (hypothesis 5a and hypothesis 5b) the standardized regression weight is 0.666.

It is very interesting to look more deeply at this difference between my quantitative and qualitative data. Until now there is no distinction between the views of the managers and the views of the employees within the analyses of the questionnaires. Based on the fact that on the one hand managers within the interviews support hypothesis 5a and don't support hypothesis 5b and on the other hand the questionnaires show exactly the same standardized regression weights for hypotheses 5a and 5b it is in this case interesting to split up the questionnaires of the employees and the questionnaires of the managers into two different groups and to look at the differences between both. This can provide awareness of the differences between employees and managers in the field of support leadership and team climate.

		Employees:	R&D managers:
Mean	Support leadership	3.4550	3.7000
	Team climate	3.1200	3.4091
Standard deviation	Support leadership	0.61213	0.4000
	Team climate	0.39428	0.46007

Table 11: Mean and standard deviation divided into groups of employees and R&D managers. (n = 38)

I conclude that managers indicate both support leadership and team climate higher than their employees. To look at the relationship between support leadership and team climate I did a correlation analysis and a regression analysis. The results are as follows:

		Team climate employees	Team climate managers
Support leadership employees	Spearman correlation coefficient Sig. (2 – tailed)	0.391 0.054	-
Support leadership managers	Spearman correlation coefficient Sig. (2-tailed)	-	0.159 0.661

* = correlation is significant at the 0.05 level (2 – tailed)

Table 12: Spearman correlation coefficient (n = 38)

		Employees: (n = 28)	R&D managers: (n = 10)
R	Support leadership → Team climate	0.516	0.165
R square (R^2)	Support leadership → Team climate	0.266	0.027

Table 13: Regression analysis hypothesis 5a, divided into groups of employees and R&D managers. (n = 38)

		Employees: (n = 28)	R&D managers: (n = 10)
R	Team climate → Support leadership	0.516	0.165
R square (R^2)	Team climate → Support leadership	0.266	0.027

Table 14: Regression analysis hypothesis 5b, divided into groups of employees and R&D managers. (n= 38)

The correlation coefficient looks at the relationship between two variables (Field, 2009). When looking at the data of employees, the relationship is much stronger than is the case at the R&D managers. A weak point is the fact that these correlations aren't significant. Therefore we can't draw 100% certain conclusions.

When looking at the data of the employees the regression analysis of these both variables display an R square of 0.266. This means that 26,6% of the variance in one of both variables is explained by the influence of the other variable. When looking at the data of the R&D managers the regression analysis of these both variables display an R square of 0.027. This means that 2,7% of the variance in one of both variables is explained by the influence of the other variable.

Striking is the fact that the regression analyses of hypothesis 5a and hypothesis 5b show exactly the same values. This means that the influence of support leadership on team climate is exactly the same as the influence of team climate on support leadership.

After these analyses I can say that managers, compared to employees, describe that team climate and support leadership is higher within the company, but when analyzing the questionnaires of R&D managers the connection between both variables and the influence of one of these variables on the other is substantially lower than is the case when analyzing the questionnaires of employees. This is an interesting point, because it means that employees and managers differ in their view on certain aspects. They also differ in opinion about the degree to which a good team climate and support leadership is present within their company. Based on these differences I would like to give employees and R&D managers the advice to talk to each other regularly about their different opinions, in order to prevent problems.

When looking at the academic literature Amar, Hentrich, Bastani & Hlupic (2012) describe that it is a commendable way of working when the management decides to share the authority to lead with its employees, align the firm's goals with employees' preferences and influence them toward the broadly desired objectives of the company. Within the broad frameworks of the organization's formal structure, each company should give its employees the freedom to think, decide, and act. It isn't a good way of working when managers are structuring the goals which their employees should achieve in isolation. Managers should decide to draw upon the knowledge, experience and abilities of its employees and so develop innovations together.

5. Conclusion and discussion

5.1 Conclusion

5.1.1 Support of the hypotheses

The contribution of radical innovative capability in relation with radical innovation outcomes:

For the development of good radical innovation outcomes possessing a good radical innovative capability is very important. The percentage variance of the radical innovation outcomes explained by the radical innovative capability is 47,7%. A company can reach a good radical innovative capability by ensuring that their employees have time available for the development of innovations and time for learning about the development of innovations. Daily activities require a lot of time. When people don't have enough time only small improvements (incremental innovations) will arise and radical innovations will not occur. To prevent this, project teams aimed at radical innovations should be set up.

Managers determine experimentation capability and openness capability as the two most important aspects of radical innovative capability. To reach a good radical innovative capability these both aspects should get enough attention. This reach a good experimentation capability managers determine that daring to experiment, having people with different disciplines within your company and having enough budget available are very important. For the development of a good openness capability

The contribution of team learning in relation with radical innovative capability:

I can conclude that team learning presents a very large contribution to the radical innovative capability, because 69,2% of the variance of the variable radical innovative capability is described by the variable team learning. This relationship is significant ($p < 0,05$).

The biggest contribution is delivered when employees, besides working in their own team, also work within project teams. When people only work within their own team for a long time and at a certain position they work according to a fixed pattern. When people work according to a fixed and structured pattern, the ability to develop innovations is declining sharply. An effective way to prevent this is working within project teams. Project – teams are multidisciplinary. People from different disciplines come together in a team, which enhances the learning effect.

The contribution of support leadership in relation with team learning and indirectly radical innovative capability:

Support leadership has a significant correlation with team learning and radical innovative capability ($p < 0,05$). The standard regression weight of 0,785 shows that support leadership has a relatively large influence on team learning. Based on the fact that team learning is of great importance for the development of a good radical innovative capability I conclude that support leadership indirectly is essential for a good radical innovative capability, because it creates a good team learning

environment within your company. Earlier research has described that there is a widespread belief among executives that supporting employees' community service activities enhances employee commitment and retention. It is important for a leader to gives his team support with his ability, passion and conviction and not with his formal authority (Austin, 1998). This means that the leader should give responsibility to his employees, also called empowerment. Employees need room to be innovative and a leader should provide this. The manager should describe the framework of the innovation process and ensure that people can to their work undisturbed. The leader should not be too strict. Besides giving some working room to his employees, a leader must be accessible when they have problems. When this is the case, a leader offers a good supportive leadership.

The contribution of teamwork cohesion in relation with team learning and indirectly radical innovative capability:

My conclusion is that teamwork cohesion gives a negative direct contribution to team learning or indirect contribution to radical innovative capability, because the regression coefficient between teamwork cohesion and team learning is negative. Moreover the relation between teamwork cohesion and team learning and the relation between teamwork cohesion and radical innovative capability isn't significant. This indicates that there is a big chance that the value found is caused by chance.

Important to ensure a good team cohesion is the fact that from the start a leader should formulate a clear project goal and should communicate this clearly with all employees. This provides support within the team. When a team with a good cohesion is formed, it is important that this team continues together throughout the whole lifetime of a project, because people know each other well. To achieve this good teamwork cohesion, a good assumption policy is also important. When new people are appointed, it is very important to map out if this person fits in the team.

I conclude that it is important for the internal team process that a company stimulates good teamwork cohesion, but that this cohesion shouldn't absolutely not be too high. When the cohesion is too high, this has a negative influence on team learning.

The contribution of team climate in relation with team learning and indirectly radical innovative capability:

The correlation between team climate and team learning is significant ($p < 0,05$). But the team climate isn't significantly correlated to the radical innovative capability. Team climate has a positive influence on team learning, because the percentage variance of team learning explained by the previous variables increases with the influence of team climate from 63,2% to 71,4%.

A positive team environment is the most essential aspect within a company. The company's success depends on it. It is very important that the employees enjoy working and that they have a heart for the company. This means, for example, that they don't object to an extra working hour.

Also important for a good team climate is making clear appointments and using deadlines. For the development of innovations, limitations in time, money and space are needed. When there aren't any restrictions for a team, creativeness drops to little radical innovations.

How team climate strengthens the relationship between teamwork cohesion, supportive leadership, team learning and radical innovative capability:

Team climate has a direct influence on team learning, because the influence of team climate on team learning strengthens the variable team learning. Without the direct influence of team climate on team learning the percentage variance of team learning explained by his previous variables is 63,2%. With the direct influence of team climate on team learning, this percentage increases to 71,4%.

Besides this direct influence of team climate on team learning, in some cases indirect influences are also possible. In this model, this isn't the case.

When I look at the indirect influence of team climate on team learning, through its influence on teamwork cohesion, this doesn't make any difference. The percentage variance of team learning explained by his previous variables remains 63,2%.

When I look at the indirect influence of team climate on team learning, through its influence on support leadership, the percentage variance of team learning explained by its previous variables has decreased from 71,4% back to 69,7%. This means that the influence of team climate on support leadership decreases the contribution which the variables team climate and teamwork cohesion together could deliver to team learning.

I have concluded that team climate only strengthens the relationship between teamwork cohesion, supportive leadership, team learning and radical innovative capability through its direct influence on team learning.

5.1.2 Summary of the support of the hypotheses:

Hypotheses:	Supported:	Significant at 1% significance level:	R / correlation: (when the hypothesis is measured together with the other hypothesis)
1a. Team learning positively affects the radical innovative capability.	Yes	Yes	0.832
1b. The radical innovative capability positively affects the radical innovation results.	Yes	Yes	0.690
2. Support leadership positively affects team learning.	Yes	Yes	0.538
3. Teamwork cohesion positively affects team learning.	No	No	-0.076
4a. Team climate positively affects teamwork cohesion.	Yes	Yes	0.359
4b. Team climate positively affects team learning.	Yes	Yes	0.396
5a. Support leadership positively affects team climate.	Yes	Yes	0.666
5b. Team climate positively affects support leadership.	Yes	Yes	0.666

5.1.3 Answer research question

Important determinants for the development of a good radical innovative capability:

I have concluded that team learning is the most important variable for delivering a good radical innovative capability within a company. If you want to bring radical innovations on the market as a company, you should give team learning enough attention. Managers describe that information interpretation is the most important aspect to reach a good team learning. This means that employees give their view on the external knowledge they collected and transform this knowledge into common team knowledge.

To reach this good team learning I can conclude that support leadership is an important factor. Teamwork cohesion doesn't contribute to a good team learning environment. The variable teamwork cohesion only has a very limited or negative influence within my model, so this variable isn't an important contributor for the development of a good learning environment and indirect good radical innovations. Striking is the fact that this variable has a very high mean within the companies measured (a value of 4,0461). So: I can conclude that a very high teamwork cohesion isn't good for the radical innovations within a company. When looking at academic literature Zolin, Kuckertz & Kautonen (2010) describe that human resource flexibility is important for organizations that need to respond to the changing challenges. An entrepreneurial team performs better if the team members are willing to modify their roles and also leave the team if required. The potential downside of strong ties in terms of human resource flexibility is that they could lead to an absence of resource flexibility, because relationships based upon strong ties are likely to be harder to quit. Chandler et. al. (2005) find that sacking team members is positively related to new venture performance, particularly in the more advanced stages of business development.

The variable team climate delivers a positive contribution to the variable team learning in certain cases, and so also indirect to the variable radical innovative capability. This variable only has a direct influence on team learning. When that is the case, the result is that the percentage variance of the variable team learning explained by his previous variables increases from 63,2% to 71,4%.

The indirect influence of team climate on team learning through teamwork cohesion didn't exist, because the percentage variance of team learning explained by his previous variables remains 63,2% in that case. On the other hand, the indirect influence of team climate on team learning through support leadership has been observed, because when the variable team climate has, besides its direct influence on team learning, an indirect influence on team learning on the one hand through its influence on the variable teamwork cohesion and on the other hand through its influence on the variable support leadership the percentage variance of the variable team learning explained by his previous variables increased from 63,2% to 69,7%. To reach this good team climate, which is important, managers describe within the interviews that the core conditions for a good team climate are openness in the team, honesty between the workers within the team and having a heart for the company and not minding extra working hours

5.1.4 Summary of the direct or indirect influence of each variable on the development of a good radical innovative capability:

Variable:	Importance:	Short explanation of importance:	R – square (R^2)
Team learning	This is the most important aspect for developing a good radical innovative capability. It should be high.	Team learning has a direct and high influence on radical innovative capability.	Team learning accounts for 83,2% of the variation in radical innovative capability.
Support leadership	This is the second most important for developing a good team learning.	Support leadership is of direct importance for the team learning within you company. The leader shouldn't try to influence team climate too much with his way of leading, because when support leadership influences team climate, the influence of team climate on team learning will decrease.	Support leadership, teamwork cohesion and team climate together account for 69,7% of team learning.
Teamwork cohesion	Not important. Should not be too high.	When teamwork cohesion is too high, it has a negative influence on team learning and so also an indirect negative influence on the radical innovative capability.	
Team climate	This is the third most important for developing a good team learning.	Team climate has a direct positive influence on team learning.	

5.1.5. Advice to R&D managers:

When you are an R&D manager it is important to know which team aspects must excel and need a lot of attention. When this is achieved, it has a positive influence on radical innovative capability and on radical innovation outcomes within a company in my view.

As a manager you must guarantee a very good team learning within your company when you want to reach a good radical innovative capability. To reach this good team learning within your company the support leadership you offer as a manager is very important and has a huge influence. In the interviews managers describe that the best aspect of supportive leadership is give empowerment to your employees. Employees should get responsibility from their leader and should have room to be

innovative. Weggeman (1995) describes in his research that there is a link between learning and leadership within a company. Knowledge management is a means of improving the efficiency and pleasure of the production factor knowledge. Weggeman (2011) also describes that it is important that you as a leader give confidence to the people who are good at their craft. As a manager you should facilitate these people, instead of planning and checking their work, all the time. This way of giving support leadership means that you are a leader who serves. It implies that employee and manager work together to develop a collective ambition. A manager needs to listen to what is happening on the floor. Employees need to be inspired and involved in strategy development. Assertive action is only necessary towards people who don't function very well. This is an important aspect. Having an authoritative, but also serving and humble attitude makes a manager offering good supportive leadership.

Team climate should also be good within your company to reach a good team learning environment, but this aspect is less important than the supportive leadership you offer. To reach a good team climate working in an informal way at your company is important. There must be sufficient space for an informal talk and discussion. Employees should also be involved in the status of the company. It is very important that employees feel that they are involved and that they are taken seriously.

Also teamwork cohesion is a fact which should have your attention. As described in earlier research of Hoegl, Weinkauf & Gemuenden (2004) there is a natural tendency in teams to focus on their own team goals and to build strong intrateam cohesion. As a manager you should ensure that this teamwork cohesion doesn't become too high. When teamwork cohesion within your organization is very high, it has a direct negative influence on team learning within your organization and so also an indirect negative influence on the radical innovative capability. There is no challenge.

So as a manager you must ensure that there is a certain cohesion within a team, but it is very important that this cohesion isn't too high. Within some interviews R&D managers describe that it is very good to work with project teams and sometimes place an external expert within the team. An advantage of working with project teams is on the one hand that people work together with a lot of different people. Employees learn more when they work together with a lot of different people. On the other hand, through working with project teams, it is possible to prevent a too high teamwork cohesion. When teams exchange their experiences, views and ideas, etc. regularly and aren't constantly together then, an organization could prevent that the cohesion within a team becomes too high. On the other hand too high cohesion can be prevented by appointing an external expert. When using external input the company will not be hindered by knowledge that the company already has. When a company uses external input you will get a different climate in the company, allowing people to open up more and become more developed. Sometimes this cooperation with other companies is necessary for the development of radically new technologies. When combining this qualitative data with my quantitative data I see that from the variable teamwork cohesion the items 'I prefer to work with others in a team rather than working alone', 'people should be made aware that if they are going to be part of a team then they are sometimes going to have to do things they don't want to do' and 'people in a team should realize that they sometimes are going to have to make sacrifices for the sake of the team as a whole' gives the highest contribution to a high teamwork cohesion within a company. This means that, when a manager wants to decrease the teamwork cohesion to a certain extent, there should be focused mainly on decreasing these items.

5.2 Discussion

5.2.1 Limitations

A limiting factor of our study is the Cronbach's alpha, which is relatively low for each variable. This means that the reliability of our research is low and can confirms that the results do not show what they should show. This could be caused by the limited number of N, which is 38. Peduzzi et al.(1996) have published simulations studies suggesting that logistic and survival models will produce reasonably stable estimates when the limiting sample size allows a ratio of approximately 10 to 15 observations per predictor. Within this study the number of predictors, or independent variables, is 5. This means that the minimum number of respondents must be 50. Our respondents number of 38 is lower than this 50. When this is the case you do not know whether the relationships described are real relationships or that the relations I described as non-existent don't really exist. To solve this problem partly I have measured the relationship between radical innovative capability and radical innovation outcomes once during the regression analyses and have removed the variable radical innovative outcomes during the other six regression analyses. By taking this step our reliability improved somewhat, because the number of independent variables decreased from 5 to 4. This indicated that 40 respondents was enough. Our respondent number of 38 is close to this 40.

Another aspect to discuss is the striking significant relation between team climate and support leadership ($p < 0,05$). Regardless of the direction of the arrow the standard regression weight between support leadership and team climate will be 0.669. So, hypotheses 5a and 5b show exactly the same values and exactly the same relationship, while managers expected that hypothesis 5a really existed and that hypothesis 5b probably did not exist. After having divided employees and R&D managers into groups, the correlation and regression measured within the employee group was the same for hypotheses 5a and 5b. The correlation and regression measured within the manager group was the same for hypotheses 5a and 5b. When looking at the data of the employees the relationship between team climate and support leadership was significant. But when looking at the data of the managers the relationship between team climate and support leadership wasn't significant. So, the limiting factors related to this are the fact that hypothesis 5a and hypothesis 5b show exactly the same values each time. I have no clear explanation for this. Another limiting factor related to this is the fact that the relationship between team climate and support leadership isn't significant when looking at the manager data.

Another limiting factor of this research is the fact that hypothesis 3 isn't significant. Hypothesis 3 isn't supported, but based on the fact that the fact that the hypothesis isn't significant, we don't know for sure if this is caused by the extremely high value of teamwork cohesion or by the fact that the relationship isn't significant.

5.2.2 Further research

It is very well possible that some follow-up studies based on this research will take place in the future.

Firstly, a follow up study could attempt to improve the reliability (the Cronbach alpha) of this research. This can be done by carrying out the study on a larger scale and collect more data. When this happens, the N value of the research can be increased and the reliability should therefore improve.

Another second potentially interesting follow – up study may look more specially at the variable teamwork cohesion. When this variable is high valued within your company it will have a negative influence on team learning. As described by Zolin, Kuckertz & Kautonen (2010) an entrepreneurial team performs better if the team members are willing to modify their roles and also leave the team if required. Further research could try to map how to reach this. The optimal teamwork cohesion and how companies could achieve this optimal teamwork cohesion is an important aspect to look at. It is a challenge for a manager to create an optimal teamwork cohesion which isn't too high on the one hand and on the other hand ensures that the team climate is at a good level.

A third follow up study could deepen the relation between team climate and support leadership. As described above, it is striking that the influence of team climate on teamwork cohesion is exactly the same as the influence of support leadership on team climate. The standardized regression weight of the influence from team climate on support leadership is exactly the same as the standardized regression weight of the influence from support leadership on team climate. This value is 0,669. After having divided, the data I conducted into groups, I concluded that the relationship is much more present at the employee data and has been observed very limited at the managers data. A striking point is that also after having divided the data in the groups of employees and managers in both groups hypothesis 5a and hypothesis 5b show exactly the same correlations and regression weights. A follow up study can look at the cause of the fact that these correlations and standardized regression weights are exactly the same, while managers in the interviews on the one hand suppose that the influence of support leadership on team climate really exists and on the other hand have doubts about the influence of team climate on support leadership. Based on the fact that the quantitative data and the qualitative data divers on this point it is very interesting to look at it more detailed.

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Appendix 1: Elaboration exploratory interviews

The first part of my research in eleven different companies is an exploratory interview with an innovation manager or R&D manager. These interviews focus on the team climate, the teamwork cohesion, team learning, support leadership and radical innovative capability.

The aim of these interviews is to identify how R&D managers the concepts, described in my model, notice within their company and what aspects in their eyes are very important to give these concepts the right interpretation. In addition, the aim is to analyze how the managers understand the different relationships that I have described within my model.

The first part of the interview focuses on company information and the company in relationship to radical innovation capabilities. The second part focuses on how the various concepts within the company are formed, and what issues could probably be improved in these areas. The last part focuses on how the manager thinks about the relationships between the different concepts.

Appendix 1.1: Elaboration exploratory interview with company 1

1.1.1. Company information and the company in relation to radical innovation capabilities

The first company is a multinational company with offices and manufacturing locations in India, South Africa and the Netherlands. It is a young, ambitious and dynamic organization that prides itself on its unique identity.

The Dutch company manufactures and sells high quality tires under different brand names. The company is a flexible and market – oriented organization that focuses on continuous innovation and the optimization of competences, aimed at improving the business performance and developing talent as a source for a successful policy.

A recent radical innovation that took place in this sub department testing of the research & development department is in the field of the outdoor testing. The innovation included a trailer to test tires. A brake stops a belt and then, the force was measured.

The manager described that innovation is often associated with a product, but according to him it should take place throughout the whole company. E.g. when you want to develop your company in a new and smart way innovation is necessary.

A radical innovation which took place within the system of this company is the introduction of the Document Management System. Through this document management system departments are well placed together and can work together more easily.

The development of such innovations is on project basis, headed by a project leader. This project leader gets employees capacity from other departments at his disposal, to be used for the development of a new product or a new process. This project team works with a mandate from the management. Before a project starts, much information must be very clear on paper. When it goes

completely the other way during development, it is viewed if they will stop or that one makes the choice to adjust the goals.

1.1.2. Various concepts within the company

1.1.2.1: Radical innovative capability

The problem with the ability to develop radical innovations is the fact that people apart from thinking about a radical renewal also have the daily work which asks a lot of time and attention. In order to solve this, it is possible to set up project teams for the development of radical innovations. These project teams receive support and assistance.

Aspects which a company need to achieve a good radical innovative capability are:
- Give people who are low in the organization a lot of responsibilities. This is called 'empowerment'.
- Use the ideas of employees whenever possible.
- Reward people for a good performance
- Provide an informal atmosphere
- Provide a flat organization
- Forming a good team, which both has the freedom to develop innovations and has been given the necessary conditions by the management.

The company ranks the determinants of radical innovative capability as follows:
(10 = very important, 1 = absolutely not important)

Determinant:	Score of importance:	Extra information:
Experimentation capability	10	By experimenting often new ideas arise. Subsequently, it is important to establish a link between these several new ideas. It also happens that radical innovations come from a project that was not initially intended for that purpose.
Autonomy capability	8	It is important that people have the freedom and space to do an experiment. However, it is of importance to create preconditions as management. When there is a limitation on the time available and the money, employees will be more creative.
Openness capability	6	It is important that there is a budget available for attending conferences and that visiting these conferences is also stimulated.
Integration capability	4	It is important that you step out and put blinders off.

1.1.2.2: team learning

The team learning is encouraged in this organization. This is partly because many people work in project teams. These teams are multi – disciplinary. People from different sides come together in a team, which enhances the learning effect.

In addition, having an open mind within the organization is very important. Within this company they

have working spaces with lots of glass and little doors. This openness enhances a good team learning effect.

Also, having a forum is a good stimulus for team learning. In this company they have a weekly forum for the entire R&D team. As an employee, you can bid when you want to share your project in this forum. Any employee who has time and interest can come and listen to what the project requires. When you present your project, you can ask your colleagues for help. They can give you some hints. The rule in these forum meetings is that they have a positive approach. You do not give others a lot of criticism, but you try to think with them and to help them.

Briefly, the following things are important when you want to reach a good team learning effect:
- Having an open character.
- Being multi – disciplinarily
- Having forum meetings

The company ranks the sub processes of team learning as follows:
(10 = very important, 1 = absolutely not important)

Sub process:	Score of importance:	Extra information:
Information interpretation	10	You speak only about knowledge when someone adds value to information. It is very important for a company to do this.
Knowledge acquisition	9	
Information distribution	9	
Organizational memory	8	This organizational memory is for people who also do the interpretation of the information.

1.1.2.3: support leadership

Within his team the manager finds a number of aspects very important to offer a good supportive leadership:
- Give responsibility to your employees. This is called empowerment.
- Work as a manager of trust and give confidence.
- As a leader you demand results from your employees and aim at them.
- Give employees room to be innovative and also urge them to do it.

The company ranks some aspects of support leadership as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score of importance:	Extra information:
Giving positive appreciation to the employees.	10	It is important to speak openly about appreciation, for example in the department meeting. A good example is often followed.
Giving positive feedback to the	8	Feedback is more individualistic.

employees.		
Giving an additional reward to employees when they perform well.	6	A reward follows a system. If you do well you get an increase in salary or the whole team can be rewarded by going on an excursion or a pleasure trip.

1.1.2.4: teamwork cohesion

Within this team there are specialists with extensive knowledge and people who are more focused on testing. Testing consists on the one hand of the building – up of tests and on the other hand of the implementation of the tests.

Within a team, it is very important that workers are functional. When a task can only be done by one person and that person leaves the company, then there is a problem. It is also true that when you specialize too much on a task, you get too few news ideas and input from the outside.

To achieve a good team cohesion, it is important to give employees confidence and let them participate in decisions about important issues. When employees have a say in decisions workers often stand behind the choices made and are open to cooperation. It is also important to have a joint idea about the strategy for the future from both management and employees.

The company ranks some aspects of teamwork cohesion as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	10	If you work with a team you have to put your personal goal aside. The purpose of the team goes above the individual purpose. Of course it is also true that there is a kind of division of labor within a team and that everyone can do what he/she is good at.
Team members must follow the group perspective and not do what they want themselves.	8	

1.1.2.5: team climate

The manager describes the team climate in this company as follows:
- Supportive. Employees are willing to sacrifice and subordinate themselves to the organization.
- There is a 'we' feeling.
- There is a sense of pride. That is also appointed by people.

Important things to come to a good team climate are:
- Ensure a good balance between the work to be done.
- Make sure there are deadlines.
- For innovations there are also limitations needed in time, money and space. If there aren't restrictions, there is too little creativity.

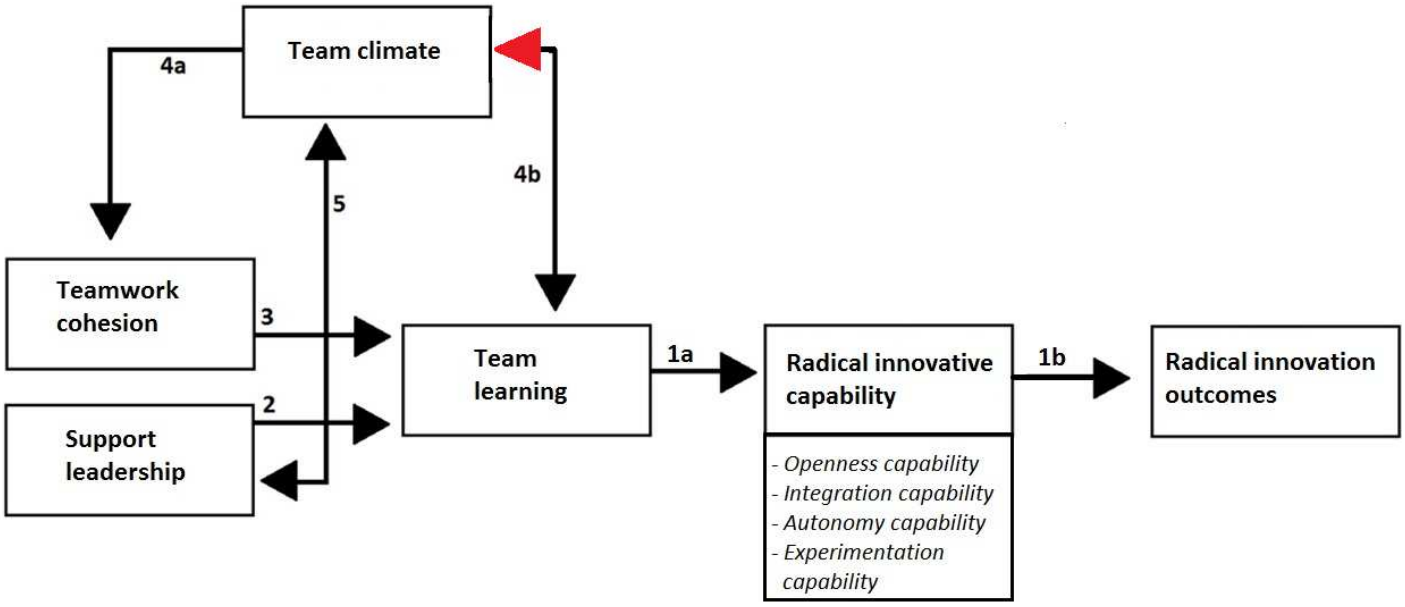
The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

Core element:	Score:	Extra information:
Focus on the target	10	
Social – emotional support	9	To solve problems, drinking coffee together is very important.
Task support	8	
Emphasis on the resources	7	When certain resources are needed the manager tries to arrange it. However, it must fit in the budget as well as the objective.
Guidance on an extra pay	5	If you show results, you are rewarded. But when the goal is for workers to gain a bonus then they are wrong here. A bonus is discussed only after real results.

1.1.3. Relation between the different concepts

The R&D manager has one suggestion for adapting my research model:
- Relationship 4b is complementary. Team learning also has an effect on team climate. If you are learning together as a team it will have a positive effect on the team climate.

He also notes the following things after watching the model:
- Relationship 5 is recognizable. The support that you try to give as a leader is reflected in a team environment. That positive team environment motivates the manager to look at new ways of giving support.
- Team climate and teamwork cohesion have a lot in common.
- Make sure you clearly describe why you focus on radical innovation and not on incremental innovation.



Appendix 1.2: Elaboration exploratory interview with Company 2

1.2.1. Company information and the company in relation to radical innovation capabilities

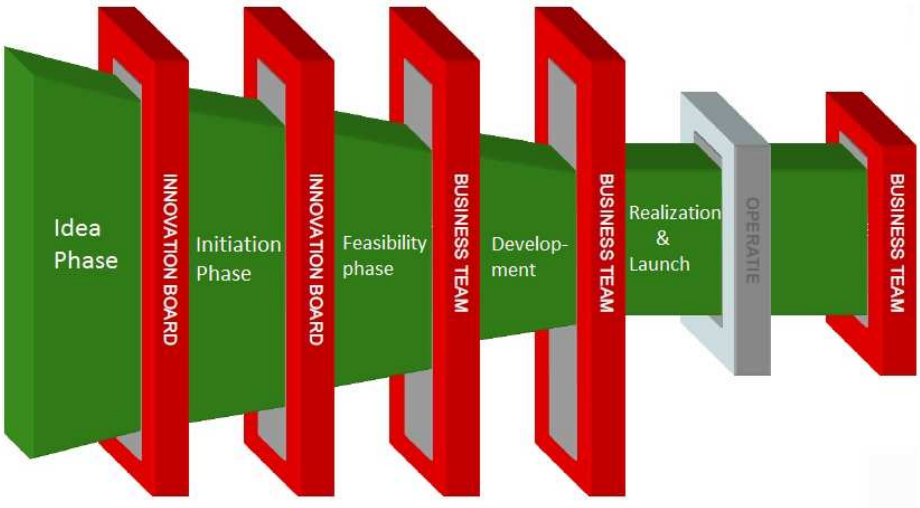
This company has been a subsidiary of a very large brewery since 2008. This large brewery has 70.000 employees worldwide, of which 12.500 in Europe. The vision of this company discloses that they believe in the power of beer in the beverage market. Their mission describes that the company will break the homogeneity and will give the product back their premium status.

Some recent radical innovations that took place within this company:
- The introduction of the new beer bottle in 2007. There was a great homogeneity in the beer market. With the change of the colour of the bottle from brown to green, this homogeneity was radically broken. The goal was to stand out in the competition with this green bottle.
- The introduction of 'Cheersch' in 2008. This is an innovative home draft system with a 2 – liter PET bottle. You can put this tap head each time on a new bottle of beer.

1.2.2. Various concepts within the company

1.2.2.1: Radical innovative capability

For the development of radically new products this company uses an innovation funnel. This innovation funnel is a kind of stage – gate model and has a decision point after each stage. It looks like this:



When this subsidiary implements radical new changes it will be in cooperation with the parent company.

An important aspect to achieve a good radical innovative capacity is the fact that people must have the time available to develop their creativity. Some employees must be made 100% free for the development of radical innovations. If you are to develop radical innovations together with your normal daily activities the chance of success is limited.

The company ranks the determinants of radical innovative capability as follows:
(10 = very important, 1 = absolutely not important)

Determinant:	Score:	Extra information:
Autonomy capability	9	You should not inhibit the team.
Integration capability	9	
Openness capability	8	
Experimentation capability	8	This comes naturally within an innovation team.

1.2.2.2: team learning

In this company the employees critisized each other at each stage in the innovation funnel. In addition, they speak to each other about things that do not go well. In this way you can learn a lot from each other.

When you want to come to a good team learning climate working in project teams is important. Because all experts are placed in these teams, you can learn a lot from each other.

Important aspects to develop a good project team are:
-There should be a budget available. This is necessary for attending courses and training.
- Make sure that the staff has sufficient time available for the project team.
- Provide adequate information and good communication between the employees. Good communication is the core of team learning.

The company ranks the sub processes of team learning as follows:
(10 = very important, 1 = absolutely not important)

Sub process:	Score:	Extra information:
Information distribution	9	It is very important to find the right method.
Organizational memory	8	
Knowledge acquisition	8	
Information interpretation	8	

1.2.2.3: support leadership

Within this company they have two types of leaders: a project sponsor and project manager.

The project sponsor is a board member. This member defines the major frameworks of the project, for example the budget. In addition, he checks if the innovation project fits within the company's strategy.

The project manager is the leader who follows the daily routine. It is also important that this project manager defines the roles that everyone has within a team. If there isn't a role description, this could work demotivating. This project manager should also at any time be available to answer questions of the members of the project team.

Important aspects for good supportive leadership are:
- Be accessible.
- Make sure you have time for your employees.
- Make sure that you are clear about functions and responsibilities.

The company ranks some aspects of support leadership as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Giving positive feedback to the employees.	9	It is of great importance in order to be fair.
Giving positive appreciation to the employees.	9	As a leader you should encourage your team.
Giving an additional reward to employees when they perform well.	8	The most common is a team reward. It is important to inform everyone before the project starts about the project and the 'bonus' connected to it.

1.2.2.4: teamwork cohesion

A team must be open and creative when you want to create a good cohesion. Everyone needs to understand the field of study, but personally you can differ. Different characters within a team can have a positive impact on the results, because this leads to better cooperation.

It is important that people within a team challenge each other. Sometimes a lot of questions may be irritating, but for the development of good radical innovations, they are very important.

To ensure a good team cohesion and good relationships between the different people a team leader must provide the following:
- He or she should be send to a team that functions well.
- He or she is responsible for a team's right information.

An individual member of a team should contribute to the following to achieve a good team cohesion and a good relationship between the different people in a team:
- Accept each other.
- Be open to a good cooperation
- Have sufficient time available to think about innovation.

The company ranks some aspects of teamwork cohesion as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	10	
Team members must follow the group perspective and not do what they want themselves.	9	

1.2.2.5: team climate

The team climate within this company is okay, people enjoy working.

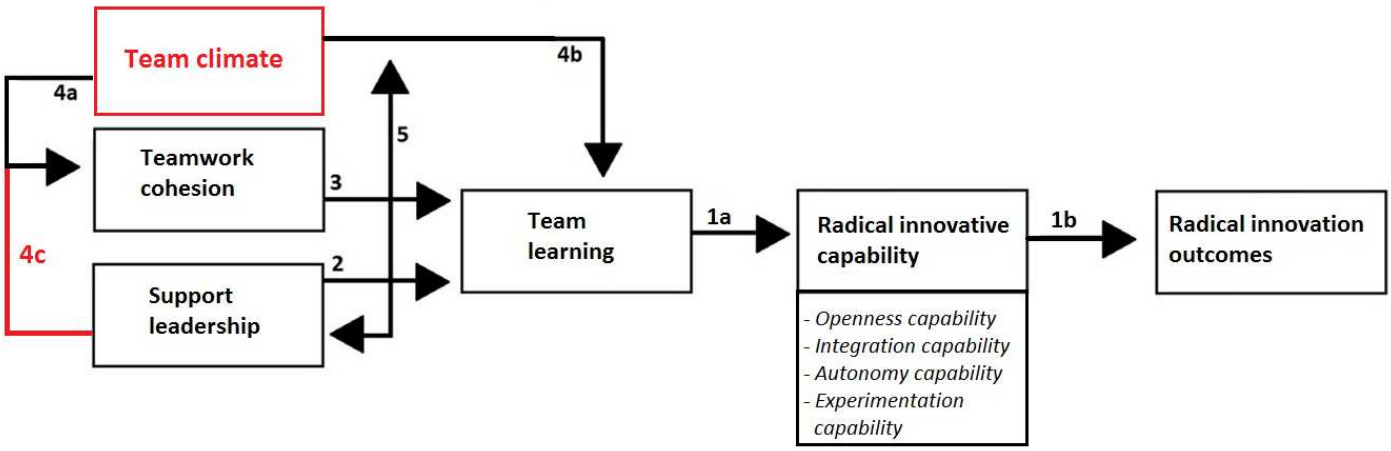
To achieve a good team climate the following two things are important:
- People should be fully dedicated to the work, to the development of radically new things.
- Everyone should pursue the same goal.

The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

Core element:	Score:	Extra information:
Focus on the target	9	
Social – emotional support	9	It is very important to be open, honest and respectful.
Task support	8	This is very important. Otherwise you hinder your work.
Guidance on an extra pay	7	It is important to look at the whole team when you give a reward.
Emphasis on the resources	6	

1.2.3. Relation between the different concepts

The manager has a suggestion for adapting our research model. This adjustment suggestion relates to the variable 'team climate'. The manager said that he would shift the variable team climate within the model. He also indicates that team climate is related to more variables than is the case in the current model.



Appendix 1.3: Elaboration exploratory interview with company 3

1.3.1. Company information and the company in relation to radical innovation capabilities

This electricity company which operates in the low voltage focuses mainly on the areas electrical, hydraulic and aerospace.

Some radical innovations that took place within this company are:
- The remote terminal unit
The R&D group of the low voltage electronics department developed this product for the medium voltage department. This remote terminal unit is used for the medium voltage switchgear Xiria. The RTU is a measurement, regulation and control, storage and communication unit that is connected to the Xiria medium voltage installation, the low voltage installation and the transformer. The RTU receives information from these systems and communicates with the system from the network company. The purpose of the RTU is to reduce the duration of the power failure.

- CXH
This is a control and switching unit for engines. The system of electric circuits underwent a major renovation by this.

Through a recent acquisition, the company has grown from 75.000 employees to 100.000 employees. Compared to competitors, this company has the disadvantage that they often need a third party for the development of new products, while the entire process can take place in-house at competitors. The aim of the company is to grow and develop the possibility in the future to let the entire development process take place in house.

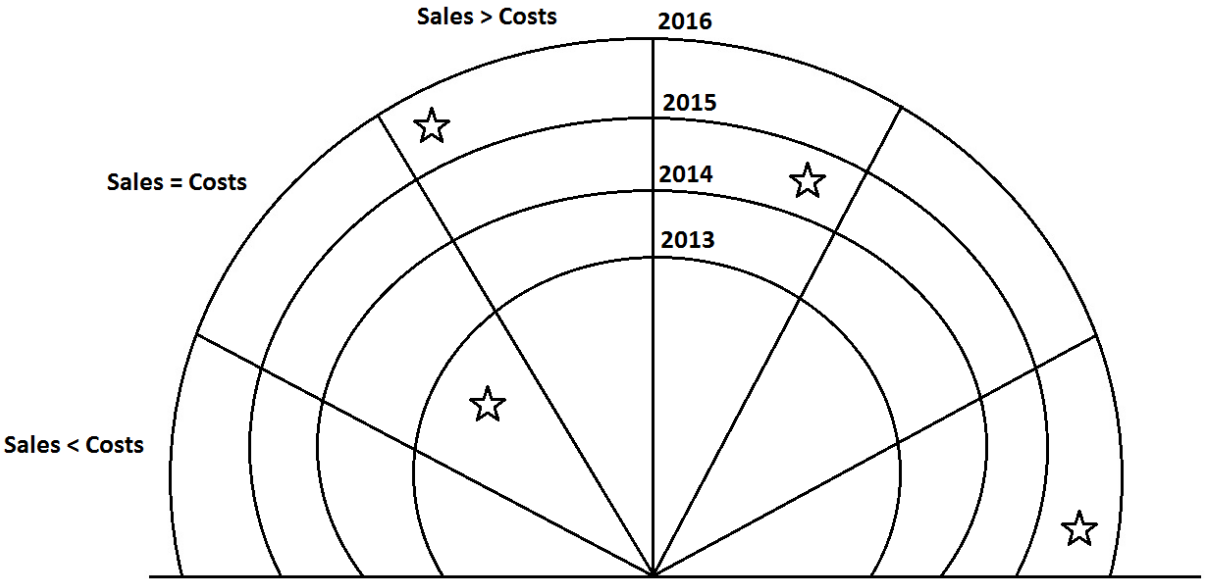
1.3.2. Various concepts within the company

1.3.2.1: Radical innovative capability

When this company wants to develop new products they use a radar event. New ideas are placed in a radar. This radar, also called the technology radar, indicates how likely it is that money is earned with this idea and how soon this can take place.

After this radar event they use a ‘water line process’ for upward filtering the best ideas. Ideas are weighed and must exceed a certain ‘waterline’. These are minimum requirements that the ideas have to meet. About 20% of the ideas comes through this weighing.

This radar is as follows:



In this case, the symbol 'star' indicates at which location an idea is at the moment. An idea close to the center in the area 'sales > costs' is nominated for the waterline process.

To ensure a good radical innovative capability, the following things are important in the eyes of the manager:
- Provide an adequate level within the company. Within this company they try to raise the education level. This is done by appointing many graduate masters. The disadvantage of talents in technical fields is that they often switch to management and not continue to work within the technical field. In the technical side you need a lot of experience before you can make a career. Not everyone is willing to dedicate time and enthusiasm for that.
- Have good contacts with universities.
- Joining an innovation group. This company participates in 'innovation group East'. Several companies from the region are represented in this group.

The company ranks the different determinants of radical innovative capability as follows:
(10 = very important, 1 = absolutely not important)

Determinant:	Score:	Extra information:
Experimentation capability	8	
Openness capability	10	This is very important, but the problem is that everyone hasn't got 'plenty of time. There always is a lot of pressure at work to perform well.
Autonomic capability	7	Within this enterprise employees are reasonably free. The manager looks at the performance of his employees from the side. Employees must try to figure out their own problems, without help of the manager. The manager is also somewhat forced to let his employees

		free, because he has no time to constantly keep an eye on them.
Integration capability	9	It is very important that an idea can be made useful, e.g. make an idea into a product.

1.3.2.2: team learning

In this company the different employees learn a lot from each other. For example, they teach each other how to use a computer program called 'design for six sigma'. People can use this computer program for statistical error analysis.

To ensure a good team learning effect it is very important that the management gives attention to team learning and provides the opportunities to do it. For example, it is important that the management organizes meetings on specific topics. People can learn from one another during these meetings.

The company ranks the different determinants of team learning as follows:
(10 = very important, 1 = absolutely not important)

Sub process:	Score:	Extra information:
Knowledge acquisition	10	
Information interpretation	9	It is important to do this before the simulation and test phase.
Information distribution	8	
Organizational memory	7	This is important and should improve in this business. When employees do not know where certain knowledge is stored, it is also difficult to store new knowledge in the right location.

1.3.2.3: support leadership

Supportive leadership is strongly present within these companies. For example from the management there is much support and assistance in making a planning.

In this company one distinguishes between project review and technical review. The project review is mainly focused on the achievement of objectives focused on the available time and the available budget. The technical review looks at the technical progress.

Important things for being a good supportive leader are:
- Give your employees confidence.
- Be open to problems of your employees. Employees must feel that they can come to you when they have a problem.

The company ranks the different determinants of support leadership as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Giving positive feedback to the employees.	10	
Giving positive appreciation to the employees.	9	
Giving an additional reward to employees who perform well.	8	Within this company they use a bonus system. When you perform well you get points within this system. When you have many points you can choose something from a shop. In addition, employees can also stimulate each other through this system. Recently, the company launched a major bonus pool of money. This bonus was € 5.000,- The reason for such a bonus is that one is obliged to deliver the project in time. At the end of the project the manager and the project leader determine who gets how much money.

1.3.2.4: teamwork cohesion

Important for a good team cohesion is that you must form good teams. For this, the following things are important:
- Regular consultations
- An open culture
- Freedom of speech

The company ranks the different determinants of teamwork cohesion as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Team members must follow the group perspective and not do what they want themselves.	10	
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	9	

1.3.2.5: team climate

Within this company the management observed that the employees felt that they were not rewarded for performances. The management changed this. When you excel you earn more and are in for promotion.

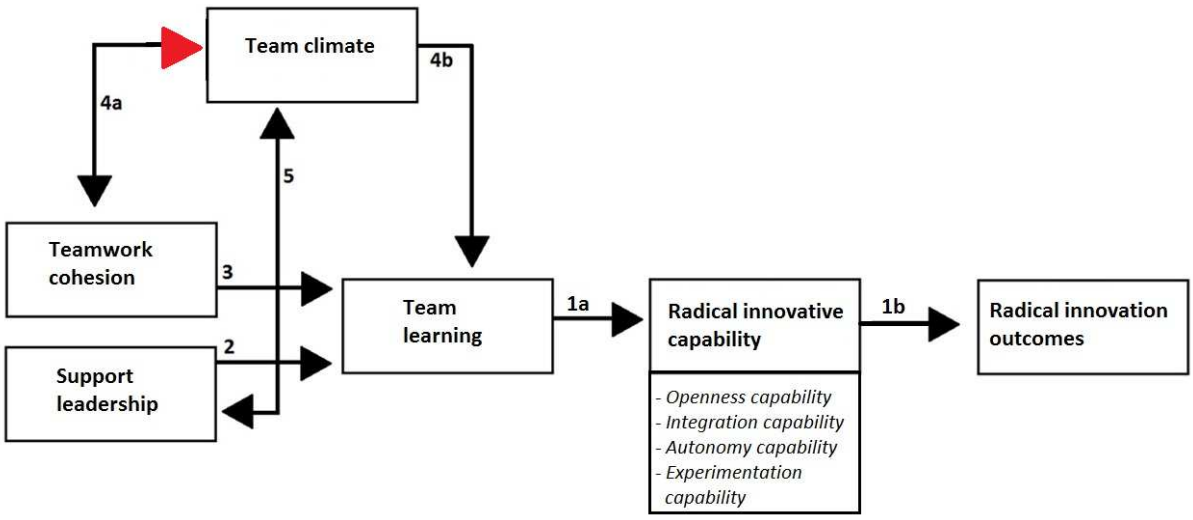
To ensure a good team environment, it is important to improve each time and let employees excite.

The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

Core element:	Score:	Extra information:
Focus on the target	10	It is very important to have a good team with clear objectives. This is also called 'united we stand, divided we fall'.
Task support	9	
Emphasis on the resources	8	
Social – emotional support	7	
Guidance on an extra pay	6	This company doesn't emphasise this. A bonus is not be very important in their eyes.

1.3.3. Relation between the different concepts

The manager adds to my research model that relationship 4a is interchangeable. A good team cohesion can lead to a good team environment. If this is not the case, it leads to a friction.



Appendix 1.4: Elaboration exploratory interview with company 4

1.4.1. Company information and the company in relation to radical innovation capabilities

The company is a diversified power management company with 2009 sales of $ 11.9 billion. It is a global technology leader in electrical components and systems for power quality, distribution and control; hydraulics components, systems and services for industrial and mobile equipment; aerospace fuel, hydraulic and pneumatic systems for commercial and military use; and truck and automotive drivetrain and powertrain systems for performance, fuel economy and safety. They have approximately 120.000 employees and sells products to customers in more than 150 countries.

It is an American company that originated early in the last century. Over the years they have bought several companies, for example Westinghouse (nuclear power plants).

Another company was bought by the parent company. This company was responsible for the production of switching and distributional systems for electricity. For example Nuon and Essent are their customers.

The company can be described as a component supplier. They work in the B2B* market and supply, e.g. components for Airbus. Their main activities include the supply of components for electrical distribution, such as transformer stations.

1.4.1.1 Recent radical innovations

1. Xiria ring main units.
A great enemy of electricity is moisture and dirt. If you exclude those two things you prolong service. A ring main unit is an existing product within the company. Xiria is the name of a new generation of ring main units. They are characterized by their high level of operational safety and are suitable for applications up to 24kV. Xiria units are also very compact. Xiria units can be supplied in two-, three-, four- or five-panel versions. Both the primary part of the unit and the mechanisms are housed in a fully enclosed housing which protects the system against environmental influences. There is a choice of two basic panel versions in their product range:
- A vacuum load break switch for ring cable connections.
- A vacuum circuit – breaker for protecting transformers and cable connections.
Both versions can be supplied in a unit in any desired combination and order.
Making this ring main unit gas-tight and air insulated is one of the recent radical innovations of the company.

2. FMX.
Within the FMX design, different technologies are used to prevent an internal arc. Engineers designed the busbar components based on the company's key technology for electrical field control. By means of special shapes and dimensions, the possibility of an internal arc is minimized.

** B2B = Business to Business*

The purpose of the company when they started with the FMX design was to come to a large contact opening in a short period of time. Earlier, this was done with a spring mechanism. The radical innovation, called FMX, means that the switch is driven by an electromagnetic drive now. Within milliseconds magnets attract or repel each other.

1.4.1.2 Development of these radical innovations

Some of the fundamental aspects to come to a good radical innovation are:
1. Creativity
2. Dare to experiment
3. Appointing people with different disciplines

See below for more information about these important aspects.

As described above this company thinks creativity is one of the fundamental aspects you need when you want a good radical innovation. 95% of radical innovation consists of blood, sweat and tears. In an innovation department you need people with wide interests who read a lot of literature and acquire knowledge.

The innovation process at this company is highly structured. Their way of working is based on the stage-gate model, which is very well known in the innovation literature. This innovation development process consists of some different stages, with gates between them. At every gate there is a go / no – go moment. This decision is always taken by the entire management.

At such a go / no – go moment they look at the feasibility of the project in different areas, these areas are:
- Financial
- Marketing
- Technical / Economical

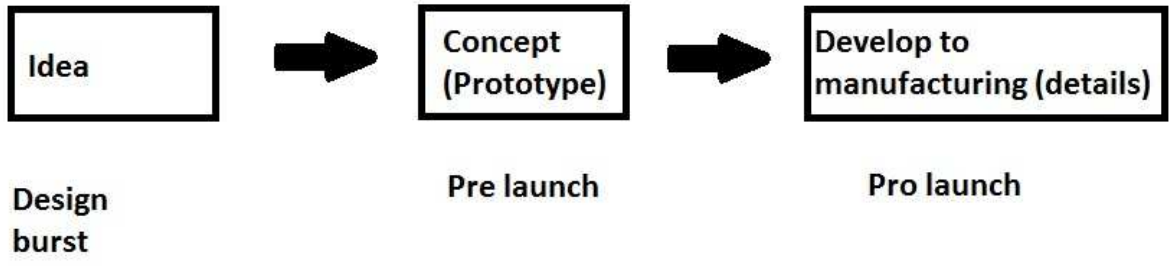
The view of the customer (VOC) is very important in this whole process. It is very important to check whether a product meets the customer demands at an early stage. In developing FMX the company made a technology demonstrator. Customers could give their opinion about this technology demonstrator. Using this technology demonstrator made it possible to detect some possible defects early.

The goal of this company is to make an idea into a product you can produce in bulk.

The first stage is the pro launch. At this stage you can create development projects.

Dare to experiment is a second very important aspect when you want to achieve successful radical innovations. 10% of the time people at this company are free. They can spend this time fully on developing innovations.

The different stages in developing an innovation are:



The third important aspect for successful innovations is having people with different disciplines. At this company they have mechanical engineers and electro technical people.

1.4.2. Various concepts within the company

1.4.2.1: Radical innovative capability

The innovation process at this company has a highly American aura; it is based on many processes.

To come to new innovative ideas one or two times a year a 'design burst' is organized at an R&D department. This is a brainstorming session with the entire department. The aim is to keep people sharp and to trigger them. After the design burst the pre launch follows. In this phase they check whether the idea is an air bubble or a golden invention.

The R&D manager describes that working systematically and the courage to experiment and actually doing it are very important for a good radical innovative capability.

Important aspects for a good radical innovative capability are:
- Having an own prototype workshop and a laboratory. This is because many things are unknown and you want to test and simulate the new products. To achieve a radical innovation you should dare to experiment and actually do it.
- Having available enough money. Within many companies there will be cuts nowadays. An R&D department always works on long-term-profits. This means you will feel a cut in R&D spending much later. As a result, some companies may be inclined to reduce their spending on R&D.

The company ranks the determinants of radical innovative capability as follows:
(10 = very important, 1 = absolutely not important)

Determinant:	Score:	Extra information:
Autonomy capability	10	
Experimentation capability	9	
Integration capability	8	
Openness capability	7	Engineers should orientate themselves outside the company. 40% of the employees do. This may include exchange visits, customer visits and participating in platforms at the University. That's how they get informed about current problems.

1.4.2.2: team learning

Once a month, they have a work meeting in this company. Workers tell what the problems are they approach. When more employees face the same problem they can share their knowledge and learn from each other in this way.

For the manager, the challenge is to ensure that workers with the same problems cooperate with each other. Sometimes it is difficult for a manager to create a climate in which people learn from each other. Employees must be open to share their mistakes with their colleagues. To achieve this, the company has chosen a large open work department with no separate workspaces for each employee.

Important aspects for a good learning environment within a team are:
- Knowledge management: learning from each other.
- Openness of sources: as a company and as management you should create adequate facilities for external gathering of new knowledge.

The company ranks the sub processes of team learning as follows:

Sub process:	Score:	Extra information:
Information distribution	10	
Organizational memory	9	The sharing of existing knowledge is more important than the collecting of new knowledge. You can add new knowledge, but if you do not know how to share this knowledge you will reach nothing.
Knowledge acquisition	8	
Information interpretation	7	It is important to set up an archive and repeat each time where to find certain knowledge.

(10 = very important, 1 = absolutely not important)

1.4.2.3: support leadership

The company is very explicit in their style of leadership that people in their own field are professionals. The management style is partly based on the book of Mathieu Weggeman, which is called 'Leading professionals? Do not.'

As a manager you have the following tasks when you guide professionals:
- Ensure that people of your department can do their work undisturbed.
- Challenge employees and ask critical questions when people come up with a new idea. It is important to see if it is workable every time a new idea comes up.
- Ensure that the people are working as a team. Focus on the main aim of the company: turnover. Technicians are in general good team players. They complement each other.

Leadership on a R&D department is very different from leadership in a production department. In an R&D department rules are very loose and in production departments there are strict guidelines.

The company ranks some aspects of support leadership as follows:
(10 = very important, 1 = absolutely not important)

1.4.2.4: teamwork cohesion

Aspect:	Score:	Extra information:
Giving positive feedback to the employees.	10	It is very important to give both positive and negative feedback.
Giving positive appreciation to the employees.	9	It is very important to give the whole team a positive rating when they perform well. When a department of the company reaches a KEMA – certificate, they get pastries. And a successful test gets a reference in the company magazine.
Giving an additional reward to employees when they perform well.	8	Techies are more team players, rather than focusing on an individual extra reward.

The teams formed inside the company have a strong bond with each other. Colleagues help each other every time. Overwork is done as a team and not as individuals. If a test goes wrong, people don't say: 'That's his fault', but: 'We can improve'.

It is important that a team continues together throughout the whole period of a project. People know each other well when they work together for a long time and understand each other.

As a manager you have the responsibility to ensure that the whole team contributes to the objective of the company: making profit.

The company ranks some aspects of teamwork cohesion as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Team members must follow the group perspective and not do what they want themselves.	10	Teams must agree to the company's policy. Each team member must follow the choices the company makes (the organizational policy).
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	8	You work in the company with the ultimate goal of making profit. Techies need each other and will therefore make a sacrifice for each other. You should also have a certain degree of professionalism as a team member, and sometimes work together with someone who is not personally your favorite.

1.4.2.5: team climate

The team climate in this company is largely determined by the fact that the company is set by procedures. Everything within the company is related to each other according to procedures.

For the design of new products, each person follows: design burst, pre launch, pro launch. Within these phases, an employee is free to make his own choices to a certain extent.

Important aspects for a good team climate are:
- Having sufficient focus on the (final) goals that have to be achieved.
- Good communication. The process and purpose can be very clear, but when you do not know how to communicate you will reach nothing.

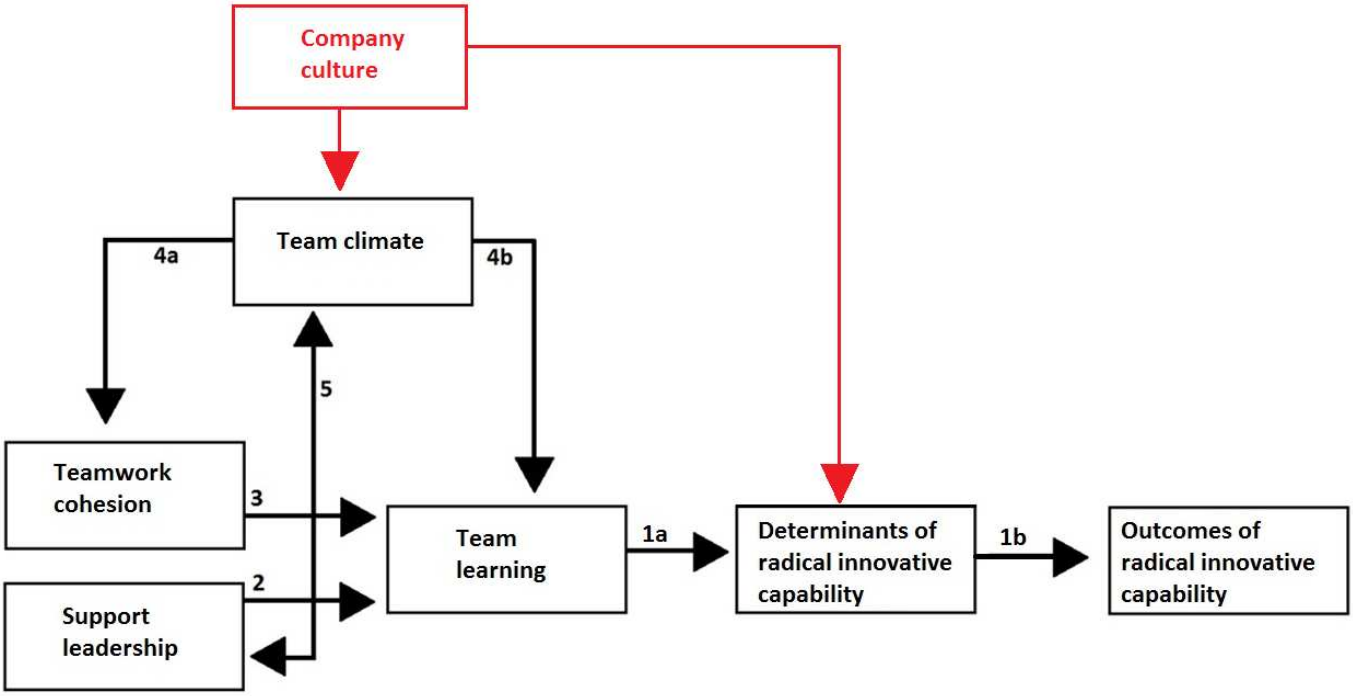
The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

Core element:	Score:	Extra information:
Focus on the target	10	
Emphasis on the resources	10	
Task support	8	
Guidance on an extra pay	7	
Social – emotional support	6	An employee who does not feel well, will not perform well. In this company there is a company doctor and a social worker. It is also possible to switch to an external agency when you experience too much stress in work and private life. The company regulates and pays it, but does not know exactly what the problems of the employee is. The employee is not obliged to tell this.

1.4.3. Relation between the different concepts

The company has two suggestions for adapting my research model:
- Add an extra variable: the variable 'corporate culture'.
The R&D manager assumes that the corporate culture is important for how the team works and how it is prepared. Also adding the variable 'corporate culture' makes the relationship between team climate and teamwork cohesion more clear.

- Add an extra relationship between team climate and determinants of radical innovative capability.
The R&D manager assumes that there exists a stronger relationship between team climate and the determinants of radical innovation than between team learning and the determinants of radical innovation (hypothesis 1).



Appendix 1.5: Elaboration exploratory interview with Company 5

1.5.1. Company information and the company in relation to radical innovation capabilities

This international company is concentrates on the production of components that are needed to let aspects of products move, for example in cars.

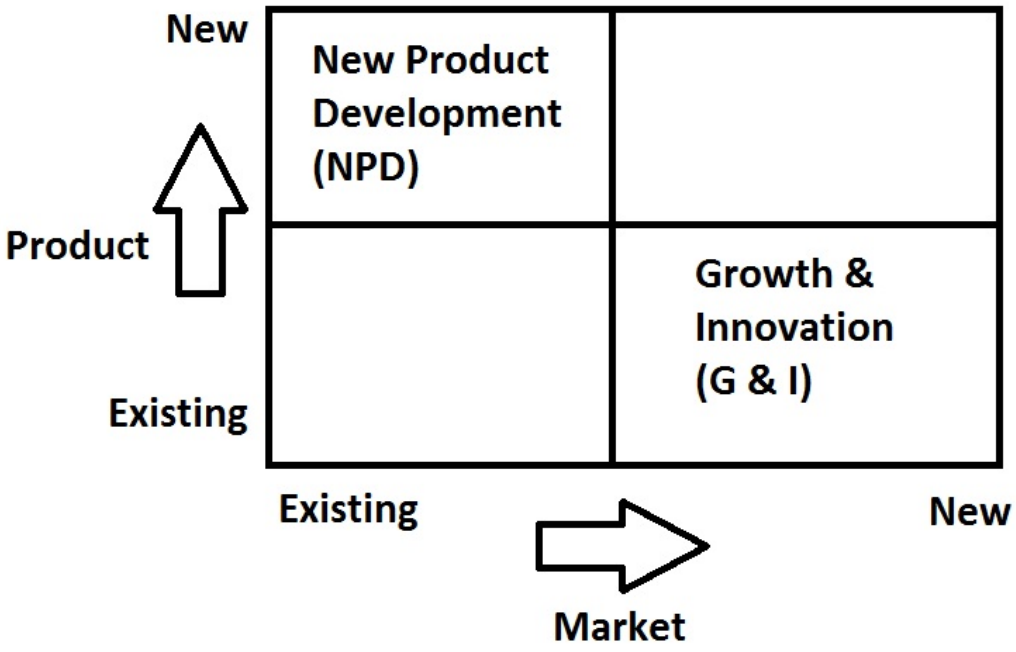
Some recent radical innovations developed within the company are:
- In the field of cars and trucks: Producing low weight products. Thus, the product has less emissions and environmental requirements could be achieved previously.
- In the medical field: the market changes, because patients are becoming obese. The medical industry needs, for example, new types of operating tables.
- In the shipping industry: developing materials that can be used to close large hatches leak-proof.

This company is, along with several other sister companies, under the protection of a large main company. Every month there is a growth and innovation consultation with all sister companies to quickly obtain each other's new innovative ideas and new contacts. When you work like this, you can help each other to solve problems in the developing process.

The main company has defined a certain number of growth markets where the daughter companies could operate. If you would like to enter a certain growth market as a company you can relatively easy come in with the support of one of your sister companies.

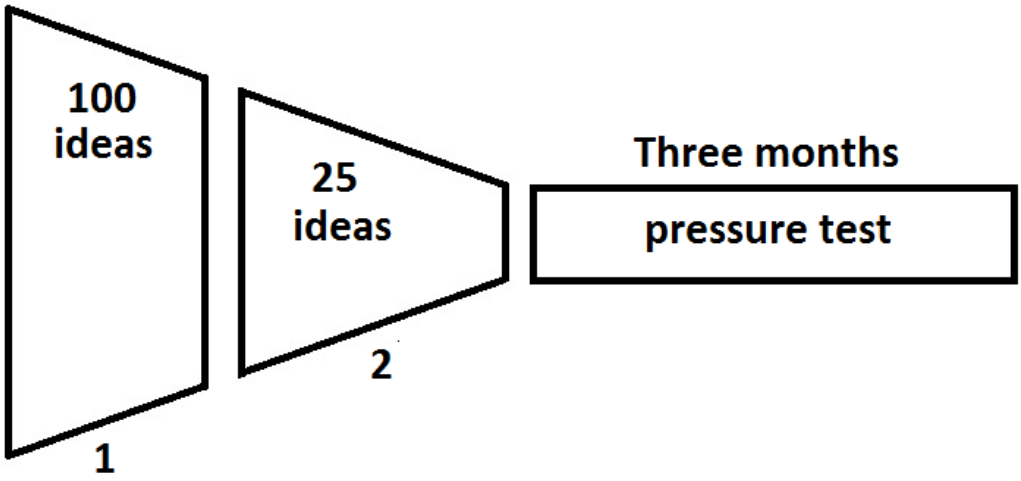
After this monthly growth and innovation consultation and the additions they received there from others it is important to work out the ideas and turn to the market.

The company uses the following model to categorize ideas and plans:



The growth & innovation team focuses on the introduction of existing products in new markets. In order to do this successfully, it is necessary to use a lot of marketing. The new product development team focusses on the introduction of new products in existing markets. Within this team many radical innovations are taking place.

* The growth & innovation team:
The growth & innovation team (G&I) uses a kind of funnel system to come to the most optimal idea.



About 1 of 50 ideas comes through this funnel system.

A new idea starts at funnel one. Here the idea is analysed and can go to the second funnel when one is confident. At the second funnel they map potential customers and competitors. The idea is in this way tested for the market. When an idea passes this second funnel the pressure test will start. At this phase, a concept will be created and plotted on the market. They examine the technical – economic practibility of a product at this phase. This pressure test should absolutely not take more time than three months. When a product can't prove its success in three months they should stop developing the product. With this realistic approach they focus on the development of a product, rather than money.

* The New Product Development team:
The new product development team looks at the technical development. The market in which they operate is a known market, so marketing technically you need to do little.

The projects of this team are: try to map what is needed to improve existing markets. They try to investigate and predict how the market demands in a few years will be.

Certain core competencies, such as weight, noise and development, are very important. Through these core competencies they are trying to find solutions if there are any acunds. They will compare these solutions with the solutions of the competitor. This is called benchmarking.

To maintain an overview of all the projects, the company be started a kind of 'roadmap'. With the help of this roadmap they try to plan at what time a project will be started in the future. It is often difficult to predict the right time for the start and to predict when a competitor start its

development. To get some insight in this it is important to talk regularly with your customers. In these interviews, the company tries to find out if the future plans of their own company corresponds to those of the customers. This roadmap will be updated annually. Projects which can provide cost savings can be brought forward.

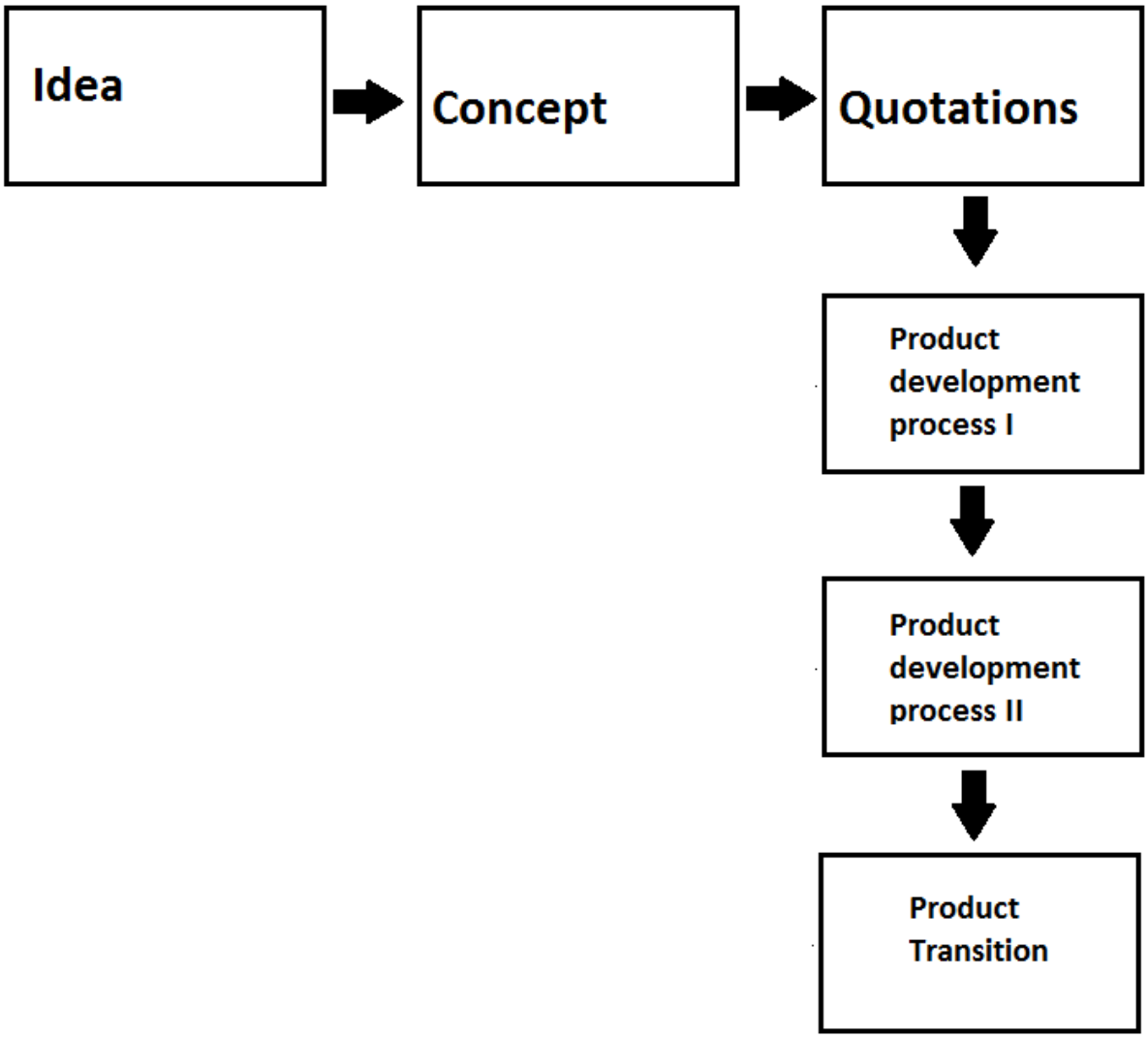
In addition, it is also possible that there is a direct co-operation between the company and the customer. When the company works in this way, they develop new ideas together with the customer. The voice of the customer (VOC) is a very important aspect when you are developing new products. When you are working in this way, you can see early if the product meets the customer demands.

After this phase a regular development process starts.

1.5.2. Various concepts within the company

1.5.2.1: Radical innovative capability

The radical innovative capability of this company consists of a number of different phases. The biggest challenge lies in the fact of creativity, but it must be possible to make it productive. The phases that are performed in this situation, are the following:



Within the concept phase, the company develops one product. In this way you have something concrete you can talk about. Within the quotation phase the company defines some guidelines, for example what the product should cost. After this phase there is a go / no – go point. When the product gets a 'go' the development stages will follow. Phase I is a more creative and open development phase. Phase II is focused on the implementation. This second phase is more result – oriented. After this the product transition phase follows. In this phase, production workers take over.

To increase the radical innovative capability, the company tries to give employees a certain openness. They are trained to think differently at certain times. With the aid of the 'TRIS, gen 3' method the company tries to achieve a different perspective on products and gain new knowledge in this way.

Another way they attempt to increase the radical innovative capability is by working in project teams of different structure each time. When you come into a new team, you can give your new team members the knowledge you have gained in your previous team. An employee doesn't only add knowledge to the team, but also receives some new knowledge from his team members.

The company ranks the different determinants of radical innovative capability as follows:
(10 = very important, = 1 absolutely not important)

Determinant:	Score:	Extra information:
Openness capability	10	
Experimentation capability	8	
Autonomy capability	7	
Integration capability	6	

1.5.2.2: team learning

Another way through which learning takes place within this company is by visiting their suppliers and, e.g. attend a workshop from their suppliers. These workshops focus on process development and development of new machines.

Important for developing a good team learning environment is to realize that you can't do everything only as an individual. You can't know everything as an individual and therefore you need to work together. In many different places you need to gather knowledge and then combine it.

Some possible sources of knowledge:
- The purchasing department.
- Attend workshops at your suppliers.
- Change the teams within your company constantly.
- Work together with students from constantly different study fields.

The company ranks the different sub processes of team learning as follows:
(10 = very important, 1 = absolutely not important)

Sub process:	Score:	Extra information:
Knowledge acquisition	10	The gathering of new knowledge is o.k. within this company, but the farther from the source, the weaker the chain will be.
Knowledge interpretation	9	It is important that an employee who is collecting new knowledge always asks the question: what information should I share with my collegues and what information shouldn't I?
Information distribution	7	
Organizational memory	6	For example, this company has conducted a study on the calculation method used. This method has been set, in order to ensure that everyone uses the same method.

1.5.2.3: support leadership

Supportive leadership happens within this company from the sidelines. The focus is on running projects. The manager determines the direction of these projects. The manager is not constantly at the workplace involved. When a project is likely to escalate the manager intervenes.

To be a good leader/ manager and also give a good supportive leadership you should accept, as a leader, that your people know more than you know.

In addition, it is important to realize as a leader that you should give your employees some freedom when you want to achieve radical innovations. As a leader you should not decide whether your employees turn left or turn right, but you should give them a certain amount of freedom to be creative.

In this company they distinguish between product development process I and product development process II (see picture above). Product development process I is focused on creativity, in this phase the leader stands aside. Product development process II is more toward the product transition. The leadership at this is more instructive. This is also what the employees expect at this stage.

Another important aspects for a good supportive leadership is:
- As a leader, you must be open and not have too many paradigms. In some cases, you know that your employees are not perfect, so allow them to make mistakes.

The company ranks some aspects of supportive leadership as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Giving positive feedback to the employees.	10	As an employee you will find this very enjoyable.
Giving positive appreciation	8	Positive valuation is difficult to express in some cases for a manager.

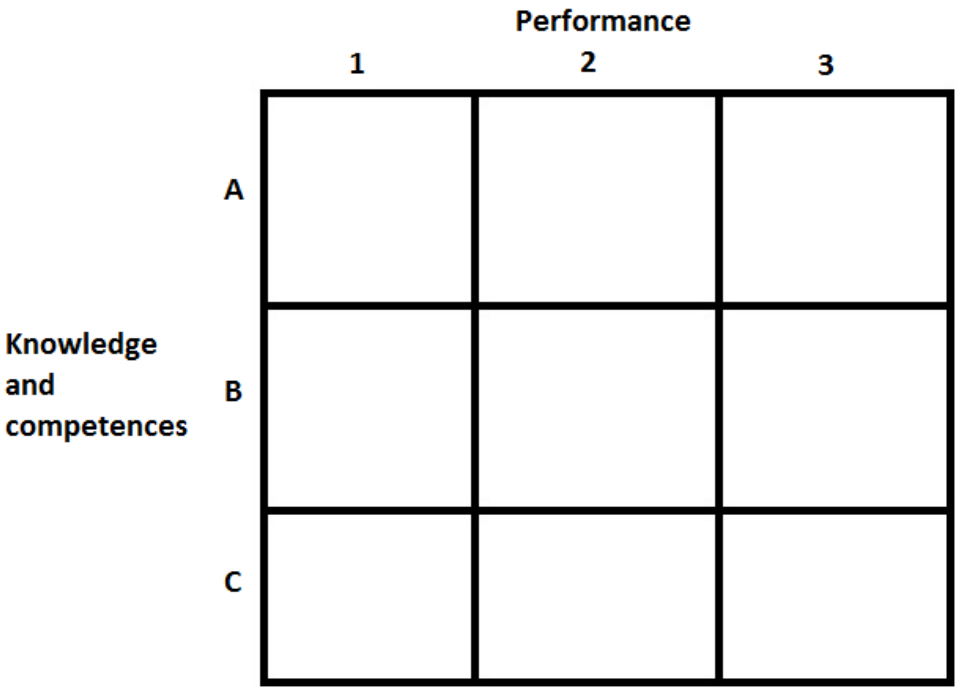
to the employees.		
Giving an additional reward to employees when they perform well.	6	In this company they formulate personal goals. You see the reward in return when you meet the targets.

To map the performance and possible bonus of an employee this company uses the following assessment matrix:

This is a very American way of working. Any possible bonus depends on the place you have in this matrix. An employee who scores B2 has an average score and does well within the group. This employee has the right competencies and provides the correct output. This is a building block for the company.

An employee who scores A1 has an excellent performance and is an example for the other employees. This employee can make a difference for the future. For example, this employee receives an award and is listed on the internal website. It is also possible that this employee receives an extra reward.

An employee who scores C3 has a low average performance. Using interviews they try to adjust it. When this fails separation is inevitable.



1.5.2.4: teamwork cohesion

To be a good team and to achieve consistency, it is necessary that people are in the right place, have the right relationship to each other and let openness prevail within these relationships.

Team members who always 'want to shoot at the target' should be slowed down. They must learn to be more of a team player.

It is also important for a good teamwork cohesion to focus on the strength of people.

In addition, the right combination of people should be made. For example, it is wise to let two academics, who possess much knowledge, work together with two practical colleages, who are more focused on the application and implementation of this knowledge.

The company ranks some aspects of teamwork cohesion as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	8	
Team members must follow the group perspective and not do what they want themselves.	6	To develop innovations, you need Einzelgangers. People should follow their own path to develop an innovation. You shouldn't completely stop creativity and change, but limit it in some cases.

1.5.2.5: team climate

To achieve a good team environment a company should give their employees the space to broaden their knowledge. Important is that new books and new software are available.

The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

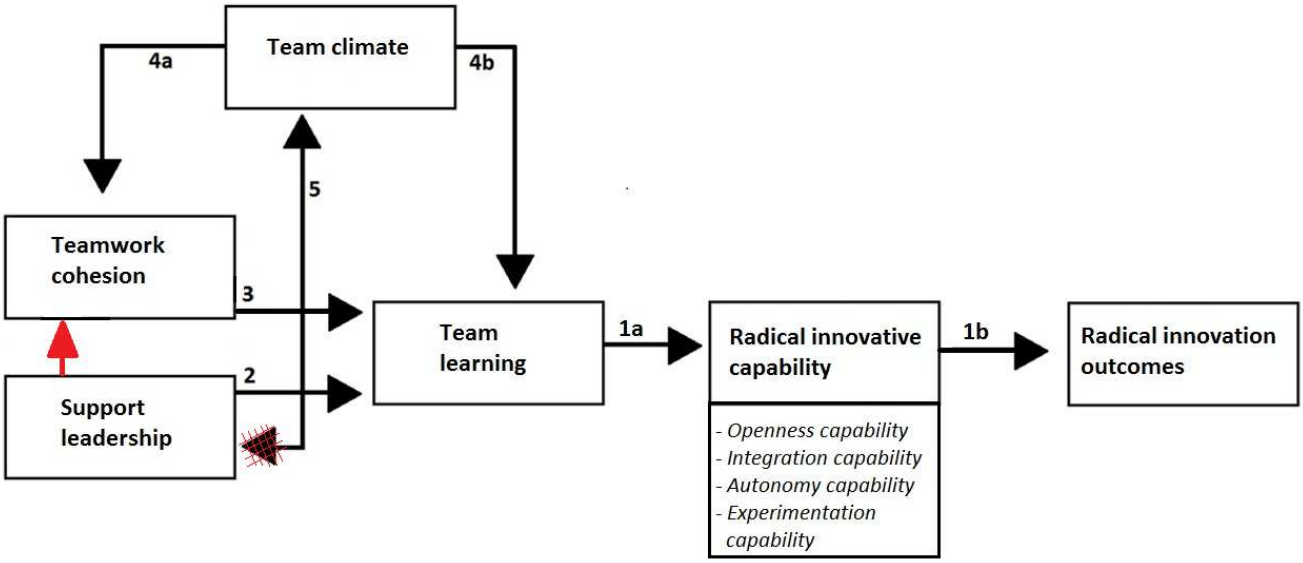
Core element:	Score:	Extra information:
Focus on the target	10	
Task support	9	
Social – emotional support	8	
Emphasis on the resources	7	When a particular resource is not at hand, always something else can be turned to. For example, when a computer is not working, it is possible to use paper.
Guidance on an extra pay	6	

1.5.3. Relation between the different concepts

The company has two suggestions for adapting my research model:
- Add an extra relationship to support leadership and teamwork cohesion.

The R&D manager describes to use leadership to drive the team to a certain cohesion, which you need to develop good innovations.
- Move the relationship from team climate to support leadership.
The manager thinks that the climate in the company doesn't have any influence on how you function as a leader.

Besides this suggestions, the manager tells me that he supposes that relationship 1a and 1b are stronger than the other relationships.



Appendix 1.6: Elaboration exploratory interview with company 6

1.6.1. Company information and the company in relation to radical innovation capabilities

This branch of the company is focused on membrane vibration and the filtration of all kinds of liquids. With the aid of membrane, it is possible to filter refinely. The main application is the filtering of drinking water, but the company makes for example also filters for beer.

A recent radical innovation within the company is a filter which is capable of filtering out substances that are dissolved within a liquid. Before this radical innovation, it was only possible filtering out small particles present in a liquid. In this radical innovation the company is ahead of its competitors.

The way the company develops this radical innovation is a technology push. In order to ensure that this technology – push really reaches the customers after its launch, the company goes to potential customers to talk about their wishes and ideas about the new product early in the development.

The company very often uses the stage – gate process when developing a radical new product. In the above mentioned radical innovation the company did not work very tightly according to these gates, because it was very clear that they necessarily wanted to develop it.

1.6.2. Various concepts within the company

1.6.2.1: Radical innovative capability

As a company, you often tend to stay within existing paths (incremental innovations), but in that way you do not survive in the long run.

When you, as a company want to start a radical innovation it works well to use external input. When using external input the company will not be hindered by knowledge that the company already has. When a company uses external input you will get a different climate within the company, allowing people to open up more and become more developed. Without external input, this company would not function probably optimally.

Another important aspects for a good radical innovative capability is a good internal cooperation. It is important that different departments (e.g. sales and development) work together at an early stage. This cooperation is necessary for:

- A good introduction of the product.
- For the development of opportunities for mass production.
- For achieving efficiency.

The company ranks the different determinants of radical innovative capability as follows:
(10 = very important, 1 = absolutely not important)

Determinant:	Score:	Extra information:
Experimentation capability	9	
Openness capability	8	
Autonomic capability	8	Framework is necessary, but within this framework an employee should be completely free.
Integration capability	7	

1.6.2.2: team learning

This organization thinks it's necessary to combine people with different work experiences within a team to optimize team learning . There is also a mix of juniors and seniors within a team. Seniors often are leaders of project teams, they must encourage juniors to develop new innovative products. A senior employee who is the leader also works within the team daily. Through his daily attendance in the team he gets a very good picture of what is happening in a team. To give a chance to juniors to learn how to deal with being a leader of a project team they will sometimes act as leader in smaller projects.

Another important aspect for a good team learning climate is the capability to delegate as a R&D manager. As a manager you shouldn't want to do everything on your own, but you should entrust some things to your team members.

To reach good education and a good learning effect within your organization a certain awareness among the employees is also important. Employees must be alert of their development and also engage in areas where they are not experts.

This company uses collective trainings to develop social skills (such as communication) within the company. The R&D manager will ensure that the R&D department will be more outward looking and communicates a lot. To reach this he sometimes hires external training agencies that give workouts to the department.

In the area of specific job knowledge they commonly use individual training.

The company ranks the different determinants of team learning as follows:
(10 = very important, 1 = absolutely not important)

Sub process:	Score:	Extra information:
Information interpretation	9	When you gain knowledge it's crucial that you understand it.
Knowledge acquisition	9	
Information distribution	8	Within the company, this doesn't often happen. Employees should

		be much encouraged to do so. Within this company people very often give presentations to a lot of colleagues about new ideas they have. So it becomes more clear what the R&D department in the company exactly does.
Organizational memory	8	In this company is currently reported in Word / Excel. An orderly and easy to use document management system lacks at the moment. However, the company is engaged in developing such a system.

1.6.2.3: support leadership

The supportive leadership is currently far too little present in this company at the moment. The head of the R&D department would like to talk regularly with people about the progress of the projects, but simply lacks the time to do this in a good way.

As head of the R&D department he sees it as his primary task to remove obstacles. When employees meet obstacles they come to him and talk about the obstacles and how to remove them.

The R&D managers in R&D department helping out the time constraints of the R&D head and talk more with the employees of the different teams. But despite this, the head of the R&D department would like to have more time available to coach his employees in certain areas.

Important contributions that must be met as head/ manager of an R&D department in order to be able to offer a good supportive leadership are:
- You must have sufficient time available to offer supportive leadership.
- You must have empathy.
- You have to send out peace and should have an overview. Having a helicopter view of a department ensures that you always know what is happening.
- You must have the ability to delegate. If you want to do everything yourself, this will not work.
- It is the trick to ensure that employees see 'no lions and tigers along the way'. As a manager you should always explicitly say that people should turn inhibitions that hinder the development (for example, conversion of the production system) aside and should focus on thinking about developing radical new products.

The company ranks the different determinants of support leadership as follows:

Aspect:	Score:	Extra information:
Giving positive feedback to the employees.	8	
Giving positive appreciation to the employees.	8	
Giving an additional reward to employees when they perform well.	6	They work very little with bonuses within this company. Only in some cases employees receive an additional payment at the end of the year when they have performed exceptionally well. The head of the R&D department describes that bonuses could be a trigger, but believes that you really have to be careful with individual bonuses. This can cause misery. In most cases a team bonus works better.

(10 = very important, 1 = absolutely not important)

1.6.2.4: teamwork cohesion

Within this company they work with functional teams and with multidisciplinary teams.

A functional team is led by an R&D manager. These teams are organized by subject. Within the team may well be a very diverse range of people, from people who just come in to people who have already been involved in the business for a very long time.

A multidisciplinary team is led by a project leader. This type of team is also called cross – functional team. Within this type of teams you can find a very diverse range of people coming from various disciplines, for example marketing & sales, production and R&D. To achieve good radical innovations multidisciplinary teams are very important. With this type of teams you could bring quickly and successfully products to the market, because everyone brings knowledge from his own field. Developing new products in isolation doesn't work.

Important for a good teamwork cohesion is having a clear and distinct purpose and communicate this well with all employees. This provides support within a team. The management also needs to find the object of a specific team important and back it up.

The company ranks the different determinants of teamwork cohesion as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Team members must follow the group perspective and not do what they want themselves.	9	In the creation of radical innovations, it is the case that people more frequently collide within a team.
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	9	

1.6.2.5: team climate

People within the functional teams usually work for a long time together. These colleagues are open to others, help each other and are also physically in the same place.

When people start working in a multidisciplinary team (a project team) they are away from the familiar surroundings. Some people have to get used to these new team first. When the team has achieved a good result once, people see that the team operates well and this should have a positive influence on the team climate.

It is also important for a good team climate that the project leader intervenes at the right moments.

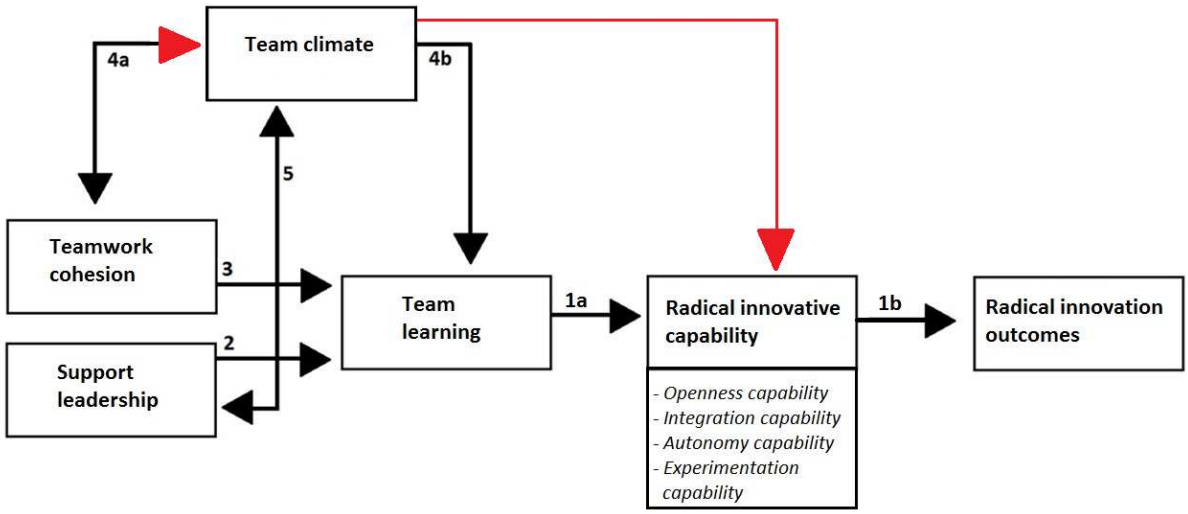
Some other important characteristics/ things you need in a company to develop a good team climate are:
- A clear goal
- Commitment of the management
- Good communication within teams.
- Let teams release where they stand at any given moment and what they have achieved so far.
- Give people time to do things.

The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

Core element:	Score:	Extra information:
Focus on the target	9	
Task support	9	This happens not active, but everyone is aware of it.
Social – emotional support	8	Within this company from the project manager, the R&D manager and the head of the R&D department take all care about people.
Emphasis on the resources	7	
Guidance on an extra pay	7	

1.6.3. Relation between the different concepts

The R&D manager has two suggestions for adapting my research model:
- Create a mutual arrow for the relationship described with hypothesis 4a.
The manager thinks that there is also a certain relationship between teamwork cohesion and team climate.
- Add an additional relationship: from 'team climate' to 'radical innovative capability'



Appendix 1.7: Elaboration exploratory interview with Company 7

1.7.1. Company information and the company in relation to radical innovation capabilities

This company focuses on the production of many various sensors and controls. Their devices help satisfy the world's growing need for safety, energy efficiency and a clean environment and improve safety, efficiency and comfort for millions of people every day. They are world leader and an early – innovator in mission – critical sensing, electrical protection and power management. They are also key player in the automotive, appliance, aircraft, industrial, military, heavy vehicle, heating, air conditioning, data, telecommunications, service and recreational vehicle markets.

More than 1.000.000.000 devices are shipped each year. They produce 16.000 unique products within 400 different product families. Worldwide the company has 11.500 employees and is located in 11 different countries.

Some recent radical innovations the company developed are:
- A cylinder pressure sensor
This sensor developed the company on the basis of competences themselves. With the aid of this new sensor, it is possible to measure the pressure in the combustion chambers. The company worked for six years on this innovation, which was pushed by the market, and proved a good force in 2008.

- High temperature sensors
These are used for example to measure the temperature in an exhaust. For this purpose, six temperature sensors are installed in the exhaust.

To succeed this innovation, the company has bought another company. The radical innovation was developed by the other company, but they were not capable of mass production.

- Turbo position sensor
This sensor is able to measure the position of the scopes within the turbo.

The strength of the company lies in the fact that they are focused on the development of basic technologies that can be applied again and again in different ways.

1.7.2. Various concepts within the company

1.7.2.1: Radical innovative capability

The focus of this company is to develop radical innovations based on existing technologies. All

innovation activities they undertake are urged by the market. A disadvantage of this way of working is that the market possibly needs the product before the company has finished the innovation process of a certain product.

In addition, the company sometimes chooses deliberately to buy other companies they need to develop a certain radical innovation, so as to ensure that they do not come too late to the market.

Important aspects for a good radical innovation capacity are:
- The company must create a group of people within the company who are separated from the company's day-to-day activities. These people must be able to focus on the development of radical innovations. It is often true that first the usefulness must be demonstrated first, before a whole project team is going to invest time in it.
- There should be a budget available. You need this money to ensure a test ability and to promote the product.

The company ranks the determinants of radical innovative capability as follows:
(10 = very important, 1 = absolutely not important)

Determinant:	Score of importance:	Ranking of situation at the moment:	Extra information:
Integration capability	9	6	In practice the focus is often too much on the short – term goals and the long term objective is then somewhat forgotten. Most important thing is that the company is on the market with a new invention at the right moment.
Experimentation capability	8	8	
Openness capability	8	5	Openness is important as a company, you should have the right sources, to get the right information.
Autonomy capability	7	6	

1.7.2.2: team learning

The manager describes the team learning effect within the company above average.

Uniquely, this worldwide organization knows how to work well with each other around the world. Through this global cooperation the ability to learn is immense.

The company also provides customized training for its employees. Managers make curricula for each function. Some of these courses are provided by an internal (for example: new product development) , the other by an external agency (for example: a training communication course with customers).

The company also has a keen eye on its own development process. They also try to introduce innovations in the development process itself. These innovations in the development process are coordinated with the VU Amsterdam.

Important aspects which a company needs to develop for a good team learning environment are:
- A good training plan

- Career Development & Results Analyses (CD & RA)
At the beginning of the year they formulate personal goals for each employee. Moreover, they should also develop an analysis of the extent to which a worker has certain skills. Both employer and employee make such analyses, to see if their thoughts are on one line. If this is not the case, discussion will follow. Based on these data, an individual training plan can be drawn up.

The intent and budgets are available, but the company notes that in real practice it is sometimes difficult to have everyone trained on time.

The company ranks the sub processes of team learning as follows:
(10 = very important, 1 = absolutely not important)

Sub process:	Score of importance:	Ranking of situation at the moment:	Extra information:
Information distribution	9	9	
Information interpretation	9	7	
Organizational memory	9	5	It is important to look at the beginning of a development process at the lessons learned in the past. After the development process you should evaluate if there are any changes needed within the lessons learned. For organizational memory, the company is currently using a design summary sheet. During development you record why you make certain choices, so you do not make mistakes of the past again in the future. The problem is that the use of this system should be prescribed more compelling.
Knowledge acquisition	8	7	

1.7.2.3: support leadership

Within this company the line manager provides supportive leadership to the employees. The project managers have the task to control the projects. If problems occur, the project manager goes to the line manager. The line manager is then responsible for providing someone with the right skills and knowledge to solve the problem.

A manager who wants to offer a good supportive leadership, must have the following qualities:
- Possessing above average leadership skills. To develop these competencies, leaders also receive training.
- A leader must feel to optimize his employee's skills to get the most out of themself.

The company ranks some aspects of support leadership as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score of importance:	Extra information:
Giving positive feedback to the employees.	9	
Giving positive appreciation to the employees.	9	
Giving an additional reward to employees when they perform well.	8	When someone exceeds the expectations, every colleague can nominate that person for a bonus. A bonus within this company can be a 'thank you award', a dinner voucher, a cash bonus or 3% of the annual salary. The company attaches value to give the bonus as soon as possible after an excellent performance.

1.7.2.4: teamwork cohesion

Teams within this company are very fraternal. People really go through hell. People are really trying to help each other.

There are also informal meetings out of business hours, such as a BBQ or karting together. Between different teams manages there is also a high degree of collegiality.

An important things to achieve a good team cohesion is a good assumption policy. When new people are appointed, it is very important to bring in chart if this person fits within the team. This is also the reason that a company conducts several interviews with individuals and also submits an assessment. What also is of great importance, is to see how a person is open to change. This may be an indication of how he is dealing with other people.

The company ranks some aspects of teamwork cohesion as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Team members must follow the group perspective and not do what they want themselves.	9	It is important to focus on this aspect when you have a job interview.
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	8	If a person is absolutely unwilling to do so, there is a chance that the company seek that person. Everything this company does is in teams, so there is no place for people who couldn't work together.

1.7.2.5: team climate

The team climate within this company is very positive. Employees talk about 'we are doing something' and not 'they want us to do something'.

People within a project team also indicate that they really feel that they could contribute to the business success in a good way.

As well he fact that colleagues outside the office visit each other, for example, to sport, indicates that the team climate is good.

Important aspects which contribute to a good team climate are:
- Have a 'staff – to – win'. If you make the choice to do something, you should have the people and resources available and make every effort to achieve your goal. Especially in a small business, it sometimes goes wrong on this aspect.
- Provide a transparent decision – making process. Also make sure that this decision – making process is in line with your strategy.

The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

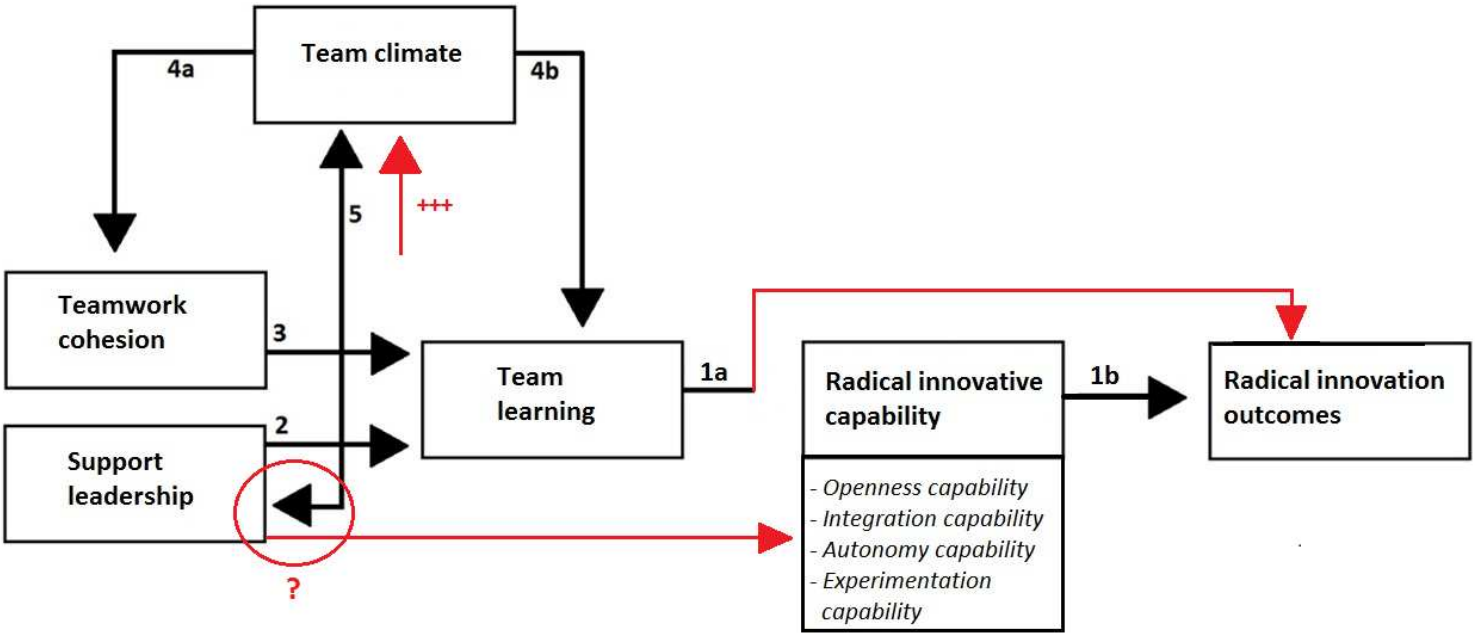
Core element:	Score:	Extra information:
Task support	9	Task support is very important in a company. It works demotivating when this is not properly regulated.
Focus on the target	7	
Social – emotional support	7	In particular, in the direct line connection this is important. The manager should try to solve problems in the one – to – one relationship. In some cases, an expert is required.
Guidance on an extra pay	6	A team reward can motivate.
Emphasis on the resources	5	It is important to maintain the autonomy. Very tight rules do not work. The engineer must know when to deliver the product. How he

		achieves this goal is up to him.

1.7.3. Relation between the different concepts

The R&D manager has two suggestions for adapting my research model:
- Support leadership should have a direct influence on the radical innovative capability. The manager says that a leader directly shows the ability to radical innovations.
- Team learning should have a direct influence on the radical innovation outcomes.

The manager also states that in his opinion the influence of support leadership on team climate is very strong, but he doubts the opposite relation.



Appendix 1.8: Elaboration exploratory interview with company 8

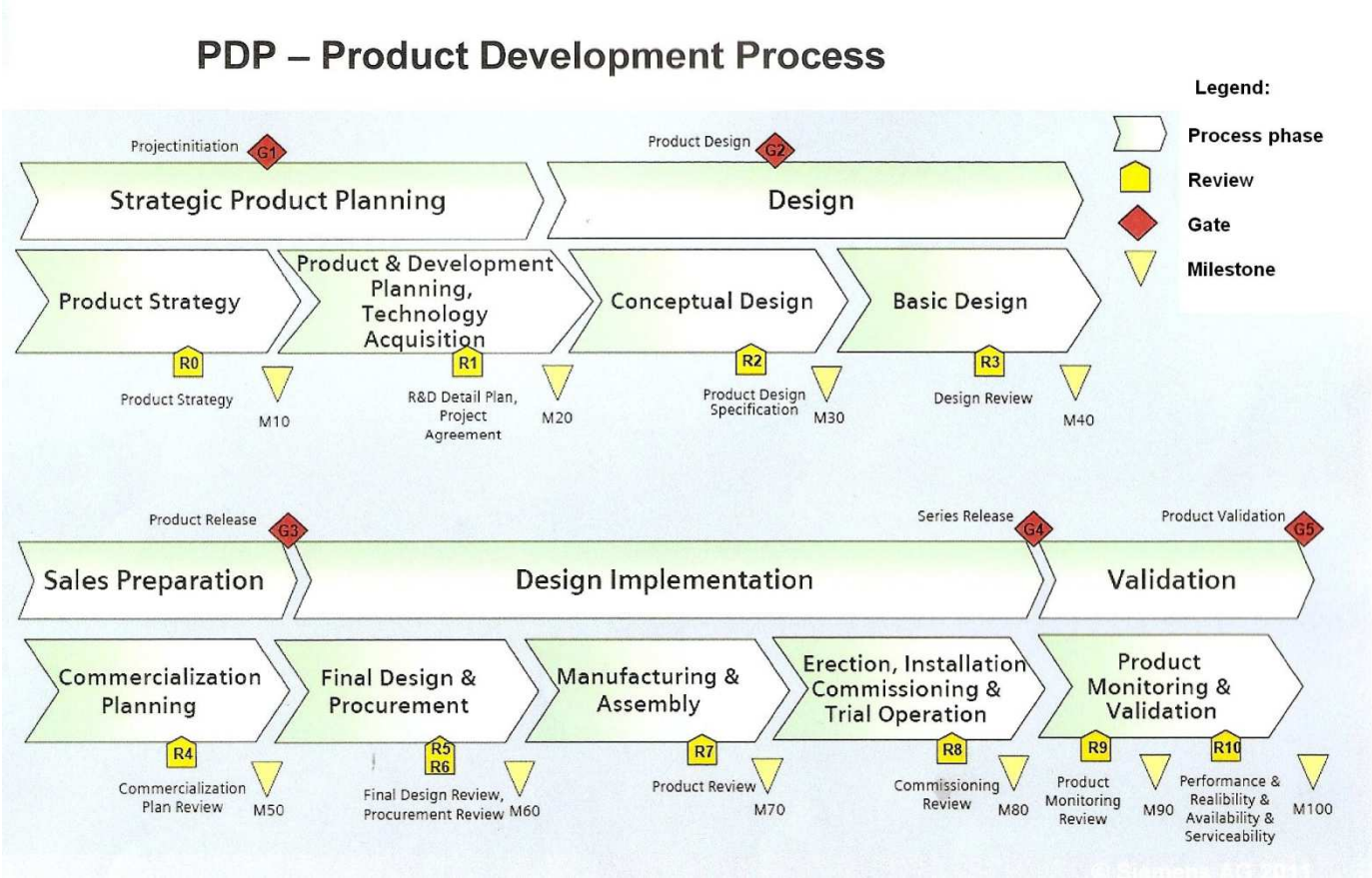
1.8.1. Company information and the company in relation to radical innovation capabilities

This department of the company focusses on the production of compressors for the oil and gas industry. For example, they make pumps for gas that can be used on drilling rigs.

Their goal is to create value for the long term by treating people and environment responsibly. They help their customers to achieve their business goals while meeting global challenges such as urbanization, demographic change, climate change and resource scarcity.

The development of such a new product is created with the support of a process that has 5 stages. This is called the Product Development Process (PDP). At the end of each stage there is a gate with a go/no-go moment.

The product development process is formed as follows:



A recent radical innovation this company developed is a turbo compressor. This new turbo compressor not only produces lower emissions, but also offers increased efficiency and operational safety.

A radical renovation of the compressor is the fact that it is arranged vertically instead of horizontally. The advantage of vertically is that less surface area is needed. In particular, where surface area is expensive.

Another radical renovation of the compressor is the fact that the compressor and the driver now are located in one house. There used to be a shaft protruding from the compressor for this radical change, which lost, this is no longer the case after locating the driver and compressor in one house. This is called a hermetically sealed compressor.

1.8.2. Various concepts within the company

1.8.2.1: Radical innovative capability

The capacity for radical innovations within the company is very high. The company has a large innovation character. Every year they spend 4 billion on R&D.

Three spearheads of the company are:
- Innovation
- Excellence
- Responsibility

The difficulty is sometimes to connect the right knowledge to each other. This happens because there is a lot of knowledge available.

To achieve a good radical innovative capability, the following things are important:
- Money must be available within the company.
- There should be investment in people, using the conditions of training and education. On the one hand this company use external training and education, and on the other hand they use internal training.

The company ranks the determinants of radical innovative capability as follows:
(10 = very important, 1 = absolutely not important)

Determinant:	Score:	Extra information:
Autonomic capability	9	Within a company you need people who can fully focus on R&D. If you want to innovate radically, the employees must have the possibility to spend 100% of their time on this.
Experimentation capability	8	It is important that a company tries to do many different things. You must also learn from mistakes you've made in the past.
Integration capability	7	It is important that you know, as a company, your policy for the future. If you do not have a 'dot on the horizon' you lose the motivation and the development as a company. Having a vision and product planning are very important issues.
Openness capability	7	The information capacity is high within this company. Sometimes it is hard to find the things you are looking for. An informational database is missing here.

1.8.2.2: team learning

Team learning often happens on – the – job. Within project teams it is the daily routine that employees learn from each other.

Important issues for creating a good learning environment within an organization are:
- Having a confidential environment. Employees must be able to be vulnerable.
- Employees should be allowed to make mistakes. A mistake must be seen as a teaching point, and not as a failure.

The company ranks the sub processes of team learning as follows:
(10 = very important, 1 = absolutely not important)

Sub process:	Score:	Extra information:
Knowledge acquisition	8	Gathering new knowledge is a very essential aspect in an innovative company.
Information distribution	7	Knowledge distribution must frequently take place internally. If information isn't shared, there is a risk that everyone looks at the same information again. However, it is important, as a company that internal knowledge is not leaked. In that case there is chance that a competitor copies your knowledge.
Information interpretation	7	It is important that the department technology & innovation brings knowledge in a way that is understandable for the whole enterprise.
Organizational memory	8	It is very important to store knowledge. Otherwise, there is a risk that you reinvent the wheel twice.

1.8.2.3: support leadership

In this company leaders are trying to provide much support.

Important qualities a leader must have to offer a good supportive leadership are:
- The ability to provide confidence. Thus, it is important to create an open relationship and listen very well.
- The leader must function as a coach for his employees.
- As a leader you need to give guidance to your employees. Thus, it is important for optimal results that the right people work together with each other.

The company ranks some aspects of support leadership as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Giving positive feedback to the employees.	9	This is very important when people work in a creative and innovative way.
Giving positive appreciation to the employees.	9	
Giving an additional reward to employees when they perform well.	6	In the research & development world people are not focused on achieving rewards. These people chose this work because they are innovative and creative, and not for the pocket money they get when they perform well. However, in this company the way of working that people with a very exceptional performance receive a reward.

1.8.2.4: teamwork cohesion

Important for a good team is having a good diversity within a team. In addition, it is important for the cohesion to have a good project leader. This leader must have both technical knowledge and overview of the activities.

Important aspects to achieve a good team cohesion are:
- Having a kind of 'living room' where colleagues can brainstorm face-to-face.
- Having an online sharing point. In this way you can work together and share information with each other when you're not in the same room.

The company ranks some aspects of teamwork cohesion as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	9	
Team members must follow the group perspective and not do what they want themselves.	7	It is important that there is a balance between monitoring group appointments and being clear and creative as a R&D engineer. If you do not do that, you wouldn't achieve radical innovations. Sometimes it is difficult to maintain that balance.

1.8.2.5: team climate

The manager describes the team climate within this company as follows:
- Constructive
- Good
- Creative
- Could still be something more result oriented. The manager does attempts to achieve this.

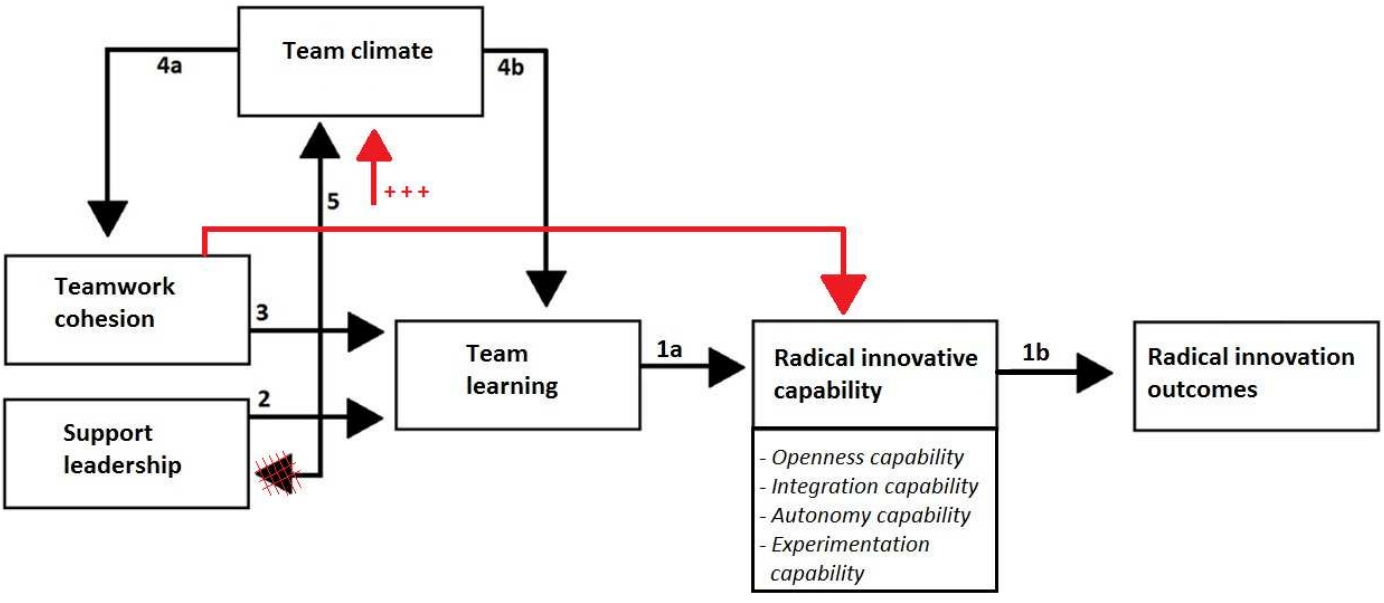
Important aspects to achieve a good team climate are:
- Trust
- Creativity fuelling and stimulating. To achieve this rules and guidelines must sometimes be put asides
- Good mix of individuals
- Create an open atmosphere. Employees must dare to fail.

The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

Core element:	Score:	Extra information:
Focus on the target	9	It is important that your organization has a clear goal in mind and that you do not jump to conclusions early.
Task support	8	A disadvantage for a large organization is that it may cost much energy to arrange something.
Social – emotional support	8	It is very important to have enough attention for the welfare and wellbeing of your employees. You should as a manager show understanding for problems and support your employees. When you help your employees very well with their problems, they will be more loyal to the business in the future. In addition, people perform better when they feel well.
Emphasis on the resources	7	
Guidance on an extra pay	8	The manager rates this aspect an eight.
Guidance on extra pay	6	The manager rates this aspect a six when it comes to salary or benefits.

1.8.3. Relation between the different concepts

The R&D manager has two suggestions before adapting my research model:
- The manager doubts whether the relationship between supportive leadership and team climate is mutual. He expects that the impact of supportive leadership on team climate is very large, but the other way found that the team climate has no influence on supportive leadership.
- He adds an extra relationship. His expectation is that the teamwork cohesion has a direct relationship with the radical innovative capability.



Appendix 1.9: Elaboration exploratory interview with company 9

1.9.1. Company information and the company in relation to radical innovation capabilities

The person interviewed works for a small company which focuses on open innovations. This research- and development centre aims at thermoplastic composites for a broad range of end use markets. Thermoplastic composites are important materials for many contemporary high end applications in transport, industry, energy and healthcare. The company primarily executes joint development projects on new thermoplastic composite technologies and applications. In these projects the company takes into account materials, processing and design aspects.

The company was founded in 2009. They have 17 people employed, which make up 13 FTE.

The research they perform is mostly aimed at the longer term. A recent radical innovation came from Sebastiaan Haanappel. He developed a new test method for thermoplastic composites. With the help of these devices, one can determine how the material will deform in certain situations. The deformation process of the product is mapped in this way.

The company distinguishes between members and customers. Members pay a fixed amount each year and must watch the whole process. In return for this payment, members receive:
- The privilege to use the facilities in the company hall.
- A certain amount of control over the strategic direction of the company.
- Access to research that is done.

Customers come along once and do not have the advantages described above.

When developing new things, they work with a kind of road map. The industrial members define the materials and examinations necessary.

A disadvantage of this way of working is that you can never develop specific products, because the members of the company (for example Fokker and Boeing) also compete with each other. When you develop specific products you get too much up in the competition atmosphere.

A strength of the company is that they work more fundamental than the competitor and try to understand why certain things are as they are.

1.9.2. Various concepts within the company

1.9.2.1: Radical innovative capability

The company has a good capacity for radical innovations. This is based on three core concepts:
- Their industrial members, with which they have every two weeks a consultation. Through these consultations, the industrial members are involved in the research.
- The fact that they have qualified people in their company. This will ensure that the company survives.
- The fact that they have a very specific focus on a particular market segment: the thermoplastic material. Through this focus, they greatly excel in this market.

The company ranks the determinants of radical innovative capability as follows:
(10 = very important, 1 = absolutely not important)

Determinant:	Score:	Extra information:
Experimentation capability	9	This is important. There is a private lab available at this company and researchers have access to the lab of partners.
Openness capability	8	Every research that is done must be scientific. When this is the case, you can't only concentrate on your own lab.
Autonomic capability	8	The industrial members watch the process, but they rarely guide the process. When employees are free, in a large extent, they will produce the best results.
Integration capability	7	The company mostly focuses on the long term. They think this is important to do. They do a lot of generic research, the application of which lies in the future.

1.9.2.2: team learning

The learning environment within a team of this company is pretty good. This is because it is a small company and all employees have a lot of contact with each other. There are many so – called 'coffee machine conversations'. In addition, every two weeks there will be a research meeting. Employees speak at these meetings about two hours to each other. Everybody tells what he/she is doing and where he/she has any problems. There is also an every two weeks contact with the industrial partners of the company, to hear what is important to them.

The company ranks the sub processes of team learning as follows:
(10 = very important, 1 = absolutely not important)

Sub process:	Score:	Extra information:
Organizational memory	9	A good organizational memory is very important. In practice this is difficult, because it takes a lot of time to report it well.
Information interpretation	9	This is the essence of research.
Knowledge acquisition	8	This is done in the company by doctoral students and researchers.
Information distribution	8	This is important. At this company they use research meetings and interim reports for the distribution of information.

1.9.2.3: support leadership

At the company they offer a pretty good supportive leadership. The leaders are always available to ask answers and provide support. They also think carefully about providing the right facilities. Because the company is very small, all this goes almost automatically.

Important facilities to provide as a manager for good supportive leadership are:
- Having an office that is close to the workplace. This allows you to work with short lines and promotes having informal contact.
- Having a meeting room.

The company ranks some aspects of support leadership as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Giving positive feedback to the employees.	8	
Giving positive appreciation to the employees.	8	
Giving an additional reward to employees when they perform well.	6	Giving an extra reward hardly happens. The possibility to do this isn't there. It is also true that technicians do not value extra reward much. Technicians are more driven by an intrinsic motivation. A major disadvantage of giving individual bonuses is the fact that people might be going to work too much individually and withhold knowledge for their colleagues . In such cases, it would be better to give a team bonus. Then you promote cooperation.

1.9.2.4: teamwork cohesion

The teamwork cohesion within the company is very good. This is partly because it is a small company. The company has a good mix of people working together. People in the company are willing to work for each other and help each other in solving problems. These aspects are very important for a good

teamwork cohesion.

Other things which are important for a good teamwork cohesion:
- A coffee room/ lunch room, where employees can have breaks together.
- Time and money available to occasionally have an activity for the team.
- A flat organization, with an open door policy.

The company ranks some aspects of teamwork cohesion as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Team members must follow the group perspective and not do what they want themselves.	7	In this company it is not always possible to look at the group perspective, because every researcher has its own project.
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	8	It is important that an employee is sometimes willing to sacrifice something for his team. It is especially important that employees are open to cooperation. When you are collegues, it is good to talk to each other, learn from each other and sometimes criticize each other.

1.9.2.5: team climate

The team climate at the company is very positive. Every employee is aware of the fact what the company stands for, what they want to achieve and also contribute to this.

Two very important aspects for a good team climate are:
- Working in an informal way. There must be sufficient space for an informal talk and discussion. These are the so – called 'coffee machine conversations'. In a small company like this one, this happens fairly easily.
- Employees should be involved in the status of the company. It is very important that employees feel that they are involved and that they are taken seriously. It is important to tell employees what is happening the company and what the contacts are.

The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

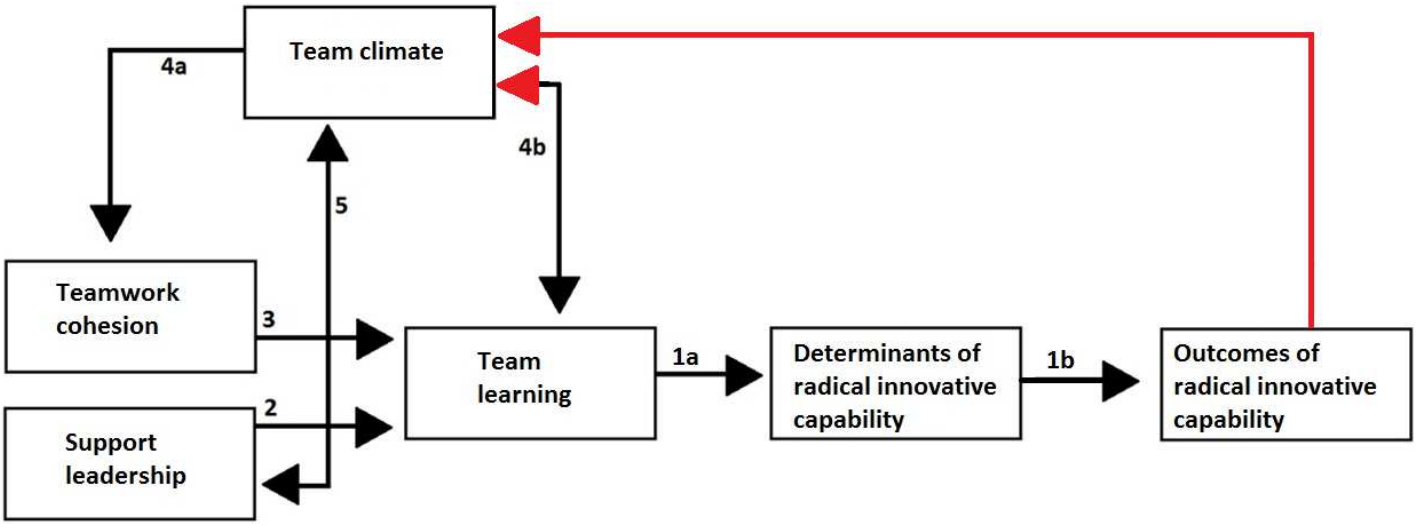
Core element:	Score:	Extra information:
Social – emotional support	9	It is very important that people feel at home within an enterprise. Within a small company like this one, this is fairly easy. The interviewee experiences his work environment as a group of friends where he goes to work.
Task support	8	Nothing is more frustrating than wanting to do research, but missing the materials/ equipment. This gives you the feeling of not being taken seriously.
Focus on the target	8	
Emphasis on the resources	7	
Guidance on an extra pay	5	A reward has little of no effect on the work attitude of PhD students. They work more for the honor and the challenge.

1.9.3. Relation between the different concepts

The R&D manager has two suggestions for adapting my research model:
- Create a mutual arrow for the relationship described with hypothesis 4b.
When you have an

where you learn much from each other, this will have a positive effect on the team climate.

- Add an additional relationship: from 'outcomes of radical innovative capability' to 'team climate'.
When a team makes a very successful new product, and this for examples reaches the news, this (especially in a technical environment) will have a positive effect on the team climate.



Appendix 1.10: Elaboration exploratory interview with company 10

1.10.1. Company information and the company in relation to radical innovation capabilities

This company is part of a globally established company. The main focus of the company is on safety, sustainability and high end specifications in the area of textile technology based materials.

The company carries out its activities on six different final markets:
- Personal protection (22% of sales)
- Defence (9% of sales)
- Sport & Leisure (23% of sales)
- Aerospace & Automotive (11% of sales)
- Infra & Environment (28% of sales)
- Other (7% of sales)

An activity in which they excel is making fibers. This eventually gets a textile application. Fibers can be converted into fabric architectures. These are then processed into textiles.

Some recent radical innovations that have taken place within the company are:
- The fuselage of an airplane is made of artificial material.
- The company has entered the oil- and gas market. Make of composite materials they have developed pipes.
- Electric cars are too heavy. With composite materials lighter cars are made.
- The plates of a ship have been produced with lighter material. Because the ship is lighter, fuel is saved.
- Geosynthetics. These are artificial dikes. These dikes have fiberglass. These registrate every movement and pass it on to a central.
- Measuring instruments for the heart rate and oxygen integrated in clothing. This is for instance suitable for firefighters, when they must enter a burning building.

The aim of the company is to develop technologies that are suitable for multiple applications. When a technology has only one application, the development process is mostly too expensive.

1.10.2. Various concepts within the company

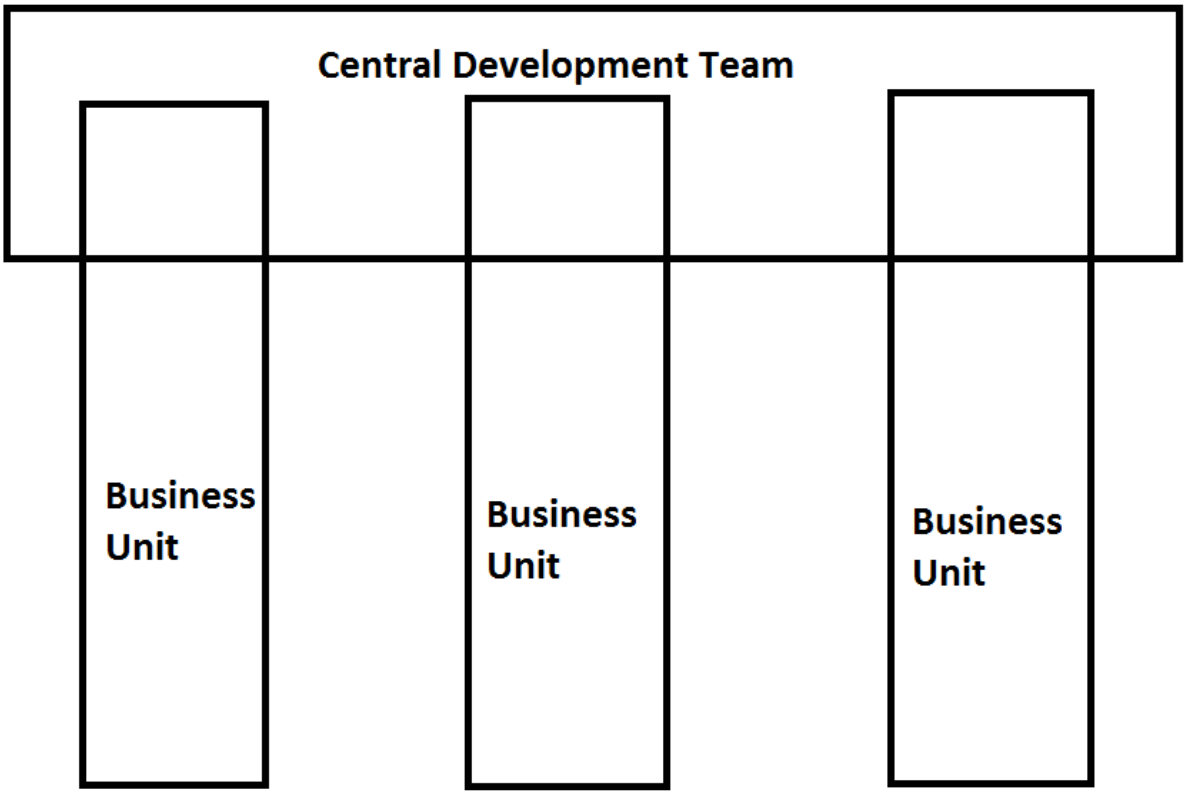
1.10.2.1: Radical innovative capability

Within this company they have a separate group of employees who are engaged in radical innovations throughout all day long. The manager prefers radical innovations actually take place within the team.

The moment you have a good idea you form a team. It is true that the forming of such a team can sometimes change when specific expertise is required.

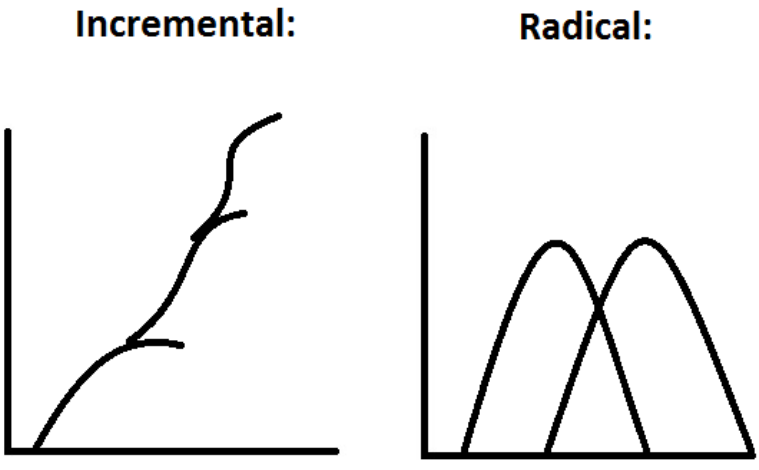
Besides developing radical innovations with internal teams, it is also possible to outsource such activities as a company.

The manager provides for the development of radical innovations preference by using the following structure:

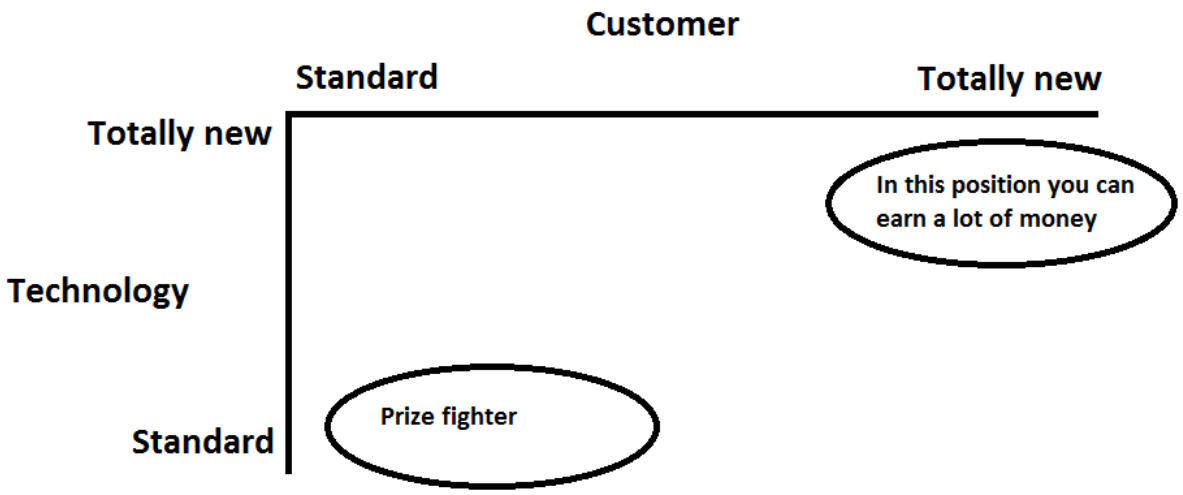


The manager says that many investments are necessary for radical innovations, because you are starting with a completely new product. In bad times there are more incremental innovations than radical innovations.

The difference between the incremental and radical innovations shows the manager with the following figures:



To divide the technologies that the company develops they make great use of the technology – customer matrix:



When the company develops a totally new technology (radical innovation) and reaches new customers they can earn a lot of money. To reach this, sometimes cooperation with other companies is needed.

When a company develop radical innovations it is very important to see how the new product is marketed in the right way and how this new product can reach the consumer.

The company ranks the determinants of radical innovative capability as follows:
(10 = very important, 1 = absolutely not important)

Determinant:	Score:	Extra information:
Openness capability	10	
Autonomic capability	9	As an employee, you must be free.
Integration capability	7	
Experimentation capability	7	

1.10.2.2: team learning

Within teams, it is sometimes difficult to achieve a good learning climate. People often work a long time at a certain position and are working according to a fixed pattern. When you always work according to a fixed pattern, the ability to develop innovations is declining sharply.

Teams working with external parties are often more open to ideas and develop better and faster than a radical innovation team that only works internally. For this reason, this company often tries to set up developments with external parties.

To achieve a good team learning experience within a company, the following things are important:
- Put an external manager on a project when several parties are involved within the project. When you have an external manager, you could prevent the manager being too busy with other everyday activities.

- Have access to a place. This should be outside the existing business unit.
- You must have a good administration system. This should not be much paperwork and bureaucracy, but an orderly administration.
- Provide a strong team and trust the team. The manager must also function as a good inspiration.

The company ranks the sub processes of team learning as follows:
(10 = very important, 1 = absolutely not important)

Sub process:	Score:	Extra information:
Information interpretation	10	Everything has been invented. The trick is to understand business and combine the right things. Much knowledge is not optimally used for earning money.
Information distribution	9	
Knowledge acquisition	8	
Organizational memory	7	

1.10.2.3: support leadership

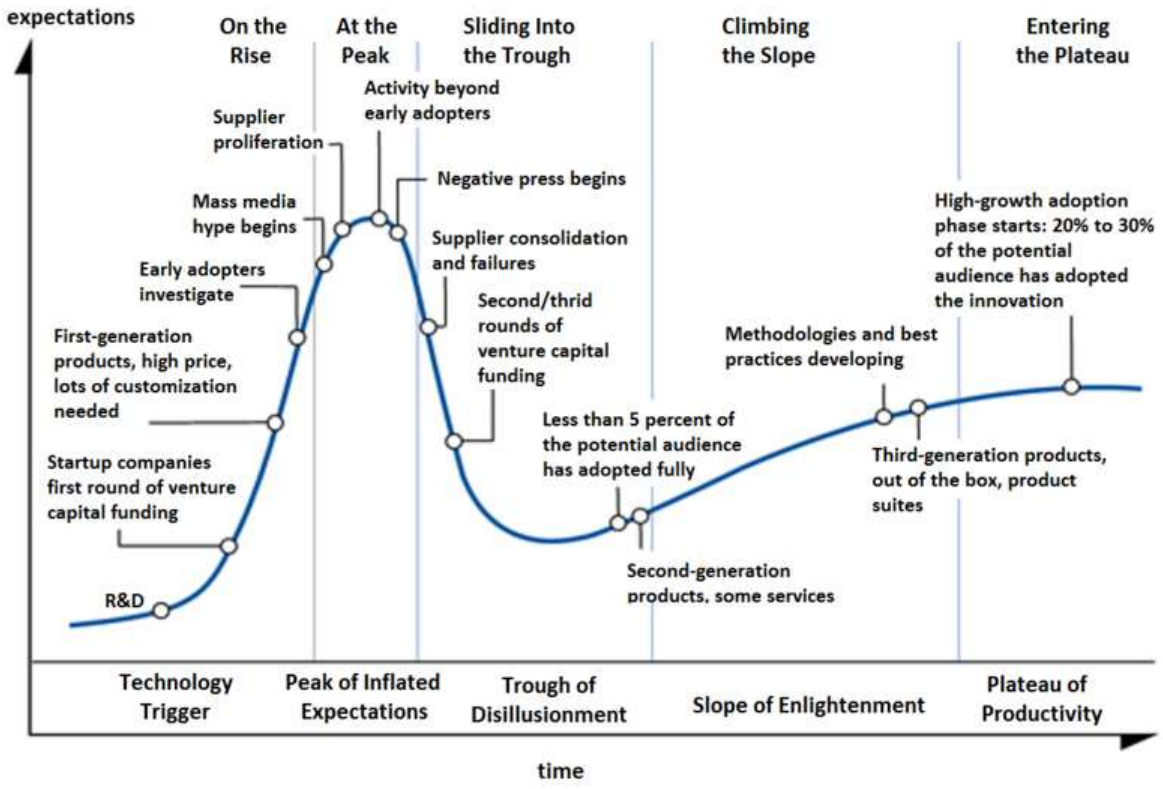
A team that focuses on radical innovation needs coaching leadership. Leading your employees in a bureaucratic way doesn't work within a team focused on radical innovations.

When you have professors as employees, you do not have to tell them exactly what to do as a leader. As a leader, you must make sure that you build up certain frames, your employees should stay in. This is seen as entrepreneurial leadership.

Important things you should convey to your employees as supportive leader are:
- Trust
- Motivation
- Inspiration
- Perseverance

Developing new products is associated with highs and lows. This is mentioned the 'hype curve'. As a leader, you must help employees through the lows.

A hype curve looks like this:



After reaching the peak, the negative press begins. As a leader/ manager, you should be there for your employees at these moments. It is important to talk together and, if necessary, look for additional help. This could be a student or an external company.

The company ranks some aspects of support leadership as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Giving positive feedback to the employees.	10	
Giving positive appreciation to the employees.	9	
Giving an additional reward to employees when they perform well.	7	A reward has only a temporary effect. Many times, a team reward is even more important than an individual reward.

1.10.2.4: teamwork cohesion

The teams within this company are highly multidisciplinary. To develop radical innovations it needs people from the production and finance department.

Important aspects that, in the eyes of the manager, contribute to the cohesion of a team are:
- Manufacturability of the product. It must be possible to produce in large quantities.
- Market severability. Do people have money for this product? Will people want to buy the product?
- Reproducibility. Could you make the product in large quantities? What is the cost price in that case?

Sellers and technicians should work together to find an optimal combination between these three aspects.

The company tells the following things about some aspects of teamwork cohesion

Aspect:	Score:	Extra information:
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	Soft side	
Team members must follow the group perspective and not do what they want themselves.	Hard side	When an employee generally does what he wants and doesn't see the groups perspectives a discussion with this person and with other persons of the team will follow. The strength of a team lies in the fact that each individual makes a clear contribution, but an individual must not act solo.

1.10.2.5: team climate

A good team environment is the most important aspect within a company. The success of your company depends on it.

Important aspects to achieve a good team environment are:
- Openness within the team
- Honesty between the workers within the team
- Extra time is accepted, you are willing to stop energy in the team. As a team you are actually a small business.

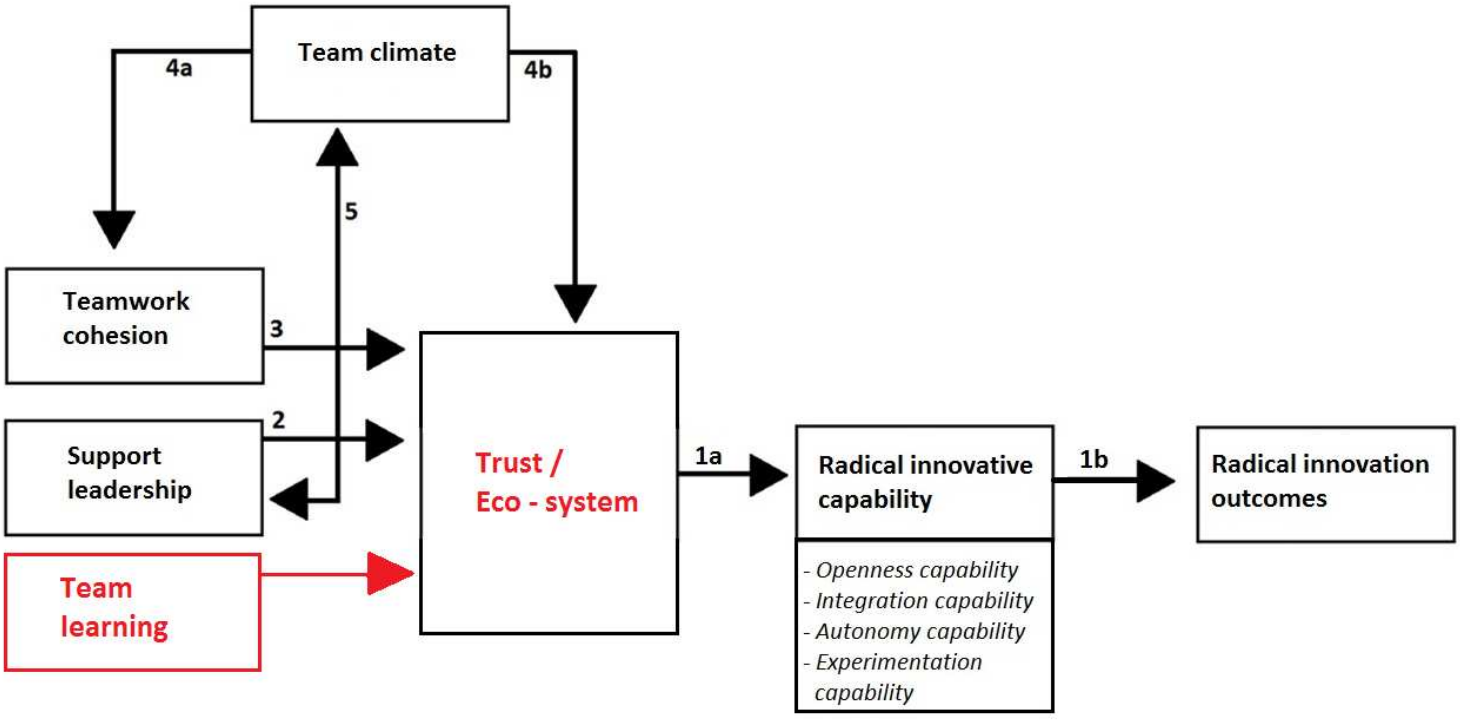
The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

Core element:	Score:	Extra information:
Focus on the target	10	You go for results with your business, that's the most important thing.
Social – emotional support	8	As an employee, you must feel well to achieve a particular goal.
Emphasis on the resources	8	Resources are of secondary importance.
Guidance on extra pay	7	
Task support	7	

1.10.3. Relation between the different concepts

The R&D manager has two suggestions for adapting my research model:
-Move the variable team learning more to the left side in the model.
- Mention in the middle of the model the variable 'trust' or 'eco – system'.

Besides these two things the manager tells that it fits more incremental innovations to put the process in a model. If you want to reach a good radical innovation you'll have to give employees



more room. You shouldn't prescribe fixed models for them.

Appendix 1.11: Elaboration exploratory interview with company 11

1.11.1. Company information and the company in relation to radical innovation capabilities

This company is an international industrial company focused on the development, production, and sale of semi – finished products, buses and other finished products and the assembly of passenger cars. It is a collection of flexible, independent companies, each with their own specialty. The strength of the VDL Group lies in the mutual cooperation between the companies.

Since its inception in 1953, this family business has grown into a company with 82 companies, spread across 18 countries and with more than 8.800 employees.

Within this branch of the company they develop a new product when a specific customer asks them for it. So they aren't asking for technically innovative products without a specific customer.

Some radical innovations that have taken place in the production process:
- Lean and six sigma.
This is a three – year program that started two years back. Lean refers to the purpose to produce in the most efficient way. Six sigma is a statistic, that looks at quality assurance in processes. This is a radical change in the production process for this company. With a small number of products they aim at high efficiency jumps.
- The development department has been expanded.
They have grown from 11 to 38 product developers. First they were only focused on parts. Later they added assembling, test, and also designing for customers.

A recent radical innovative product they developed is a kind of vacuum robot. This robot must be fast and accurate and also achieve a low vacuum of nearly 0. All molecules (gases) are deleted to achieve this.

Because this company develops products for specific customer wishes, small innovations take place every moment when the customer asks for minor changes.

This company is a major player in its field. This is an advantage, because they can provide financial security and continuity. This scale is unique.

1.11.2. Various concepts within the company

1.11.2.1: Radical innovative capability

The innovative power of this branch of the company lies in the fact that 80 of the 300 employees are college or university educated and are engaged in innovations all the time.

Important aspects to reach a good radical innovative capability are:
- Have the right people, with the right qualifications and training.
- Have the right resources. Simulation software is one of the important resources. This will allow you to map, in advance, if the things you have created will work.
- Have the appropriate means of production. The innovative strength of a company lies in the fact of having large and precise machines and new production technologies.

The company ranks the determinants of radical innovative capability as follows:
(10 = very important, 1 = absolutely not important)

Determinant:	Score of importance:	Ranking of situation at the moment:	Extra information:
Openness capability	9	9	It is important to be transparent as a company and invite customers to think with you at an early stage of the process. This goes well at this company at the moment.
Integration capability	8	3	This company's work is mainly focused on the short term.
Autonomy capability	7	7	As a company, it is important to give your employees independence and give them the opportunity to do their own thing. On the other hand, it is true that an employee should listen very carefully to the customer's wishes.
Experimentation capability	7	3	Developers go fast by theorizing. There is a risk that they are too theoretical. It is important for a developer to try out things at the right moment. In reality however, there is often no budget to try out many things.

1.11.2.2: team learning

The strength of the learning environment within the technology & development department of this company is that the department is transparent. Everyone is open and people ask each others for help when necessary.

Things which are important for a good team environment are:
- Transparency
- Openness
- Career guidance. You can never do this enough as a company, but often there is not enough money and time available.
- Consciously setting up a 'young professionals' program. This is a training program for higher graduated people. These people work on different departments. Through working on different departments the coherence between the departments increases and their own knowledge increases too.
- Learning at work It is important to share experiences with colleagues. In this way an employee can learn from the experiences of his colleagues.
- Let the developer of a new product also help to build the prototype. This is confrontational and creates a great learning effect, because by working this way you look at the shortcomings in your own design.

The company ranks the sub processes of team learning as follows:
(10 = very important, 1 = absolutely not important)

Sub process:	Score:	Extra information:
Information distribution	10	It's negative for a company when knowledge remains with one person. This can stop the growing process of the company.
Organizational memory	10	
Information interpretation	8	It is important to adapt the knowledge of one person in a process. 80% of the production consists of standardized knowledge. 20 % is added value of R&D employees. It is necessary to innovate and improve the process. It is important to ensure, as a manager, that people do not feel redundant.
Knowledge acquisition	8	This is useful in theory, but it is not sufficient to ensure a good result.

1.11.2.3: support leadership

In this company they like to have a facility leader and not a controlling leader. They assume that this is the key to successful innovations. Furthermore, higher educated people do not like being guided.

The manager considers it important that employees have a fair autonomy. He says that in his opinion the quality of the end product is very important and not the content of the process which brings you there.

Important aspects to give a good supportive leadership are:

- Describe clearly the outside boundaries of the innovation process.
- Work along with your employee to a substantive product review.

The company ranks some aspects of support leadership as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score of importance:	Extra information:
Giving positive feedback to the employees.	7	Besides positive feedback managers also give negative feedback in this company. They think that it is important to give direct feedback to errors. Employees can learn from their mistakes.
Giving positive appreciation to the employees.	7	
Giving an additional reward to employees when they perform well.	4	This happens very rarely. The motive of technicians is not the money, but making a good technical product design and see their own input in it.

1.11.2.4: teamwork cohesion

There is not much consistency in project teams of this company. This is caused by the fact that people come from different departments and only temporarily work together. An individual has a project interest and a department interest. This sometimes causes friction.

Important things to ensure a good team cohesion are:
- Formulate clear project goals and communicate them clearly.
- Ensure at the start of the project that each individual employee has a clear idea of the project's purpose and what he must achieve in his department in the short term. This can prevent conflicts.
- Stimulate informal contact between project team members.
- Celebrate team successes. It is important to realize when something went well. This is done too little in practice.

The company ranks some aspects of teamwork cohesion as follows:
(10 = very important, 1 = absolutely not important)

Aspect:	Score:	Extra information:
Team members must be willing to sacrifice for the team, they should be open for business cooperation.	10	
Team members must follow the group perspective and not do what they want themselves.	6	It is important to clearly indicate the boundaries of a framework as a manager, but within this framework individuals should have a strong opinion and also express this.

1.11.2.5: team climate

The climate that prevails within this company is open and transparent. It is mandatory within this company to give colleagues insight into your work. By explaining to your colleagues what you've done you force yourself to think again about your idea and describe it in such a way that potential customers can understand it.

Important aspects you need to reach a good team climate are:
- Have the availability of an office garden inside your company. Working together in a room, instead in all individual workstations, improves innovative ideas.
- Ensure that a central computer disk is available, which people can use to share things of the project.

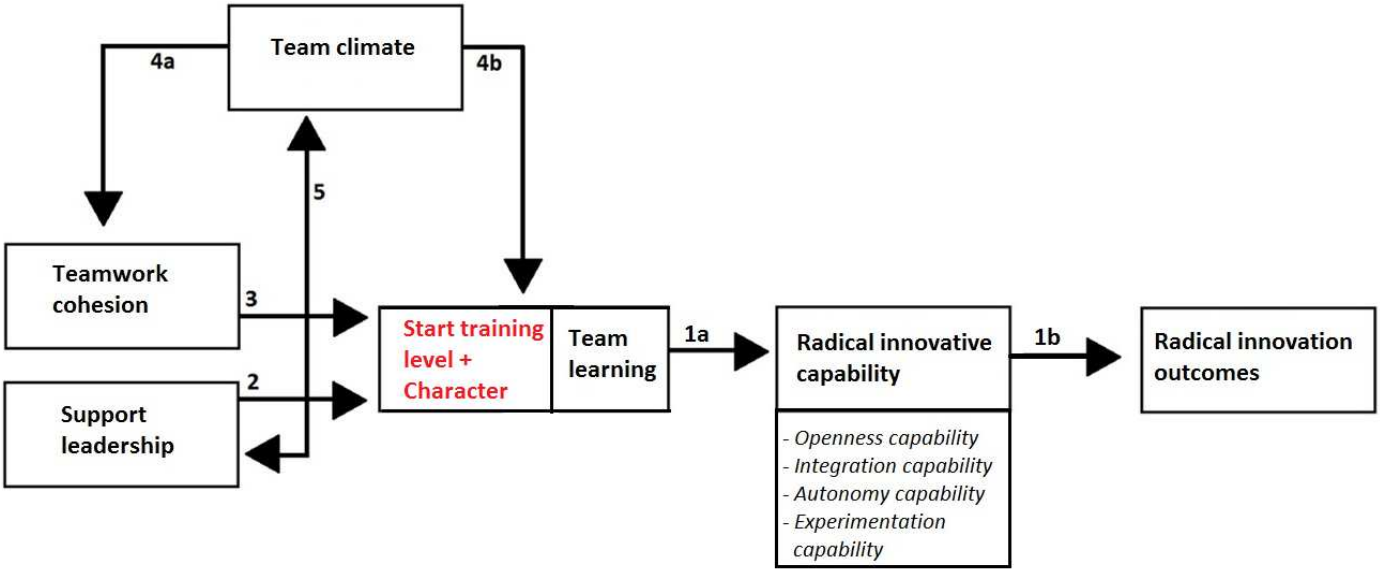
People within this company feel very connected with the target. For example, they are willing to work overtime voluntarily and on their own initiative. The fact that absenteeism is only 0,5% indicates, according to the manager, that the employees at this department are motivated.

The company ranks the core elements of team climate as follows:
(10 = very important, 1 = absolutely not important)

Core element:	Score:	Extra information:
Focus on the target	10	This company is highly targeted.
Guidance on an extra pay	6	
Task support	6	
Social – emotional support	6	
Emphasis on the resources	4	For innovations the resources are not very important. With the help of other resources than planned you can achieve the same goal too.

1.11.3. Relation between the different concepts

The manager of this company contributes two aspects to the research model:
- Start training levels. Free spirits can and should not be lead directly.



- Character. The character is associated to the self-learning ability. If you have a self-motivating character, this automatically creates a good learning effect.

Appendix 2: Questionnaire

I will use the same item list for the manager and the employees to compare when the manager and the employees have the same thought about the state of affairs within the enterprise.

A Likert-type 5-point scale (1 totally disagree, 5 totally agree) was used to express the level of agreement or disagreement with the different items of the manager and the employees.

Introduction:

Dear Sir/ Madam,

I'm a Business and Administration student at the University of Twente. I've chosen the track Human Resource Management and are writing my master scription at the moment. My master research focuses on the relation between team climate and radical innovative capability. The company you work for is one of the companies where my master research will be conducted.

I would like to ask you if you want to help me in completing the following questionnaire.
The questionnaire starts with some general questions.
The second phase consists of statements about the different concepts of my research. These concepts are radical innovative capability, team learning, support leadership, teamwork cohesion and team climate.

A 5 points Likert scale (1 = totally disagree; 5 = totally agree) is used to measure your opinion about the different statements.

Thanks in advance for your help.

Kind regards,

Monique Kotte

General questions:

What is the name of the company you are working for?	
What is your function within this company?	
What is your gender?	
What is your age?	

Statements about the different concepts:

A Likert-type 5-point scale (1 totally disagree, 5 totally agree) is used to express the level of agreement or disagreement with the different items.

Please put an 'X' to give your opinion on the Likert scale.

Radical innovative capability:

Please put an 'X' to give your opinion on the Likert scale.

Factor	Items	Your opinion				
		1	2	3	4	5
		Totally disagree	Disagree	Don't disagree/ Don't agree	Agree	Totally agree
Openness capability (OC)	We participate in industrial networks such as industrial associations, standard organizations and industrial forms.					
	We invite scientists and gurus to predict the future					
	We co-operate with universities/ research institutes, to develop brand new ideas					
Integration capability (IC)	We apply the knowledge gained in previous projects to new projects.					
	We encourage cross – functional learning and fertilization.					
	We upgrade and integrate our technology capabilities, new product development and marketing.					
Autonomy capability (AC)	Business unit managers are able to frequently renew product portfolios.					
	Business managers are able to update necessary technology and market information.					
	We empower business unit managers to implement their own innovation strategy.					
Experimentation capability (EC)	We usually adopt new ideas and develop them as reliable products.					
	We commercialize proven concepts into market.					
	We develop methods and tools, to improve R&D.					

(Chang, Y-C, Chang, H-T, Chi, H-R, Chen, M-H, Deng, L-L, 2012)

Outcomes of the radical innovative capability:

Please put an 'X' to give your opinion on the Likert scale.

Factor	Items	Your opinion				
		1	2	3	4	5
		Totally disagree	Disagree	Don't disagree / Don't agree	Agree	Totally agree
Outcomes of radical innovative capabilities	In new product and service introductions, our company is often first-to-market.					
	Our new products and services are often perceived as very novel by customers.					
	In comparison with our competitors, our company has introduced more innovative products and services during the past five years.					
	In comparison with our competitors, our company has higher success rate in new products and service launch.					
	Our firm's R&D or product development resources are adequate to handle the development need of new products and services.					
	Key executives of the firm are willing to take risks to seize and explore 'chancy' growth opportunities.					
	Senior executives constantly seek unusual, novel solutions to problems via the use of 'idea men'.					
	When we see new ways of doing things, we are first at adopting them.					

(Wang & Ahmed, 2004)

Team learning:

Please put an 'X' to give your opinion on the Likert scale.

Factor	Items	Your opinion				
		1	2	3	4	5
		Totally disagree	Disagree	Don't disagree/ don't agree	Agree	Totally agree
Knowledge acquisition	The employees attend fairs and exhibitions regularly.					
	There is a consolidated and resourceful R&D policy.					
	New ideas and approaches on work performance are experimented continuously.					
Knowledge distribution	The company has formal mechanisms to guarantee the sharing of the best practices among the different fields of the activity.					
	There are individuals within the organization who take part in several teams or divisions and who also act as links between them.					
	There are individuals responsible for collecting, assembling and distributing internally employees' suggestions.					
Knowledge interpretation	All the members of the organization share the same aim to which they feel committed.					
	Employees share knowledge and experiences by talking to each other.					
	Teamwork is a very common practice in the company.					
Organizational memory	The company has directories or e-mails filed according to the field they belong to, so as to find an expert on a concrete issue at any time.					
	The company has up-to-date databases of its clients.					
	There is access to organization's databases and documents through some kind of network (Lotus Notes, intranet etc.)					
	Databases are always kept up-to-date					

(Jiménez-Jiménez & Sanz-Valle,2010)

Support leadership:

Please put an 'X' to give your opinion on the Likert scale.

Item:	Your opinion				
	1	2	3	4	5
	Totally disagree	Disagree	Don't disagree / Don't agree	Agree	Totally agree
The supervisor always gives positive feedback when the employee performs well.					
The supervisor gives special recognition when the employees work performance is especially good.					
The supervisor would quickly acknowledge an improvement in the quality of the employees work.					
The supervisor commends the employee when he/she does a better than average job.					
The supervisor personally pays the employee a compliment when he/she does outstanding work.					
The supervisor informs his boss and/or others in the organization when the employee does outstanding work.					
If the employee does well, he/she knows that the supervisor will reward him/here.					
The supervisor would do all that (s)he could to help the employee go as far as he/she would like to go in this organization if his/her work was consistently above average.					
Good performance of an employee rarely goes unacknowledged by the supervisor.					
When an employee performs well in his job, he rarely receives no praise from his supervisor.					

(Podsakoff, Todor, Grover & Huber, 1985)

Teamwork cohesion:

Please put an 'X' to give your opinion on the Likert scale.

Item:	Your opinion				
	1	2	3	4	5
	Totally disagree	Disagree	Don't disagree/ don't agree	Agree	Totally agree
I prefer to work with others in a team rather than working alone.					
Working with a team is better than working alone.					
People should be made aware that if they are going to be part of a team then they are sometimes going to have to do things they don't want to do.					
People in a team should realize that they sometimes are going to have to make sacrifices for the sake of the team as a whole.					
People in a team should be willing to make sacrifices for the sake of the team's well-being.					
A team is more productive when its members do what the group wants them to do, rather than what they want to do on their own.					
A group is most efficient when its members do what the team wants them to do, rather than what they wants to do on their own.					
A team is less productive when its members follow their own interests and concerns.					

(Wagner, 1995)

Team climate:

Please put an 'X' to give your opinion on the Likert scale.

Factor	Items	Your opinion				
		1	2	3	4	5
		Totally disagree	Disagree	Don't disagree / Don't agree	Agree	Totally agree
Goal emphasis	Performance is often measured within our organization.					
	The management determined very accurately which general goals are to be achieved.					
	Individual employees must perform according to specific criteria.					
Means emphasis	Work instructions are very clear in writing.					
	The work is carried out strictly according to fixed procedures.					
	The leadership style let freedom in the work.					
Reward orientation	The assessment of an employee is directly linked to achieving goals.					
	It is very clear how good performance will be judged and rewarded.					
	There are hard criteria on the basis of which work performance is measured.					
Task support	The management of the company puts the emphasis on stability in the works.					
	The facilities necessary for good performing the work are abundant.					
Socio – emotional support	Employees are very infrequently treated impersonal.					
	The management show interest in personal problems of employees.					
	Employees feel really at home within the organization.					

Thanks for completing the questionnaire

When you have any comments/ suggestions for improvements of this questionnaire, then I urge you friendly to make a note below. Thanks in advance.

When you have completed the questionnaire digitally, you can send it back to:
m.h.m.kotte@student.utwente.nl

When you have completed the questionnaire on paper, you can send it back to the following address:

M. Kotte
Grobbenhoeksweg 5
7666 LM Fleringen

Appendix 3: Codebook SPSS

Vraag nummer	Afkorting variabele	Naam variabele	Omschrijving	Codering
1	-	Company	Number of the company the person is working for.	1 = Company 1 2 = Company 2 3 = Company 3 4 = Company 4 5 = Company 5 6 = Company 6 7 = Company 7 8 = Company 8 9 = Company 9 10 = Company 10 11 = Company 11
2	-	Function	The function of the person within the company.	E = Employee M = R&D Manager
3	-	Gender	Gender	M = Man W = Woman
4	-	Age	Age	-
5	RICOC1	Radical innovation capability, Openness capability, statement 1	We participate in industrial networks such as industrial associations, standard organizations and industrial forms.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
6	RICOC2	Radical innovation capability, Openness Capability, Statement 2	We invite scientists and gurus to predict the future.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
7	RICOC3	Radical innovation capability, Openness Capability, Statement 3	We co-operate with universities/ research institutes, to develop brand new ideas.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
8	RICIC1	Radical innovation capability, Integration capability, Statement 1	We apply the knowledge gained in previous projects to new projects.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
9	RICIC2	Radical innovation capability, Integration capability, Statement 2	We encourage cross – functional learning and fertilization.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
10	RICIC3	Radical innovation capability, Integration capability,	We upgrade and integrate our technology capabilities, new product development and marketing.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree

		Statement 3		5 = Totally agree
11	RICAC1	Radical innovation capability, Autonomy capability, Statement 1	Business unit managers are able to frequently renew product portfolios.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
12	RICAC2	Radical innovation capability, Autonomy Capability, Statement 2	Business managers are able to frequently renew product portfolios.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
13	RICAC3	Radical innovation capability, Autonomy Capability, Statement 3	We empower business unit managers to implement their own innovation strategy.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
14	RICEC1	Radical innovation capability, Experimentation capability, Statement 1	We usually adopt new ideas and develop them as reliable products.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
15	RICEC2	Radical innovation capability, Experimentation capability, Statement 2	We commercialize proven concepts into the market.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
16	RICEC3	Radical innovation capability, Experimentation capability, Statement 3	We develop methods and tools, to improve R&D.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
17	RICO1	Radical innovation capability, Outcomes, Statement 1	In new product and service introductions, our company is, often first-to-market.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
18	RICO2	Radical innovation capability, Outcomes, Statement 2	Our new products and services are often perceived as very novel by customers.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
19	RICO3	Radical innovation capability, Outcomes, Statement 3	In comparison with our competitors, our company has introduced more innovative products and services during the past five years.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
20	RICO4	Radical innovation capability,	In comparison with our competitors, ,our company	1 = Totally disagree 2 = Disagree

		Outcomes, Statement 4	has high success rate in new products and service launch.	3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
21	RICO5	Radical innovation capability, Outcomes, Statement 5	Our firm's R&D or product development resources are adequate to handle the development need of new products and services.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
22	RICO6	Radical innovation capability, Outcomes, Statement 6	Key executives of the firm are willing to take risks to seize and explore 'chancy' growth opportunities.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
23	RICO7	Radical innovation capability, Outcomes, Statement 7	Senior executives constantly seek unusual, novel solutions to problems via the use of 'idea men'.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
24	RICO8	Radical innovation capability, Outcomes, Statement 8	When we see new ways of doings things, we are first at adopting them.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
25	TLKA1	Team Learning, Knowledge Acquisition, Statement 1	The employee attends fairs and exhibitions regularly.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
26	TLKA2	Team Learning, Knowledge Acquisition, Statement 2	There is a consolidated and resourceful R&D policy	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
27	TLKA3	Team Learning, Knowledge Acquisition, Statement 3	New ideas and approaches on work performance are experimented continuously.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
28	TLKD1	Team Learning, Knowledge Distribution, Statement 1.	The company has formal mechanisms to guarantee the sharing of best practices among the different fields of the activity.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
29	TLKD2	Team Learning, Knowledge Distribution, Statement 2.	There are individuals within the organization who take part in several teams or divisions and who also act as links between them.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
30	TLKD3	Team Learning, Knowledge Distribution,	There are individuals responsible for collecting, assembling and distributing	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree

		Statement 3.	internally employees' suggestions.	4 = Agree 5 = Totally agree
31	TLKI1	Team Learning, Knowledge Interpretation, Statement 1.	All the members of the organization share the same aim to which they feel committed.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
32	TLKI2	Team Learning, Knowledge Interpretation, Statement 2.	Employees share knowledge and experiences by talking to each other.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
33	TLKI3	Team Learning, Knowledge Interpretation, Statement 3.	Teamwork is a very common practice in the company.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
34	TLOM1	Team Learning, Organizational Memory, Statement 1.	The company has directories or e-mails filed according to the field they belong to, so as to find an expert on a concrete issue at any time.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
35	TLOM2	Team Learning, Organizational Memory, Statement 2.	The company has up-to-date databases of its clients.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
36	TLOM3	Team Learning, Organizational Memory, Statement 3.	There is access to organization's databases and documents through some kind of network (Lotus Notes, intranet etc.)	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
37	TLOM4	Team Learning, Organizational Memory, Statement 4.	Databases are always kept up-to-date	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
38	SL1	Support Leadership, Statement 1	The supervisor always gives positive feedback when the employee performs well.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
39	SL2	Support Leadership, Statement 2	The supervisor gives special recognition when the employees work performance is especially good.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
40	SL3	Support Leadership, Statement 3	The supervisor would quickly acknowledge an improvement in the quality of the employees work.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree

				5 = Totally agree
41	SL4	Support Leadership, Statement 4	The supervisor commends the employee when he/she does a better than average job.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
42	SL5	Support Leadership, Statement 5	The supervisor personally pays the employee a compliment when he/she does outstanding work.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
43	SL6	Support Leadership, Statement 6	The supervisor informs his boss and/or others in the organization when the employee does outstanding work.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
44	SL7	Support Leadership, Statement 7	If the employee does well, he/she knows that the supervisor will reward him/here.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
45	SL8	Support Leadership, Statement 8	The supervisor would do all that (s)he could to help the employee go as far as he/she would like to go in this organization if his/her work was consistently above average.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
46	SL9	Support Leadership, Statement 9	Good performance of an employee rarely goes unacknowledged by the supervisor.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
47	SL10	Support Leadership, Statement 10	When an employee performs well in his job, he rarely receives no praise from his supervisor.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
48	TC1	Teamwork Cohesion, Statement 1	I prefer to work with others in a team rather than working alone.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
49	TC2	Teamwork Cohesion, Statement 2	Working with a team is better than working alone.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
50	TC3	Teamwork Cohesion, Statement 3	People should be made aware that if they are going to be part of a team then they are	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree

			sometimes going to have to do things they don't want to do.	4 = Agree 5 = Totally agree
51	TC4	Teamwork Cohesion, Statement 4	People in a team should realize that they sometimes are going to have to make sacrifices for the sake of the team as a whole.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
52	TC5	Teamwork Cohesion, Statement 5	People in a team should be willing to make sacrifices for the sake of the team's well-being.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
53	TC6	Teamwork Cohesion, Statement 6	A team is more productive when its members do what the group wants them to do, rather than what they want to do on their own.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
54	TC7	Teamwork Cohesion, Statement 7	A group is most efficient when its members do what the team wants them to do, rather than what they wants to do on their own.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
55	TC8	Teamwork Cohesion, Statement 8	A team is less productive when its members follow their own interests and concerns.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
56	TCGE1	Team Climate, Goal Emphasis, Statement 1	Performance is often measured within our organization.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree, 5 = Totally agree
57	TCGE2	Team Climate, Goal Emphasis, Statement 2	The management determined very accurately which general goals are to be achieved.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
58	TCGE3	Team Climate, Goal Emphasis, Statement 3	Individual employees must perform according to specific criteria.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
59	TCME1	Team Climate, Means Emphasis, Statement 1	Work instructions are very clear in writing.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
60	TCME2	Team Climate, Means Emphasis, Statement 2	The work is carried out strictly according to fixed procedures.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree

				4 = Agree 5 = Totally agree
61	TCME3	Team Climate, Means Emphasis, Statement 3	The leadership style let freedom in the work.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
62	TCRO1	Team Climate, Reward orientation, Statement 1	The assessment of an employee is directly linked to achieving goals.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
63	TCRO2	Team Climate, Reward Orientation, Statement 2	It is very clear how good performance will be judged and rewarded.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
64	TCRO3	Team Climate, Reward Orientation, Statement 3	There are hard criteria on the basis of which work performance is measured.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
65	TCTS1	Team Climate, Task Support, Statement 1	The management of the company puts the emphasis on stability in the works.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
66	TCTS2	Team Climate, Task Support, Statement 2	The facilities necessary for good performing the work are abundant.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
67	TCSE1	Team Climate, Socio – Emotional support, Statement 1	Employees are very infrequently treated impersonal.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
68	TCSE2	Team Climate, Socio – Emotional support, Statement 2	The management show interest in personal problems of employees.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
69	TCSE3	Team Climate, Socio – Emotional support, Statement 3	Employees feel really at home within the organization.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
70	RIC	Radical innovative capability	Different statements have been merged into one variable.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree

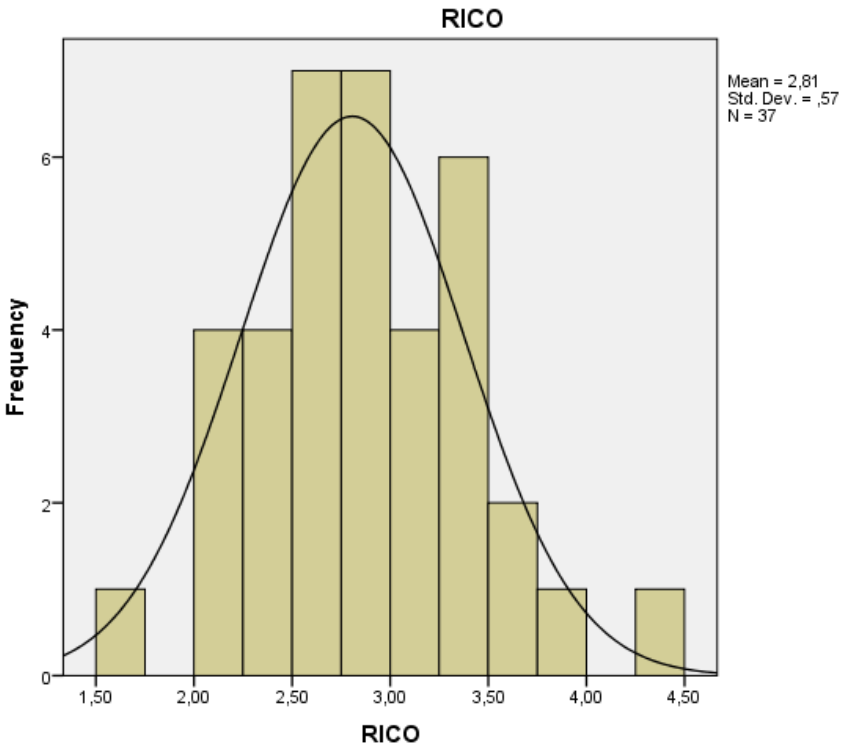
				5 = Totally agree
71	RICO	Radical innovative outcomes	Different statements have been merged into one variable.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
72	TL	Team learning	Different statements have been merged into one variable.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
73	SL	Support leadership	Different statements have been merged into one variable.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
74	TCO	Teamwork cohesion	Different statements have been merged into one variable.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
75	TCL	Team climate	Different statements have been merged into one variable.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree
76	TCLWDI	Team climate with deleted items	Different statements have been merged into one variable, tree items are deleted.	1 = Totally disagree 2 = Disagree 3 = Don't disagree / Don't agree 4 = Agree 5 = Totally agree

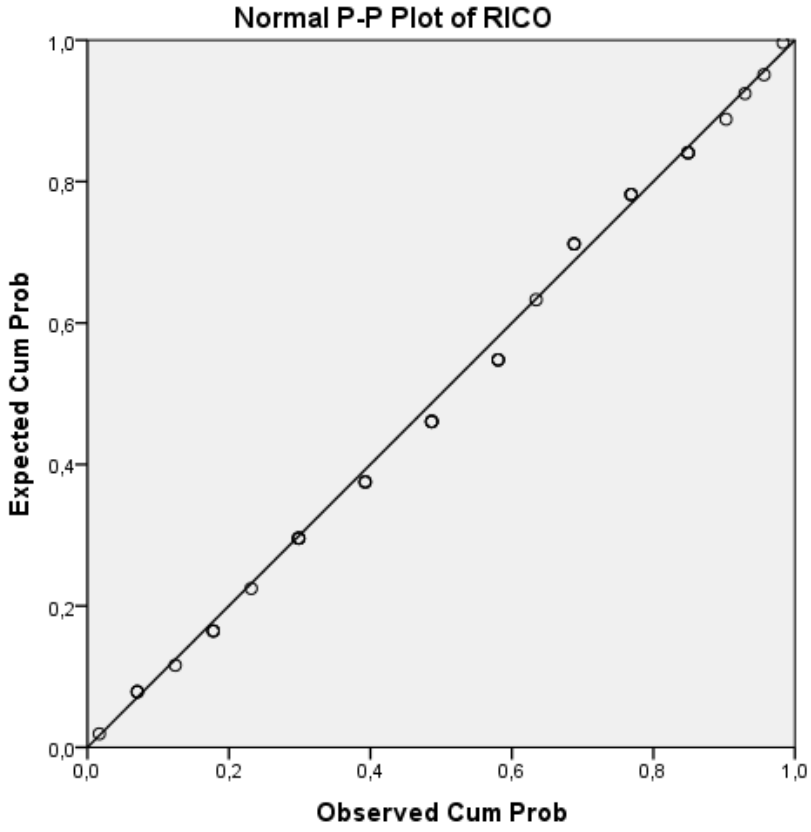
Appendix 4: Normal distribution histograms and P-P plots

When data is normally distributed, the left side and the right side from the center of the data should look the same in the normal distribution graph. Another graph which is useful to see if data is normally distributed is the P – P plot. Such a graph shows the cumulative probability of a variable against the cumulative probability of a particular distribution, in this situation a normal distribution. This means that data are ranked and sorted. Then for each rank the corresponding z-scores is calculated. This is the expected value that the score should have in a normal distribution. Next the score itself is converted to a z-score. A Z-score is simply a score from a distribution that has a mean of 0 and a standard deviation of 1. These actual z-score and expected z-score which are calculated are plotted against each other. If the data are normally distributed the actual z-score will be the same as the expected z-score and the result will be a straight diagonal line. Within a P-P plot deviations from the diagonal line show deviations from normality (Field, 2009).

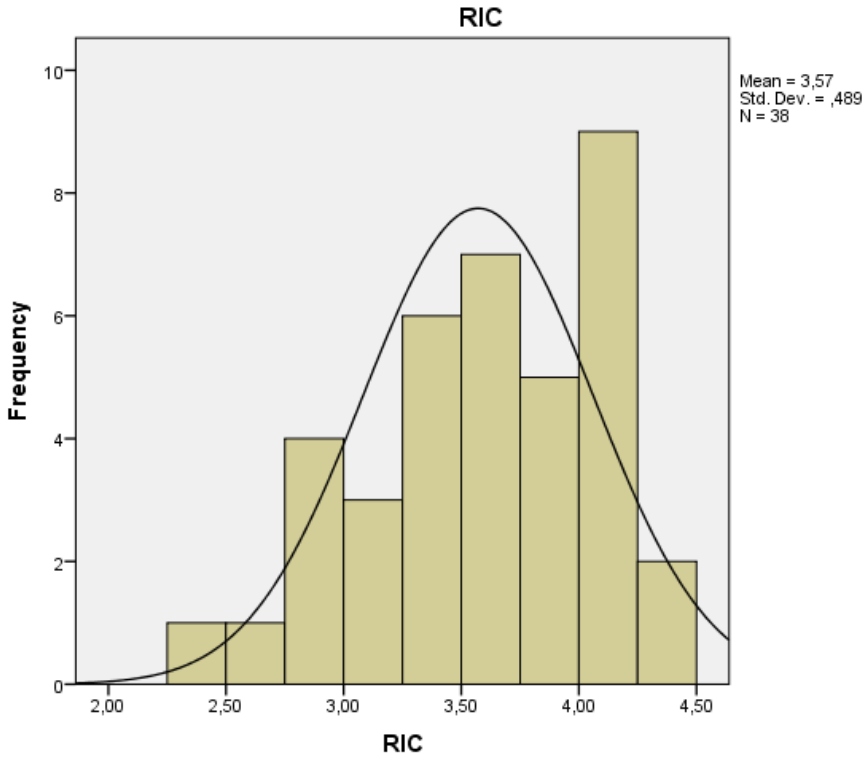
The normal distribution graphs and P-P plots of our variables are displayed on the following pages.

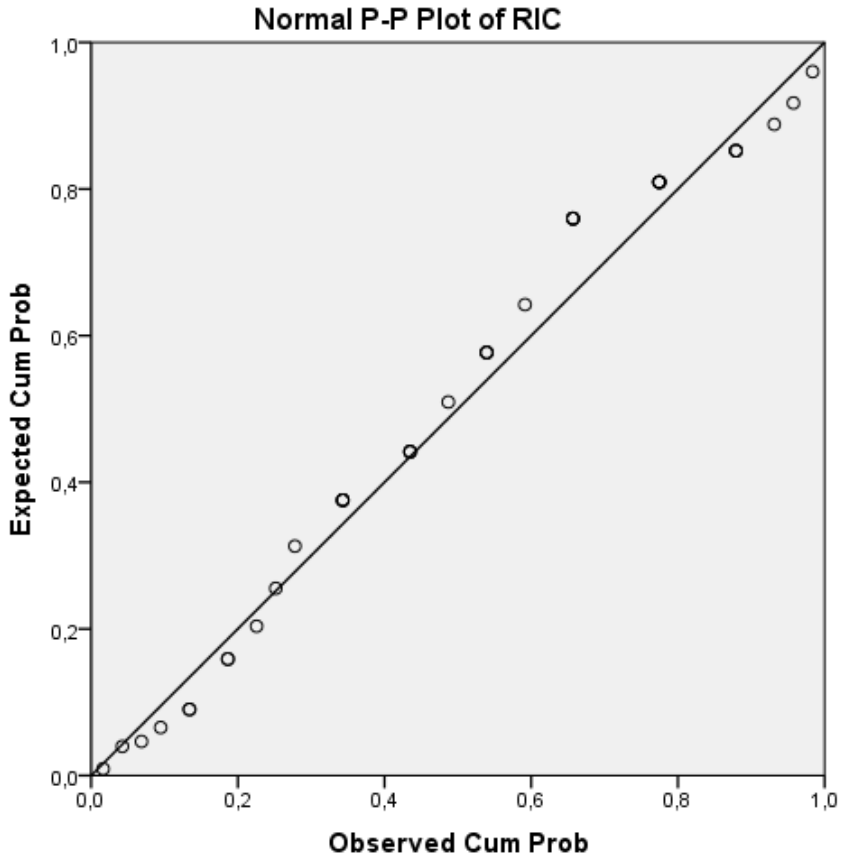
Appendix 4a: Normal distribution histogram and P – P plot of radical innovation outcomes



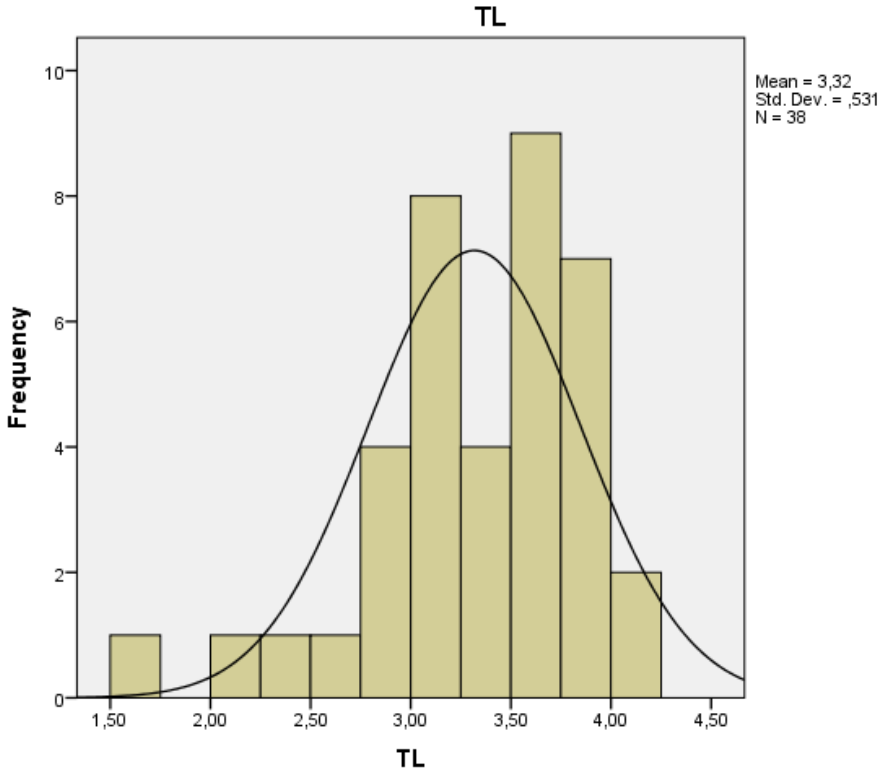


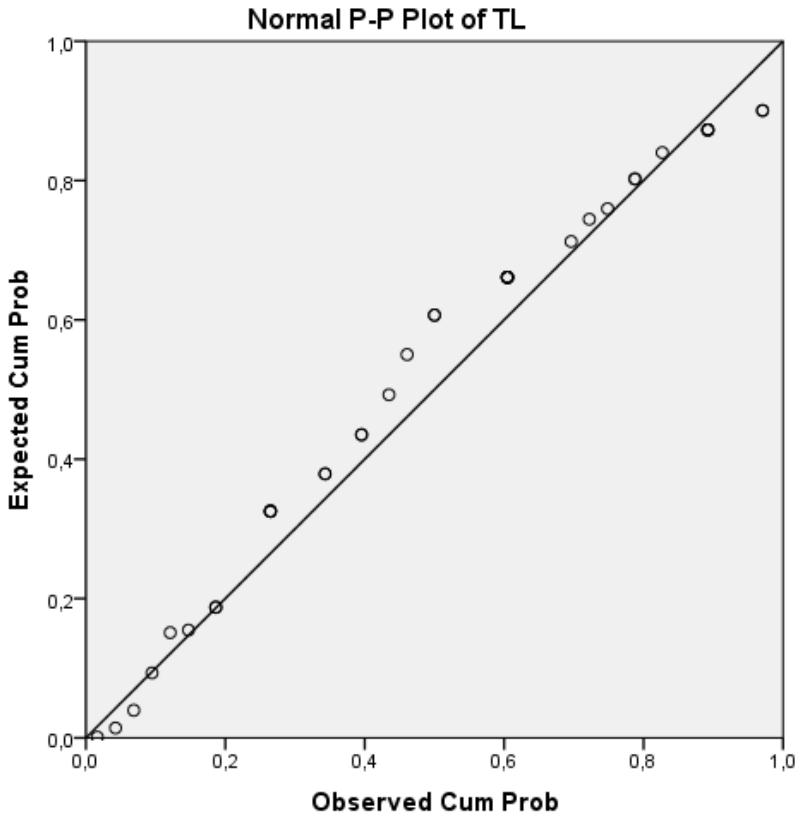
Appendix 4b: Normal distribution histogram and P – P plot of radical innovative capability



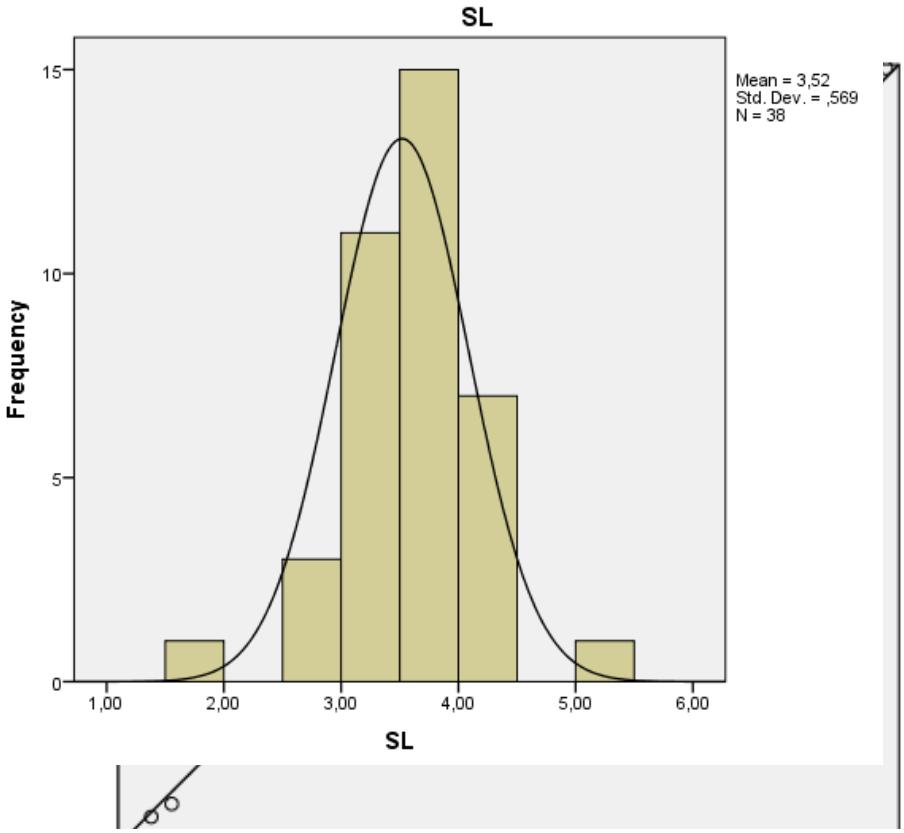


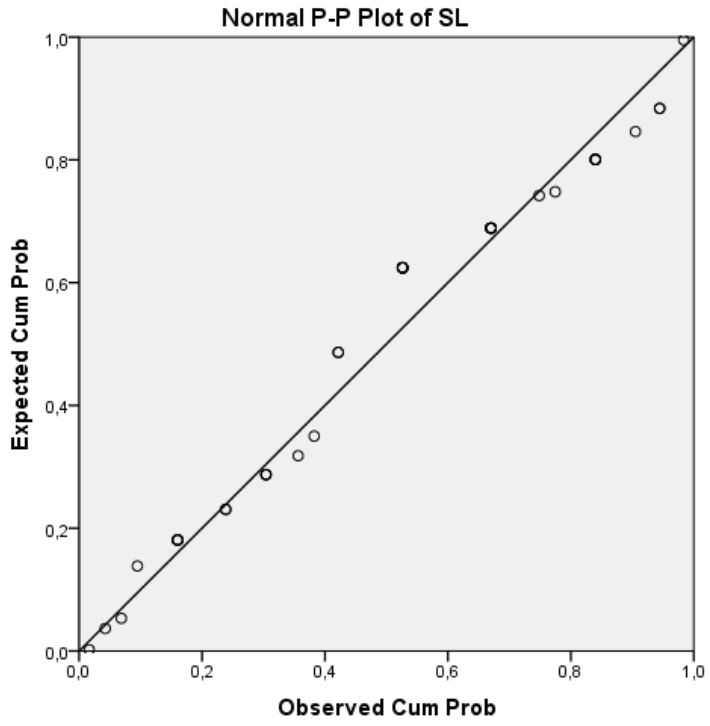
Appendix 4c: Normal distribution histogram and P – P plot of team learning



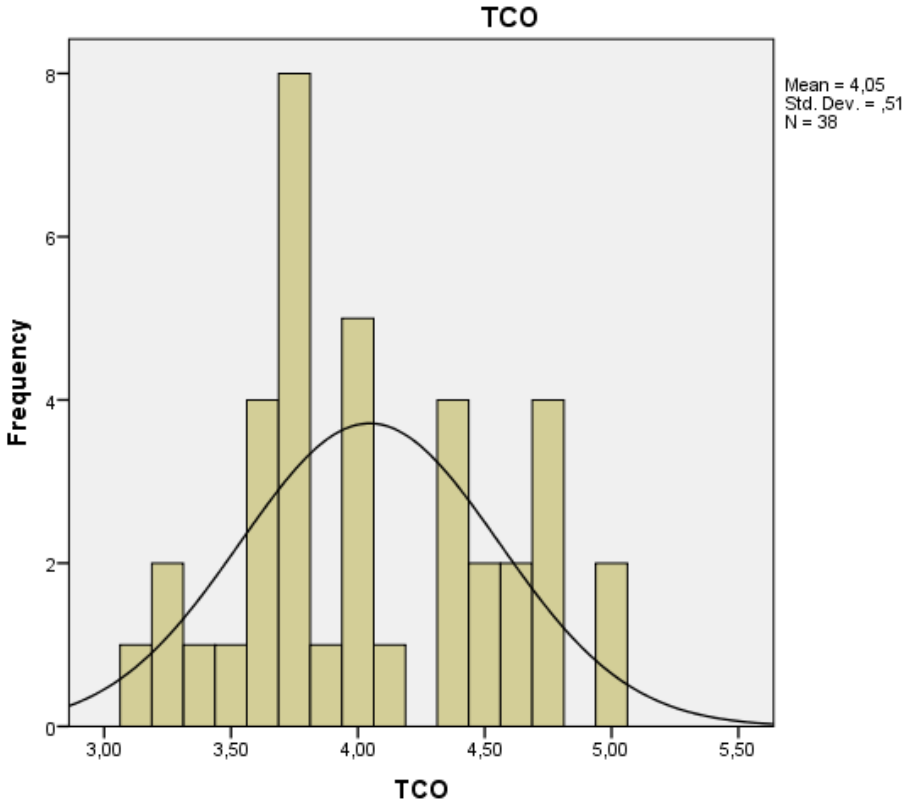


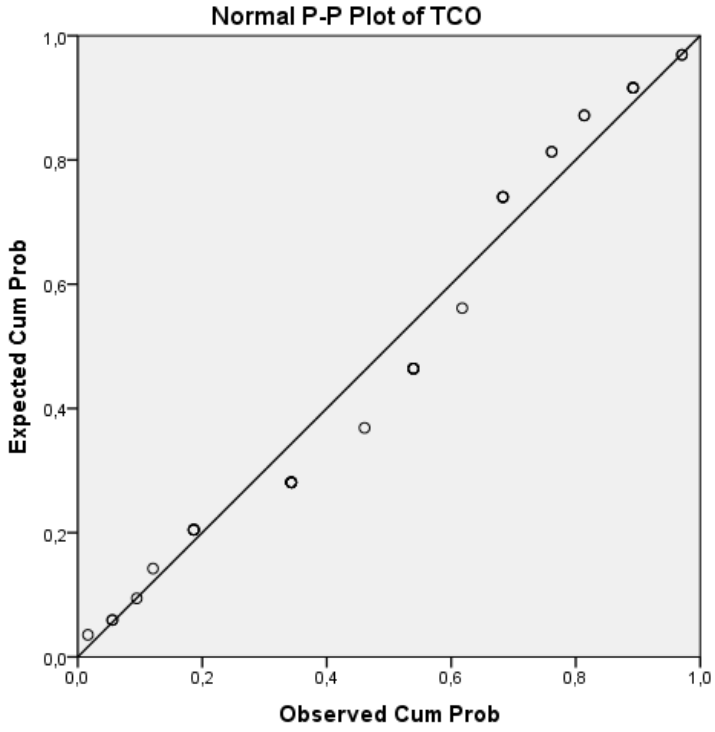
Appendix 4d: Normal distribution histogram and P – P plot of support leadership



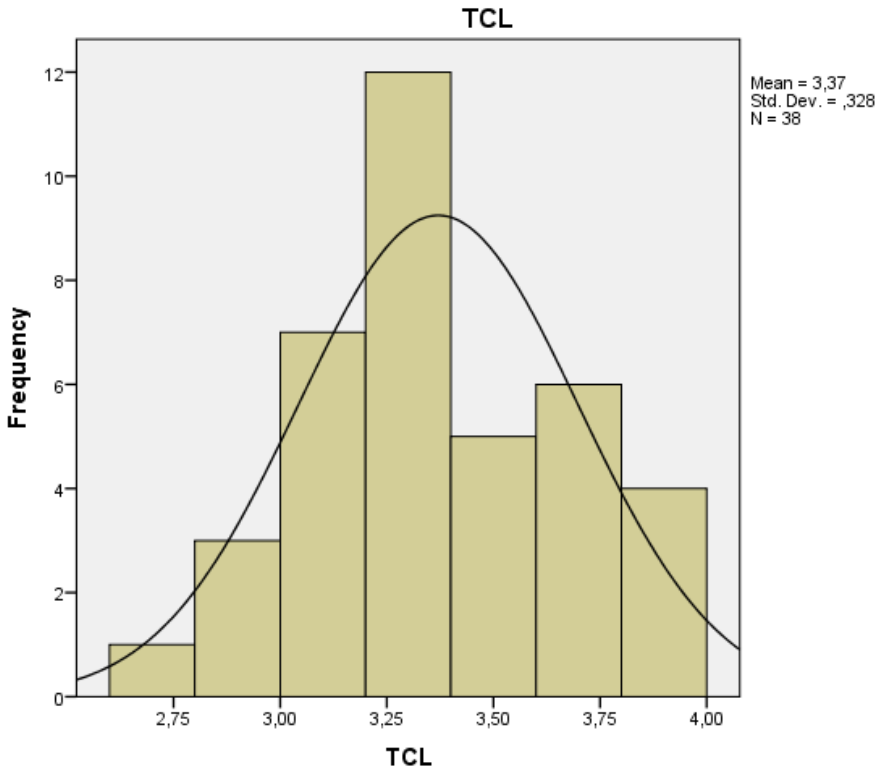


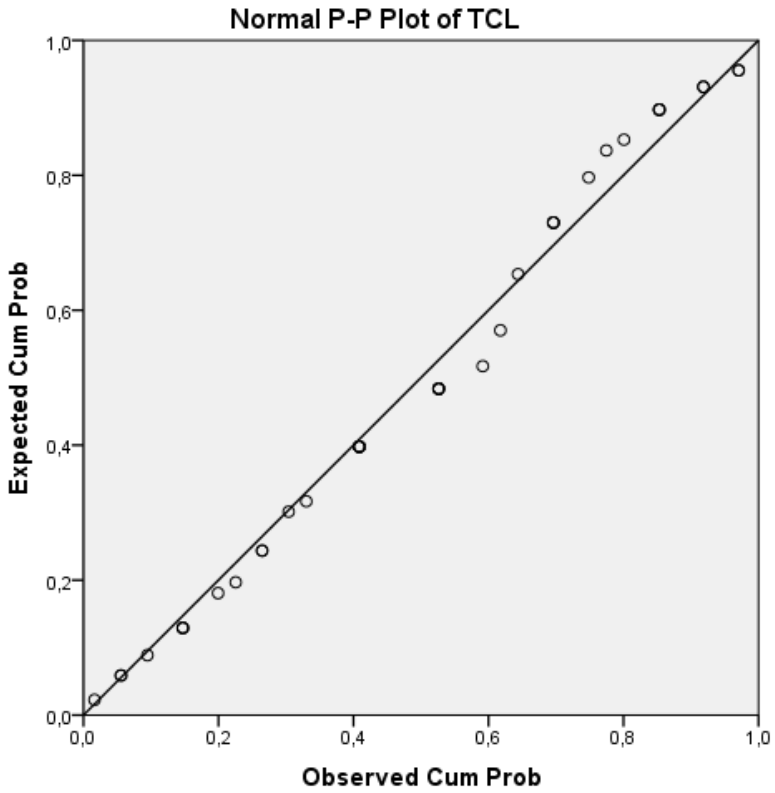
Appendix 4e: Normal distribution histogram and P – P plot of teamwork cohesion





Appendix 4f: Normal distribution histogram and P – P plot of team climate





Appendix 5: Mean and standard deviation of each item:

Radical innovative capability:

Factor:	Items:	Mean	Standard Deviation
Openness capability (OC)	We participate in industrial networks such as industrial associations, standard organizations and industrial forms.	3.97	.747
	We invite scientists and gurus to predict the future	2.71	1.017
	We co-operate with universities/ research institutes, to develop brand new ideas	3.77	.973
Integration capability (IC)	We apply the knowledge gained in previous projects to new projects.	4.34	.591
	We encourage cross – functional learning and fertilization.	3.77	.877
	We upgrade and integrate our technology capabilities, new product development and marketing.	3.89	.631
Autonomy capability (AC)	Business unit managers are able to frequently renew product portfolios.	2.94	.906
	Business managers are able to update necessary technology and market information.	3.17	.857
	We empower business unit managers to implement their own innovation strategy.	2.89	.867
Experimentation capability (EC)	We usually adopt new ideas and develop them as reliable products.	3.46	.919
	We commercialize proven concepts into market.	4.14	.912
	We develop methods and tools, to improve R&D.	3.77	.910

Outcomes of the radical innovative capability:

Factor:	Items:	Mean	Standard Deviation
Outcomes of radical innovative capabilities	In new product and service introductions, our company is often first-to-market.	2.74	.741
	Our new products and services are often perceived as very novel by customers.	3.14	.733
	In comparison with our competitors, our company has introduced more innovative products and services during the past five years.	2.54	.780
	In comparison with our competitors, our company has higher success rate in new products and service launch.	3.00	.804
	Our firm's R&D or product development resources are adequate to handle the development need of new products and services.	2.69	1.051
	Key executives of the firm are willing to take risks to seize and explore 'chancy' growth opportunities.	2.83	1.014
	Senior executives constantly seek unusual, novel solutions to problems via the use of 'idea men'.	2.54	.919
	When we see new ways of doing things, we are first at adopting them.	2.80	.964

Team learning:

Factor:	Items:	Mean	Standard Deviation
Knowledge acquisition	The employees attend fairs and exhibitions regularly.	3.53	.896
	There is a consolidated and resourceful R&D policy.	3.44	1.106
	New ideas and approaches on work performance are experimented continuously.	3.06	1.205
Knowledge distribution	The company has formal mechanisms to guarantee the sharing of the best practices among the different fields of the activity.	3.15	.989
	There are individuals within the organization who take part in several teams or divisions and who also act as links between them.	3.68	.843
	There are individuals responsible for collecting, assembling and distributing internally employees' suggestions.	2.76	.923
Knowledge interpretation	All the members of the organization share the same aim to which they feel committed.	3.59	.821
	Employees share knowledge and experiences by talking to each other.	4.09	.514
	Teamwork is a very common practice in the company.	4.06	.919
Organizational memory	The company has directories or e-mails filed according to the field they belong to, so as to find an expert on a concrete issue at any time.	2.35	1.070
	The company has up-to-date databases of its clients.	3.00	.853
	There is access to organization's databases and documents through some kind of network (Lotus Notes, intranet etc.)	3.76	.741
	Databases are always kept up-to-date	3.09	.830

Support leadership:

Items:	Mean	Standard Deviation
The supervisor always gives positive feedback when the employee performs well.	3.74	.567
The supervisor gives special recognition when the employees work performance is especially good.	3.53	.896
The supervisor would quickly acknowledge an improvement in the quality of the employees work.	3.59	.783
The supervisor commends the employee when he/she does a better than average job.	3.71	.676
The supervisor personally pays the employee a compliment when he/she does outstanding work.	3.85	.657
The supervisor informs his boss and/or others in the organization when the employee does outstanding work.	3.35	.981
If the employee does well, he/she knows that the supervisor will reward him/here.	2.82	.936
The supervisor would do all that (s)he could to help the employee go as far as he/she would like to go in this organization if his/her work was consistently above average.	3.65	.950
Good performance of an employee rarely goes unacknowledged by the supervisor.	3.29	.760
When an employee performs well in his job, he rarely receives no praise from his supervisor.	3.35	.812

Teamwork cohesion:

Item:	Mean	Standard Deviation
I prefer to work with others in a team rather than working alone.	4.30	.740
Working with a team is better than working alone.	4.14	.855
People should be made aware that if they are going to be part of a team then they are sometimes going to have to do things they don't want to do.	4.22	.750
People in a team should realize that they sometimes are going to have to make sacrifices for the sake of the team as a whole.	4.19	.616
People in a team should be willing to make sacrifices for the sake of the team's well-being.	4.03	.687
A team is more productive when its members do what the group wants them to do, rather than what they want to do on their own.	3.65	1.086
A group is most efficient when its members do what the team wants them to do, rather than what they wants to do on their own.	3.54	1.016
A team is less productive when its members follow their own interests and concerns.	4.11	.699

Team climate:

Factor:	Items:	Mean	Standard Deviation
Goal emphasis	Performance is often measured within our organization.	3.74	.790
	The management determined very accurately which general goals are to be achieved.	3.62	.697
	Individual employees must perform according to specific criteria.	3.41	.743
Means emphasis	Work instructions are very clear in writing.	2.91	.866
	The work is carried out strictly according to fixed procedures.	2.74	.963
	The leadership style let freedom in the work.	4.12	.591
Reward orientation	The assessment of an employee is directly linked to achieving goals.	3.21	.880
	It is very clear how good performance will be judged and rewarded.	2.82	.834
	There are hard criteria on the basis of which work performance is measured.	2.71	.970
Task support	The management of the company puts the emphasis on stability in the works.	3.09	.933
	The facilities necessary for good performing the work are abundant.	3.15	.925
Socio – emotional support	Employees are very infrequently treated impersonal.	4.00	.778
	The management show interest in personal problems of employees.	3.91	.712
	Employees feel really at home within the organization.	3.82	.758