CHALMERS
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The effect of project leader on the organizational culture in R&D

A case study in Volvo Car Corporation

§Master's Thesis in the Master's Programme Master's International Project Management

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Division of Construction Management
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Master's Thesis BOMX02-16-128

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Examensarbete BOMX02-16-128/ Institutionen för bygg- och miljöteknik,
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Abstract

The interest in project leadership is growing in different industries. In addition, the way of behaviours, interaction and cooperation among employees or generally participants, which is defined as organizational culture, is another important topic among leaders. The combination of them presents the critical roles of the project leader in the organizational culture. Therefore, this study describes the organizational-culture to present a wide picture of the culture in an organization; then combines it with the role of the project leader and discusses about leadership-culture. Then, it goes further and discusses about the communication as a critical task of a leader in the organizational-culture.

This dissertation is a case study among different levels of project-leaders in R&D organization in Volvo Car Corporation. Volvo car is a well-known car manufacturing company in producing safest cars in the world that established in 1927 in Gothenburg - Sweden.

The objective of this study is to discover the effect of leadership on the organizational culture (associated to communication) in R&D organization. This research uses mixed methodology, which is the combination of qualitative and quantitative. Qualitative method provides an opportunity to discover the culture (associated to communication) in R&D organization and furthermore explore the empowerment areas that can be elaborated in the future; and the quantitative methods provide information about the relationship between leadership roles and communication. As a conclusion, it can be seen that the organizational culture in R&D in Volvo Car Corporation is established well according to the specifications of the company. On the other hand, it can be seen that there is a need to do some evolutions in different sections to see the possible improvements in the culture of R&D organization. Furthermore, we can see the strong correlation between communication and leadership roles in this organization.

Keywords: Organizational culture, leadership culture, and communication.

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Acknowledgement

This master-thesis is a case study that is conducted in Volvo Car Corporation. This study is a part of joint venture research between Chalmers University of Technology, Gothenburg University, Volvo Car Corporation and KTH – Royal Institute of Technology; therefore there were different people who have participated and helped me in my thesis. First, I would like to express my gratitude to Dr. Max Rapp Ricciardi, who was the main supervisor in my thesis. He set up the idea of this study and helped me to be a part of the research-team; actually it was a great opportunity and experience to participate in a real project. Also special thanks to Professor Danilo Garcia as my co-supervisor, who helped me with the project and data-analysis.

Furthermore, I would like to express my gratitude to the people inside the (Volvo Car) company, who helped me in this study. Jon Nilsson was my supervisor in the company; he helped me with the needed information for the dissertation and also helped me to follow the company's legislations and rules associated to my writing. Also special thanks to Peter Ewerstrands, the head of Technical Project Leaders, who helped the group with the confirmation with different units to facilitate the processes; and finally special thanks to Hannaneh Yazdi (previous IPM student) who is working in R&D-Volvo Car; she helped me to know the company's structure and also provided good information about R&D organization.

Finally thanks to Martine Buser, my examiner at Chalmers University. She helped me to improve my thesis according to the rules at Chalmers University. At the end, I would like to mention to positive atmosphere in the Chalmers University. I had two progressive, positive years, which definitely will help me in my future life.

Göteborg, June 2016

Meisam Pashah

Notations

Figures:

Tables:

List of abbreviations

R&D	Research and Development
HR	Human resource

Units:

T&I	Technology and implementation
VE	Vehicle Engineering
EE&C	Electrics/Electronics and chassis
B&T	Body and Trim Engineering
PT	Power Train engineering
Q	Quality section

Participating positions in R&D:

TPL	Technical Project Leader
UPL	Unit Project Leader
SPL	System Project leader
AL	Attribute Leader

FMEA	Failure Mode and Effect Analysis
DV	Design Verification
TCr	Team Centre Request (Team Centre is the designing application for vehicles)
DRM - P	Design Review Meeting – Program
PSS	Product System Structure
CAE	Computer Aided Engineering

1 Introduction

The interest in project management is growing in different industries. There are different project types, which work in parallel and their functionalities depend on each other. International companies with large customer-base try to use various ideas from different people to use their experiences in order to provide the products, which can cover the needs of more customers (Rapp Ricciardi, 2001). This research has been conducted in R&D organization among different levels of project-leaders in Volvo Car Corporation. Volvo Car Corporation is a well-known international company, which the headquarters and the power of decision of this company are located in Gothenburg. The main part of R&D section is also located in this city and it is responsible for developing the future products of the company. R&D consists of different units, which work together to present competitive products by considering technology, customer demands, environmental effects, price, safety and etc. There are many employees in R&D organization, most of whom are experienced project managers and project leaders with high capabilities. R&D is a multi-functional organization where each unit in R&D should lead their group according to their duties and also have a good cooperation with other units because all R&D units work for a unit portfolio project. In this environment, the communication is an important aspect to consider.

Due to that, the main keyword that is discussed in this research is 'communication' and as a result of communication, 'cooperation' will be discuss on a small scale. The reason to choose the communication as the main keyword is that this study is conducted in R&D organization where numbers of departments work together on a common goal, therefore communication is one of critical factors that should be considered by the project leaders (e.g., both vertical-communication, from project-leaders to subordinate, and horizontal communication, from co-workers to co-workers). In this study both project manager and project leader will be discuss; there are different types of project leaders in the organization in which the formal project leader is the main focus in this study; formal leader is a person who officially has the authority to lead the group. Therefore use the phrase "Project-leader" means the formal part of leaders in the project and not informal leader/leaders. Generally, project-managers focus on the "structural arrangement" of the project and try to use the time, cost and quality in the efficient way and project-leaders focus more on the "quality of obtaining the result" by inspiring and motivating the people to lead them in the right and planned direction (Maylor, 2010, p.267, 268).

Müller and Turner (2010) state that well-organized communication plans and proper leadership style are needed to have efficient cooperation in the organization. Leadership style, in this context, could be understood as whether the leader focuses on monitoring the progress with appropriate control systems, on planning in order to ensure that the team set realistic targets, on keeping good relationships with sponsors, on managing the team, on dealing with external stakeholders, and self-managing (Briner, Geddes and Hastings, 1990)

It is discussed that good communication is needed to have efficient cooperation. Furthermore, it is mentioned that connecting people and inspiring them to have sufficient cooperation is one of the important focuses of the project leader (Briner, Geddes and Hastings, 1990). Therefore, a solution is to have an organizational culture that supports positive communication, behaviours and cooperation between and within people and units. In order to have effective organizational-culture, there should be good cooperation between project managers and project leaders because both project-manager and project-leader affect on the organizational-culture in different ways. Project-managers are more involved in the

specifications of the project and can realize the proper way of working that can help the organizational performances; and the project-leaders affect of the organizational-culture by helping and contacting different people (directly or indirectly) involving in the project and leading them in the right and proper direction according to the main goal/goals of the project. Therefore in the next step, the leadership-culture will be discussed because the leadership culture is needed to have consistent culture in an organization or in other words, the leadership culture is an important key to control and lead the organizational culture (Aitken and Higgs, 2010). Therefore the main focuses in this research are the culture in the organization and the roles of the project-leader associated to the culture.

Indeed, to have efficient leadership-culture, a proper leadership-style is needed: a leadership-style that is in accord with the goal and the specifications of the organization in a way to manage, motivate and inspire people to have efficient communication and cooperation (Aitken and Higgs, 2010). There are various leadership styles that are proper for different organizations depend on their specifications; therefore leadership style is mentioned lightly in this study (Acar, 2012; Zehir et al., 2011).

According to the mentioned discussion, and mainly the critical leadership impact in the organizational culture and the necessity of having proper leadership culture, the aims of this study are to:

- Describe the culture of Volvo Car Corporation in R&D organization, associated with communication and cooperation.
- Explore the employees' perceptions from R&D organization to discover the empowerment areas in communication and report them to the project-leaders to see if they are align with the goal of the organization.
- Assess the relationship between leadership-culture (i.e., leadership roles) and the communication.

According to these aims, the following research questions are designed.

Research Q1: How the communication and cooperation work in R&D organization and consider if these behaviours are align with the organizational-culture?

Research Q2: How are project-leader roles associated with the way of communication?

1.1 Volvo Car Corporation

Volvo Car Corporation is a car production company that established in 1927 in Gothenburg - Sweden. Since that time, the company tries to make world-changing innovation along the way. Volvo car is a well-known car manufacturing company in producing safest cars in the world. The Headquarter of Volvo Car is located in Gothenburg – Sweden and the production take place in Sweden, Belgium, China and Malaysia. In 2015, the number of employees in this company was over than 28,000 people, which a main part of it (62,5%) is working in Sweden (Volvocars.com, 2016a). The vision of the company defined as follow:

> *"Our vision is to be the world's most progressive and desired premium car brand. And we believe our global success will be driven by making life less complicated for people, while strengthening our commitment to safety, quality and the environment" (Volvocars.com, 2016a).*

Some of the highlighted keywords in the vision of Volvo Car Corporation mentioned as follow:

It is mentioned that Volvo is "made by people", which is the combination of various groups and thoughts (volvocars.com, 2016b). It is clear that various groups need a good framework of communication and cooperation to be able to work together. Another highlighted vision is about safety. Volvo Car has a goal to produce "No Death, No Serious Injury" and "IntelliSafe Autopilot technology" in their products by 2020, which both of them are related to higher level of safety in their products (Volvocars.com, 2016c).

The vision of the company shows different goals that should be considered by the project-leaders. Different leaders work with different projects in the company; the projects should align with each other and the combination of them should work well in order to have successful outcome. Therefore the leaders should be able to communicate and cooperate well with people inside the project and the people in other projects. In other words, there should be a framework to lead them have sufficient communication and cooperation. This framework builds on the culture of the company. This study considers and discusses only a part of the culture, which is about the communication and cooperation.

1.2 Volvo Car's R&D Organizational Structure

The research and development unit in Volvo Cars consists of seven different units:

- Technology and implementation (T&I)
- Vehicle Engineering (VE)
- Electrics/Electronics and chassis (EE&C)
- Body and Trim Engineering (B&T)
- Power Train engineering (PT)
- China operation section
- Quality section (Q)

This categorization is based on Volvo Cars products. Since they are producing car vehicles, they have divided each unit of Research and Development organization in connection with each unit of cars production. In this research, we mainly focus on T&I, B&T, PT, EE&C and VE since there are "project leader" position in all these five units.

Generally the projects in R&D Executive Program fall into one of the following Vehicle Programs:

- New Car Program
  New project are for the vehicles that are totally new in the company, for example the X90 project, which is a totally new product.
- Model Year Program

For the vehicles that already exist and have been produced in the company before. The company decided to produce and offer new version of it, for example the new V40.

- Running Change Project
  For the smaller projects that need to be run in maintenance phase due to specific needs. For example if there is a problem in a section of the car that should be taken care of instantly, it will be done in this category.

Each of these categories has several projects, which each project calls as a "Vehicle Program". There are different participants in each Vehicle Program. Each of the seven Units of R&D has a representative or a group of representatives in each Vehicle Program. In addition there are other organizations that are participating to complete the group; for example marketing organization, design organization, manufacturing organization and other necessary organizations (Yazdi, 2016). We can see a sample of a vehicle program as follows (Figure 1):

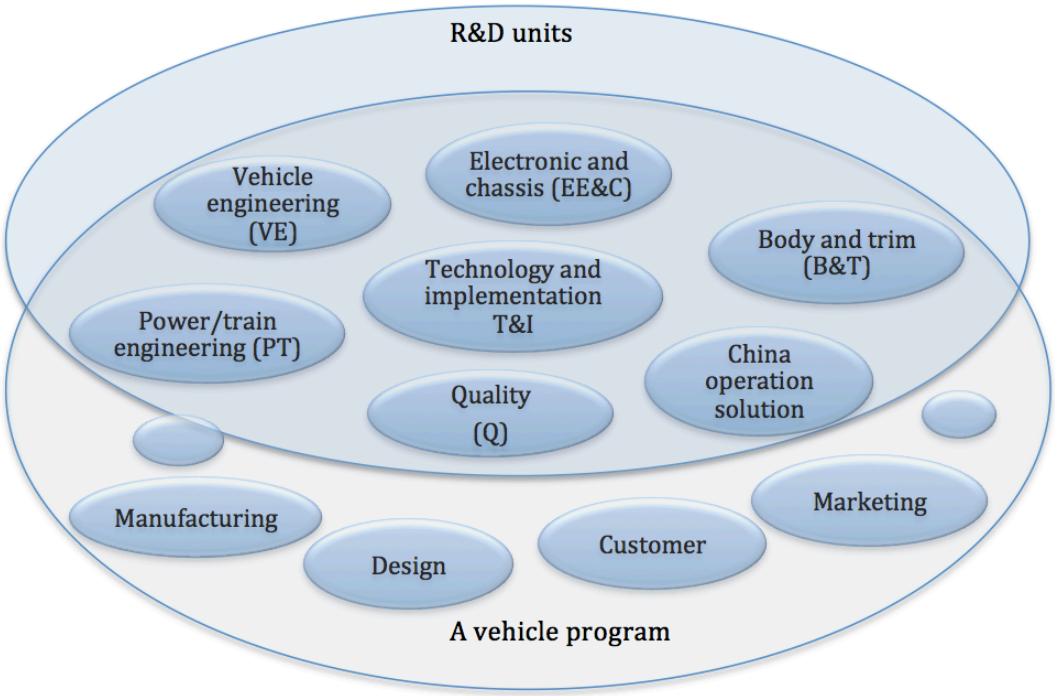

Figure 1: A sample of a Vehicle Program - Volvo Cars- R&D.
Source: Yazdi (2016).

Figure 1 shows different units that are working together; the way of cooperation between them is important because their activities depend on each other or in other words, they complete each other's tasks. The way of communication and cooperation between different units should be defined in the proposed culture. In addition, all the participants and units are in contact with each other; it was not possible to draw the line and connect each unit with all other units.

For all vehicle programs, there are the below positions to lead the project in different scopes:

- TPL: Technical Project Leader
- UPL: Unit Project Leader
- SPL: System Project leader (PT, B&T, EECE)
- AL: Attribute Leader (VE)

SPL and AL are at the same level, where the differences between these two positions are their units that they are belonging to. Attribute leader is only defined position at Vehicle engineering Unit, the rest of units (B&D, E&C and PT) have SPL (System Project Leader).

"China operation solution" unit participates in the vehicle Programs if the project has any connection with China, like supplier, customer organization, leadership unit or any other connection.

Figure 2 shows the participants of different sections of R&D in a vehicle program. As it mentioned before, there are different vehicle programs (New car program, Model year program and Running change program). The number of the participant in each vehicle program vary depends on the program, which "New year program" has the highest number of participants and "Running change program" has a lowest number of participants. Figure 2 is an example of the number of the people in "New car program" (Yazdi, 2016).

As it shows, TPL has the main responsibility of leading and coordinating the vehicle program according to the defined target. There are one or two persons from each "Unit program leader" and then 11 to 19 people from "System project leader" and "Attribute leader".

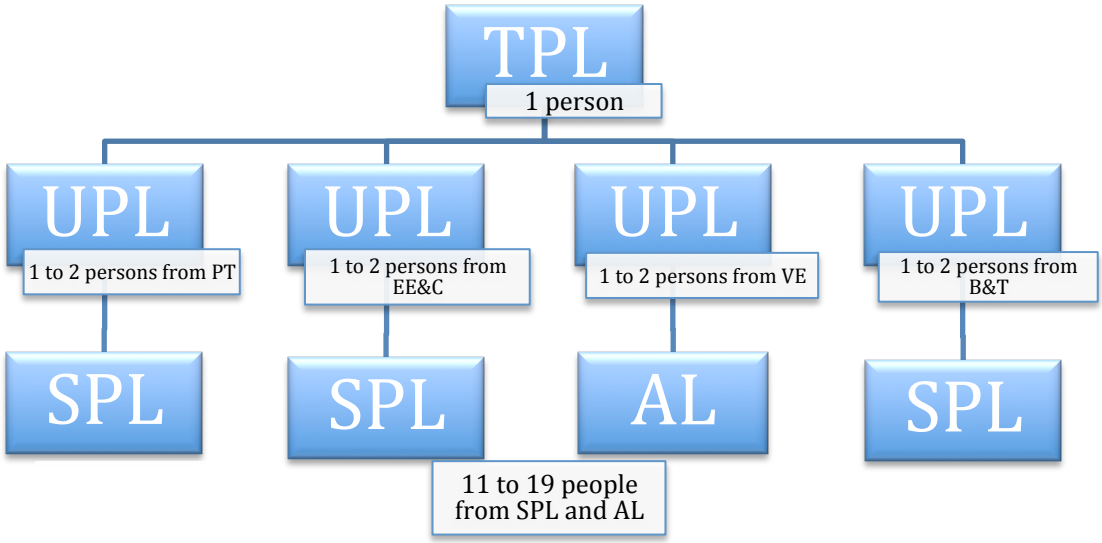

Figure 2: An example of R&D participants in a vehicle program.
Source: Yazdi (2016).

1.3 Culture at Volvo Car

This section is base on the several meetings with Jon Nilsson (my supervisor in Volvo Car Corporation) and the main source of the information is the Volvo Car internal website, which is not accessible for outsiders to the company; therefore the mentioned reference is just Jon Nilsson's name and position. Jon Nilsson has been working in Volvo Car Company more than 20 years. From June 2014, he is working as a "change management" manager and "responsible for supporting R&D´s transformation [program]. Focus on cultural change. Design and delivery of management support" (Nilsson, 2016b).

Volvo Car Corporation has built up the culture in the organization in a way to introduce the aspired way of commitment and cooperation in both employee's behaviours and leadership's behaviours, with the goal of making differences in people's life. Furthermore, the aspired culture of Volvo Car Corporation is based on employees, managers and leaders performances, which needs trust between them and believing in strategy. Also "challenges" and "accepting challenges" are highlighted keywords; challenge is considered to be necessary in order to generate innovation and improvement. Generally, the culture should guide employees and leaders to show the proper way of behaviours that is align in a direction of defined goal and target, which will lead to predictability and control that are combined with innovation and creativity (Nilsson, 2016a).

The culture and the considerations of the Volvo Car Corporation presented as follow:

Volvo Car is a global organization with global customers. It operates in many different countries and continents. Thus, "diversity" is a keystone in the organizational culture. Participation of different people with different experiences, backgrounds competencies and personalities give the opportunity to have diverse ideas, which lead the organization to have better innovation, healthier bottom lines and other positive effect in their long term goals (Nilsson, 2016a).

The Volvo Car Corporation presents the culture, goals and the vision of the company in the following categorizes:

- Passion for customers and cars
- Move fast and aim high
- Real challenge and respect

Passion for customers and cars: From employees' perspective; they have to be passionate, energetic, understand external customers' needs, understand that they are working in global environment, so their commitments and performances are important for the organization. From leadership perspective; the leader should have an overview of the market, competitors and the customers. By using this knowledge, the leader should create a meaning among team members, a meaning that shows the bigger picture of their activities and daily works (Nilsson, 2016a).

Move fast and aim high: From employees' perspective; they have to learn, develop, help other members to reach defined goals, drive changes, overcome difficulties, identify business profitability, admit mistakes to the organization that other people can learn from them, influence other with respect and confident. From the leadership perspective, it is important to take responsibilities; remove or reduce problems by using active communication and participation, identify the potential of innovative ideas and rewards new solutions to encourage team members express their ideas, which is intended to generate more creativity in the organization (Nilsson, 2016a).

Real challenge and respect: From the employees' perspective, it is important to seek out personal feedback and provide constructive and productive feedback to the colleagues. It also means to be willing to share knowledge and experiences, be transparent and honest in the communication to show respect to others and to contribute and cooperate actively in order to reach to the common goals. From a leadership perspective, it is considered to be important to show trust in the employee's personal potential, to help team members to cultivate good working relationship with one another (Nilsson, 2016a).

The presented culture discusses about different aspects and considerations that both leaders and employees should pay attention and follow. One of the common noticeable key in all mentioned categorizes is the communication. Both employees and project-leaders should be able to communicate well to connect to other people, express their ideas, reduce problems, create creativity and generally have better cooperation. Communication is an important tool for a project leader to influence on the organizational culture (Holá and Pikhart, 2014). For this reason this study explores the connection between leadership culture (leadership roles) with communication and cooperation.

1.4 Limitation

The first point that the project faced with was the needed time for the confirmation because this study is apart of a larger project with the high numbers of questions in the survey. Therefore, the first step of the project was the confirmation with unit manager, as well as highly experienced managers in the company, which needed several meetings. It took about one month to come to the agreement. The target participants for this survey were experienced-managers in R&D organization in Volvo Car Corporation. As they are quite busy, it was imperative that they understood the benefits and gains that would be achieved from answering this long survey. Since the result of the survey was the most important part of this research, preparations and confirmations with responsible managers who can influence on R&D employees was an important initial step. I was present in the meetings at Volvo Car and participate in the discussion if I had any idea about it.

In connection to the previous point, the size of the questions sample used in this research is part of the limitation. Since this project is part of a much broader study a kind of Joint Venture, only a selected part of the data is used. As it explained in this section, there were 175 questions in the survey, which is the combination of quantitative and qualitative questions. A part of quantitative data (38 questions) and a part of qualitative data (2 open questions) are used in this study.

The second point was the variety and selection of the topics. The project is the combination of leadership, culture and communication; each of them is connected to other sub-topics. For example, the culture of the company should adopt according to the environment, customer demands and competitors to be able to be successful. Therefore, it connects to the culture change and some leadership characteristics that are needed to affect the culture change. Another example is about communication. One of the goals of the structured communication is to create "trust" in the organization. Considering the role of leader in building "trust" is another interesting topic. Finally, after considering related topics, main keywords were chosen that are "Organizational culture", "Leadership-culture" and "communication". Thus these keywords and limited related subtopics were chosen to write about in the literature part in a way to connect them to the discussion section.

The next point is about abductive approach, which is related to the access to the data. As it mentioned, I could access and use the qualitative data when I wanted, but for the quantitative data was not the same. I could not access and analyse the quantitative data directly (just by myself) because as a student of Chalmers University I did not have access to SPSS software. Therefore I had to work with another person in Join Venture group to use and analyse the data that I wanted. Therefore it was a part of the limitation, how to access and work with quantitative data. At the end, the data that I used in my thesis (both quantitative and qualitative) had to get a permission of my supervisor.

2 Theoretical framework

This chapter presents the concept that will use to describe and analyse the situation about communication and corporation at Volvo Car Corporation, which are the collection of the related literature about the organizational culture and leadership culture. The organizational culture consideration is the next topic that shows and explains about the critical responsibilities that should consider. Organizational culture can be describe as the framework that the employees follow it to be able to connect, communicate and behave in a way that the company planned. Furthermore, it explains about the leadership role associated to communication and cooperation, which are the parts of the leaders' roles in the organizational culture. It is based on a model (Briner, Geddes and Hastings, 1990) that categorizes the leadership's roles into six dimensions.

2.1 Organizational culture and leadership

The purpose of this section is to introduce and discuss about organizational culture and the role of leader in it. In order to do that, the definition of the culture and the affect of the culture in the organization will be explained. Then, it describes more about the role of leader in the organization culture and focuses more on the leadership culture.

Culture is presented as a set of behaviours, norms, knowledge, belief, habits, and attitude and generally a framework that prescribes how people act. There are different factors that influence on the culture, and as a result, culture influences the beliefs and values of the people involved. The factors that influence on the culture, increase the level of cultural-complexity, therefore it needs multidimensional considerations from the managerial perspective that mainly the project-leader is responsible for that (Mohelska and Sokolova, 2015). By another definition, culture is a set of reflections of what has happened in the past. Culture can also be defined as a set of behaviours, which have been accepted due to the successful results of exhibiting them (Schwartz and Davis, 1981). Therefore, the culture has two main sides, first is the way of working and behaving in the organization and second is the needed change or changes that the project-leaders realize and affect them on the culture in order to improve the efficiency of the organization. (Hofstede, 2001, Mohelska and Sokolova, 2015; Soares, Farhangmehr and Shoham, 2007)

Organizational culture regulates the performing way of the employees and the interaction between them. "A healthy culture empowers employees to view themselves as part of a team and their work as integral to that team's success. In an unhealthy culture, employees will feel like individuals who are treated unfairly. Signs of a bad culture can include high turnover, tardiness and indifferent or unmotivated employees" (Investopedia, 2015). In general, organizational culture has been created over time according to the interactions between people and stakeholders. The culture in each company is unique for that company, but the differences is how the project leader set the dress code, hours, office set-up, benefits, hiring practices in a way to support the corporation in that company (Mohelska and Sokolova, 2015; Nilsson, 2016).

Shim and Steers (2012) discuss about organizational culture by doing a case study in Hyundai and Toyota; they present the meaning of culture in an organization by the simple example as follow:

If a customer asks Toyota Company to make a chair, then the company designs a plan to see the necessary steps. They will then organize the work-system to do the process. Then they will gather the people who are going to work in production. They will check to become sure

that everyone understood their tasks. Finally, they consider the location and the necessary resources to provide (Shim and Steers, 2012). This example shows the culture of Toyota Company, which is the combination of managing the processes, leading people, and dealing with different steps that are completing each other.

The connection between organizational culture and leadership has been discussed in several articles in recent years (Mohelska and Sokolova, 2015; Soares, Farhangmehr and Shoham, 2007; Eckhardt, 2002). Companies with defined organizational-culture according to their goals and visions have significant advantages in compare to the companies without defined culture for the organization. Furthermore, how to preform as a project-leader has a direct impacts on the whole organizational culture and all employees; therefore a project-manager ought to be a good psychologist and not only a good specialist. It also helps the leader to be aware about the impact of social aspect on the participants (Mohelska and Sokolova, 2015).

Aitken and Higgs (2010) discuss about the impact of leadership on the organizational culture and vice versa. They present it as a leadership culture. The leadership culture is defined as follow:

> "[The] amalgam of lived purpose, critical behaviours and essential personal values, identified and agreed by the leaders as authentic and functional for their organization culture (whole or part), which the leaders (formal and emergent) role model through their everyday communications and actions" (Aitken and Higgs, 2010, ch5).

"Leadership and organizational culture represent two realities of organizational life that are closely intertwined" (Block, 2003, p.329). Block discusses the role of leader in the organization by focusing on two topics. The first one is *adaptation*, which is related on the shared belief about the responses to the changes and the second item is about *integration* to ensure and clarify the functional relationship in the organization (Block, 2003). As a result, he says that the leader is responsible to build the positive culture in the working environment in the organization and explains it as the "important role of immediate supervisors in creating a context in which employees feel committed to and involved in creating a high performing organization" (Block, 2003, p.331).

Figure 3 shows the connection between leadership culture and organizational culture and position of leadership 'by the team' as a collective leadership. 'By the team' is used to show the collection of formal and informal project-leaders (two types of leadership) that are affecting and influencing in the organization's leadership; but as it mentioned in chapter 1, this study focuses on one type only, which is the leadership experienced by formal leader. Generally, Aitken and Higgs (2010) present the leadership-culture as a defined process that how the leaders should act and behave to be able to influence on the employees attitude and working-process. Then in the connection to leadership-culture, they discuss different leadership-styles as an important factor to encourage efficient leadership-performances and to create a feasible and functional leadership-culture for the organization.

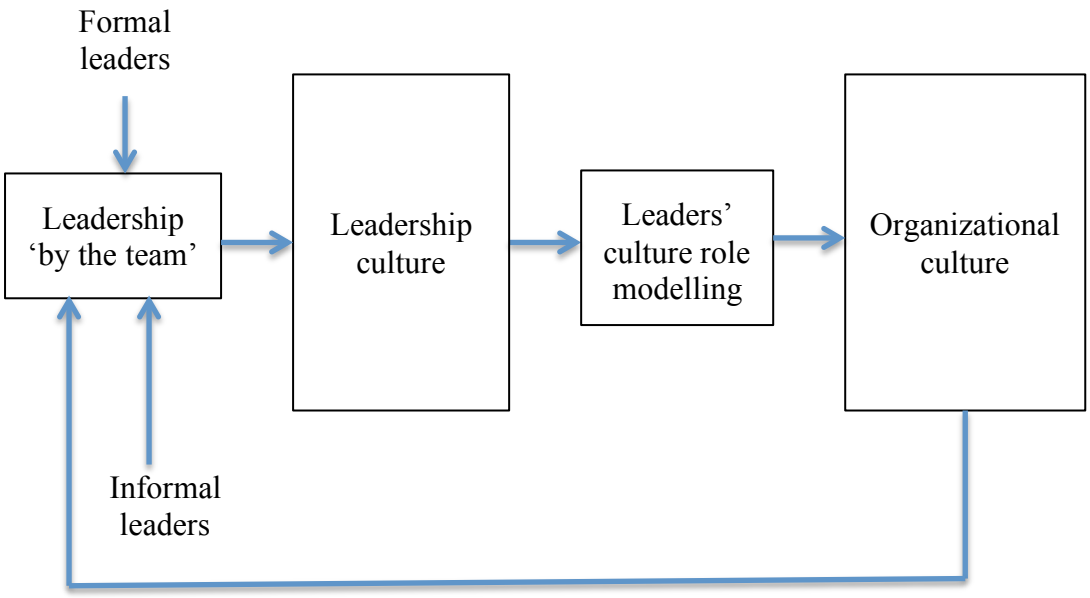

Figure 3: A model of 'Leadership Culture' within the context of organization culture(s).
Source: Aitken and Higgs (2010). Edited and deleted the informal leader because it is out of scope.

As it mentioned, Figure 3 (Aitken and Higgs, 2010) shows the effect of leaders on the leadership culture and as a result on the organizational culture. On the other hand, Figure 2 shows an example of R&D participants in a vehicle program. Figure 2 shows different levels or different hierarchical positions that they have different responsibilities. The combination of these two Figures shows that different level/different positions have different effects on the organizational culture.

Leadership style

Another critical item in leadership culture is "leadership style". It is stated in this section because it is not a keyword in this study, but it helps to make better understanding of the leadership-culture.

Different authors are offered and listed a number of leadership-styles that are suitable for different organizations and situations. For example, Trivellas and Drimoussis (2013) investigate on leadership style according to their behavioural competencies. They mention to the list of behaviours such as leadership behaviours (communication, problem solving, decision making), self control, self-management, openness, creativity, negotiation, problem solving and etc. Then they state that each leadership style has different levels of these behaviours. The level of these behaviours can connect personal values with a specific leadership style (Aitken and Higgs, 2010). They also mentioned that an ideal leadership-style should be able to influence the core behaviours and attitudes of the people involved in that organization or in other words, a proper leadership-style makes an assertive leader.

Most discussed leadership-styles that have different effects on the organizational-culture are as follow: transformational-transactional leadership, humanistic leadership-style, democratic leader, the authoritative leader and the coaching leader. Each of the following leadership-style is appropriate for a specific situation or in other words, each of them has special power that gives the ability to a leader to affect on the organizational-culture (Zehir et al., 2011; Senior and Swailes, 2010; Keegan and Den Hartog, 2004; Müller and Turner, 2007). For example, Aitken and Higgs (2010) state that leadership-culture "leaning heavily on the transformational-transactional leadership" (ch.5). They believe that transformational

leadership style has more advantages than other because in this leadership style, the leader and the followers are working closely and have better connection and interaction, therefore the transformational leadership works better with the organization that need more communication and cooperation.

For example, in transformational leadership the leader works with the followers to motivate and inspire them, for example to be as a role model for the followers or make them the authority to decide that is called empowerment. In this kind of leadership-style, it is necessary to understand the strengths or weaknesses of the followers to have better understanding and build a stronger relationship (Keegan and Den Hartog, 2004; Senior and Swailes, 2010). In contrast, in transactional leadership the leader promotes the followers, based on their performances by punishments or rewards. This kind of leadership is suitable for crisis or emergency situation in the organization, when the company needs to make a process or change within a short time (Keegan and Den Hartog, 2004; Müller and Turner, 2007).

Another example is about humanistic leadership-style that is stated by Zehir et al. (2011); they mention that one of the main responsibilities of the leader is to deal with followers and according to that, they highlight humanistic leadership-style. They mention to the power of decision-making, interaction orientation, and mutual trust as noticeable behaviours of this leadership style. This type of leadership is suitable for the organizations that are working in a dynamic environment that needs higher human resource support and practices (Zehir et al., 2011).

In order to have an ideal leadership culture, there should be a good connection between organizational-culture and leadership-culture to support each other and moreover an appropriate leadership-style is needed to implement such a culture in an organization (Zehir et al., 2011; Aitken and Higgs, 2010).

Due to the following discussion about various leadership-styles, Müller and Turner (2007) believe that it is important to choose the right leader for the right project. It is an important task for the higher managers/leaders to identify the leaders capabilities and the needs of the upcoming projects to match the right leader with the right project. In other words different leaders have various skills and characteristics and also different projects need different required characteristics, therefore it is critical to match "the personal characteristics of a leader to the leadership situation" (Zulch, 2014, p.173).

The connection between leadership style and the needed culture in an organization can follow the same rule; that a proper leader is need to implement and work in the specific culture. This is the reason that "leadership-style" is explained slightly in this section.

2.1.1 Organizational culture consideration

In the previous section, it is mentioned that there are different factors that play a critical role and affect on the culture in an organization. New technologies, different participants in different projects, new competitors and many other issues are the examples of the effective factors on the culture. Schwartz and Davis (1981) discuss about critical factors that should be consider by a leader. They presented a model that is illustrated in Figure 4; it shows that system, people and structure are different parts of the culture and visa versa, therefore it is mentioned that the leader should pay more attention to them while leading people in an organization (Senior and Swailes, 2010). "No organization will perform well in a competitive environment unless these four dimensions of organization are internally consistent"

(Schwartz and Davis, 1981, p 32). In other words, these points should be considered when the leader plan and set a framework; the framework that leads the people how to behave, communicate, act and cooperate (Senior and Swailes, 2010).

This theory is chosen to illustrate the different factors that influence on the leader. The leader should consider people satisfactions, the outcome of the system, right working structure and finally the culture, which it has different angles (Figure 4). This theory is chosen to make better understanding of the connection between the leaders' input (factors that affect on the leader) and the leaders' output (the framework or the organizational culture). The connection of the following items with the Volvo Car Corporation can be that the "people" are the employees in R&D organization; system relates to the technology; structure is related to the way of working and the culture is the combination of them in different sections.

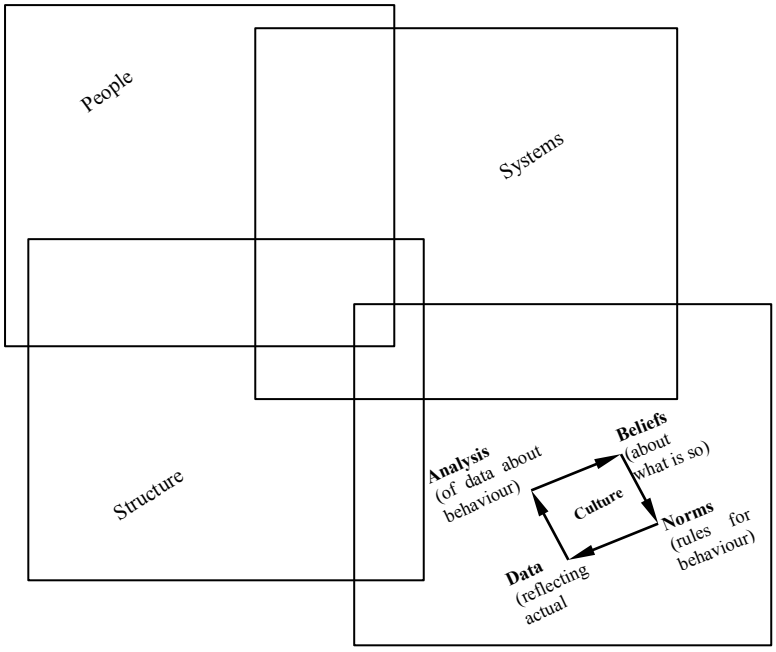

Figure 4: Culture development – organization.
Source: Schwartz and Davis (1981) p.34.

2.2 Project Leadership

This section presents Figure 5 that illustrates six roles of the project leader. It shows the common leaders' responsibilities, which in here it is called leader's roles. The comparison of this theory with the result of the survey in the discussion part presents how successful the leader has been in R&D organization in Volvo Car Corporation.

Recent literature indicates that the role of the project leader become more vital in managing and leading cooperation in organizations (Geddes, 1990; Kaulio, 2008). Geddes states that the leader has an important role in "managing the network of individuals who make up the team" (Geddes, 1990, p.216). The leader directs, motivates and develops the individual's skills to assist the group complete the project-tasks as they planned. Other authors consider the project leader task from the uniqueness perspective; they say "All the project leaders we have met think that, because their projects are unique, their roles must also be unique" (Briner, Geddes and Hastings, 1990, p.3). They continue that it can be seen in both angles; from one hand, each project is unique, depend on the specification and goals of that project; on the other hand, there are some mutual characteristics in every leader's roles that are connected to leadership skills. Briner, Geddes and Hastings (1990) explain six dimensions of the project leader's roles in Figure 5.

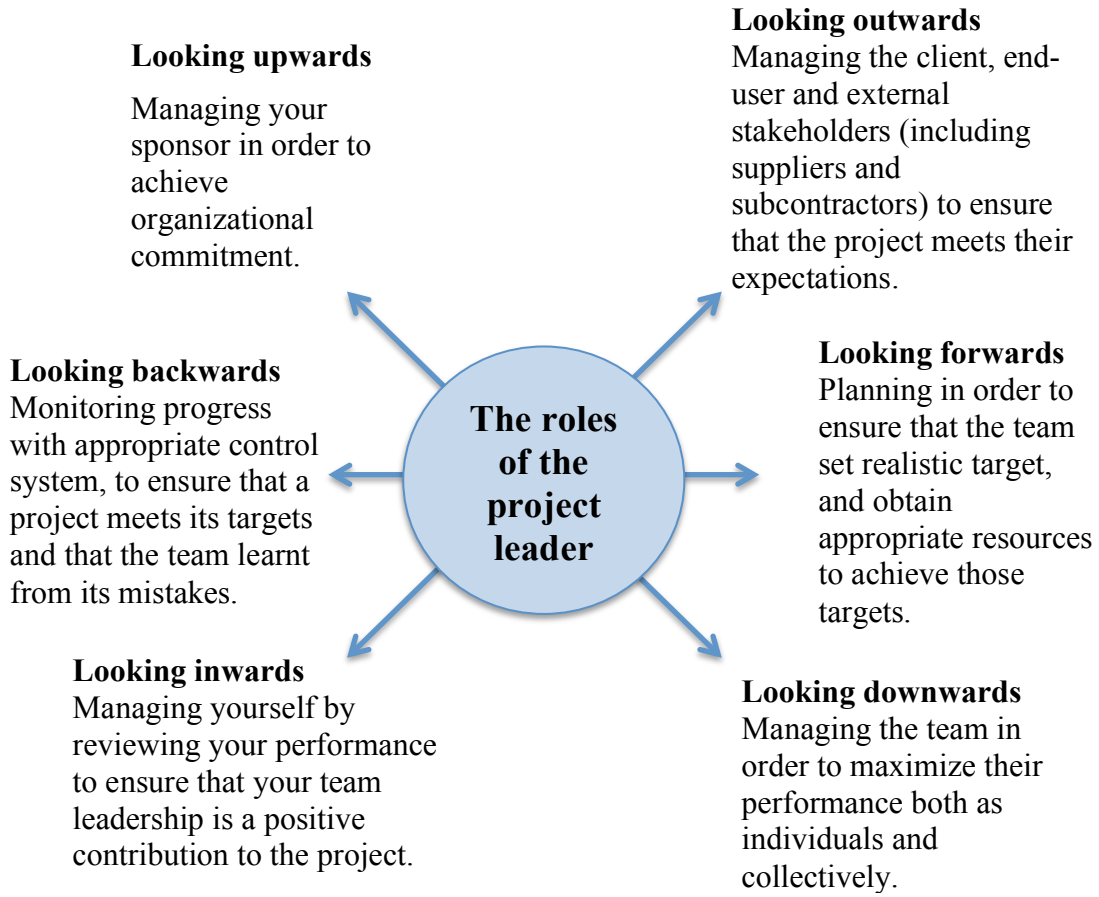

Figure 5: The roles of the project leader.
Source: Briner, Geddes and Hastings (1990).

Looking upwards: It is one of the essential parts of the project that a project-leader looks upward, have a contact and manage the sponsor. It is the sponsor who supports or acts as an umbrella on the project; therefore it is needed to have good connection with sponsor and supporter of the project.

Looking downwards: The leader should observe the group, both collectively and individually to ensure that the group use its capabilities in the performance process. Moreover, the employees should follow the instructions and follow the organizational-culture, so one of the leader's roles is to observe, control and be in contact with them to ensure if the employees are moving in the right direction.

Looking outward: All projects have external stakeholders, as client, subcontractor, final customer, and etc. It is one of six dimensions to pay attention and support the external stakeholder's because the project needs their support as well as internal stakeholders to be successful.

Looking inwards: This step is to evaluate your performances as a project-leader. When there are lots of tasks to do, then main goals, which are motivating and leading team members from different perspectives might get lost. Therefore it is important to evaluate and see that what have you done; was it enough or if there is a need for any changes.

Looking backwards and looking forwards: These two dimensions are the project-leader responsibilities to analyse the potentials in the group and set the job that the group are able to do that; or to prepare the necessary resources that is the prerequisite to do the project. In this way, the project-leader can identify the capabilities of the group and match the task with capabilities.

Figure 5 illustrates different roles of the leader, which most of them are related directly to the leaders roles associated to the organizational culture, communication and cooperation. Among six mentioned roles of the leader, Looking-Outwards is connected indirectly to the communication and cooperation because the leader is not having direct contact with the clients and if there is any contact, then it is out of the scope of this project. There are other units out of R&D organization that are in contact with clients and they cooperate with project leaders to reflect the clients' ideas and desires into the projects. Therefore Looking-Outwards is connected indirectly to the leaders roles and the other 5 roles are related directly.

There are many theories about the leadership roles in organizations, which Briner, Geddes and Hastings (1990) theory chose to use in this study. The reason is that it illustrates different common roles of the leader in an organization that are connected to the way of communication between different people inside and outside of the project. On one hand, the focus of this study is on leadership and communication and on other hand, the survey designed in a way to have the related questions about leadership roles from the participants; the combination of this theory and the output of the survey match to present a logical comparison and conclusion.

2.2.1 Multi functional organization and cooperation

This project conducts in the R&D organization, which is a multi-functional organization where various units have cross-functional cooperation. Leufkens and Noorderhaven (2011) mention to the need of effective cooperation in multi-functional organizations; furthermore they mention to the critical role of the project-leader in such organizations to implement an active and successful communication and cooperation between various units.

Leufkens and Noorderhaven (2011) mention to the work of Artto et al. (2008) and Medlin (2006) that multi-functional project consist of several parties where each party has its own

interest and perspective. Thus, it is important to set a proper communication framework in the organization to make better understanding of each other. It helps to overcome the conflicts between different sections, which as a result it makes the cooperation much more convenient.

Another important point that is considerable for the project-leader in the multi-functional cooperation is the observation of individuals (looking downwards). If the witnesses observe that other individuals strive for their interests, then they will try to do the same. Therefore, it is very important for the project-leader to pay enough attention to the individuals' behaviours and attitudes, which can be done if the leader be close and work closely with individuals/followers. It is important to make an understanding that all individuals receive higher payoff if all cooperate and not defect. (Leufkens and Noorderhaven, 2011)

This section provides better understanding of the need of communication in multifunctional organization like R&D in Volvo Car Corporation. Due to that, the communication is more important when there are different parties with various ideas and interests because they need better cooperation.

2.2.2 Leadership communication

The communication is one of the most important tools that the leader should use it as efficient as possible. Communication is the connector of leader with followers; therefore the leader should set an efficient communication between different people and sections to have better cooperation in the groups and the organization (Mohelska and Sokolova 2015; Holá and Pikhart, 2014). Zulch (2014) discusses about leadership characteristics and skills and adds that communication is one of the most important skills that the leaders use to be in contact with other people and be able to influence on them and also with help of communication, the leader can connect different people and sections together.

In leadership culture (section 2.1), it is mentioned about various leadership styles; Aitken and Higgs (2010) state about transformation-transactional and add that transformation leadership style has more advantage in most leadership situations. Furthermore, project leadership (section 2.2) mentions different roles of a project-leader, which all of them need effective and efficient communication to have good connection with different sections (e.g., sponsor, external stakeholder, individuals, etc). Moreover, in multi-functional organization (section 2.2.1) it is discussed about cross-functional cooperation, which the communication plays a key-role in it. Therefore the communication is a part of this study to explore if the leaders in R&D organization have successful communications.

Communication defined as "the process of the exchange of ideas, thoughts, opinions and views" (Holá and Pikhart, 2014, p.161). Other authors mention to the communication as a "key element of effective teamwork" (Boies, Fiset and Gill, 2015, p.1084). By having effective communication, the people can exchange information to discover and learn from each other, which as a result can make efficient team performance. From the managerial perspective, communication is an important discipline that defines as a key role in effective leadership, which creates a collaborative environment and aligns the expectations (Mohelska and Sokolova 2015; Holá and Pikhart, 2014). The need for the cooperation and the teamwork is more noticeable than before because of increasing demands on resolving challenges in competitive environments.

From the change management perspective, one of the main leader's tasks is the ability to affect and influence on the team members to lead them follow the presented changes, which

again “communication” is the highlighted required for that (Boies, Fiset and Gill, 2015). “Companies realized that communication helps employees understand what is demanded from them” (Holá and Pikhart, 2014, p. 161). These characteristics of leaders that are about communication and connections with followers are necessary requirements of all kinds of leaders. All leaders needs to connect with followers to be able to influence on them but there are two leadership styles that use communication skills more than other; they are charismatic and transformation leadership styles. They need and use communication more than other leadership styles because they need to have closer relation to their followers (Mohelska and Sokolova 2015).

Boies, Fiset and Gill (2015) and (Zulch, 2014) mention to trust as an important factor in connecting people and sharing knowledge. They highlight communication skill as a required key to make a trust among participants. Leaders try to make trust between participants by encouraging them have good communication. If there is trust among team members, then they feel free to share their ideas, knowledge and abilities. By having more ideas and thoughts, there will be more options to consider and as a result, which it increases the level of creativity in the team (Boies, Fiset and Gill, 2015). When the level of trust is low, then cooperation will have more challenges and knowledge sharing would not be as successful as it should be because the people do not trust to each other to share their knowledge and experiences. (Lin, Wang and Kung, 2015).

According to Boies, Fiset and Gill (2015), there are two factors that are making initial trust; they are “a judgment of demographic similarity” and “information about team members”, which can occur during initial communication in the team (p.1083). The leader can use “Inspirational motivation” and “intellectual stimulation” to encourage participants to introduce themselves, which can make initial awareness about their personality, habits, interests and etc. It can be the first level of communication and trust among them. From another point of view, making effective communication among participants is an important part of the culture in an organization. The leader should establish the culture in a way that motivates individuals and managers to have frequent communications to have better cooperation (Boies, Fiset and Gill, 2015).

Holá and Pikhart (2014) mention to new technologies and globalization as a challenges in communication that is important to consider, if the company is interacting in global intercultural environment. Then, as a solution, they offer to focus on modern strategies to have successful communication between different sections and organizations.

Huang and Newell (2003) state to the pros and cons of communication in cross-functional cooperation. From one hand, there are some difficulties and challenges in cross-functional cooperation, like decision-making process due to different ideas in team (Huang and Newell, 2003). “[D]ifficulty in creating a coherent, integrated team due to interfunctional conflict, team leader autonomy conflicts with team members, and a lack of goal congruency” (Lin, Wang and Kung, 2015, p. 130), which can make problems in the cooperation in multi-functional team. On the other hand, the decision making process is more efficient in multi-functional group because there are various ideas and perspectives which can make the decision stronger, more practical and reliable. Therefore cooperation in cross-functional team depends on the effectiveness of the communication. If the project-leader can plan the communication to perform well, then there will be good output due to the diversity in a group; and if the project-leader cannot set and lead the communication in a proper way, then there will be conflict, which can make difficulties in cooperation (Huang and Newell, 2003; Lin, Wang and Kung, 2015).

Communication and cooperation

Pinto and Pinto (1990) discuss about the relationship between communication and cross-functional cooperation and state that the communication is an important key to have effective cooperation and teamwork in the group. Since this project conducts in R&D organization, then the cooperation is an important part of the cooperation in this organization. They stated that there are many factors that influence on the cooperation in the teamwork, which one of the most important one is the effective and efficient communication. The communication depends on the number of the people in the group, the distance in the group, different kinds of communication tools (telephone, email, face to face talking, meetings and so on). The communication system connects the people together and this connection makes a network of contacts, which as a result it will make the efficiency of the cooperation in the group (Pinto and Pinto, 1990).

2.3 Summary

In this chapter, culture and organizational culture were explained and the factors that influence in them were discussed as well. Then the role of project-leader discussed and in the next step, it explained that how a leader should consider different factors to be able to propose the proper organization-culture (the way of behaviours that is align with the organizational goals and visions). It also mentioned that this study focuses and discusses just about the formal leaders and not informal leaders. Furthermore, some leadership styles described and in the connection with that, the communication skills discussed as a critical leadership skills. By reading this chapter, we can understand and become familiar with some concepts such as culture, organizational-culture and the role of project-leader in the organizational-culture, which they are the keywords in this study.

3 Methodology

This chapter designed to explain the reasons for choosing Volvo Car Corporation as a company to conduct this research. Also it describes the way of collecting literature and explains how the keywords were chosen to ensure the validity of the study. Moreover, it explained the data collection process, research approach that is abductive and the research methodology, which is mix-method (a combination of quantitative and qualitative methods). Furthermore, it discusses the benefits and reasons why mixed-method is proper for this research.

This study performed in R&D organization at Volvo Car Corporation where experienced project leaders and managers are working in a cross-functional environment. The survey conducted in R&D organization where experienced managers and project leaders work, which it makes the result of this survey more reliable. Among all units in R&D organization, those who are working as a project leader or in contact with them were chosen to answer the survey of this research. To evaluate quantitative part of the result, SPSS software is used to analyse the result of the quantitative data. This software provides an opportunity to illustrate the result in various forms; especially, it shows the correlations between different variables, which make the comparative-part much easier and understandable, for example by presenting the correlations between variables.

This master-thesis is a case study that is conducted in Volvo Car Corporation. This study is a part of joint venture research between Chalmers University of Technology, Gothenburg University, Volvo Car Corporation and KTH – Royal Institute of Technology. Therefore I was participating in a bigger research group and only a part of the result that relate to this topic, was used in this master thesis. According to the sensitivity and big scope of the whole project, my tasks in the research were given to me. The survey was designed out of standardized questions and collected online. Since I did not have access to SPSS program to work with quantitative part of the data, then I was responsible to work with qualitative part of the data. I translated all open questions (18 questions) from Swedish to English, categorize them and make the conclusion out of the questions, which are related to the scope of this master thesis.

3.1 Literature study

In accordance to the meetings and discussions with my supervisor and co-supervisor, the main keywords for this study were chosen. Then the related literature was collected, mainly among online articles from Chalmers University of Technology library website and the "science direct" website. Four books were used as well, two of which were borrowed through the library of Gothenburg University. The literature was chosen in a way to support the final chapters' discussions. Another consideration when choosing the articles was the date of publication. Attempts were made to choose new articles since they consist of old and new theories. Some older articles were chosen as well because they are the bases of other theories. After further considerations, some topics were omitted to be able to focus more on the core topics. Finally, according to the aim of the project main keywords were selected, which are as follows: organizational-culture, leadership-culture and communication.

3.2 Abductive approach

Abductive is the mix approach of inductive and deductive approaches. In abductive approach, the researcher studies the existing literature and empirical study simultaneously. The researcher tries to match the result of empirical study with the relevant literature and at the same time, look to find the literature in a way to support empirical result (Polsa, 2013).

He discusses about the advantages and disadvantages of abductive approach. He is indicated that the strength part of abductive approach is "while seeking empirical familiarity without losing their way in empirical particulars, they also seek theoretical generality" (Polsa, 2013, p. 289). The weak point of abductive approach is presented as it might fail, if the research is in the field of International Business because the researcher might fail to find the related theories to their topics since most the literature has developed by western countries according to western culture.

In this study, while it is started to gather the literatures according to the aim of the research, the data collection was in the process as well. It was an opportunity that literature and the result of the survey help each other to make a stronger and more logical output. Due to that, I could access to the data when I needed. The data is the combination of qualitative and qualitative parts. The access to the quantitative part was not direct because I as a student at Chalmers University do not have access to SPSS software; this will explain more in the limitation (Section 3.7).

3.3 Sample

This study is conducted in Volvo Car Corporation in R&D department. Volvo Car Corporation is chosen because it is an international well-known company in Sweden-Gothenburg. R&D is the multi-functional organization that consists of experienced project leaders and project managers who work together and responsible to present competitive products of the company. Therefore, exploring the leadership-culture in R&D organization with different units and the expectations of the project-leader from senior-leaders is aligned with the goal of this research. The results of this survey from different units in R&D serve to answer the research questions. In this research, the main focus is on five units of R&D (T&I, B&T, PT, EE&C and VE) because the project leader positions belong to these five units.

The aim of this research is to explore the organizational-culture from the leadership perspective in R&D organization. The participants in this organization were chosen from different units to have project leaders from various groups; it increases the validity of the finding. This study does not explore the leadership roles and the comparison correlations in each unit separately because it needs wider research scope and more time. Therefore the overall performances associated to leadership roles and communication is explored in R&D organization.

3.4 Research design

Due to the research questions and the aim of this study, the mix methodology was chosen as a research method. Mix methodology is the combination of qualitative and quantitative data collection. A mixed methodology approach has become more popular since the 1990s (Huan-Niemi et al., 2016). Each qualitative and quantitative study has its advantages, but the highlighted point with mix-methodology is that the benefits of mix-methodology are more than the sum of qualitative benefits plus quantitative benefits. Makrakis and Kostoulas-Makrakis (2016) mention that based on their experiences; the two methods are complementary and there are some advantages by combining them. Creswell, Fetters and Ivankova (2004) state that mix-methodology presents the integration of "collecting quantitative and qualitative data concurrently or in parallel or gathering information sequentially", which means they can complement each other well (Creswell, Fetters and Ivankova, 2004, p. 7). The following advantages of the mix-methodology can aid the process of creating a stronger output of the survey. As a conclusion, it is recommended that "using a

sequential transformative mixed method evaluation can produce more robust results than could be accomplished using a single approach" (Makrakis and Kostoulas-Makrakis, 2016, p. 144).

As a part of mix-methodology, the quantitative research method was chosen because the project survey runs in R&D organization with different groups. The result of quantitative research (38 questions about leadership style and communication) provides an opportunity to compare different ideas about one topic or compare the combination of them. On the other hand, the qualitative research methodology (2 open questions about communication and cooperation in which each question has 90 responses) was chosen because it gives an opportunity to receive different open ideas from participants and furthermore these two methods complete each other.

3.5 Questionnaire design

A web-based questionnaire was chosen to collect the data in this research. The web-based questionnaire makes it easier for the participants to the answer the questions; additionally the collected-data is inserted into the database directly. SPSS software can then be used to analyse the data in the database.

The survey of this study includes 175 questions that cover various topics. It consists of 157 structured questions, 10 free-text questions to write 10 characteristics and 8 open or semi structure questions that the participants could write their answers in a text format. All questions were written in Swedish since the majority of the participants in this survey were Swedish speakers or international employees who can understand good Swedish. This was designed to make it more convenient for them to read and answer the questionnaire and also to increase the quality of the answers as they can express their opinions more easily in their native language. Furthermore, all questions were designed in a short format, easy to read, understand and answer to save the time for the participants.

As it mentioned before, this study is the part of joint venture and just a part of the data is used in this thesis. The survey consists of various topics that just the following topics are used in this study:

Quantitative part:

- Leadership style (six dimensions) leading up, down, inside, outside, forward, backward.
  This part consists of 30-structured questions that they are categorized into 6 dimensions (5 questions in each dimension). The categorization is according to the "the roles of project leader" (Figure 5).
- Communication in project, vertical and horizontal
  This part consists of 8-structured questions that categorized them into vertical and horizontal communication.

Qualitative part:

- Communication, cooperation, communication and learning
  This part consists of 2 open questions (semi-structure), which each of them has around 90 responses.

3.6 Data collection

The whole survey (in the joint venture group) that consists of 175 questions was sent to 5 units of R&D organization in Volvo Car Corporation. Table 1 shows the number of people in each unit and the number and the percentages of participants. The participants in each unit consist of different roles (TPL, UPL, SPL and AL) in the project, which the combinations show the diversity of the participants in the survey, which increase the validity of the data. As it shows in Table 1, the target sets as 70% of total employees per unit, which 4 units completed the survey more than the target.

Table 1: Number and percentages of participants.

	Total per Unit	Target	Complete Answer	%Total	%Target
Technology & Implementation	10	**7**	7	70%	100%
Electronics & Chassis	54	**36**	49	91%	136%
Vehicle Engineering	88	**59**	71	81%	120%
Body & Trim Engineering	61	**41**	47	77%	114%
Powertrain Engineering	51	**34**	32	63%	94%
Sum	264	177	206	78%	116%

Figure 6 shows the number of employees in each unit, target number and the number of responses. The target response rate was 70% and the total result become 78%, which is 8% more than expected target.

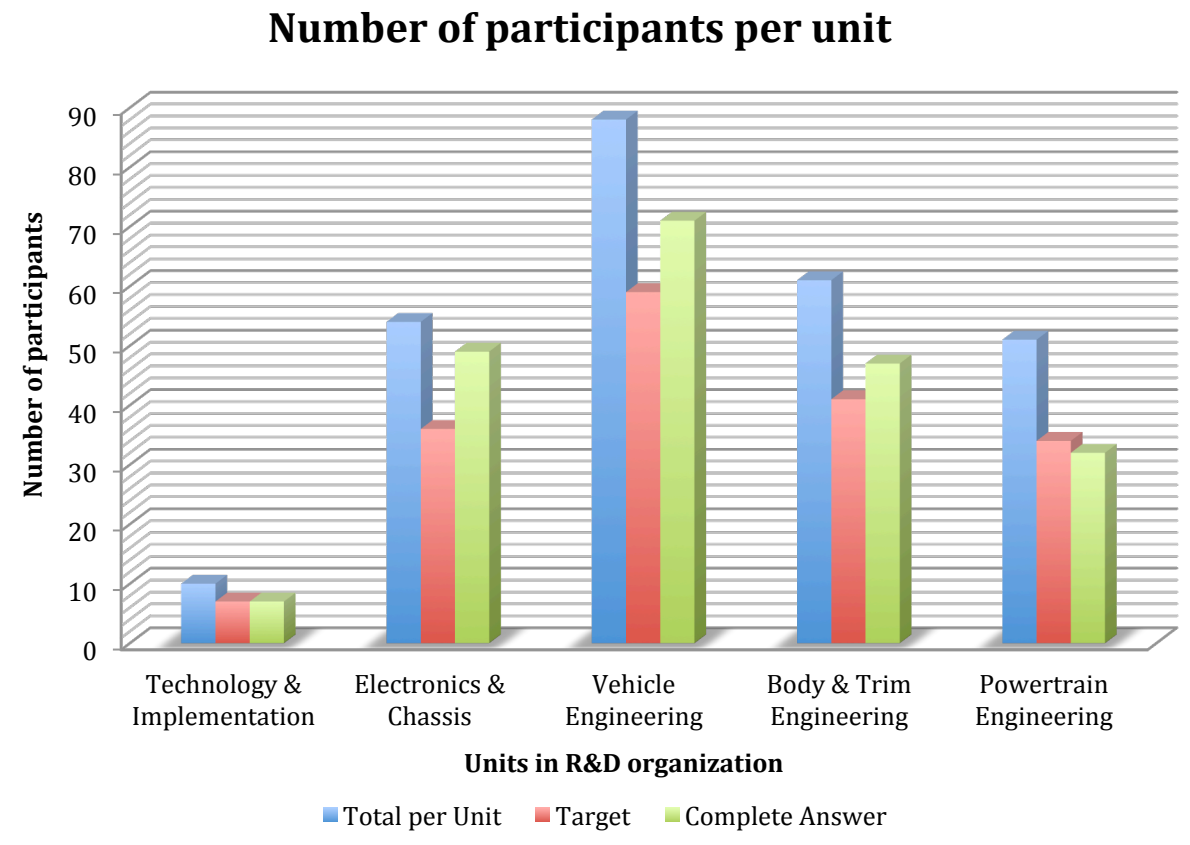

Figure 6: Number of participants per unit

4 Finding

4.1 Quantitative finding

4.1.1 Leadership roles and communication

In the quantitative part of the survey, there are 30 questions in the field of leadership-roles, which they are categorized into six dimensions in this section (5 questions in each dimension). The main model that this study uses is six-dimensions of leadership-roles that is illustrated in section 2.2 (Figure 5). Table 2 is the output of SPSS program that shows the descriptive statistics, which consist of "Mean", "standard deviation" and "N" for each variable. Mean is the average of the numbers answered in a question/questions and then divide them by the number of answers.

Standard deviation is "a measure of dispersion obtained by extracting the square root of the mean of the squared deviations of the observed values from their mean in a frequency distribution" (Dictionary.com, 2016) and "N" stands for the number of the people who answered that question/questions. The possibilities to answer each questions was 1 (lowest rate) and 9 (highest rate).

Table 2 - Descriptive statistics of leadership focuses and efficiency.
Note: The missing values have been replaced with the mean of the variable.
The scores of all variables ranged from 1 to 9.

Descriptive statistic

	Mean	Std. Deviation	N
PLF_Upwards	7.390	0.985	209
PLF_Outwards	7.262	1.039	209
PLF_Backwards	7.365	0.842	209
PLF_Forwards	7.026	0.977	209
PLF_Inwards	7.329	0.934	209
PLF_Downwards	7.480	0.940	209
Horizontal communication	6.296	0.990	209
Vertical communication	7.235	1.261	209

Table 2 shows that all six dimensions of leadership in R&D are rated slightly high (more than 7 out of 9). PLF-Forward is a bit lower than other dimensions, which shows that the employees in R&D have less attention to this area. It is a topic that the Join Venture group discussed in the meetings with project leader and the manager of project leader in the company to see if these results are aligned with the goal and vision of the company. Then, it is shown that Horizontal communication is rated a bit lower than vertical communication, which is another topic to discuss with the manager of project leader in the company. Furthermore, it is shown that the standard deviation of vertical communication is a bit higher than horizontal communication. It means that the employees in R&D have different ideas about vertical communication that is why the standard deviation of vertical communication is 1,261 that is higher than horizontal communication.

Table 3 shows the correlation between six dimensions of leadership roles and vertical and horizontal communication. The numbers in the table 3 shows that there are significant correlations between both vertical and horizontal communication with 6 dimensions of leadership. If the number (Pearson correlation) is closer to 1, then it means that there is stronger correlation between two topics. For example the correlation between horizontal communication and PLF-Forwards is 0,415 and the correlation between vertical communication and PLF-Forwards is 0,227. It means that the correlation between horizontal communication and PLF-Forwards is much higher and stronger than the correlation between vertical communication and PLF-Forwards.

Table 3 -The correlations of leadership focuses, personal and organizational efficiency, horizontal and vertical communication.

CORRELATION									
		PLF-Upwards	PLF-Outwards	PLF-Backwards	PLF-Forwards	PLF-Inwards	PLF-Downwards	Communication Horizontal	Communication Vertical
PLF-Upwards	Pearson correlation	1							
	Sig. (2-tailed)								
	N	209							
PLF-Outwards	Pearson correlation	,577**	1						
	Sig. (2-tailed)	0							
	N	209	209						
PLF-Backwards	Pearson correlation	,630**	,597**	1					
	Sig. (2-tailed)	0	0						
	N	209	209	209					
PLF-Forwards	Pearson correlation	,561**	,520**	,808**	1				
	Sig. (2-tailed)	0	0	0					
	N	209	209	209	209				
PLF-Inwards	Pearson correlation	,644**	,582**	,696**	,684**	1			
	Sig. (2-tailed)	0	0	0	0				
	N	209	209	209	209	209			
PLF-Downwards	Pearson correlation	,560**	,614**	,738**	,690**	,718**	1		
	Sig. (2-tailed)	0	0	0	0	0			
	N	209	209	209	209	209	209		
Communication Horizontal	Pearson correlation	,429**	,305**	,381**	,415**	,441**	,429**	1	
	Sig. (2-tailed)	0	0	0	0	0	0		
	N	209	209	209	209	209	209	209	
Communication Vertical	Pearson correlation	,431**	,231**	,233**	,227**	,312**	,316**	,707**	1
	Sig. (2-tailed)	0	0.001	0.001	0.001	0	0	0	
	N	209	209	209	209	209	209	209	209

** The correlation is significant at the 0.01 level (two-tailed).

4.1.2 Communication

The survey contains 8 questions (attached in Appendix) about communication section, which Table 4 shows the questions, their means and standard deviation and the number of people who answered each question. It shows that the lowest mean is for the third question (Communication between departments with R&D works well.) and the highest mean is for the question number 4 (I can freely communicate with my immediate superior, if necessary).

In this section 8 statement were written and the possibility to answer them were 1 to 9, which 9 was "totally agree" and 1 was "totally disagree". For example the responses to the third question (Communication between departments within R&D works well) is 5.21. It means that the Mean (average) of 183 responses in R&D is 5.21 out of 9, which it shows that the employees in R&D do not that much agrees with this statement. Another example is the forth question that is "I can freely communicate with my immediate superior, if necessary" rated as 8.04, which it shows that the respondents do more agree with this statement.

Table 4- Descriptive statistics of communication.
Note: The missing values have been replaced with the mean of the variable.
The scores of all variables ranged from 1 to 9.

Descriptive Statistics

	Mean	Deviation	N
The communication works well in my team.	6.86	1.333	183
The communication works well within our department.	6.22	1.617	183
Communication between departments within R & D works well.	5.21	1.457	183
I can freely communicate with my immediate superior, if necessary	8.04	1.358	183
I can freely communicate with the senior manager in my department if necessary.	7.34	1.969	183
Project managers and line managers interact and communicate in a good way.	6.11	1.735	183
On the whole works vertical communication (up and down) good.	6.32	1.589	183
On the whole functioning horizontal communication (between employees) good.	6.58	1.352	183

4.2 Qualitative finding

The qualitative part of the data consists of 8 open questions, which the result of 2 questions will present in the qualitative part of this study because they are reflecting the communication part of the culture in R&D at Volvo Car Corporation.

The first question is "what is working well in term of collaboration, communication and learning in R&D in Volvo Car". There are 81 responses to this question. The responses to this question present the current culture of the R&D organization in the field of communication collaboration and learning. In another perspective, it shows how successful the leaders were to conduct good communication. If the responses show good communication, it means that there is good culture in the field of communication, which it shows that the leaders in R&D organization could do a good job in leading the communication.

The second question is "what should do to improve the collaboration, communication and learning within R&D". There are 89 responses to this question. The responses to this question present a part of the culture (associated to communication) that needs some improvements; in other words, the overall responses to this question show the lacking part of the culture. From another perspective, it shows the areas that the leaders should pay more attention to improve them.

ID shows the number of persons who answered to that question (the numbers are according to the database order). [Working good] represents the responses to the first open question (what is working well) and [Improvement] shows the responses to the second open question (what should do to improve).

Most of the responses to these two questions relate to different ways of communication. Therefore, I grouped the responses in a way to be able to compare them. For example, I gathered and grouped the responses related to "meeting and contact" that work good in R&D and compare them with the group of responses to the same field ("meeting and contact") that should be improve in the future in R&D. This categorization will provide an opportunity to compare and discuss about them in the next chapter.

4.2.1 Meeting and contacts

This section presents the group of positive reflections about communication in the culture. There are 32 responses that mentioned about good communication culture in the company as well as good meetings and cooperation in the team. Also there are 11 positive responses about open climate in an organization, which all of them mentioned in here:

[Working good]: One of the highlighted points was about meetings, contacts and cooperation with their links with flat organization. There are a number of similar ideas that said about the easy communication in the R&D organization, such as meeting, forum, face-to-face meetings as well as easy contact with the leaders. For example "Good communication within the project team." (ID: 96), "Good communication project-UPL-SPL on project location and future work." (ID: 147). Another person mentioned the distance and geography location in communication and said, "It works well with those who are close to the team, but also with those who are geographically located close." (ID: 204). Another perspective was mentioned about the clearness of the communication "Overall communication from management cascaded clear" (ID: 172). Another idea was stated about the good communication structure "When it breaks down, and collect the taskforce communication works well." (ID: 159). Another idea was mentioned that project meetings works good (ID: 210).

[Working good]: The people who have been working for a long time in Volvo Car state the advantages of their old contacts, for example a person with 19 years working experience said that "Many have a fantastic network of contacts used" (ID: 165) or another person with 22 years working experience said "all communications through old contacts works almost always" (ID: 169). One other person mentioned the communication between different levels and says that line communication works well, along with communication between group level and unit level (ID: 181), and similar idea expressed about communication between different sections "The contact between SPL and sections / department works well. Work on project management work well on a purely technical level, that is, problem solving and more." (ID: 42).

[Working good]: Another group of participants mentioned to the cooperation and said that there is good cooperation in the team (ID: 105). One another perspective connected the collaboration and communication to the target image, "If the will is there and the target image is common, we are highly effective and have few problems with collaboration and communication" (ID: 209).

In the connection to the way of communication there are 8 positive ideas that mentioned to open climate as a good side of the communication in R&D organization.

[Working good]: Another highlighted point that was noticeable is about open climate and positive sense to express the idea. One person said about relaxed climate "Throughout relaxed climate TPL, boss, co-workers." (ID: 35) and another idea just stated about open climate (ID: 97) and unpretentious feeling (ID: 89) and another similar idea "Easy to talk to the line of what is happening." (ID: 48) and openness in various levels and desire to help (ID: 127). Another perspective was mentioned about the positive culture and flat organization "High ceilings, positive culture and flat organization in practice (ie, easy to talk to senior management direct)" (ID: 135) and the similar idea "Good cultural map equality, everyone gets to speak if they have done their homework and have something to say." (ID: 201); another similar idea is connected to the idea of being daring; "There is much to learn for those who want and dare to ask." (ID: 11)

In contrast, there are 11 responses about the way of meeting; this group of people in R&D suggested some improvements that some of them are as follow:

[Improvement]: A group of participants stated their ideas about improvements for the meetings. For example a group of them stated that there is a need to have more physical meetings. A person said that it is better to have more meetings and talk and less email because have a meeting give an opportunity to discuss and understand the background and the problem better (ID: 92). The similar idea was expressed by another participant "Meet more physical in the projects. Follow up white papers (technical lesson-learned) more after they were written" (ID: 204). The similar idea that was mentioned is to book a meeting, go and talk and dare to raise the issues (ID: 180). One another participant stated that communication system is good, but it should focus on physical exercise in the project as well as virtual, because physical exercise creates contacts and understanding (ID: 127). A person stated that there is a need to have "[m]ore open communication and meetings between departments on the employee level" (ID: 48). Another participant stated that the location to the employees is important in communication; closer location to the employees gives more time and easier communication with them (ID: 117). Two participants presented that there is a need to have more cross-functional meetings (ID 13, 18).

4.2.2 Forums

Another group of responses are related to the forum. 7 responses relate to the positive points of the forums in the company, which they are as follow:

[Working good]: Next noticeable item is about different forums that are mentioned by many participants in the survey. They mentioned to the benefits of various forums and said that often there is good information in forums (ID: 164), "Forum DRM P [Design review meeting] is good, and that's where it happens." (ID 20). Another person stated about UPL meetings, which is a good forum to share data and information (ID: 28). Another idea was stated that there are number of forums where the people can lift thing and try to get help (ID: 107) and another one about the advantages of decision-making forum "Project meetings and decision-making forums. Line Meetings and decision forums." (ID: 210) and the similar one stated that forums are good to address various issues (ID: 39) and another person stated that the management-forum is good to gain the information from the managers (ID: 32).

On the other side, there are 5 people who mentioned some improvements ideas about forums that are as follow:

[Improvement]: There are also 4 improvement ideas about forums; a suggestion was to create a forum to coordinate the knowledge strategies where all involved participates motocross organization (ID: 146), another suggestion was expressed to create a forum where the leader can discuss and interact about missing (ID: 196). Another suggestion stated about forum "[m]inimize the number of systems and use them correctly. Remove redundant control forums that take time and energy" (ID: 127). And "Fewer forums, clearer description of the mandate at different levels." (ID: 47).

4.2.3 Decision-making

Another group of responses are related to the problem solving and decision-making. 7 participants stated that the decision-making process is working well in R&D.

[Working good]: Problem solving is another noticeable area that some people were mentioned, which indicated that problem solving in R&D works good (ID: 17, 203) and also problem solving in the technical level (ID: 42) and another person said about the problem solving due to the common goal "Everyone wants to do the right car, we strive for the same goal and try to solve problems in a balanced way" (ID: 46). Another person presented problem solving according to task focus "task force and the solution of problems focused" (ID: 191). Also some people mentioned about decision-making system that it works well in the organization "meeting structure and decision-making clear" (ID: 58). Also decision works well even if there is crisis "When we have a crisis, it is all on our toes and collaborates quickly to reach a solution." (ID: 161).

Another group of participants state their improvements ideas about different perspectives of decision-making and the way of using time. The 9 responses are as follow:

[Improvement]: A group of participants stated their ideas about the power of making a decision and openness. "Responsibility for own area to lead to trust and to be allowed to take their own decisions in their own field." (ID: 19). Other participants represented their ideas about the openness of decision-making. "More openness about the decisions and strategies in the line organization." (ID: 210), and the same person mentioned the idea about decision maker; to make it clear that who or which unit and in which level should make the decision. Another person connected decision making with the increasing cooperation and says that increase cooperation-line can help the decision making process (ID: 152). Another participant suggested clarifying the grounds on which a decision is taken (ID: 202). Two participants

stated about top-down decision. “Clear common goals from the top down! from early in the project to an end.“ (ID: 56) and “Decisions should be pushed down as much as possible” (ID: 89). Another person states about clear decision from R&D management (ID: 38). A person mentioned and connected the decision-making processes according to the time to make a decision in a correct time (ID: 157). Similar idea presented as “Faster take the strategic decision, to be clear with them and separating them from investigations that can later affect the conditions in a project” (ID 149).

4.2.4 Lesson learned

Since lesson-learn is one of the important parts of the cooperation and there should be scheduled meetings and communication in order to perform it in a good way. There are 7 people who mentioned to different positive points of lesson learned in R&D. They are as follow:

[Working good]: Another group of people mention to the lesson-learn and knowledge sharing from several projects (ID: 12, 98) and similar one said “We try to work with the Lessons Learned and reflect. Good!” (ID: 125). Another person presented a good side of information and experience exchange “There is a common arena where the units Upper meet for information and experience exchange, it works well.” (ID: 195), also it was mentioned about capabilities of knowledge sharing in various systems in the organization (ID: 26) and another person stated the idea of learning through system training and technical training (ID: 120). It is also stated that it is easier to get support from the project managers and line managers if the person is working closely with them (ID: 116).

Furthermore, there are 5 responses, which address some improvements for the lesson learned in R&D organization. They are presented in here:

[Improvement]: A group of responses were about lesson-learn. A person said that lesson-learn from the previous projects should increase the level of personal or organizational responsibilities (ID: 10). Another person had the similar idea and added “Learning from previous project and actually have the time to incorporate them in the new project” (ID: 170). “We should make the batter lessons learned and reflections for projects to get us all into the next project. “ (ID: 131). One other participant connected lesson learn to cross the border and says “Using more people across the border R & D / Manufacturing / Purchasing. Today it is watertight. Very few people switch between these limits. Lesson Learned is always subject to improvement.” (ID: 139). One participant stated about a step before making a decision “Ensure that all the facts and all aspects are reported before any decision is taken” (ID: 190).

4.2.5 Other improvements

There are other improvement ideas about different areas in R&D organization associated communication and cooperation. These ideas are listed in this section. One of the main one is about the structure of the company; 11 people state their ideas about the improvements in the structure of the cooperation in R&D.

[Improvement]: Structure of various parts of an organization was another noticeable item among responses. A person said that “[b]etter communication about the new ways of working that will come as line can send their employees for training before these new "tools" should be used sharp in the projects.” (ID: 181). Other people stated their ideas about clarifying the workload equally. One participant stated that structuring the projects more all the work divide among people equally (ID: 11), one other person stated the similar idea “Clarifying work splitting between different roles. Transform IT tools so that they support our processes.” (ID: 109) and another similar idea was expressed “Ensure that the workload lands in a balanced

level so the time given to take decisions with long-term planning" (ID: 135). "Review the organization and affiliation of functions / function owners" (ID: 110), and a critical suggestion "Clarify the functions of each role should have. Not just on paper but in reality" (ID: 21) and "Clarify roles and expected deliveries" (ID: 42) and similar idea was stated to make it more clear about the responsibilities regarding responsibilities and the expectation of each role (ID: 120).

[Improvement]: Another highlighted point was about job rotation. A participant mentioned to job rotation to get better understanding between different departments (ID: 159, 116), similar idea that was stated the benefits of job rotation as "job rotation; The more understanding you have for other tasks, components or know-how, the better we cooperate" (ID: 58)

[Improvement]: There are following 4 improvement ideas about time; These ideas show that the people involved would like to have more time to have better cooperation. A person stated about the needed time "Set a time for each type of matter on an annual basis in order to increase customer Partnerships in their own field. Usually no time for personal development" (ID: 28) and another person said that if there is free time, then it gives the opportunity to teach other people. (ID: 3). Another suggestion was expressed about managing the time, "Make time for the core business. Good for study instead of extinguishing late" (ID: 141). Another suggestion mentioned to another perspective "Should be more time cooperation outside the project to cope with the problems that arise in the projects. More openness between different devices, exploiting councils or other for a mechanism to collect and disseminate information and knowledge." (ID: 32).

[Improvement]: 4 other ideas stated about the improvement of the cooperation, which are related to pooling the project and connect them with the time. A person just suggests pooling the project (ID: 4) and another person said "Pooling of projects team. Quick decisions." (ID: 26) and the similar one "Pooling during periods in projects to create good quick dialogue. Provides opportunities to reduce the boundaries between units." (ID: 39) and similar one "Pooling of teams working together, for example, R & D / Purchasing." (ID: 47)

[Improvement]: 4 ideas stated about cooperation. The idea just mentioned about improvements to increase the cooperation (ID: 188). One other participant stated about the need of more education about successful project work and project delivery (ID: 217) and another educational point, "Develop database for learning a construction area" (ID: 147) another participant stated "Better kick-off event in the projects with the presentation of the employees from every part of the organization." (ID: 15).

[Improvement]: Finally 3 other improvement ideas about the role of the mentor. A participant stated, "'seniors' should have a clearer role of mentor" (ID: 31), another person stated just having mentor to have clear processes (ID: 33) and another suggestion was to increase the use of "mentors" or "coaches" for the project (ID: 143).

5 Analysis and discussion

5.1 Introduction

The purpose of this study is to explore the culture in R&D organization and investigate the impact of leadership-culture in the field of communication (vertical and horizontal) and moreover, discover the empowerment areas that can be elaborated in the future associated with leadership culture and communication.

To reach to the following aims, two research-questions were designed, which the first one is "How the communication and cooperation work in R&D organization and consider if these behaviours are align with the organizational-culture?". The answer of this question gives us the picture of leadership-culture associated to cooperation and mainly communication. Furthermore, it shows what is actually lacking in the organization culture and due to that the further improvement area will report and present to the project-leaders at the company to check if they are align with the goals and visions of the company.

The second research question that is "How are project-leader roles associated with the way of communication?" provides an opportunity to discover and discuss the impact of leadership-culture (six roles) on communication and cooperation.

"Finding" shows what can we get in each section of positive proposed ideas. "Recommendation" shows the improvement recommendation to the leader.

5.2 Question 1: Communication and culture in R&D

This section is the reflection and the combination of the related literature and findings to answer the first research question which is "How the communication and cooperation work in R&D organization and consider if these behaviours are align with the organizational-culture?".

In the literature part (Chapter 2), the definition of leadership culture is explained (Section 2.1) and also the general definition of the organizational culture is described (Section 2.1.1), which the combination of these two topics presents that the leader duties and considerations; it shows that the leader has some critical responsibilities to create a framework in the organization. The framework that shows the way of behaving, communicating, cooperating and collaborating in the organization that it calls organizational culture. This study focuses just on the communication as a part of the organizational culture. The reason is that the communication is a tool to make a bridge between the leaders and the followers as well as connecting people inside the group together; which as a result the communication is the key to have better cooperation in the team (Boies, Fiset and Gill, 2015; Zulch, 2014).

One of the open questions in the survey was (what is working well in term of collaboration, communication and learning in R&D in Volvo Car), which the responses to this question present the current culture of the R&D organization in the field of communication and cooperation. The second open question in the survey is about the areas that need improvement (what should do to improve the collaboration, communication and learning within R&D). The responses to this question present the areas that are not working well or need improvement.

Meetings and contacts

It is mentioned that the leader has critical role in making effective cooperation in multi-functional environment and implement active and successful communication and cooperation between different units (Leufkens and Noorderhaven, 2011). Also according to the way of

cooperation in R&D, it is mentioned that R&D is a cross-functional organization where different team collaborate for a common goal (Yazdi, 2016) therefore the meetings and contact are critical factors in such environments. The responses to the survey about the meetings and contacts show that the communication and meeting are working well in R&D organization. There are 32 responses that support the good established communication in R&D. These responses show that the leaders in R&D organization could manage the meetings structure for that area. Furthermore, there are 11 responses that mentioned to the positive side of open climate. It shows that the communication structure is set in a way to have open climate in an organization that people feel free to express their ideas and able to talk with senior managers.

Another discussed item is about the observation of individuals. In the theoretical part, it is mentioned that the leader is responsible to pay enough attention to the individuals' interests therefore the leader should be them and work close to them to identify the individual's interests, behaviours and desires (Leufkens and Noorderhaven, 2011). Some of improvement areas are related to the meetings that were mentioned by 11 respondents. Most of the following improvements are related to "physical meeting"; they believe that there is a need to have more physical meetings instead of virtual meetings to discuss and understand more about the background of the topic.

Finding #1: Communication between people and units are working well in R&D organization, which it means that the communication framework has set according to the specification of the involving people in R&D.

Recommendation #1: Project managers should re-consider and balance the percentages of physical meetings and virtual meetings. Need for more physical meetings (less email).

It is mentioned by Zehir et al. (2011) and Aitken and Higgs (2010) that there should be a good connection between organizational culture and leadership culture to order to make efficient and functional communication in the organization, therefore it is important for the project leader to consider and work with employees' recommendations to be able to improve the communication part of the culture in the organization.

Forums

Another mentioned point of the culture is about forums in R&D, which one type of communication in the organization. In section 2.2.2 of theoretical part, it is explained that the communication is the most important tool for the project leader to connect with followers and due to that the leader should set an efficient communicational framework in which the people in the group can talk easily about different topics and be able to transfer their ideas to each other (Mohelska and Sokolova 2015; Holá and Pikhart, 2014); it is also mentioned that communication is critical when the organization is in the change process (Boies, Fiset and Gill, 2015). In addition, Zulch (2014) mentioned that different forms of connection could help the leaders affect on the followers. Also in section 2.1, it is explained that the effective communication culture is the one in which the people can talk, communicate and express their ideas (Aitken and Higgs 2010; Mohelska and Sokolova 2015).

There are some relevant responses about forums in the survey. There are 7 positive responses about various forums in the organization. It is stated that different forums help the members in the organization have opportunity to discuss about issues, get help (e.g., decision-making) and gain information from higher-managers. In contrast, there are 4 improving suggestions about the forums, which most of them are about having less forums because they believe that some of the forums are not good enough; for example "Fewer forums, clearer description of the mandate at different levels." (ID: 47).

Finding #2: Forums in R&D organization have a positive influence on the employees. The forums could help people to have sufficient meetings and increase the level of learning during these meetings.

Recommendation #2: Create new forums, such as knowledge strategy and a forum that the leaders can discuss and interact about missing. Some forums are not needed, so have fewer forums, clearer description of the mandate.

Decision-making

Decision-making is another item that is mentioned by participants. 7 participants stated about the positive side of decision-making process in R&D, which some of them mentioned to the structured-meetings as good part of it (ID: 58) and another one mentioned to the good cooperation as a reason of having good decision making process in the organization (ID: 161). As it mentioned in Chapter 2.1, there are some theories that discuss about transformational and transactional leadership styles; due to the previous discussion, it is realized that the way of working and the behaviours in R&D organization are much closer to the transformational leadership. One of the noticeable characteristics in transformational leadership is empowerment, which is the authority to make a decision. Giving the authority to the project leader to make a decision can motivate and inspire them work better because they can feel that the project-leader is working much closer to them and not just ordering them that what do they have to do (Aitken and Higgs, 2010; Keegan and Den Hartog, 2004; Senior and Swailes, 2010).

On the other side, there are 9 responses that expressed their improvement ideas about decision-making process in R&D organization. Their ideas are mainly about the responsibility and having more openness in decision-making (ID: 19, 210) and some other ideas are about the structure of decision-making to make it clear that who should make a decision in the group (ID: 152, 202).

Finding #3: Problem-solving is working well in R&D organization, due to the focus on common goals, a balance in the way of working and also on the problems themselves.

Recommendation #3: More authority to make a decision in own group, clearness of decision-making that who or which unit should make a decision.

This is one of a topic that respondents have different ideas about it. A part of respondents would like to have more authority to make their own decision especially for their group and a small part of the respondents would like to have the decisions or instructions from the higher managers. The result and the discussion will send to Volvo Car to make them aware about different ideas in R&D, so the managers of the project leaders can decide which situation is proper for R&D.

Lesson learned

The next identified point from the responses is about lesson-learned, which it needs efficient communication to provide the information that make better cooperation in the future projects. The goal of this section is not about the content and the process of lesson learned, but it is about the needed communication to have lesson-learned in an organization. In section 2.1, it is mentioned that organizational culture has been created over time according to different interactions in the company (Mohelska and Sokolova, 2015). Lesson learned from the previous projects, help the organizational in the same direction in order to improve and do not repeat the problems that has been occurred in the past. Therefore lesson learned from the past connects with the theory of Mohelska and Sokolova that the organizational culture should learn from the past and improve. The role of leader is critical in this process because it

is the leader's duty to observe and identify the problems to learn from them and use the result in the future. In addition, one of the dimensions in the role of project leader is "Looking backwards" that is connected with the monitoring and learning from the mistakes that has happened in the past (Briner, Geddes and Hastings, 1990).

Due to the result of the survey, there are 7 positive responses about the lesson-learned in R&D, which 3 of them mentioned about the easy access and the possibilities to meet higher manager to get help, information and experience exchange. In contrast, there are 5 responses in which proposed some improvements for the lesson learned in the organization, for example a person mentioned to the needed enough time to learn the lessons (ID: 170).

Finding #4: The communication and meeting related to lesson-learned in the organization works good enough, especially the possibility to meet higher managers.

Recommendation #4: Specify more time because lesson learned from the previous projects need time to incorporate them in the new projects and use more people cross the border (in a field of lesson-learned) to have some ideas about the projects in different environments.

Other improvements

It has been tried to match the topics from both sides (working good and need improvements) to be able to compare them, but here are some improvement suggestions that do not have a match or similar topic that is working good; therefore this section is just reflecting these improvement points and not comparing them.

There are 11 improvement suggestions about the structure of the organization, which they are mainly about clarifying and balancing the workload equally and clarify the roles in the project.

There are 4 other improvement responses about the time; the responses mentioned that free time can help people teach and help each other and a person said, "Should be more time cooperation outside the project to cope with the problems that arise in the projects" (ID: 32).

There are 4 other improvement responses about the cooperation, by pooling the project. They believe that pooling the projects can help the cooperation, making quick decision and have better dialogues.

There are 3 ideas about the role of the mentor in the projects; they mention that senior manager should have clearer role as a mentor.

Recommendation #5: The leaders should pay more attention to balance the workload to all people.

Recommendation #6: Leader should investigate the effect of having free time in individuals' improvements. It should be planned if it is necessary.

Recommendation #7: Leaders should investigate about the advantages and disadvantages of pooling the projects in order to increase the number of them R&D organization.

5.2.1 Summary

According to the data in the previous chapter (Chapter 4) and the description of some leadership-styles (Section 2.1) it can be seen that the leadership style in R&D is very close to transformational leadership. The obvious reasons are the open climate, open communication and the possibility to meet the higher managers when it is needed (by having a meeting or in specific forums). These specifications indicate that the relation between leaders and the followers is good and they are working closely; therefore it is very close to the specification of transformational-leadership.

Another noticeable point is about variety of ideas about one topic. From one hand, the leadership style should be chosen in a way to support all members in the group and from another hand, there are different people who have different ideas about one topic. For example, there are 7 people who said that forums are good to learn and exchange knowledge and experiences; in contrast 4 other people think that there should be less forums because some of them are not good enough. It means that the leader cannot satisfy all the members inside the group; but always there is possibility for the improvements.

It is mentioned in Figure 3 (Aitken and Higgs, 2010) that there are different factors that influence on the leader and organizational culture; in addition Figure 2 (Yazdi, 2016) shows different leaders with different responsibilities. Various leaders see the organization from different view/distance and they have different opinions to affect on the culture; therefore they need various meeting, forums and other kind of communication to discuss and choose the proper behaviours and appropriate organizational culture for the company. In addition, we have the results of two open questions in this chapter that due to them we can realize that the leaders should consider different factors to plan the efficient communication in R&D organization. For example, how many forums should be in R&D and how frequent should the meeting conduct; how many physical meeting is needed and how frequent they should be (only virtual meetings are not covering all needs); how the communication should be set to help the problem solving process in R&D organization and many other points. The same idea is for the lesson-learned; it should be effective communication to help the lesson-learned processes; therefore the leader should clarify about the hierarchy to make a decision that who is responsible to make a decision and specify the scope of decision-making as well.

Therefore, if we set and compare these aspects with the theory and the diagram (Figure 4) in which presented by Schwartz and Davis (1981) then we can see the factors that influence on the leader. This theory shows that the leader should consider people (employees), system (technology) and the structure (way of working) before shaping and defining culture for that organization. We can see that the leaders should consider all of them to reframe and shape an effective communication framework or communication culture in the organization that fit with goals and visions of the company (Schwartz and Davis, 1981; Senior and Swailes, 2010). This culture should cover a set of communication forms in order to connect people and groups together to have and make an efficient cooperation in the organization.

In section 2.2, organizational culture discussed and in section 2.1 it mentioned that there are some factors that affect the project-leaders; furthermore it stated that the leaders is responsible to rephrase and define the organizational-culture that is proper for the organization's goals and visions. Therefore, if we see a leader as a station, then this station has some inputs (factors that affect the leader) and some outputs (factors that affect the organizational culture), which is proposed framework to the organization. Therefore the leader has some data (input) that should analyse them and propose a framework (output) that is proper for that organization. "Good leadership seems to be the type of leadership that safeguards both the development of employees and the performance requirements of the organization" (Boe and Holth, 2015).

Data suggest that, the communication related to the organisational culture is working well because most of the responses are positive regarding the organisation of meetings, problem solving, forums, and lesson learned. But as we seen there are some proposed improvement areas in the communication and cooperation that should be covered or reconsider with the leaders in R&D organization to see if there is a need for any changes in the organization, therefore some recommendation have proposed to the leaders in R&D organization.

5.3 Question 2: The roles of the project leader

This section combines and discusses the findings related to the different leadership roles and communication. The finding for this section is taken mostly from the quantitative part of the data. The goal of this discussion is to answer the second research question, which is "How are project-leader roles associated with the way of communication?"

This section is mainly base on the theory that categorizes the leaders' roles into 6 dimensions (Figure 5) by Briner, Geddes and Hastings (1990). This theory categorizes the leader's roles into Upwards, Downwards, Outwards, Inwards, Forwards and Backwards. Furthermore there are 30 questions in the survey, which were designed to evaluate the strength and weaknesses of these leadership roles (Table 2, 3). According to the results, if the responses to a dimension are high (range of 1 to 9), then it means that the leader has been successful in that dimension and if the responses is low to a dimension, it means that the leader could not perform good in that dimension. The strength parts can be follow as a role model in the similar companies and the weaknesses can be reconsider by the leaders in the company to improve them in the future.

The literature mentions that effective communication is needed to have efficient cooperation, teamwork and team performance. It is stated that a main key for a leader to connect with followers is the ability to make a proper connection with them; therefore communication is one of the most important key and tool for the leaders (Mohelska and Sokolova, 2015). But it does not mean that if there is a good communication in an organization, then the cooperation will work perfectly; but according to the literature, good communication is helping the cooperation by making better understanding of each other (Pinto and Pinto, 1990).

In section 1.2 it is mentioned that this study conducts in R&D organization where various groups are working for a common goal. This combination illustrates a cross-functional cooperation that is explained in the same chapter. Moreover, there are some leadership-skills that the leader should pay more attention when the group cooperates in a multi-functional environment like R&D organization. In a connection to that, Figure 5 shows six leadership-roles that most of them need communication to connect and affect on employees, managers, sponsors, client, internal and external stakeholders and other sections; therefore finding the connections and correlations between communication and leadership roles are important to consider.

Table 2 shows the statistics of the leadership roles and the communication. It shows that the findings associated to all six dimensions of leader's roles are close to each other; where Downwards is stronger than other and Forwards is weakest among them. Looking Downwards is related to managing the team; it shows the connection between leaders and followers are the best among others (according to the result). It is another indicator that the leadership style in R&D is close to transformational leadership. As it mentioned before, in transformational leadership style, the leader should have stronger communication with followers to be able to influence on them.

Other information in Table 2 supports this theory because it shows that the mean of vertical communication is a bit higher than horizontal communication. It means that up-down communication (the communication between employees and managers or the communication between leaders with senior leaders - vertical communication) is working better than the communication between the people in the same hierarchy level (horizontal communication).

Table 3 shows that there are significant correlations between both vertical and horizontal communication with all leadership focuses. By paying attention to table 3 (highlighted rows), it is noticeable to see that horizontal communication have slightly stronger correlations with

leadership roles than vertical one. That is the noticeable point, because in Table 2 it is mentioned that the mean of vertical communication is higher than the horizontal communication, but Table 3 shows that the correlation of horizontal communication and leader's roles are a bit higher than the correlation between vertical communication and leader's roles. Maybe the reason is related to two communication-questions in table 4. The responses to two communication questions are highest among other questions. "I can freely communicate with my immediate superior, if necessary" has 8.04 as a mean (the possibility to rate was 1 to 9) the next question is "I can freely communicate with the senior manager in my department if necessary" has 7.34 as a mean. These two questions are in the group of vertical communication and they have highest rate of mean (Table 4).

Due to the findings in table 2 and 3 and the specification of R&D organization, it is identified that the communicational culture in this organization has been planned correctly. It shows that the multi-organizational considerations that explained in section 2.2.1 have been considered well. As we can see in Figure 7, all dimensions of project leadership have slightly high responses, which it means that the leader could manage different roles in an acceptable way.

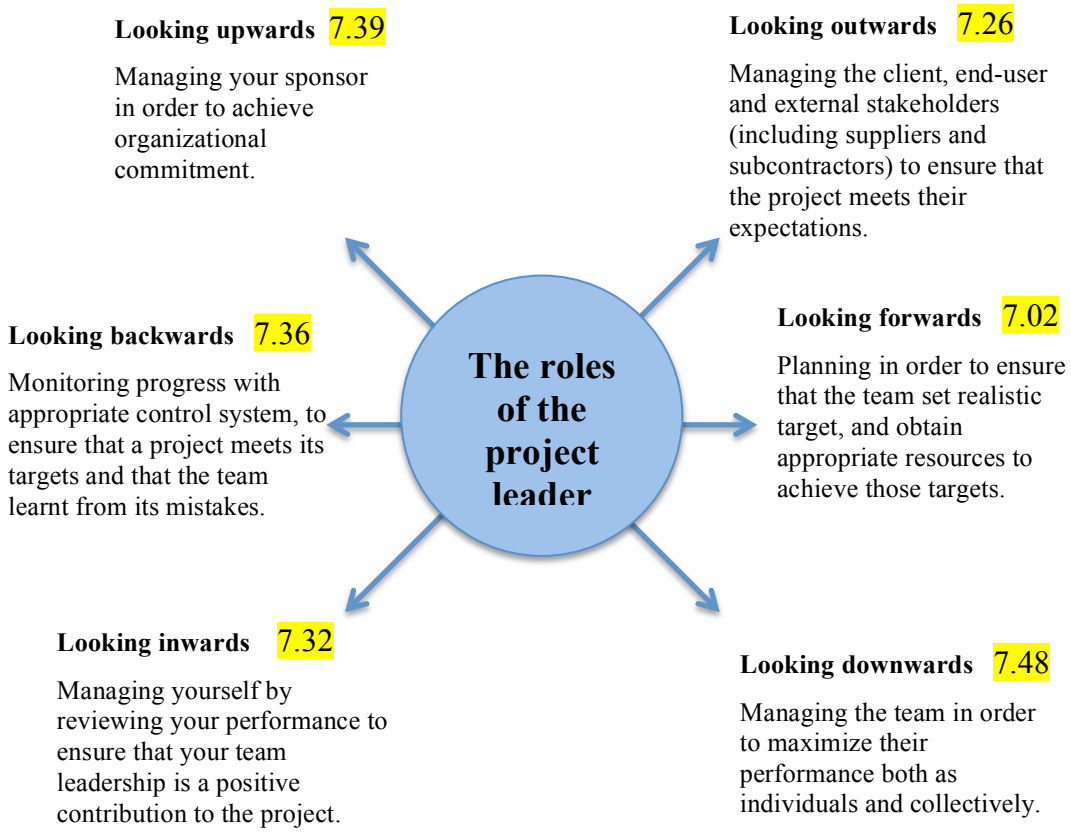

Figure 7: The result of the different roles of the project leader. Source: Briner, Geddes and Hastings (1990).

6 Conclusion

This chapter concludes this dissertation by presenting the result of discussion part in a way to answer the research questions. This study could manage to reflect all aims by answering the research questions.

The main contribution to this study is that, if the result of the communication and leadership in the organization is good, then it means that a leader or a group of leaders could be successful in their responsibilities and roles (Mohelska and Sokolova, 2015; Nilsson, 2016). There are many factors that affect and change the output of the group, but generally the evaluation of leader's performances are based on the results or the output of their works and activities. Due to that, the leader should realize the situation, the size of the group and the way of cooperation between them in order to set and define the framework to lead the participants have efficient communication and cooperation in the group. That framework in the organization is called organizational-culture (Section 2.1.1). But as it mentioned, the successful communication and cooperation in the organization depends on various factors that some of them are not relate to the project-leader but according to this study, a proper communication framework helps the organization have effective and efficient communication and cooperation.

According to the Findings (1 - 4) in the discussion part (Section 5.2.1), the results suggest that there is good communication between people, units and roles in the divisions; there is open climate in this part of the organization; people feel free to express their ideas; it is possible and convenient to meet senior manager and get help; there are positive and functional forums and also there is good problem solving structure in R&D organization. These indicators show the positive organizational culture, which indicates the successful leadership-culture in this organization. This is the answer to the first part of the first research question, which is about the organizational culture associated to communication and cooperation in R&D organization.

The responses to another open question in the survey provide the answer to the second part of the first research question, which is about the improvements in R&D organization. Due to the responses, it is realized that the leaders in R&D would like to have some improvements in the working environment. More physical meetings, more authority to make a decision, clearness of decision-maker, pool the projects, use more people cross the border, divide the workload among all people, increase the role of mentors are the summary of the proposed suggestions. These are the improvement items for the future that will send to the company to consider them.

The responses to the quantitative part of the survey provide the information to answer the second research question, which is "How are project-leader roles associated with the way of communication?". According to the quantitative result (Table 2, 3 and 4) it is identified that mainly the leaders are satisfied with both vertical and horizontal communication in R&D organization; in addition, all six leadership roles (Figure 5 – Section 2.2) were rated closely and positively. It is also realized that there are significant correlations between vertical and horizontal communication with all leadership roles. Due to the definition of healthy and unhealthy organization (Investopedia, 2015) in Section (2.1.1), the results of the leader's roles and the significant correlations between both vertical and horizontal communication with leader's roles, it can be seen that the leadership-culture performance is good because the result show that Volvo Car Corporation looks healthy, which is the indicator that the leadership-culture is performing well in R&D at Volvo Car Corporation.

At the end, the critical role of leadership is defined as "supervisors in creating a context in which employees feel committed to and involved in creating a high performing organization" (Block, 2003, p.331). Due to the result of the survey, we can see that most of the employees in R&D are satisfied with the established and planned way of communication in this organization. It means that the leader could manage and propose a sufficient way of communication, which it calls as communication culture. However there are some improvement points that need further considerations.

As a result, all the information and identified improvement points (7 recommendations – section 5.2) will be reported to the managers and project leaders in R&D organization - Volvo Car Corporation to see if there is any need for any changes for improvement in the field of communication in the organization. They can also make assessment that why the rate of horizontal communication is a bit lower than vertical communication. The company can evaluate to see if the current communication-culture (associated to horizontal and vertical) is aligned with the goal and vision of the company; furthermore the company can decide which communication category is more important for the cooperation in the company.

7 Further study

According to the limitations that are explained in section 1.4, there are various possibilities to continue this research. There are high numbers of responses (209 responses to many questions), which with help of SPSS software, the result of the data can present and discuss in various formats.

One of the best possible further research is to go further in data and find out the responses according to different units (Figure 6) in R&D organization to see the differences between them and due to that the strength and weak points of each unit. Furthermore, we can find out the responses to six dimensions of project leadership roles in each unit to see and identify the differences and the possible reasons. Another possible research is to have face to face meeting with 2 to 3 project-leaders in each unit to discuss about the results of that unit and compare them with other units to see why they are in that position; and ask them if the result of the unit is align with the planned communication culture.

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9 Appendix

1. The Communication questions/statements are as follow:
2. The communication works well in my team.
3. The communication works well within our department.
4. Communication between departments within R & D works well.
5. I can freely communicate with my immediate superior, if necessary
6. I can freely communicate with the senior manager in my department if necessary.
7. Project managers and line managers interact and communicate in a good way.
8. On the whole works vertical communication (up and down) good.
9. On the whole functioning horizontal communication (between employees) good.