Composition of Skunk works teams

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Abstract

The focus of this thesis is to explore the composition of the Skunk works’ innovation team, which directly influences team performance. Such research is important in order to understand how the Skunk works team deals with innovation. Specifically, how the team’s size, diversity and the roles of team members can influence its performance and have an effect on its success.

During the time when we were looking for the definition of Skunk works we mostly found that it is a small group of highly qualified and skilled people in different fields. However, we did not find so many theories about the composition of Skunk works teams. This was due to the high level of secrecy in this field, because Skunk works was originally used only for military purposes. To have a more clear view, we decided to use theories from different research fields, such as research about Skunk works itself, and about team and team composition. We found that it is quite easy to find literature about the role of the leader as a member of the innovation team, who can also be known as the “champion”. However, on another hand we found that it is quite difficult to find information about the whole team, specifically about roles in the team. We believe that, even though the leader has a key role, a well-balanced combination of roles should be also taken into consideration in such teams.

The research method deployed in this thesis is multiple-case study, where we have used three cases which are operating in different companies and industries, such as entertainment, scientific research and industrial manufacturing, as well in different geographical positions, such as Sweden and Spain. We have collected data via interviews and secondary data, where we interviewed a representative of these three companies via personal interviews and by e-mail.

The findings from this thesis provide evidence that the team composition elements, such as roles in the team, as well its size and diversity can influence on further efficiency of the team. During our research we found that all three companies, especially teams in those companies, could be good examples of Skunk works. Moreover, during the research we found that our findings can be in line with existing studies, that it is unnecessary that the project should be in total secret or fully mandated and that there are a lot of other types of Skunk works teams as well. Also during the research we confirmed with other present studies required characteristics for the “champion” and for other team members. Another finding was about the optimal number of team members in a Skunk works team.

The main conclusions drawn from this thesis are that firstly, the composition of a Skunk works team can influence the further team productivity and success of the project. Secondly, that the optimal size of team should not exceed ten people. Thirdly, we can conclude that properly chosen roles as well as characteristics of team members can have an influence on the further success of an innovation project.
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I. Introduction

The introduction section provides the background of the current master thesis with its further overview. Here the thesis research question and its purpose will be established regarding the problem.

1.1. Background

“Just as energy is the basis of life itself, and ideas the source of innovation, so is innovation the vital spark of all human change, improvement and progress.” (Theodore Levitt, Harvard Business Review editor, an American economist)

The strength of the team is each individual member. The strength of each member is the team. (Phil Jackson, Coach, Los Angeles Lakers)

Nowadays innovation is becoming a key business factor and one of the main sources of the competitive advantage in organizations (Fosfuri & Rønde, 2009, p. 274). Holt (1992) suggested that innovation could be identified as a transformation of creative ideas in some applications which should be useful, where creativity is a prerequisite to the innovation process (Holt, 1992, p. 32). Due to the fact that innovation is interrelated with creativity and the fact that creativity brings something new, it could be suggested that innovation is something new within organizations. It is important to consider that success of innovation depends on a lot of factors, one of which is people. People, their ability to work together as well as their creative performance, are important for an innovation team (Magalhaes, 2001).

The reason why organizations innovate is to introduce something new, for example a new product, but this new product should be a right product with its further introduction at the right time and in the right market (Fosfuri & Rønde, 2009, p. 274). After ten years of research Hargadon (2003) found that the progress and success in innovation results from the combination of ideas, people and objects (referred in Coakes & Smith, 2007, p. 75).

It is necessary to take into consideration that according to Higgs (1999a, b), Dulewicz (1995) and West (1994) team composition is very important and it effects team performance (referred in Higgs, Plewnia & Ploch, 2005, p. 227). Krech et al. (1962) found a number of indicators which can influence team performance and grouped them into four main categories (Ibid.). The three main indicators are structure indicators (e.g. team size, characters, etc.), situated environmental indicators (e.g. functional position of the group), and task-related indicators (e.g. type of task, restrictions) (Ibid.). The fourth category directly influences the previous three categories and is called intervening indicators (e.g. type of leadership, internal personal relations, etc.) (Ibid.). It is also important to take into consideration the fact that it is not enough, for effectiveness of the team, just to put together a group of people. An effective innovation team requires deliberation about which type of team is necessary to use, the size, diversity, as well as
proximity of the team (Barczak, 2010, p. 229). Based on the theories of Krech et al. (1962) and Barczak (2010) we decided that in the current thesis the main indicators of team performance will be the size of the team, its characteristics, diversity and roles.

There is a discussion between some researchers about homogeneous teams versus heterogeneous teams. In some research papers it is assumed that it is better to have heterogeneous teams, rather than homogeneous teams in the organization. However, there is another assumption that it does not matter if a team is heterogeneous or homogeneous, because both of them have an effect on team performance (Hollenbeck, DeRue & Guzzo, 2004, p. 357). The advantages of homogeneous teams are a lower rate of conflicts, great team cohesion, and great communication within the team. This leads to team members’ satisfaction. And furthermore according to Tsui, Egan and O'Reilly (1992) homogeneous teams promote implementation of innovation (referred in Drach-Zahavy and Somech, 2001, p. 113). However, the disadvantage of such a team could be a low level of creativity (Higgs et al., 2005, p. 233). On the opposite side are heterogeneous teams; where the level of conflict is quite high and the communication between team members is low, but creativity and innovation are nurtured (Ibid.). The research of Higgs et al. (2007) confirmed the suggestion of Staehle (1999) that very successful teams consist of highly heterogeneous team members (referred in Higgs et al., 2005, p. 227).

Leonard-Barton and Sensiper (1998) found that innovation depends on both the individual and collective expertise of employees, and it can be characterized by an iterative process where people are working together based on the creative ideas of each other (referred in Coakes & Smith, 2007, p. 75). Such an ability of team members to work together, which can be named as teamwork, is playing one of the most important roles for the further success of innovation project and also can be identified as a sustained competitive advantage (Hoegl & Gemuenden, 2001, p. 435; Howell & Shea, 2006). Barczak (2010) concluded that teams are the establishment of successful innovation efforts. Furthermore, team members with different characteristics often form the most effective team (Tonnquist, 2008, p. 91).

Chakrabati (1974), Howell and Shea (2001), and Markham (1998) suggested that innovation teams need a person who will be able to deliver with enthusiasm and self-motivation the new product or new process idea (referred in Salomo & Gemunden, 2010, p. 263). This person will be able to show a high level of personal involvement in the innovation project and develop the project in addition to his or her position in the organization (Ibid.). As a result such behavior can be seen as the behavior of the champion or a leader in an innovation project. Authors such as Stata (1989) and Tushman and Nadler (1986) associated champions with transformational leaders who are playing the main role in innovations due to their ability to bring people together, as well as their ability to promote vision and trust (referred in Coakes & Smith, 2007, p. 79). However it is important to take into consideration, Bryman (1992) suggested that visions can be achieved only with participation and action from the team and not only through persuasion abilities of the leader (referred in Grint, 1997). It is important to have a well
developed relationship between the team and the leader\textsuperscript{1}. It is also important that the leader is able to express confidence in team members’ ability to solve problems and meet high expectations, which means that the leader will be able to increase team potency beliefs (Kirkman & Rosen, 1999).

Skunk works can be defined as one of the innovation team types, which will be the focus in the current thesis work. Brown (2004) found that the term skunk works is covering a wide range of innovation entities (Brown, 2004, p. 130). The field about Skunk works and its concept is still incomprehensible with confusion and misunderstanding. The primary reason of Skunk works’ creation and existence was the war because during that time there was a huge demand and mandatory for research and development of innovative military projects (Brown, 2004, p. 131). And until now Skunk works-like programs are used to accelerate the research and development cycle. During the last time business environment becomes more dynamic, and as a result innovation becomes a survival issue. As a result this leads to the emergence of many organizational innovations, which Skunk works represent (Brown, 2004, p. 132). After management guru Tom Peters made “skunk works” fashionable during 1970s and 1980s, a lot of large corporations began to use skunk works. And from 1990s the concept of the Skunk works began to spread from military projects to technology-based corporations (Gwynne, 1997, p. 18). Nowadays, skunk works can be found in such spheres as automobile, information systems, computer sciences, communications and other industries.

1.2. Problem discussion

Frequently, the most important issue in indentifying the success of an organization is how well it innovate (Johnson, 2001, p. 341). There are a lot of theories where researchers are trying to find the key to successful innovation implementation in the organization. Some of them assert that teamwork plays one of the most important roles for the further success of an innovation project (Hoegl & Gemuenden, 2001, p. 435). From the previous paragraphs it could be concluded that the team is important and has an influence on effectiveness of the innovation project, where one of the factors which determines the high effective team is its composition.

Previously, there was quite a lot of research and theories about innovation projects, teams, and Skunk works. However, there is nothing written and studied about team composition in specific Skunk works type of innovation team. A Skunk works team could be identified as a type of innovation team. Despite the fact that Skunk works exist more than 50 years this field is still not so clearly explored and it is quite hard to find enough information about it, because it was used mostly in the military sphere and as a result almost all information was in secret. Consequently, it is not surprising that the information which could be found about Skunk works is only about its history, definitions, and types of it. Types of Skunk works have been distinguished and

\textsuperscript{1} We considered that champion is equal to the project leader and as a result due to the necessity to avoid misunderstanding we decided that during the whole thesis it will be better to use word “the leader”.

Composition of Skunk works teams
Composition of Skunk works teams

1.3. Purpose

Despite the fact that there has been a lot of research in the field about innovation and team, there is not so much information about the team composition specifically in Skunk works type of innovation team. As a result we would like to address this gap by combining research investigations and findings from innovation management literature and also by using research findings about the team in general. In the thesis we would like to investigate and identify the composition of the team in Skunk works. Hence we conceptualized composition as roles in the innovation team, the size of the team, as well as its diversity. We would like to show how roles, size and diversity of the team influence on the success of the project.

1.4. Research question

Following the research purpose we have developed our research questions:

What is the composition of the Skunk works team? What are the roles and size of Skunk works team?

Identified only by one researcher who is Brown (2004). Also it is important to take into consideration that mostly all articles about Skunk works are old and they were published before 2000. As a result, the composition of Skunk works team could be considered as an unexplored gap.
1.5. Disposition of the paper

I. Introduction
In this section we will expose the importance of team composition in an innovation project, the existence of special types of innovation teams, such as Skunk works, as well as the role of the champion, who leads a Skunk works team. We will discuss and identify problems, define the purpose and develop research questions.

II. Theory
The purpose of the theory section is to explore deeper into innovation teams, with specific focus on Skunk works teams. We will also look at roles, as well as the size of the team, and how they influence the success of innovation projects.

III. Methodology
In this section we will explain the choice of our research methodology and methods we will use in this study.

IV. Empirical data
In this section we will present our empirical findings.

V. Analysis
In this section we will analyze the empirical data and support our finding with theoretical framework.

VI. Conclusion
This is the last section, where we will briefly expose our significant findings, answer our research questions and analyze if we were able to achieve the purpose of our study.
II. Theory

The purpose of the current section is to explain theoretical perspective which will be used during the research.

2.1. What is innovation?

In this part we will define innovation and its processes. After which the idea about innovation team will be presented with discussion about Skunk works as a part of it. And then we will introduce and describe the concept of Skunk works with its main characteristics.

2.1.1. Definition of innovation

West and Wallace (1991) defined team innovation as “the intentional introduction and application within a team, of ideas, processes, products or procedures new to the team, designed to significantly benefit the individual, the team, the organization, or wider society” (referred in Drach-Zahavy & Somech, 2001, p. 303). Whereas, Sullivan (1998) and Teece (1998) suggested that innovation has only happened if the new knowledge has been realized or commercialized in some way (Ibid.).

According to Amabile (1988), Glynn (1996) and Kanter (1983) innovation is “the process of bringing new problem-solving ideas into use” (referred in Coakes & Smith, 2007, p. 75). Another definition of innovation was presented by Holt (1992) and means “the process of doing new things. It is the transformation of creative ideas into useful applications” (p. 32). Van de Van (1986) defined innovation as “the development and implementation of new ideas by people who over time engage in transactions with others within an institutional order. This definition focuses on four basic factors (new ideas, people, transactions, and institutional context)” (p. 590). We decided to use the definition of innovation by Van de Van, due to the fact that in our point of view Van de Van could describe innovation clearly with all details. Van de Van also mentioned main factors of innovation. It is important to take into consideration that mostly all authors defined innovation as a process of doing something new, with new ideas, with involvement of people, transactions, as well as structures.

2.1.2. Types of innovation

Innovation can be distinguished in four categories regarding their both impact on component knowledge and on architectural knowledge:
According with this assessment we can classify innovation in four types (Smith, 2006, p. 32):

a) **Incremental innovation**: when the changes or improvements produced are in simple elements of the product which does not imply a significant variation of the existing product or service, in terms of production, but with a perceived increasing value for the customers.

b) **Modular innovation**: when new or different significantly components with different design concepts are used within the same architecture and configuration associated with the existing architecture (technology).

c) **Architectural innovation**: when change the system’s linkages, although components can also be refined or improved, but in a lower influence for the new product.

d) **Radical innovation**: when the changes comprise several differences in the technology, for both producers and customers.

Customers or users do not respond always positively to some new technologies. If the innovation implies a soft technological change or an improving of the current product, customers will rapidly be aware of a new technology, because it is likely leads to increase their competitiveness or satisfaction without an excessive exchange cost. On the other hand, if the technology implies to system changes and the introduction of new architectures, the customers / users are less likely to be happy about the changes because it implies a period when lose some competitiveness or satisfaction while the new technology is implemented. According to Smith (2006) when technology introduces something new in the market, it arises a system design competition to establish the standard architecture. This comes up with a “shake-out” process until the dominant design is adopted by all the manufacturers (Smith, 2006, pp. 39).
2.1.3. Innovation process

Smith (2006) found that innovation process deals with the phases which materialize the idea or invention into an innovation, and afterwards launch the final product or service into the market (Smith, 2006, p. 104). This process can result in the soft evolution of existing technology in the market (incremental innovation) or a totally new (disruptive) technology that creates its own market (radical innovation), suffering different levels of uncertainty regarding its breakthrough technology, design, science advances or material (Ibid.).

Incremental innovations are characterized by a linear process of continuous changes, which produce small improvements in the existing product in performance, components or in a greater functionality. Radical innovations suppose a disruptive change in technology; hence face a high degree of uncertainty (and/or risk) because of the non-linear process of change, deriving in the creation of new markets (or new customers within existing markets) (Smith, 2006, p. 34).
2.2. The innovation team

In the current section firstly we will review the appropriate definition of innovation team. After which two types of innovation team will be discussed, such as heavyweight and lightweight teams, as well as characteristics of effective team work.

2.2.1 Definition of innovation team

The importance of the team to the success of the innovation project is discussed by a lot of researchers (e.g. Belbin, Barczak, etc.). The reason for such discussion is because of the existence of various definitions among different research areas. As Holt (1992) mentioned that the team is on the top of the success factors (Holt, 1992, p. 47).

In this section four definitions of the team will be discussed after which the appropriate one will be chosen. A team is generally defined by Belbin (2011), Alderfer (1987), Hackman (1987), Wiendieck (1992), Guzzo and Shea (1992), as well as Katzenbach and Smith (1993) (referred in Hoegl & Gemuenden, 2001, p. 436; referred in Zappula, 2003, p. 30). However, Barczak (2010) had a specific definition of the innovation team.

According to Alderfer (1987), Hackman (1987), Wiendieck (1992), Guzzo and Shea (1992) the team is “a social system of three of more people, which is embedded in a organization (context), whose members perceive themselves as such and are perceived as members by others (identity), and who collaborate on a common task (teamwork)” (referred in Hoegl & Gemuenden, 2001, p. 436). Here we can notice some attributes that despite the fact that team is formed by people who are implanted in an organization, team identified and a shared task/goal as teamwork.

Katzenbach and Smith (1993) identified the team as “a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves accountable” (referred in Zappula, 2003, p. 30), where the members’ complementation is the added attribute.

Another definition of the team is done by Belbin (2011) that states “is not a bunch of people with job titles, but a congregation of individuals, each of whom has a role which is understood by other members. Members of a team seek out certain roles and they perform most effectively in the ones that are most natural to them”.

The last definition which could be more appropriate rather than other definitions is done by Barczak (2010) about the innovation team. According to Barczak (2010) it is “cross-functional group of individuals who are charged with creating and developing new products and services. Members typically come from a variety of functional disciplines…. Innovation teams are temporary in that they are together for the life of the project from idea conception to launch” (Barczak, 2010, p. 225). We chose such a definition because of several reasons. Firstly, it is because Barczak (2010) had exactly explained and defined the innovation team. The second reason is that it shows how the
2.2.2 Types of innovation team

The most common types of innovation teams are heavyweight and lightweight teams (Barczak, 2010). However, in our point of view Skunk works could be identified as another type of the innovation team. Due to the fact that Skunk works is different from the heavyweight versus lightweight teams, we decided that it will be more appropriate if we will discuss it separately in another part.

According to Barczak (2010) a heavyweight teams’ members report directly to the project leader and they are devoted to the project during the whole period of time (Barczak, 2010, p. 225). As a result, in such teams all team members feel the whole responsibility for the project. As well they are related to the further effective completion of the project. In heavyweight teams, team members are firstly dedicated to the project, and secondly to the functional group. There are several advantages of heavyweight teams. Firstly, the team is responsible for the process of task delegation, organization and implementation (Barczak, 2010, p. 225). Secondly, the team leader is responsible for the further success or failure of the project, the management process of the team, as well for team members at all. However, according to Wheelwright and Clark (1992) there is also a disadvantage - that team members can create tension towards the member who has more control (referred in Barczak, 2010, p. 225).

Another type of innovation team is lightweight teams, where team members are assigned by their functional leaders and remain under their control (Barczak, 2010, p. 225). The dedication in the team is opposite to heavyweight teams, firstly team members are dedicated to their functional group and after to the project. The advantage of lightweight teams is that only one person (the leader) ensures that everything is done on time and every team member is informed about project problems. This leads to further improvements in the coordination and communication process. According to Wheelwright and Clark (1992) a disadvantage of such teams is that the team leader’s power can be weak in case of managers’ sabotage and as a result a leader can be useless (referred in Barczak, 2010, p. 225).

2.2.3 Characteristics of the team

During the last years a lot of studies have been done where researchers have investigated the different organizational and team characteristics which influence team performance (e.g. success, customer satisfaction) (Barzack and Wilemon, 2003, p. 463). Barzack and Wilemon (2003) mentioned that the quality of team members is also an influence on the performance of the innovation team. Whereas, Hoegl and Gemuenda (2001) suggested that teamwork quality, which means how team members work together, increases the performance of the innovation team (Hoegl & Proserpio, 2004; referred in
Hoegl, Ernst, & Proserpio, 2007, p. 157). Also, if team member proximity decreases, teamwork quality could be decreased as well (Ibid.). Holahan and Markham (1996) found that each team member must have skills, such as strong interpersonal abilities and good communication skills. Also he or she should have expertise in their fields (Holahan and Markham, 1996, chapter 4). According to Barzack and Wilemon (2003) interpersonal skills include the ability to be cooperative and get on with other team members (Barzack and Wilemon, 2003, p. 464). Moreover, team members should also have personal qualities, such as to be ethic, disciplined, and have the ability to motivate themselves with resoluteness (Barczak, 2010, p. 227). From the previous statements it could be concluded that for further success of the organization each team member should have a combination of skills and interpersonal skills.

Barzack and Wilemon (2003) found that innovation teams should be cooperative, devoted to a common objective and should get on with each other, from having the right people with the right skills (Barzack and Wilemon, 2003, p.469). These teams also have an effective leader, high level of teamwork and empowerment (Holahan & Markham, 1996).

Hoegl and Gemuenda (2001) mentioned that teamwork quality is based on factors such as the ability to share information openly, be able to coordinate task activities closely, to use team members’ potential, support, norms of high effort and team cohesion (referred in Hoegl, Ernst, & Proserpio, 2007, p. 158). Zappula (2003) also stated that cohesiveness, efficiency and effectiveness are important (Zappula, 2003, p. 30). Wallasch and Huckman (1999) explained such team characteristics as the “synergy” for collaboration, when there is a joint work for joint purposes (Huckman & Wallasch, 1999; referred in Zappula, 2003, p. 30). And clarified such “synergy” where “implicitly, part of what makes an effective team a distinctive entity is the synergy arising from the complementarity of its members; contributions, entailing shared commitment extending beyond goals and their achievement to acceptance of mutual responsibility for the team’s performance” (Ibid).

2.2.4 Team performance and teamwork

Integration, coordination, collaboration and teamwork, all these words can have the same meaning or something common between all of them. Firstly, it is crucial to take into consideration how they are significant in team and influence on team performance. There are a lot of definitions of integration, coordination, collaboration and teamwork, which sometimes are contradictory to each other. For example, Kahn (1996, p. 163) defined that integration is a combination of interaction and collaboration. Kahn (Ibid) maintained that interaction focuses more on communication and exchange of information, whereas collaboration focuses on the effective process of sharing resources and goals between departments. Jassawalla and Sashittal (1998) defined collaboration as cross-functional, which also includes a high level of integration, coordination, cooperation, transparency, and synergies (referred in Barczak, 2010, p. 227). According to Hoegl, Ernst, and Proserpio (2007) teamwork includes all these concepts, such as
communication, coordination, cohesion, effort, mutual support, and balanced contributions (referred in Barczak, 2010, p. 227).

Kratzer, Leenders, and van Engelen (2004) found that a high level of communication can decrease the creative performance of the team (referred in Barczak, 2010, p. 227). Pinto and Pinto (1990) found that in highly cooperative teams, members mostly communicate to share project-related information, as well as to review the progress of the project and later to receive feedback on their activities (Ibid.). As a result, teams spend too much time on these activities, which means that they have less time for solving conflicts and problems between team members. However, in this case one of the possible solutions to resolve such problems can be “internal mechanisms” such as evaluation, rewards, and support from the management. Pinto and Pinto (1990) found that a high level of cooperation and collaboration can lead to high levels of success, whereas Kratzer, Leenders, and van Engelen (2004) stated that cooperation and integration influence on team performance in a positive way (Ibid.). However, it is important that the level of cooperation and integration is moderated, in case the level is too high or too low, creating barriers to the further team performance (Ibid.).

Hoegl et al. (2007) found that when team member proximity decreases, which means dispersion between team members, the influence of teamwork quality on team performance increases (Hoegl et al., 2007, p. 162). It is happening because factors, such as the ability to share information openly, the ability to coordinate task activities closely, to use team members’ potential, support, norms of high effort and team cohesion, which were mentioned previously, are more difficult to achieve when the distance between team members increases (Ibid.). Hoegl et al. (2007) also suggested that when team member proximity decreases, leadership effectiveness also decreases (Ibid., p. 158). Such a situation occurs because the team leader loses his or her ability to influence the team, and as a result has less access to all team members. When the dispersion between team members increases the leadership functions become more difficult to perform.

Hoegl and Gemuenden (2001) state that teamwork plays one of the most important roles for the further success of the innovation project (Hoegl & Gemuenden, 2001, p. 435). During the research Hoegl and Gemuenden (2001) found that teamwork quality is significantly related to project success, which also includes team performance, as well as team members’ personal success (Ibid., p. 446).

Some authors differentiate success between “task-related” (e.g. quality, commitment to budget and schedule) and “people-related” outcomes (e.g. team member satisfaction), which could be categorized as team performance and the personal success of team members (Ibid., p. 438). Figure 2 below shows the interrelation and comparison in research of Hoegl and Gemuenden (2001) with Gladstein (1984), Hackman (1987) and Denison et al. (1996) in the conceptualization of project team success (Ibid., p. 438).
Team performance is defined as the team’s ability to fulfill required quality, cost and time objectives (Ibid.). During the research Hoegl and Gemuenden (2001) described team performance from the perspective of effectiveness and efficiency (Hoegl & Gemuenden, 2001, p. 438). Effectiveness means the degree to which the team meets expectations regarding the quality of outcomes. The team efficiency refers to adherence to schedules and budgets (Ibid.). To achieve performance objectives, it is also necessary to take into consideration that the team also needs to work in a way that increases members’ motivation and ability to engage in future teamwork (Hackman, 1987, Sundstrom et al., 1990, Denison et al., 1996, referred in Hoegl & Gemuenden, 2001, p. 439). Figure 2 shows that the personal success of team members consists of satisfaction and learning factors. Satisfaction leads to the increase of motivation to participate in the further team projects, as well as collaboration with other people which provides the opportunity for learning (Ibid.).

2.2.4.1 Team size

The size of the team plays a very important role, because it directly influences on the effectiveness and productivity of the team, as well as on the quality of a team task process and success of the project (Campion, Medsker, & Higgs, 1993; Gladstein, 1984; Hackman, 1987; referred in Hoegl, Ernst, & Proserpio, 2007, p. 160). Barczak (2010) found that a team size is directly proportional to its productivity; when a team size is increasing, trust, team participation and productivity is decreasing (Barczak, 2010, p. 226). In large teams it is more difficult for team members to cooperate and communicate with each other. As a result, according to Steiner (1966) it will decrease the interrelation between team members (Hoegl, Ernst, & Proserpio, 2007, p. 160). However, the team size can be varied; it depends on scale of the project and the level of its innovativeness. There are a lot of assumptions about the best size of the team. For example, Katzenbach and Smith suggested that the number of team members should not exceed 10 people; this number was also supported by Tiffan (referred in Tiffan, 2011, p. 80). ‘No more than 10 people’ was suggested due to the fact that it is enough people to be able to cover the major tasks (Ibid.). Also ‘no more than 10 people’ is small enough so that it is easier to communicate as well as discuss (Ibid.).
2.2.4.2 Team diversity

According to Ancona and Caldwell (1992a) there are two types of team diversity, such as tenure diversity and functional diversity (referred in Barczak, 2010, p. 226). Tenure diversity regards the periods of time that the various team members’ are working in the organization. Functional diversity refers to diversity of functional disciplines which the core team represents (Ibid.). Ancona and Caldwell (1992a) defined that in tenure diversity team members have different skills, experiences, perspectives and networks, due to the fact that team members came to the organization in different periods of time (referred in Barczak, 2010, p. 226). Ancona and Caldwell (1992a) found an advantage of such teams stating that a high level of tenure diversity enables a team to better define project goals, develop plans and prioritize works (Ibid.).

On one hand, diverse teams are more creative and also able to solve problems. However on the other hand, because of different perspectives of team members it can be difficult to develop a purpose which will be shared between everyone; also collaboration will be difficult (Ibid.).

According to Ancona and Caldwell (1992a) functional diversity provides teams with access and information that brings diverse input into the new-product decision making process (Ibid.). It also provides high levels of communication with individuals who are outside of the team. As a result, the lack of team cooperation motivates team members to look for outsiders with whom they are able to communicate with. Moreover, functional diversity is related to faster development time (Ibid.). It also enables forward-thinking and integration of marketing, a result which will make the time to market shorter (Ibid.).

However, both tenure and functional diversity can also have a negative effect. For example, Ancona and Caldwell (1992a) found that functionally diverse teams have low capacity for teamwork; they are more open to conflicts and have less chance to achieve agreements on decisions (Ibid.).
2.2.5 Skunk works

In this part we will briefly explain Skunk works, which is a type of innovation team (e.g. the history of Skunk works, how it appeared) after which we will compare different views and definitions of Skunk works. Also in this part we will talk about the main characteristics of Skunk works and its types which were introduced by Brown.

“You've got to give great tools to small teams. Pick good people, use small teams, give them excellent tools...so that they are very productive in terms of what they are doing.”
(Bill Gates, American Entrepreneur and Founder of Microsoft Co.)

2.2.5.1 History of Skunk works

In 1943 during the Second World War, the War Department wanted Clarence “Kelly” Johnson to start the creation of a new aircraft able to fly 200 mph faster than Kelly’s previous one – 400 mph P-38 Lightning (Wilson, 1999). During 43 days Johnson, with the team of 43 engineers, created the prototype for the P-80 Shooting Star (Brown, 2004, p. 131). After the success Johnson’s team had with the F-80 project they moved to a permanent facility, a windowless hangar which smelled very bad from the plastic factory. This was the beginning of “Skunk works”, which describes the sheltered way the Lockheed’s teamwork did their tasks without hierarchy and/or bureaucracy’s pressing requirements, letting them develop their own rules in order to optimize processes and innovative achievements in a short period of time (Goldstein, 2007, p. 4). In the private sector Skunk works describes units isolated from bureaucracy, with their own rules, only focusing on innovative processes or products. Skunk works highlights the lack of managers’ ability to encourage innovation.

In Appendix 3 there is a special list of rules, which was created by “Kelly” Johnson specifically for Lockheed’s Skunk works, which can help other projects with a way to implement and use Skunk works.

2.2.5.2 Definition of Skunk works

Unfortunately there are not so many researches in the field of Skunk works which are published. The lack of information is due to the fact that a lot of Skunk works are military projects and so classified as a secret. During the research it was also found that there is no one common definition of Skunk works. As a result in Table 1 there are several different definitions of Skunk works presented.

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2 The term “Skunkwork” comes from a change in the name “skonk work”, which first appeared in the depression-era cartoon “Lil Abner”, whose creator Al Capp objected to Lockheed-Martin’s adoption of his term to describe its secretive research facility (Boyne, 1991; referred in Goldstein, 2007, p. 4).
Author(s) | Definition of Skunk works
--- | ---
Technological dictionary, Whatis.com, 2001, (referred in Brown, 2004) | “… a group of people who, in order to achieve unusual results, work on a project in a way that is outside the usual rules. A Skunk work is often a small team that assumes or is given responsibility for developing something in a short time with minimal management constraints. Typically, a Skunk work has a small number of members to reduce communications overhead. A Skunk work is sometimes used to spearhead a product design that therefore will be developed according to the usual process. A Skunk work project may be a secret” (p. 134).

Single and Spurgeon (1996) | “Method of managing the innovation process, characterized by extremely efficient use of time by a small group of creative engineers” (p. 39).

Neal Goldsmith, the president of Tribeca Research, Inc. (referred in Gwynne, 1997) | “A protected and culturally antithetical body for purposes of innovation” (p. 18).

Brown (2004) | “A true Skunk works is an isolated and highly skilled team designed to accelerate the research, but especially the development of innovative product/services. The team typically works outside the bounds of the parent’s rules and regulations and under time pressure” (p. 134).

Gwynne (1997) | “Provide large technology companies with the opportunity to compete on a level playing field against smaller competitors. But they require careful preparation if they are to pay off” (p. 18).

“Small groups of scientists, engineers and other personnel who tackle specific problems and try to commercialize the solutions” (p. 18).

“Today,…., the concept of the Skunk works is spreading rapidly to technology-based corporations concerned about the slowing pace of innovation” (p. 18).

Bwired (2009) | “A term widely used to describe a team that have a high degree of autonomy, little bureaucracy and work on specific projects” (p. 3).

Table 1. Definitions of Skunk works

From Table 1 above it can be seen that almost all authors defined Skunk works as “group of people” or “a team”, who are working on “specific projects” with the process of development of innovative products or services (Brown, 2004). Based on the previously mentioned definitions of Skunk works, we tried to define it in our own way, where Skunk works is:

_A small isolated group of people (team), who are highly skilled, with the high level of knowledge in their own field, and who are participating in an innovation_
Skunk work focus on the process of innovation project development in short periods of time with high level of efficiency during this time. The Skunk work team is separated from the rest of the organization and are led, managed and supported by a person who has an authority in the formal organization and serves as an advocate of the innovation, developed by the Skunk work team (i.e. innovation champion).

2.2.5.3 Main characteristics of Skunk works

Nowadays a lot of organizations want to implement Skunk works due to its success. However, there are a lot of factors which must be taken into consideration. After analyzing different articles of Gwynne (1997), Rich (1994), Single and Spurgeon (1996) and Brown (2004) we decided to summarize main characteristics of Skunk works, which will lead to the further success of the organization:

I. Mostly in the team there must be a small amount of people. It is happening because in a small group it is easier to communicate with each other, to share information, and it is easier to manage such a team. According to Goldsmith (the president of Tribeca Research, Inc.) the ideal Skunk works group should have a group from five to seven people (as cited by Gwynne, 1997, p. 21). This number of team members was also supported by Bantel and Jackson (1989) and Howell and Higgins (1990) (referred in Hauschildt & Kirchmann, 2001, p. 42).

II. Another key factor of Skunk works is leadership (Gwynne, 1997; Rich, 1994). The team must have a strong leader, who will be able to see the whole situation without focusing on day-to-day details, and be the ultimate decision-maker with the ability to delegate both authority and responsibility (Rich, 1994, p. 67). Moreover, the leader must be charismatic, and have an ability easily inform and give people vision, goals and objectives. Both the leader and a team must think in long-run perspective and be able to look ahead (Single & Spurgeon, 1996). Furthermore, the leader must be able to create a special environment of trust and informal processes with close personal interaction (Brown, 2004, p. 142).

III. The team’s members must be chosen correctly by the leader, due to the fact that the further success is fully dependant on the team and its leader. According to Single it is necessary to find the right people and give them complete freedom from bureaucracy (as cited by Gwynne, 1997, p. 21). Also team members must be highly qualified and experienced. According to Single and Spurgeon (1996), the key to a successful Skunk works is to have the right people with the right combination of skills, knowledge and personal qualities (Single & Spurgeon, 1996, p. 39).

IV. The Skunk works team must be separated from the parent organization. It is mostly a win-win situation, due to the fact that both the parent company and small organization can have its own goals and work separately without intersection with each other (Rich, 1994).
V. **Creativity** is also one of the main secrets behind Skunk works, which helps to encourage the working process (Rich, 1994). It is happening due to the fact that people who are working in Skunk works are not afraid to look on everything from different perspectives and to break some kind of common rules. Furthermore, creativity is helping to find the solution to the problem without spending too much time on a “trial-and-error method” (Single & Spurgeon, 1996).

VI. **Time** is another factor which leads to the further success of the organization. Rich (1994) mentioned an interesting finding that “time is money”.

### 2.2.5.4 Types of Skunk works

Brown (2004) created a matrix (Figure 3), where he analyzed Skunk works from two dimensions, which are level of secrecy and level of management support. Figure 3 shows four main Skunk works types, such as true, pseudo, emergent and transitional Skunk works.

![Figure 3. The Skunk works matrix (Brown, T. 2004, p. 137)](image)

In the “**true Skunk works**” there is a special limited group of people with a high level of skills, who are separated from others with the focus on the process of developing innovative products and services. However, nowadays “true Skunk works” are mostly limited and belong to military and government projects with limited access to information. As a result, most “true Skunk works” are fully supported from the top management which leads to their further success (Brown, 2004, p. 138).

Nowadays, mostly all corporate Skunk works are “**pseudo**”, which are known “throughout the organization as causing some of the organization’s dysfunctions and problems” (Brown, 2004, p. 138).

Frequently “**emergent Skunk works**” are started from small and secret programs, where even top management cannot know about the project. However, if the project grows and makes some sense, it will stop being a secret and will move to another kind of Skunk works (Ibid.).
“Transitional Skunk works” are both public and emergent, which is all the time changing. The direct influence on “transitional Skunk works” is coming from the top management, who are able to choose what will happen with the project in the future. For example, the project could be continued and moved to “pseudo-Skunk works”; or in case of rejection of the project, it can be moved to “emergent Skunk works” and become “more secretly and more unofficially than previously” (Brown, 2004, p. 139).

### 2.2.5.5 Key transitions of Skunk works

There are two main key transitions which true Skunk works or pseudo-Skunk works have, such as market transition and organization transition.

### 2.2.5.6 The market transition

Only in case of true Skunk works and pseudo-Skunk works the output can be not only invention, but also a product. Both these Skunk works types can be the most effective in companies which are oriented mostly on products.

Xerox had a Skunk works program which failed. One of the reasons why it failed is because Xerox was mostly oriented on the technological part, rather than on innovation (Brown, 2004, p. 140). According to Brown (2004) innovation has two sides which must cooperate with each other, such as invention (which means technology) and market orientation. As a result this new product must have market or business orientation. The main point is that there must be a balance between orientation on technology and market. Furthermore, the main characteristic of all types of Skunk works is that they are focusing not only on creation of “next generation products”, but also “about satisfying next generation customers” (Brown, 2004, p. 140).

### 2.2.5.7 The organization transition

To have the right people is not only a key factor of Skunk works, but it is a very important competitive advantage too. It is also necessary to have “an organizational transition person” who will be in between team and the parent company (the organization), who will be helpful in deciding all kinds of problems (Brown, 2004, p. 141). Examples of the tasks performed by ‘an organizational transition person’ include to help to provide of all necessary resources which are required and to help transfer the project from the team to the organization.

### 2.2.6 Roles in innovation team

The effectiveness of teams can be changed greatly. It can be confirmed that it is directly dependent on the certain roles that people perform in teams and how these roles can relate to team performance (Prichard & Stanton, 1999, p. 653). A lot of researchers suggested that a team can perform more effectively if the right combination of roles will
be present. It means that each team member must have certain skills and abilities which are required for their kind of work. However, other characteristics, such as personality, attitudes, and task process and maintenance skills should also be taken into consideration (Ibid.). The focus of the current thesis work is on the Skunk works team which consists of different kinds of roles, where the last one will be described with applying three different theories.

### 2.2.6.1 The Champion

It is necessary to take into consideration the importance of the champion in the innovation project. Salomo and Gemunden (2010) found that the champion concept is a “mono-personal concept” where the success or failure of the innovation project is referred to one person who is making a decision (Salomo & Gemunden, 2010, p. 263). Moreover Barczak (2010) found that for the further effectiveness of the team there is a need to have the champion who enables the team to do its best and to work through different problems (Barczak, 2010, p. 229).

Some authors, such as Beatty and Gordon (1991) and Pinchot (1985) identified innovation champions as “natural entrepreneurs” (referred in Coakes & Smith, 2007, p. 80). Mostly, champions are active in the process of supporting innovation and searching for new opportunities with encouragement and motivation by management (Coakes & Smith, 2007, p. 79). According to Howell and Higgins (1990) “without champions organizations may have a lot of ideas but few tangible innovations. The challenge facing management is to identify and effectively manage existing champions and to nurture potential champions” (Howell & Higgins, 1990, p. 55). Coakes & Smith (2007) mentioned that Parker and Axtel (2001) with Howell and Bois (2004) found that in order to motivate others for the innovation, there is a need for the champion to take different prospects and as a result to work cooperatively with other team members, which will lead to the further process of idea generation. It is also important to take into consideration the role of the champion due to its significant affect on the process of choosing strategic actions, as well as the whole performance of the organization with its way of distribution power and resources (Howell et al., 2005).

### 2.2.6.2 Definition of the champion

After analyzing characteristics of the champion and his or her importance in the innovation team it is possible now to identify who is the champion. In Table 2 there are different definitions which identify the champion. An interesting observation can be found - that actually almost all definitions are written by Howell, sometimes with other authors, in different periods of time. We assumed that such popularity of Howell’s articles is due to the fact that the biggest and deepest research about the champion has been done by Howell.
Table 2. Definition of "the champion"

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Definition of “the champion”</th>
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<tbody>
<tr>
<td>Howell &amp; Higgins (1990)</td>
<td>“Are informal emergent leaders who exhibit transformational behavior” (p. 182).</td>
</tr>
<tr>
<td>Holt (1992)</td>
<td>“The entrepreneur or manager who pursues the idea, planning its application, acquiring resources, and establishing its markets through persistence, planning, organizing, and leadership” (p. 37).</td>
</tr>
<tr>
<td>Jensen &amp; Jørgensen (2004)</td>
<td>“An individual that is willing to take risks by enthusiastically promoting the development and/or implementation of an innovation inside a corporation through a resource acquisition process without regard to the resources currently controlled” (pp.64).</td>
</tr>
<tr>
<td>Howell et al. (2005)</td>
<td>“Individuals who informally emerge to actively and enthusiastically promote innovations through the crucial organizational stages, are necessary to overcome the social and political pressures imposed by an organization and convert them to its advantage.” (p. 642).</td>
</tr>
<tr>
<td>Referred in Howell et al. (2005)</td>
<td>“Individuals who informally emerge in an organization (Chakrabarti, 1974; Roberts and Fusfeld, 1988; Schon, 1963) and make “a decisive contribution to the innovation by actively and enthusiastically promoting its progress through the critical [organizational] stages” (Achilladelis et al., 1971: 14).</td>
</tr>
<tr>
<td>Howell (2005)</td>
<td>“Individuals who informally emerge to promote the idea with conviction, persistence, and energy, and willingly risk their position and reputation to ensure the innovation’s success” (p. 723).</td>
</tr>
</tbody>
</table>

From Table 2 above it can be seen that champions are defined as individuals who informally emerge. Also their behavior is highlighted with active enthusiasm and persistence in order to promote innovation projects within the organization. Based on the previous definitions we created our own definition of the champion:

An individual who is leading and motivating the innovation team; dealing with any threats with his/her broad knowledge, interest, network, information; holding by tenacity against any adversity, multiple-term vision, and the power of transmission these believes to any other party.

2.2.6.3 Champions’ characteristics

It is very important to take into consideration the champion characteristics, to know how it is possible to identify him or her. For a long time various studies have been done in this field, as a result in this part the main characteristics of the champion will be based on these researches.
According to Schon (1963) the role of the champion is identified as *the main* for the implementation of innovation in a successful way. Firstly, it is necessary to take into consideration that the champion should have his or her personal *devotion to the idea*, to be able to *promote the idea* confidently, persistently and energetically, without fear to lose his or her own position and reputation (Maidique, 1980 based on the observation of Schon’s research). Secondly, according to Chakrabarti and Hauschild (1989) the champion’s behavior should also include the process of *directing the goal formation process* through the evaluation ideas which should be fitted with organization strategy, as well as explaining, teaching, and motivating people who are also involved in the process (referred in Howell et al., 2005). It could be supported by Howell et al. (2005) who measured champion behavior with three main factors, such as *enthusiasm* and *confidence* about the further success of the project, “persisting under adversity”, and the importance of having the *right people* in the project (Howell et al., 2005, p. 642). To have the combination of right people was also supported by Stata (1989), Tushman and Nadler (1986), as well as to have *trust* and *vision* of the idea about innovation and its processes (referred in Coakes & Smith, 2007, p. 79; Howell & Higgins, 1990).

Furthermore, the way champions can be recognized from non-champions is by the *process of communication*, as well as demonstration of *commitment* and *involvement* of other members (Howell & Higgins, 1990). Also, he or she makes a “decisive contribution to the innovation by actively and enthusiastically promoting its progress” (Archilladelis et al., 1971, p. 14).

It is also necessary to mention that according to Beatty and Gordon (1991) champions should also have *analytical and technical skills*, as well as *knowledge* in a specific and generic *organizational situation and environment*, which are coming through experience (referred in Coakes & Smith, 2007, p. 80). Naturally the champion has *a lot of networks* which he or she is participating in, which can be characterized as “renaissance people” (Howell, 2005) with different interests and activities (Coakes & Smith, 2007, p. 79). It could be seen that these networks are developing through *a long experience* in different positions and divisions of the organization with deep knowledge of the industry (Howell & Higgins, 1990; Coakes & Smith, 2007).

Other important characteristics of innovation champions which have been identified include the ability to *take risks* in combination with a diplomatic *talent* (Chakrabarti and Hauschildt, 1989); *strong abilities* of advocating and promoting (Beath, 1991) with the ability to overcome opposition (Markham, 1998); as well as an ability to direct through both a social and political organizational environment (Day, 1994) (referred in Coakes & Smith, 2007, p. 79).

### 2.2.6.4 Other roles in innovation team

For the current thesis work three theories about roles in the innovation team have been taken into consideration: the theory of Roberts and Fusfeld (1981) with their five different roles in the innovation team, as well as nine team roles of Meridith Belbin, and the third theory is the Communication Profile Model. All those theories describe roles in
the team generally, which are applicable not only to an innovation team but also to a Skunk work team.

- **Belbin’s Team Roles**

A theory about team roles in general was developed by Meridith Belbin in the 1970s with nine team roles (Figure 4), which describe different characteristics of team members and their behavior in the team (Tonnquist, 2008, p. 84). These nine team roles are also known as the Belbin Self-Perception Inventory or the Belbin Team Role Inventory. For the further improvement and optimization of teamwork it is better if all or most of these roles will be represented in the team and in the best scenario it will be different people (Ibid.). As stated in the theory of Roberts and Fusfeld (1981) it is also possible that each team member can have more than one role.

According to Belbin (2011) there are three possible categories: preferred roles, manageable roles, and least preferred roles. *Preferred roles* are those roles which are chosen naturally and a team member feels comfortable in them (Belbin, 2011, p. 10). *Manageable roles* are roles where a team member can “play” if it is necessary for the further benefit of the organization. And the last are *least preferred roles*, those roles which are not chosen by a team member individually (Belbin, 2011, p. 10). In such a situation it is recommended to avoid contributing in such areas in case of mistakes in behavior will prevail strengths (Ibid.).

In the research Prichard and Stanton (1999) agreed with Belbin's "role-balance" hypothesis that “teams balanced with respect to the team role composition of its members are more consistently successful than teams in which this balance is absent” (Prichard & Stanton, 1999, p. 662). Moreover, Prichard and Stanton (1999) found that in mixed teams, where different roles are represented, team members performed significantly better.
Communication Profile Model

A Communication Profile Model (Figure 5), which was described by Mikael Ohlsson in his Swedish book on relationship-oriented communication, is another theory which is used to explain how a team works within a group. It is a simple model which consists of four different human characteristics, such as open, reticent, determined and compliant (Tonnquist, 2008, p. 86).
The first characteristic is to be open and means to be relationship-oriented. This means the team member should be easy to get to know and also should be able to adapt easily to new situations (Ibid.). To be determined means being more oriented on results, to have such characteristics as decisiveness, competitiveness, speed, as well as a desire to be center of attention. The third characteristic is to be reticent and being more oriented on tasks, with the focus on details, be a “completer and also to be apprehensive in letting new people close” (Ibid.). The last characteristic is to be compliant, this means to be diplomatic and be able to understand needs of the team, as well as to take care of team members.

It could be concluded that actually each team member has these characteristics, but one can be more dominant. As a result, those four characteristics can be compared with four different roles or characters. A person who is more open and determined is a communicator (Tonnquist, 2008, p. 87). The combination of such characteristics as determined and reticent can be found in a person who is a motivator, whereas a combination of reticent and compliant is in an analyzer. And the last one is the role of the friendly person who possesses openness and compliance. During the research it was found that a communicator can easily work with a friendly person because both of them are relationship-oriented. Also a motivator and an analyzer have the reticent characteristic in common (Ibid.). It can be concluded that a communicator is bringing ideas and a motivator implements decisions and is responsible for the project running on time and on budget. An analyzer is responsible for making sure that all promises should be fulfilled, and the friendly person is focusing on teamwork and relationships in the team (Ibid.). However, there are also weaknesses of each character. For a communicator it takes quite a lot of time to focus on just one idea, whereas a motivator is impatient, an analyzer is not able to change something if it has been already decided and the friendly person sometimes can just forget goals (Ibid.).
• **Roberts and Fusfeld’s theory**

There are five different work roles which are critical in innovation process, such as idea generating, entrepreneuring or championing, project leading, gatekeeping, sponsoring or coaching (Roberts & Fusfeld, 1981, p.22). All these five roles can be “carried out” by one or several persons; however it is quite difficult to find one person who will be able to fulfill all those roles. It is necessary to take into consideration that each of the roles is quite unique and required special skills and knowledge. As a result due to uniqueness it will be quite hard to find another person who can be able to replace one of team members in case of leaving the project (Ibid.).

However, it can be confused that all roles divided between team members, there are also a possibility of other variations. For example, it is probable that one of five roles can be fulfilled by more than one person to increase the chance of the project’s further success. There is also another variation, such as, a possibility that one of the team members can have more than one role, which will mean a multiple role combination (Salomo & Gemunden, 2010, p. 265). For example, one common combination of roles can be the pair of gatekeeping with idea generating, where idea generating relate to the frequency of communication between people, especially with people who are external to the organization. Due to the fact that gatekeeper has a lot of networks and in contact with a lot of resources where he or she can get information; the combination of both these roles could be a good solution (Ibid.). And the last variation is the possibility to change over roles with others within an organization (Roberts & Fusfeld, 1981, p.22).

It is also important to have a balanced set of abilities for execution of roles in the organization; roles should not be overemphasized or underestimated. Sometimes it is possible that people with different characteristics can work and complement each other (Ibid., p.24). Roberts and Fusfeld’s (1981) research showed the importance to have all these five roles in innovation organization. Researchers found that a lot of ineffective organizations fail due to the fact that some of those roles have been missed (Roberts & Fusfeld, 1981, p. 26).

In the Table 3 below there are shown patterns of people’s personal characteristics compared with activities and which roles they are performing in innovation project.

<table>
<thead>
<tr>
<th>Roles</th>
<th>Personal characteristics</th>
<th>Organizational activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea generation</td>
<td>Expert in one or two fields</td>
<td>Generates new ideas and test their ability</td>
</tr>
<tr>
<td></td>
<td>Enjoys conceptualization; comfortable with abstractions</td>
<td>Good at problem solving</td>
</tr>
<tr>
<td></td>
<td>Enjoys innovative work</td>
<td>Sees new and different ways of doing things</td>
</tr>
<tr>
<td></td>
<td>Usually is an individual contributor</td>
<td>Searches for the breakthroughs</td>
</tr>
<tr>
<td></td>
<td>Often will work alone</td>
<td></td>
</tr>
<tr>
<td>Entrepreneuring or</td>
<td>Strong application interests</td>
<td>Sells new ideas to others in the organization</td>
</tr>
<tr>
<td></td>
<td>Possesses a wide range of</td>
<td></td>
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</table>

*Composition of Skunk works teams*
<table>
<thead>
<tr>
<th>Championing</th>
<th></th>
</tr>
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<tbody>
<tr>
<td><strong>interests</strong>&lt;br&gt;Less propensity to contribute to the basic knowledge of a field&lt;br&gt;Energetic and determined; puts self on the line</td>
<td>Gets resources&lt;br&gt;Aggressive is championing his or her “cause”&lt;br&gt;Takes risks</td>
</tr>
<tr>
<td><strong>Project leading</strong>&lt;br&gt;Focus for decision making information, and questions&lt;br&gt;Sensitive to the needs of others&lt;br&gt;Recognizes how to use the organizational structure to get things done&lt;br&gt;Interested in a broad range of disciplines and in how they fit together (e.g., marketing, finance)</td>
<td>Provides the team leadership and motivation&lt;br&gt;Plans and organizes the project&lt;br&gt;Insures the administrative requirements are met&lt;br&gt;Provides necessary coordination among the members&lt;br&gt;Sees that the project moves forward effectively&lt;br&gt;Balances the project goals with organizational needs</td>
</tr>
<tr>
<td><strong>Gatekeeping</strong>&lt;br&gt;Possesses a high level of technical competence&lt;br&gt;Is approachable and personable&lt;br&gt;Enjoys the face-to-face contact of helping others</td>
<td>Keeps informed of related developments that occur outside the organization through journals, conferences, colleagues, other companies&lt;br&gt;Passes information on to others: finds it easy to talk to colleagues&lt;br&gt;Serves as an information source for others in the organization (i.e., authority on who to see or on what has been done)&lt;br&gt;Provides informal coordination among personnel</td>
</tr>
<tr>
<td><strong>Sponsoring or coaching</strong>&lt;br&gt;Possesses experience in developing new ideas&lt;br&gt;Is a good listener and helper&lt;br&gt;Can be relatively objective&lt;br&gt;Often is a more senior person who knows the organizational ropes</td>
<td>Helps develop people’s talents&lt;br&gt;Provides encouragement, guidance, and acts as a sounding board for the project leader and others&lt;br&gt;Provides access to a power base within the organization—a senior person&lt;br&gt;Buffers the project team from unnecessary org. constraints&lt;br&gt;Helps team to get what it needs&lt;br&gt;Provides legitimacy and org. confidence in the project</td>
</tr>
</tbody>
</table>

Table 3. Patterns of people's personal characteristics (Roberts & Fusfeld, 1981, p. 25)
III. Methodology

In this section we would like to describe the methodology part for our research, and methods which we have chosen to achieve the purpose of the thesis.

3.1. Research Approach

Researchers can produce knowledge and relationship between theory and research, which leads for the deductive and inductive theories (Bryman and Bell, 2007, p. 11). Deductive theory represents the relationship between theory and research, where researchers deduce hypotheses are based on the previously collected theories for its further analysis (Ibid.). Deductive theory is associated with linear process, where each step follows another in clear logical order; in another way, it is going from general to more specific, which sometimes informally called as top-down approach.

The second approach which Bryman and Bell (2007) observed is opposite to a deductive theory; it is called inductive, which is very common in qualitative studies. In inductive theory the process begins with creation of hypothesis, as well as from specific observations and finding to broader generalization and theoretical part (Trochim, 2006). The inductive theory is called as bottom-up approach, which is sometimes, involves the degree of uncertainty.

During our research process we considered that deductive approach will be the most suitable for our study. Firstly, we began to think about our theoretical part, what will be useful for the thesis, after which we narrowed it for our research question, as well as for the collection of all findings during the research.

The research question which was created for the current theory analysis and conclusion will be tested with specific data after which we will be able to see if it can confirm or reject our findings (Trochim, 2006). The current research questions have been created and based on the literature which we used for our research. As was mentioned previously in the Introduction section, our research questions are:

What is the composition of the Skunk works teams? What are the roles and size of Skunk works teams?

In the previous research done in the field of innovation teams, researchers did not examine Skunk works as a possible type of innovation team. Our opinion considers Skunk works as a type of innovation teams is important. Also there is a lot of research about the role of champion, and for other team members information can be only found in the literature about innovation teams and team composition, but not in Skunk works’ literature.
Based on our research questions, we have developed the following hypothesis: *The roles and the size of teams are key features of the Skunk works teams.*

### 3.2. Research strategy - Case Study

According to Yin (2003) the case study can be identified as one of several ways of doing research (Yin, 2003, p. 1). In general, case studies can be considered as “the preferred strategy”, which focuses on the process of understanding the dynamics (Ibid.). Whereas, dynamics can be presented with the main questions such as “how” and “why” (Eisenhardt, 1989, p. 534; Yin, 2003, p. 1).

The case study is very popular and widely used in business research, which is also associated with a geographical location (Eisenhardt and Graebner, 2007; referred in Bryman and Bell, 2011, p. 59). Case studies can involve one or several cases, and multiple levels of analysis (Yin, 1984). Mostly case studies combine data collection methods, such as interviews, observations, and questionnaires (Eisenhardt, 1989, p. 534).

There are several advantages of case studies, which can show the reason why we decided to use them in our research. Firstly, it is important to take into consideration that due to the fact that case study extends the perception during the study; it also helps to understand better the behavior pattern of the specific unit (Kothari, 2008, p. 115). Moreover, through a case study, researchers can gain a real and enlightened record of personal interviewee’s experience (Ibid.). Case studies also help in the process of creating relevant hypothesis, as well as enable the abstract knowledge to become more affluent (Ibid.). Another reason is also because of its flexibility. It means that despite the fact that in the thesis we decided to use an interview guide which provides the ability to ask questions, it is also possible to change questions during the interview. As a result, the advantage that during the interview answers has narrowed down.

According to Yin (2003) the main distinction in designing case studies is between single-case design and multiple-case design (Yin, 2003, p. 39). Yin (2003) associated single-case design as a single experiment. Single-case design is also used to verify whether the theory’s suggestions are right or the possibility that some other alternative explanations will be more relevant (Ibid., p. 40). However, for the current thesis we will use multiple-case design, due to the several reasons. First reason for the multiple-case design is because in our thesis we studied more than one case. According to Herriott and Firestone (1983) the evidence from multiple-case is more obliged and as a result the whole study needs to be more robust (Ibid., p. 46). It is also necessary to take into consideration the fact that during our research each case study had its specific purpose. The second reason why we decided to use multiple-case study is due to the fact that it follows a replication, which showed in the Figure 6. By replication we mean that it is not sample kind of logic and means that cases should to prognose similar results (Ibid., p. 53).
From the Figure 6 it can be seen that the first step is the theory development process. During this first step we were looking for relevant theoretical framework for our research. After which we selected a case and defined the specific measurements which will be relevant and important for our designing and data collection process (Yin, 2003, p. 50). The next step includes such processes as data collection and analysis, where for our case study we used interview of three respondents from three different industries and companies. During the last step, we study with indications of how and why a particular statement was or was not argued (Ibid.). The last case study step should indicate the reason why those cases we chose had certain results, whereas others had opposite results.

![Figure 6. Case Study Method (Yin, 2003, p. 50)](image)

During our research we looked at three different types of companies, which are in different industries and from two different countries. Countries which have been chosen for our research are Sweden and Spain. The reason why we chose particular these two countries is because of several causes. Firstly we chose Sweden due to the fact that it is place where we are studying currently. Secondly, despite the fact that population of Sweden is not so big and it is approximately 9 million people, Swedish companies are growing quite fast and becoming globally famous. Furthermore, it is important to take into consideration the fact that according to the Innovation Union Scoreboard 2011 Sweden was ranked as a top innovation leader in the EU Member States' innovation performance (Johnson, 2012). The reason why we chose Spain is because it is a home country of one of our members. Despite the fact that the R&D is not so rooted within the organizations budgets, Spanish companies present in worldwide industries with high investments in technologies. Such as, energy sector (e.g. Repsol, Alstom, CECRE), infrastructures (e.g. Acciona & Ferrovial) and the entertainments (e.g. Pixar, Pyro Studios, & Zinkia).
3.2.1. **Selection of respondents**

There are several different reasons why we chose particular such companies as Sandvik Coromant, Ubisoft Barcelona Division and CSIC. To make it easier, we will look on each company separately. It is also necessary to mention that all three companies are in different industries. We thought that it will be interesting to look on the composition of team in innovation projects from different perspective and angles of different industries and countries.

**Sandvik Coromant**

The first reason for the choice of Sandvik Coromant was the fact that we already worked with this company in our previous courses and we knew the interviewee very well. Secondly, it is important to take into consideration the fact Sandvik Coromant is a part of Sandvik AB. Whereas, Sandvik AB is one of the biggest Swedish companies, which is popular globally and compete on the worldwide market. The industry and market of Sandvik Coromant is machine manufacturing, which drives the company to embrace a strategy of differentiation. By leading the technologies available in the market, offer its clients achieve the lowest unit cost using their products, and being aware of the sustainability in all aspects the differentiation strategy accomplishes its goals, letting the company be the leader in each market. This is possible by the vast amount projects the company carries off every year, with diverse composed teams as the project requires.

**CSIC**

We chose CSIC because in Spain it is the well-known institution that carries out the most of the research projects and the main source of transferred knowledge for the Spanish companies in a wide range of fields. CSIC belongs to the Spanish Ministry of Economy and Competitiveness through the Secretary of State for Research. This organization has full range of fields’ researches, operating within Spain and also collaborating with other countries in bigger projects, therefore CSIC comprehends full diversity of team compositions.

**Ubisoft**

Another choice was Ubisoft, the Guillemot’s brothers company with headquarters located in Rennes, France. Ubisoft is well known worldwide by their advance videogames formation. The choice was is due to the fact that Ubisoft is the creator of successful games in different grades of innovations, made by their own and in collaboration with other companies; furthermore we know some people who work in the company.

As well, there are several reasons why we chose specifically these current respondents:

*Shekhar Singh* was selected because of his position in Sandvik Coromant, as a Design Automation Engineer in R&D Threading Tools Department and his friendship
with both of us. Whereas Sandvik Coromant is a part of the Sandvik AB Group, well known worldwide for its innovation reputation and brand image.

_Cristian Pastor_ leads the creative team of Ubisoft branch in Barcelona. His team creates some breakthrough videogames for many studios. Ubisoft is another global company, but this in a completely different industry, which is the entertainment. Cristian Pastor amplifies broadly the scope of our study into the business area. Despite his geographical distance (Spain), we knew from the beginning that he was plenty disposed to participate in the interview for our thesis.

_Ernesto Ganuza_ is a well-known social scientist for his researches in citizens’ decision process. We asked for CSIC’s collaboration through the contact mail on its website and when they replied they regarded to Ernesto Ganuza. He also offered generously his disposition to collaborate with us. We appreciated the collaboration with him because we know that he had some personal difficulties, because of which he could not respond for us on time, however despite of everything he fulfilled our expectations. CSIC’s collaborations extends even more the scope of our study because they are in the first phases of the innovation process, developing ideas and knowledge into inventions at least, and collaborate with companies for their R&D progression.

### 3.2.2. The way of interview

**Sandvik Coromant (Shekhar Singh)**

We interviewed Shekhar Singh, who is from Sandvik Coromant, by personal meeting. However, before the meeting we send to Shekhar interview guide _Appendix 2_, that he would become familiar with the questions. During the interview we recorded all his answers. Afterwards we transcribed the audio file into a document, where in the empirical data the reader could find transcription. We decided to use a personal interview because such kind of interview has a high value, due to the fact that it is large in content and rich in information quality from Shekhar Singh answers. The advantages of the personal interview is in its flexibility of the focused interview, the ability to add some improvised questions if there is a need in some additional information (Kothari, 1985, p. 98). However, there are also disadvantages of the personal interview. Kothari (1985) emphasized that it is a difficult requirement to know how is the “rapport with the respondents that would facilitate free and frank responses”. However, we have not had enough time to know how the rapport is. The remarkable disadvantage of this type of interview which we found also is the fact that it is more-time-consuming, because of the meeting in the workplace and the transcription.

The interview was recorded using the internal microphone of a MacBook Pro as the external input connected to audio-studio recording software called Audition. Afterwards we transcribed the interview which was recorded in two times, due to some changes that were done after the first one. In this recording form we avoid any difficulty that could arise during the interview by missing returns or also avoid non-response questions (Kothari, 1985, p. 98).
CSIC-IESA (Ernesto Ganuza)  
Ubisoft (Cristian Pastor)

For both Spanish organizations CSIC and Ubisoft we sent interviews by e-mail because its cost is the lowest regarding Kothari (Kothari, 1985, p. 100-101). It is important to take into consideration that due to the fact both interviewees from CSIC and Ubisoft are from Spain, we decided that in will be better if we translate the interview into Spanish language. Firstly, it will show for interviewees that we really want to collaborate with them and how their respond is important for us. Secondly, it is easier for interviewees to answer in their own language, because it avoids some misunderstanding of questions. As well, interviewees can give broader answers in their own language. Thus, according to Kothari (1985, p. 101) “answers are in respondent’s words” just because they were more able to express well thought out answers. However the language should be kept in the academic terminology for innovation, because both respondents possess a high academic level (Ibid.).

However, there are also disadvantages of such type of the interview. Unfortunately during the e-mail interviewing we found that some questions, particular answers on those questions, have been skipped. Such a disadvantage also was mentioned by Kothari (1985, p. 101). Another possible disadvantage is the fact that it is “difficult to know whether willing respondents are truly representative” (Ibid.).

The interview guide which we sent to CSIC and Ubisoft representative was exactly the same as we sent to Sandvik Coromant. The interview guide was structured from general to narrower issues, split in different identifies parts, and formulated clearly and straight to convey only one thought a time (Ibid.).

3.3. Research Method

According to Bryman and Bell (2011), a research method is a technique which used for data collection process (Bryman & Bell, 2011, p. 41). There are two research methods, which are qualitative and quantitative. The biggest difference between qualitative and quantitative research method could be found in the techniques of collecting data, as well as in the procedures of data analysis (Saunders, Lewis and Thornhill, 2009, p. 151). Quantitative method is related to data collection or data analysis procedures that use or generate numerical data (Ibid.). Whereas, qualitative method is totally opposite to quantitative method and related to data collection or data analysis procedures that use or generate non-numerical data, hence it is associated with words or can use some visual methods. Bryman and Bell (2007) maintained that qualitative research mostly emphasizes words rather than quantification in the collection and analysis of data (Bryman and Bell, 2007, p. 28). Furthermore, qualitative research subsumes several diverse research methods, which are observation, interviewing, focus groups and language-based approaches to the collection of qualitative data (Bryman & Bell, 2007, p. 404).
3.3.1. Data collection

Data collection in qualitative research is very important, due to the fact that it is a process which is used to collect all relevant information related to the research problem. According to Kothari (2008) there are two types of data, such as primary and secondary (p. 95). The primary data means data which we collected first time and specifically for the purpose of our study, which seems as original (Ibid.). Whereas, secondary data means the data was already collected by someone else, for maybe another study, and could be concluded that such data collected not for the purpose of our research (Ibid.).

3.3.1.1 Secondary data

Secondary data is already available information and means that there is no need to collect it. Usually this data is available in different publications, books or newspapers, it could be reports which are prepared by scholars or universities, etc., as well as some official information, statistics, or companies’ reports (Kothari, 2008, p. 111). For the current thesis there was a need in secondary data to have a clear understanding about the company, we also used information from companies’ reports and their official resources.

3.3.1.2 Primary data

According to Bryman and Bell (2007) and Kothari (2008) primary data can be collected through survey, observations, interviewing or through direct communication (Kothari, 2008, p. 95). For our thesis we decided that interview will be the most applicable solution. Bryman and Bell (2011) defined that interview is the most common method in qualitative research (Bryman & Bell, 2011, p. 465). There are two main types of qualitative interviewing, such as unstructured interview and semi-structured interview (Ibid., p. 467). Unstructured interview characterized by its flexibility in questions during the interview, it not follow of “pre-determined questions” and standardized techniques of recording the information (Kothari, 2008, p. 98). For the thesis we used another type of the interview, a semi-structured, which used an interview guide with the list of questions (Bryman & Bell, 2011, p. 467). However, questions in interview guide not required to follow the structure, there is also a possibility to ask some new additional questions, which will provide more additional information (Kothari, 2008, p. 98). We decided to split our interview in several different parts and structured it in a logical order\(^3\), from more general to more specific questions. In this way we let the interviewee have a better understanding of the topic and get deeper as the interview was running (Kothari, 2008, p. 103). In both cases of unstructured or semi-structured interviews, the process of interviewing is flexible.

The advantage of the interview is that it provides great possibility to choose which particular person will answer to questions (Ibid.). It is also necessary to take into consideration that qualitative interviewing provides an opportunity to interview the

\(^3\) “Questions should proceed in logical sequence moving from easy to more difficult questions” (Kothari, 1985, p. 103).
interviewee several times if there is a necessity in it (Ibid.). Despite the fact that interviewing and specially transcription of the interview is quite time consuming process it provides a lot of necessary additional information compare with the questionnaire.

Based on the advantages of interviewing and due to the fact that the purpose of our thesis is to investigate the composition of Skunk works team, and its roles. Due to the fact that we also want to investigate how Skunk works teams are staffed. As a result we decided that it will be easier for us to get information by using interview rather than questionnaire or something else. Kothari (2004, p. 2008) suggested that the focus on qualitative research is based on discovering “the underlying motives and desires, using in depth interviews for the purpose”.

We used two types of interview, such as personal interview and interview by e-mail. With personal interview we interviewed the representative of Sandvik Coromant, Shekhar Singh (Sweden). We chose a personal interview with Shekhar Singh due to his availability, that the company where he is working is in the same city where we are currently living. However both representative from Spanish companies, CSIC and Ubisoft, we interviewed by e-mail. There are several reasons why we decided to interview those companies by e-mail. Firstly, due to the fact that Spain is quite far away from Sweden and we did not have an opportunity and enough resources to have personal interview. Actually, in the beginning we were planning to interview both Spanish interviewees by Skype, but because they were so busy with their current work and later almost rejected the interview we decided that the optimal solution for that moment will be interview by e-mail, which is second reason.

During the interview we tried to follow an interview guide Appendix 2 which was divided by several main topics, however sometimes it was quite hard to follow the structure.

3.4. Reliability and Validity

Both validity and reliability are important criteria in the process of establishing, analyzing and evaluating the quality of research for qualitative analysis (Bryman & Bell, 2007; Patton, 2002).

Due to the fact that the quality is the most important test of qualitative study, reliability is a concept which is helping to evaluate this quality with a purpose of explaining (Golafshani, 2003, p. 601; Stenbacka, 2001, p. 551). According to Stenbacka (2001) “the concept of reliability is even misleading in qualitative research; if a qualitative study is discussed with reliability as a criterion, the consequence is rather that the study is no good” (Stenbacka, 2001, p. 552). Moreover, during the process of providing reliability in qualitative research trustworthiness is playing important role (Golafshani, 2003, p. 601). To ensure reliability in qualitative research, examination of trustworthiness is very important (Ibid.). In order to ensure this thesis can be relied as truthful due to the reliability of the empirical data presented through the interviews are from past projects, these organizations and the following analysis and conclusion. Seal (1999) found that during the process of creating good quality of studies through
reliability and validity in qualitative research “trustworthiness of a research report lies at the heart of issues conventionally discussed as validity and reliability” (referred in Golafshani, 2003, p. 601). Furthermore, reliability is associated with the question of whether the findings from the research can be repeated (Bryman & Bell, 2011, p. 41). The purpose of reliability is to minimize the errors in a study (Yin, 2003, p. 37).

There is ambivalence about the importance of validity in qualitative research. Stenbacka (2001) found that validity is one of the concepts in qualitative research which must “be solved in order to claim a study as a part of proper research” (Stenbacka, 2001, p. 551). There are three types of validity, such as construct, internal and external validity (Yin, 2003, p. 34). The construct validity is used for different sources of arguments, its identifying correct measures for concepts which have been studied (Ibid.). It is also defined as the initial concept or question that is indentified which data should be collected and how it should be done (Golafshani, 2003, p. 5).

Internal validity is used only for casual or explanatory studies and mainly relates to the outcome of causality, where shown how some variables are lead to others (Yin, 2003, p. 34; Bryman & Bell, 2011, p. 42). In the current thesis internal validity was used, it is due to the fact that the information was collected from the interviewees’ answers. The last one type is external validity which shows the probability of findings if there is a necessity to be generalized. Also in external validity shows the way how people are chosen for the participation in the research is important (Bryman & Bell, 2011, p. 42).

Regarding reliability we followed the Kothari case study method (Kothari, 2004, p. 100) to set the interview in different themes and structured it from general questions (e.g. Skunk Works) to narrower questions (e.g. personal characteristics of a leader, team member, etc.), and avoiding “putting answers in people’s mouth” in order to keep the interviewees focused on the interview and let them answer their true opinion fluidly and concisely.

Regarding validity, for example in Sandvik Coromant, we had a personal interview and we had access to but not possession of information in the company about projects where Shekhar Singh is participating. We interviewed Shekhar Singh two times, during both those interviews both of us were present in the interview to make sure there were no questions or themes left to raise during the interview. After the interview both transcriptions were sent to Shekhar Singh, who was able to check everything in the transcriptions to make sure that it matched with his ideas. However, for Ubisoft and CSIC we used e-mail interviewing, where one of us, Antonio, due to the fact that he is a native speaker translated the interview into Spanish and later replies into English.
IV. Empirical data

In the current section in the first part we will familiarized the reader with empirical data, where we will present information about companies which have been chosen for the thesis. And in the second part we will present information which has been received from the interviews.

4.1. Sandvik Coromant

Company description

Sandvik Coromant\(^4\) is the division company for machining solution of Sandvik AB, a Swedish multinational company founded in 1862, that has around 50,000 employees worldwide and diversified in various business sectors like mining technology, material technology etc. Sustainability is an important feature for the company so that invests almost SEK 3 billion each year in R&D with more than 2,700 active employees in this area. Sandvik possesses about 5,500 active patents.

Sandvik Coromant is the world’s leading company in 130 countries (such as US, China, India, South Africa, Germany and Brazil) and has about 18,500 employees, reaching a turnover in 2011 about SEK 28,200 million.

Sandvik Coromant has been producing complete tools, tooling solutions, and know-how to customers in advanced industrial metal cutting for over 140 years. Among others, they are in the energy sectors, mining, construction, ordering specific solutions which require high-technology knowledge and expertise in this area to be capable to offer a very suitable solution for the customers. With extensive investments in research and development, we create unique innovations and set new productivity standards together with our customers. These include the world's major automotive, aerospace, and energy industries. We are a part of the business area, Sandvik Machining Solutions within the global industrial group Sandvik.

Skunk works

In our point of view and based on the interview of Shekhar Singh we consider his team in Sandvik Coromant, as a Skunk works team. Despite the fact that the Shekhar Singh team is slightly isolated and is focused on the project while they are working with different manufacturers and other companies around the world. Shekhar Singh mentioned that during the work they have a lot of freedom; however it is also necessary to take into

\(^4\) Information source available at:
consideration that projects should be on time, as well as on their own schedule and specific way.

**Current and previous experience**

The first correspondent was Shekhar Singh, who is working in Sandvik Coromant as a Design Automation Engineer in R&D Threading Tools Department since January 2012. Before he had an experience and worked by contract on standardization and measurement methods for Sandvik AB, after in Dormer Tools, which is a part of Sandvik Venture as an R&D engineer for several years. By measurement methods he means that he was working in the way where the factory measures the finished product for quality control. There are a lot of companies all over the world which are in Sandvik AB and all of them used different methods of measuring tools, which made the work too complicated. As a result, he was working for standardization of all these methods, that all companies from Sandvik AB could be able to measure and control the quality in the same way.

During the whole working experience Shekhar Singh had about five or six projects, some of them lasted more than one year, due to the fact that it takes a lot of time for the product development, the verification process till the moment when the product will be ready to go to the market. As a result it shows how the process is time consuming, as well as a need to do and handle a lot of things.

Currently, he is positioned as a Design Automation Engineer his responsibilities include the process of collecting knowledge from different manufacturing plans, companies and people, as well as coordination of different flow of knowledge. But all these processes depend on the type of the project, if it is transferring project or if it is a completely new project. In case if the project is transferring there is a need to coordinate between two manufacturing plants or R&D departments, and so on. But if the project is completely new or making some new systems in that case there is a need in the support from IT department. As a result it shows that there is a need in a lot of coordination and the process of managing different departments, as well as collecting information.

**Main characteristics of team member and the leader**

According to Shekhar Singh personal characteristics which are important for working in innovation projects are that it is necessary to be able to think out of the box, to have new ideas and ways of solving, it is also important to be able to carry out process in a more optimize way, “to take out a 100% from any process, project or resource”. It is important to be able to create value, as well as to save money and time, and make the project more profitable. It is also necessary to take into consideration that it is very important to know your own resources, what is currently on your control or to know which resources there is a need to put into the project before the process will start. Another important characteristic is to have enough knowledge, as well as to be able to use that knowledge in different ways. As an example Shekhar Singh provide that Sandvik Coromant runs a lot of projects for new products, where they put a 30-40% of time in
knowledge development because in case if there is a need to stay ahead in the market it is very important continuously improve the knowledge, the knowledge database or the know-how which the company has “knowledge is the main driver for any innovative process”. It is also important to be punctual because there is a need to be able to meet all decision points, milestones during the project and be ready for all the steering room meetings.

Shekhar Singh thought that to be a good leader there is a need to know what he or she is doing, to know the whole situation and all technical details. It is also important to have good public relationship, as well as to know the right people with whom is better to contact, who can provide all necessary and relevant information. As a leader by himself, Shekhar Singh is trying to manage all these characteristics. He also added that as a leader he or she should always be active, energetic, that “you cannot take it easy”. It can be concluded that the five main characteristics that contribute Shekhar to be a good leader are to be energetic, to be in good relationship with everyone, be able to manage resources in the best way, as well as to be able to adapt yourself to new problems and increase personal knowledge all the time.

Innovation team

According to Shekhar Singh the average number of team members in the project should be from 2 to 6 people, which depends only on the project. For innovation project it can be from 2 to 4 team members, where 4 is an average number, but it also can be only one person who will work alone, but only in case if he or she is in IT system of programming. It is important that in an innovation team someone can run tests, someone can test some tools, someone to develop, someone to study the problem, and work with the surfaces. He thinks that if there are too many people who participate in the project then there are too many people who will do things in their own way. But in case if there are 4 people, all of them usually have completely different roles in the project, as a result nobody’s role will overlaps.

In the organization management chooses the leader of the project, as well as team members. He gave an example that in his department there are 4 of them, they have specialists in mechanical, surfaces, systems, programming. Their boss decides who will participate in the project and which responsibilities each team member will have. But it is very important to discuss all these questions such as how much time the project needs, how the team member will be able to manage it, what is the chance that it is possible to manage particular project, and a lot of other questions. It fully depends on the person who will be able to do this and that this person will have enough time to do the best.

According to Shekhar Singh the main traits for choosing the champion are usually significant in that person, who has the maximum knowledge and capabilities to carry out this knowledge. It is important to take into consideration how the boss is good at managing his or her department, in which characteristic he or she is the best and how he or she is able to distribute the work, as well as based on which factors he or she choose suitable people. It is also important for the champion to discuss personal traits and
behaviors when he or she hires this person in his or her particular role. Even when a person is chosen there is a possibility that he or she will feel laziness or will become irresponsible over the time, and when the champion should solve such problems within the team.

**Innovation success**

In Sandvik Coromant’s success is defined by its results, how is it profitable for the company, how it could solve problems of the company; it should be ethical, correspond to company’s rules and should be done in the right way. Shekhar Singh gave an example that it is quite common when someone has a really good innovative idea and they try to work on the project during 2 or 3 years but without any results. In this situation the management can think that it is a very good idea, especially after implementation it will be really profitable, that it is really what the company needs, this is what exactly they should do, but then they are unable to do it. When the company provides a grant for an innovation project, all necessary resources, everything, and the team needs to reach all results, needs to do what they claimed that they would do at the beginning of the project, during the meeting with all milestones, they will do all these things, only in this case the innovation can be defined as successful.

The result is the main criteria, which used to determine if the innovation project can be considered successful. Shekhar Singh also added that if the result achieved during the timeframe, which was decided by management it is good, but if it achieved before it is brilliant. It is important to mention that during the last 5 years in Sandvik Coromant criteria of successful innovation project did not change; only the timeframe could be modified. They had some situations when during the project team realized that they do not have enough knowledge to continue the project till the end, in this case it is decided that there is a need to stop the project due to the necessity in the knowledge which can help in the further continuation of the project. After all necessary knowledge reached, they are picking up the project again and continued it.

According to Shekhar Singh the key factors which have contributed to the success of innovative projects are: hard working, effectiveness, communication and knowledge, but it is important to take into consideration how the team member could use this knowledge during the project.

It is also necessary to take into consideration factors which are inhibited the success of innovation projects, such as a lack of human resources which always slows down projects. It is very important to have internal trainings within the company, which helps to improve all perspective of the projects. It also was suggested that it is very important to invest in R&D department, to invest in new knowledge, which further will help to solve problems, will help to find the best way, as well as to answer on all other questions. It is very important especially in case if the company is dealing with a completely new area like aerospace, wind energy, nuclear plants, making tools for machining airplanes, carbide tools, or carbon fiber on airplanes.
The leader (a champion) and other roles

When we asked Shekhar Singh to identify himself with several roles from the Appendix 2 he found himself in all roles except the role of gatekeeping. He explained the necessity in combination of almost all roles, because he is the only engineer in automation in the department, which means that he needs to arrange all those roles, as well as be able to coordinate, lead and manage those projects.

It is important to take into consideration both the team and the leader in the contribution to the success of an innovative project. Shekhar Singh proved it that even if the leader is really efficient and the team is very lazy, it will not work. And on another side, if the team is really good and the manager mismanage, the team will be not satisfied and will be “very unhappy”. There is also a possibility when there is one person in the team who is not doing his or her role and as a result it can irritate the rest of the team.

According to Shekhar Singh the key other roles which contribute to the success of innovation project are such as idea generation, championing, teamwork, specialist, plant, as well as project leading. However, he found that implementer, as well as sponsoring or coaching is less important, because there is a need in them after the project. He also suggested that implementer should be together with project leading because they are almost the same people. All those roles have a direct influence on the success of the project. He also suggested that it is important to have good and relevant ideas to start the innovation project, after which the management must authorize to implement those ideas, and then it is necessary to know if there are enough resources to manage the project, it is important to have relevant characteristics to manage those resources. It is also necessary to take into consideration the importance of the teamwork within team, as well as with different departments. In case if there is a need in some information it will provide easier way of access to it.

It is the best within the company when team members have an opportunity to switch roles. As Shekhar Singh thought that the longer team member stays in the company more roles he or she can change, which will provide more background. He told about himself that it is his third role since he started to work, so he worked in different projects. As a result after working in different areas during several years a team member becomes a multitasking person, he or she has a lot of knowledge about it. From these it could be concluded that the longer the person stays in his or her field the broader he or she becomes to think. He defined this as an experience and knowledge which a person gathers during stay in the particular field.
4.2. Ubisoft

Ubisoft\(^5\) is a French entertainment company founded in March 1986. Firstly focused on publishing and distribution of educational software, creating in 1989 their first videogame “Zombi”. Afterwards until 1994 Ubisoft grew and opened offices in the United Kingdom, Germany, Switzerland and the United States, as well as new studios in Paris, Montpellier, and Bucharest (Romania).

In 1995 they created the successful product lifted them up to become a legend, “Rayman, Origins”. So that Ubisoft expands is global network in 1996 landing in Spain, Italy, Australia and China. In addition that year the company’s stocks were listed on the Paris Stock Exchange with a huge demand (256 times). Titles as “Prince Of Persia”, the role playing game “Myst” (most sold videogame till 2002), and “Tom Clancy’s Ghost Recon” are some acquisitions from Ubisoft international expansion strategy between 1996 and 2002. In 2009 Ubisoft succeed in the market with the Wii game “Just Dance” by selling 2 million copies in 4 months and its total sales are about 28 million copies, only beaten by “Assassins’ Creed” with 38 million copies.

The Internet market was conquered in 2002 launching ubi.com and ranking for the first time among the Top 10 independent publishers in the world. Recently the show up their financial results in 2011 with sales about € 1,039 million, and R&D investment over € 400 million.

Skunk works

Cristian Pastor Villa from Ubisoft Barcelona branch suggested this team is not Skunk works, because they are working in small multidisciplinary groups but they have never been isolated from the mainstream organization, they always depend on it.

Current and previous experience

Cristian Pastor works as Game Designer/Developer in Ubisoft for 6 years and on the current position for one year. He has been also professor in “Master in Videogames” in Universitat Autònoma de Barcelona. Before Ubisoft he has been project manager and has worked in 4 different projects\(^6\), where he asserts “organization could be change a lot, but it depends on the type of the project from small team with self-management to large productions.”

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\(^6\) The adventures of Tinitin, the Game. 3DS. Xbox 360, Kinect.

Unannounced Project.

International Basketball Manager Season 2010-2011. Pro-Basket Manager

Social Network Games. Striker Free Kicks.
Main characteristics of team member and the leader

According to Cristian Pastor the main personal characteristics that contribute to the work in an innovative project should be an experience, hard work, motivation and creativeness, which mean to be creative or try to be creative.

Cristian Pastor also possessed himself as a leader of his small group, which forms part of the bigger project department. In his opinion there are several personal the most important characteristics which contribute him as a good leader. Firstly, it is leadership, it is important to involve each team member in the innovative-creative process. Secondly, it is important to be a motivator and to know how and with what to motivate each team member. Rewarding is also very important, due to the fact that it makes feel that the project belongs to the team, as well as empathy, which keeps good relationships within the team. The last important characteristic is the ability to promote fair competitiveness among the different teams in the company.

Innovation team

In Ubisoft the innovation team is selected by personal preferences, as an example Cristian Pastor provide that if in the team there are 5 members who are football fans in this case the work is almost half-done. According to Cristian Pastor the size of innovation team should be in between 5 and 10 members (the most often number of members), where the team members fulfills the 4 or 5 of the required roles, and each member has to be responsible for his or her own field. It is important that in the team there will be not more than 10 people due to the fact that in this case it is possible the probability of self-governing. Otherwise there are special cases when big studios order projects that require more teams and the project can be split in teams of its size, which can be located all over the world, in order to finish it on the time scheduled.

In case if someone is leaving Ubisoft they are trying to replace with someone else from the local division, if they cannot find right people in this case they are looking for people from foreign headquarter. It is necessary to take into consideration that the process of adaptation of a new team member is always very risky.

Innovation success

The criteria which are used in Ubisoft to determine the success of the innovation projects is “when a new market of occasional players emerges” and this lead to the necessity to change these criteria and make the games more accessible all over the world as well as for the general public.

The success of innovative projects contributed by the need to “have a nice team” and that all team members will be unified. It is important to take into consideration that it is not enough just to be a good professional, each team member must have a good relationship with everyone and it is also necessary to be able to share the project’s vision.
It is important to avoid bad communication, which inhibit and made more difficult the project development.

The leader (a champion) and other roles

Cristian defined himself with 80% of idea generation role and 20% of champion role. It was interesting to find that Cristian Pastor cannot count himself with some other roles during his work in innovation team, because he considered that there are too many roles which we were suggested. It is possible sometimes to switch between roles but only when someone is promoted.

4.3. The Spanish National Research Council (CSIC)

Organization description

The Spanish National Research Council (CSIC\textsuperscript{7}) belongs to the Spanish Ministry of Economy and Competitiveness and is the largest public institution dedicated to research in Spain and the third largest in Europe. Employing over 15,000, which 6,000 researchers of them are researchers, its main objective is to hold and go further in research that will develop scientific and technological progress of a multidisciplinary nature (covering all fields from basic research to technological development), and often collaborates with Spanish and foreign entities in projects, as well as to train staff and advise them on this matter. CSIC generates about the 20% of all the R&D activities in Spain covering fields such as Agricultural Sciences, Humanities and Social, Biology and Biomedicine, Physical Science and Technologies, and some more; being the most relevant organization which contributes to advancing knowledge and economic, social and cultural development.

The excellence of R&D activities placed Spain at cutting the edge of knowledge in fields and industries as renewable energies, aerospace, healthcare, nanotechnology, marine science, water treatments, audiovisual and tourism (cuisine) boosting the science research image high enough to become the seventh country in number of projects and the fifth for its ability to attract top scientist from other countries.

Remarkable achievements:

- Successful Malaria Vaccine (CSIC – CRESIB)
- Identified the molecule that HIV uses to spread through the body. This brings closer the vaccine that can cure this disease.
- Demonstration that how global climate changes have produced changes in the Artic Structure and how it triggers in natural disaster effects.

\textsuperscript{7} Information source available at: http://www.csic.es/web/guest/presentacion
Skunk works

According to Ernesto Ganausa the Spanish National Research Council (CSIC) could be called as Skunk works, but he suggested that it is better to name them not team but as a department.

Current and previous experience

Ernesto Ganausa Fernández is Doctor in Sociology by the Universidad Complutense de Madrid (UCM) (2005) and works in CSIC for about 10 years, where he started as an intern. From March 2010 he is a Science Research Chief. He is also consultant to many local Spanish authorities in participatory budgeting and other participatory procedures as deliberative polling, citizen juries or open discussion with the citizens to decide issues related to public policy.

He has conducted applied research projects on the participation of citizens in decision making on the cycle of protest in consumption or deliberation. He has also managed projects on participatory approaches and experiences developed locally or regionally based on advanced use of participatory tools. During his entire carrier in CSIC he was participated in another 3 different innovation projects, where by innovation projects he thought were something totally new, where there were no previous experience that it could be compared with something else.

Main characteristics of team member and the leader

Ernesto Ganausa could consider himself as a leader, because he had an experience in leading projects. In his point of view the leader should be able to understand his or her team members, what they can do, it is important that the atmosphere between team members should not be stressful, that team members will not be overworked with tasks and responsibilities. Also the leader has a big capacity of work, management, filling the gaps, as well as to encourage and recognize the work of other team members, also he or she should creatively face the challenges and handicaps.

Ernesto Ganausa suggested that the most important characteristics which contribute to being a good leader of an innovation project team are to be patient, flexible, imaginative, which also includes creativity, and also to be able to work and rest.

And as a team member it is important to be open, clear, imaginative, empathic, and be able to plan and work. Ernesto Ganausa also added that the project will never start without imagination. Furthermore, each team member should be sure and confident in the project as well in him or herself. Such confidence should not change event if it is not clear what will happen with the project. From previous Ernesto Ganausa concluded that it is important to look on the project “in the most positive way or make it feasible immediately”.

Innovation team
Due to the fact that CSIC is half-public company it means that there is no such a big opportunity and discretion in the process of choosing and hiring new people. However, such selection is mostly done internally within organization team members, it is important that that person will satisfy all necessary requirements. There are no particular requirements for the size of the team, because it mostly depends on the project, where the volume of work, as well as time should be taken into consideration.

In CSIC there is no specific process of choosing the project leader. The leader chosen depends on how hard working he or she is, it is step-by-step process, where it depends who takes responsibility for the innovative project.

It is quite complicated when one of team members is leaving, because of the limited number of team members in the project. In this case the work divides between the rest of the group until the new team member will be found and will get all required knowledge and skills, but unfortunately it is really time consuming process. In such case it can be a problem to reestablish tasks, because not everyone has the same background or skills, hence the new team member cannot have real possibilities to face all those tasks which were fulfilled before by the team member who left.

Innovation success

In CSIC the success of an innovation project is defined by satisfaction of the client, which will lead for the further new projects. The success could also be measured by how often the project or some of team members appear, quoted/referred/mentioned in the media. During last 5 years this success criteria has been not modified. The key factors, which are contributed to the success of innovative projects, are to be daring, have wide knowledge, and be empathic with the whole team. However there is a possibility that the project could fail if team members’ expectations are not reached.

The leader (a champion) and other roles

Ernesto Ganuza defined himself with such roles as a plant, implementer, and project-leading (or co-ordinator). In Ernesto Ganuza point of view only those three roles contribute to the success of the innovation team. Ernesto Ganuza suggested that roles as a plant, implementer, and project-leading are important due to the fact that in the project there is a need in such people, who is able to lead, be mature and open-minded.

He also suggested that both the team and the leader are playing the main contribution to the success of an innovative project. It is happening due to the fact that the leader “assumes responsibilities until the exhaustion and the team because is the soul (core value) of the project”.

It is quite common in CSIC that roles switch between team members. It is happening because sometimes not everyone can be available when there is a need in for particular person, in this case there is a necessity that someone else from the team will be
able to replace that person, Ernesto Ganuza defined this as “a logical team behavior”. It is also important to be flexible, but at the same time everyone is responsible for him or herself. Concerning about other roles he asserts the main that influence the project success are Project Leading, Plant and Implementer. He reasons it out with the need of people to lead the project being mature and open-minded in their fields. Furthermore he believes that projects cannot start-up neither without imagination nor self-confidence to progress, even though it is not clear what will happen in the future. Because of this he states people need to face any fact in the most positive way or make it feasible immediately.
V. Analysis

In this section we would like to analyze the empirical data which we received through the interview and our research, and refer our finding with theoretical framework.

5.1. Introduction

The analysis section is divided by six main parts, such as Skunk works, characteristic of team, as well of the leader, also another parts are team size, innovation success and roles. Also in the analysis section the results from interviews will be overviewed and compared between all three interviewees.

5.2. Overview of results and comparisons

During the analysis we decided to make a Table 4 which will help to have more clear idea about three companies, such as Sandvik Coromant, Ubisoft and CSIC, about companies ownerships, industries, types of innovation, as well as achievements and key findings.

<table>
<thead>
<tr>
<th>Company / Organization</th>
<th>Ownership</th>
<th>Industry / Area</th>
<th>Type of innovation</th>
<th>Achievements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UBISOFT</strong></td>
<td>Private: Guillemot Brothers</td>
<td>Entertainment, Videogames and Movies &amp; TV Serials</td>
<td>Incremental: new story, version re-make, etc. Modular: “Just Dance”, Radical: collaborate in new technologies (e.g. Kinetic controller) and “Your Shape: Fitness Evolved” (uses Kinetic)</td>
<td>2009: Breakthrough dance game using remote wireless controllers, “Just Dance” 2010: Radical sport game “Your Shape”</td>
</tr>
<tr>
<td><strong>CSIC</strong></td>
<td>Public / Private. Main: Spanish Government</td>
<td>Science research and collaboration with innovative companies’ projects</td>
<td>Architectural: research in multiple new technologies and materials Radical: research in biotechnologies, etc</td>
<td>2012: Effective vaccine against Malaria Discover molecule spreads HIV. Big step to achieve AIDS vaccine.</td>
</tr>
</tbody>
</table>

Table 4. Comparison of the three companies

8 Information sources available at:
http://www.csic.es/web/guest/presentacion

Composition of Skunk works teams
Skunk works

During the analysis of interviews we found that two of three interviewees, Sandvik Coromant and CSIC, indentified their teams as representatives of Skunk works. Furthermore, both Sandvik Coromant and CSIC interviewees agreed that their projects could be identified with the definition of Skunk works, which we created based on the definitions from other researchers. Where Skunk works is “a small isolated group of people (team), who are highly skilled, with the high level of knowledge in their own field, and who are participating in an innovation project. Skunk work teams work on innovation projects in short periods of time with a high level of efficiency during this time. The skunk work team is separated from the rest of the organization and is led, managed and supported by a person who has authority in the formal organization and serves as an "advocate" of the innovation, developed by the skunk work team”.

Shekhar Singh (Sandvik Coromant) stated that their team in Sandvik Coromant isolated and have a freedom in focusing on the project, however he argued that it is important not to reduce the fact that projects should be done on time and in the correct way. Based on the interview with Shekhar Singh Sandvik Coromant could be identified as an example of “pseudo Skunk works” (Brown, 2004, p. 138). Such identification of Sandvik Coromant as a “pseudo Skunk works” firstly is due to the fact that projects in the company are somewhat public. However, it does not mean that they are known by general public or furthermore by competitors, it means that there is a possibility that in Sandvik Coromant or in Sandvik Venture people know about the current special research project (Ibid., p. 139). Or in another case it is also possible that only special number of people know about that project.

Whereas, Ernesto Ganuza (CSIC) answered that in their case Skunk works cannot be called as the team, and he prefers to call it as a department. However, we found that according to Hylkema (1990) and Witziers (1992) departments also can be seen as teams (referred in Witziers, Sleegers, & Imants, 1999, p. 295). As a result, based on Brown (2004) theory and the respond from Ernesto Ganuza, CSIC could be identified as a representative of “true Skunk works”, due to the fact that almost all projects in the beginning are in secret and they are mandated (Brown, 2004, p. 138). Furthermore, all team members who are working in the CSIC team are highly skilled, it is also important to take into consideration the fact that all team members focusing on acceleration of the research project, specifically the process of development innovative products and services (Ibid.).

And the third interviewee Cristian Pastor Villa could not associate his team in Ubisoft Barcelona Division as a Skunk works team, due to the fact that they are not separated from the main organization. Cristian Pastor Villa confirmed such suggestion that the team, where he is working, as a “small multidisciplinary groups”, which fully depend on headquarter. However, if we do not take into consideration the definition which we created, and if we focus on how Single and Spurgeon (1996), Neal Goldsmith (referred in Gwynne, 1997), Gwynne (1997) and bwired (2009) defined the Skunk works
from the Table 1 it could be concluded that Ubisoft can be definitely identified as a Skunk works representative. Moreover, based on the previously mentioned reasons as about Sandvik Coromant, we think that Ubisoft also can be identified as a representative of “pseudo Skunk works” (Brown, 2004, p. 138). First of all, because the projects in Ubisoft are some kind public as Shekhar Singh mentioned about his team in Sandvik Coromant, that the project is public but only within the company. Secondly, the project on which Cristian Pastor Villa is working currently is mandated by the top management, which is also one of “pseudo Skunk works” characteristics.

Characteristics of a team member

The quality of team members is directly influenced on the performance of innovation team, with which all three interviewees agreed (Barzack & Wilemon, 2003). Shekhar Singh (Sandvik Coromant) suggested that one of the main personal characteristics which are important, is when you work in innovation projects and have enough knowledge and as a result you know all your own resources. Holahan and Markham (1996) defined it as to be an expert in your field.

Creativeness is another important characteristic which can be defined not only as a part of team members’ characteristics but as well of the leader, who particular is also team member. All three correspondents have different definitions of creativity; Shekhar Singh (Sandvik Coromant) named this as an ability to think out of the box, whereas Ernesto Gauza (CSIC) defined it as imaginative, and Cristian Pastor Villa (Ubisoft) suggested that each team member should be creative or try to be creative.

According to Shekhar Singh (Sandvik Coromant) it is also necessary to take into consideration that team members should have new ideas, therefore the way to implement ideas. Shekhar also suggested that there is a need “to take out a 100% from any process, project or resource”. Another important characteristic of working in innovation project as a team member, which Shekhar suggested, is to be able to create value, save money and team, and as a result make the project more profitable. Whereas, Cristian Pastor Villa (Ubisoft) characterized team member as a hard worker, who has enough experience and motivation. Motivation as well as self-motivation is one of characteristics which were also point out by Barczak (Barczak, 2010, p. 227). In addition, skills in combination with interpersonal skills are requirements for each team member (Ibid.). And in Ernesto Gauza (CSIC) points of view such characteristics as openness, clearness, empathic and ability to plan and work are necessary for team members.

Characteristics of the team leader

A lot of studies emphasized the importance of the champion and connect the champion with product innovation success (Howell, Shea & Higgins, 2005, p. 642). Frost and Egri (1991) defined that “without dedicated champions, ideas for product innovations may remain dormant for future development and implementation” (referred in Howell &
Shea, 2006, p. 181). This definition shows how the role of champion is important (as was mentioned previously that we considered the champion and the leader as the same person, and as a result we will use the word the leader). Furthermore, the leader can directly affect both positively and negatively, on the way how resources, power, roles are distributed inside the team, as well as strategic actions, team performance, communication within the team (Howell, Shea & Higgins, 2005, p. 644). From previous we can conclude about the importance of the leader within the team. This research findings were also supported by all three interviewees. Further we will look on characteristics which posses the leader and will look on the importance of the leader.

Firstly, it is necessary to start with such characteristic as a personal devotion to the idea as Maidique (1980) suggested. According to Shekhar Singh (Sandvik Coromant) the good leader should know his or her responsibilities, as well as what he or she is doing, also the leader should know the whole situation of the project. The second characteristic was suggested by Cristian Pastor Villa (Ubisoft) that the leader should be also as a motivator for the team and the project. Coakes and Smith (2007) supported the suggestion of Cristian as well as necessity in encouragement and motivation by the leader.

Secondly, after analyzing three interviews we can see that main interpersonal characteristics of the leader, are to be as active and energetic (Shekhar Singh, Sandvik Coromant), as well patient, flexible, imaginative, and creative (Ernesto Ganuza, CSIC). It was interesting to find that Cristian Pastor Villa (Ubisoft) mentioned that the leader should be empathetic to his or her team members. While Ernesto Ganuza (CSIC) mentioned such characteristics as to be able to work and rest, and in our point of view it belongs to all team members, not only to the leader. The characteristic and especially focus by Ernesto Ganuza on the ability “to rest” could also characterize Spanish culture.

As Parker and Axtel (2001), Howell and Bois (2004) defined that the leader need to take several angles, to be able to work collaboratively with others, as well as be able to bring team members together (referred in Coakes & Smith, 2007, p. 79). As a result, according to Cristian Pastor Villa (Ubisoft) it is important to have leadership characteristics with abilities and necessities that all team members will be able to participate in innovative- creative process. Howell and Higgins (1990) agreed with such a conclusion and stated that the leader should be able to show commitment and involvement of other team members too. Ernesto Ganuza (CSIC) also mentioned that in his point of view the leader is person, who is capable to understand his or her team members. On the other hand, the leader should not stress team members with overcapacity of the tasks and responsibilities that “they cannot or do not want to assume”. However, about the last suggestion of Ernesto Ganuza we think that it is tricky and depends on the team, innovation project and the organization at all. Shekhar Singh (Sandvik Coromant) also argued with two previously mentioned interviewees and concluded that the leader should have “good personal relations” with everyone, which means not only people in the team but also from “outside”. Furthermore, Shekhar Singh added that the leader should know the right people with whom he or she can contact, as well people who can provide all necessary information, and have good public relations.
too. Consequently, we can have a link between Shekhar’s suggestion and Parker and Axtel (2001), Howell and Bois (2004) argument about the importance to collaborate with others, as well Coakes and Smith (2007) conclusion that the leader naturally need to have a range of network (Coakes & Smith, 2007, p. 79).

Another important characteristic of the leader which was suggested by Shekhar Singh (Sandvik Coromant) and supported by Howell (2005) is that the leader require from the team members, as well from him/herself to be challenge and learn (referred in Coakes & Smith, 2007, p. 79). Whereas, Shekhar mentioned that it is significant to increase knowledge and be able to adapt him/herself to new problems. And Ernesto Gauza (CSIC) found that it is vital creatively face challenges and difficulties.

The last characteristics according to Coakes and Smith (2007) could be the crucial role of the leader in promoting innovation and people (Coakes & Smith, 2007, p. 77). Cristian Pastor Villa (Ubisoft) suggested that rewarding is significant due to the fact that it will help team members to feel that the project belongs to the team. Whereas, Ernesto Gauza (CSIC) mentioned that encouragement and recognition of team members’ work is also important. Furthermore, according to Cristian (Ubisoft) it also will be better if the leader could promote fair of competitiveness among the different teams in the company. Howell, Shea and Higgins (2005) characterized the leader as an individual who is able to actively and enthusiastically promote innovations (Howell, Shea & Higgins, 2005, p. 642).

During the analysis of interviews we found that no one from the interviewees mentioned as one of possible characteristic of the leader the ability to take risk, which was suggested by Chakrabarti and Hauschildt (1989) (referred in Coakes & Smith, 2007, p. 79).

**Team size**

During the analysis of interview we found that the number of team members should not exceed 10 people, and this number of 10 people was also supported by Tiffan (2011). According to Shekhar Singh (Sandvik Coromant) the average number of team members in the innovation project should be from 2 to 6 people. Whereas Cristian Pastor Villa (Ubisoft) recommended that the team size should not exceed 10 people, because if this number exceed it could lead to self-governance in the team and everyone will start to do work in their own way, where Shekhar Singh (Sandvik Coromant) also was completely agreed with this suggestion. Such suggestion could be supported by Barczak (2010) findings, which shows that the team size is proportional to its productivity. That if the size of the team increases, when trust, productivity and team members’ participation will oppositely decrease (Barczak, 2010, p. 226). Shekhar Singh (Sandvik Coromant) and Cristian Pastor Villa (Ubisoft) suggested that it is important when roles split between all team members. Moreover everyone will be responsible for his or her field of work and no one’s role will intersect with other roles.
Shekhar Singh (Sandvik Coromant) told us that in his team there are 4 members. Cristian Pastor Villa (Ubisoft) lets us know that in his team the number of team members is not fixed and it is changed all time, it could be from 5 till 10 people, but the most common number is 10. However, Ernesto Ganuza (CSIC) could not tell us the optimal size of his innovation team. But Ernesto Ganuza suggested that the size of the team fully depends on the project, the volume of work, and how much time the project will need.

Roles

Previously in the analysis section we discussed characteristics of the leader and team members, in this part we will discuss and analyze more about roles in innovation project. For the interviewees we created a new table, which is in Appendix 1 where we tried to combine all three theories about team roles from Roberts and Fusfeld (1981), Meridith Belbin and Communication Profile Model. In this Appendix 1 we made some changes and decided to use roles which were in our opinion the most relevant for the current thesis. For example, we decided to combine the role of Entrepreneur or Championing from Roberts and Fusfeld (1981) theory with the role of Resource investigator from Belbin (2011). As well as Implementer (Belbin, 2011) with Analyser from Communication Profile Model. And also to combine such roles as the role of Project leading (Roberts & Fusfeld, 1981), Co-ordinator (Belbin, 2011) and Motivator from Communication Profile Model. We decided to combine those roles due to the fact that in our point of view in all those three theories they have the same characteristics.

Also it is necessary to take into consideration that we did not use several roles, which were suggested by Belbin (2011), such as the role of Shaper, Monitor Evaluator and Completer Finisher. According to Belbin (2011) Shaper is a challenging individual, who provides the need to drive and be sure that the team is moving in the right direction and do not lose the focus. However, we think that the leader of the team can do these activities as well. The second Belbin’s role which we did not use is the role of Monitor Evaluator, which as well as the role of Shaper could be changed by someone else in the team (e.g. Project leading, Championing, etc.). And the last role is the role of Completer Finisher, according to Belbin (2011) this person is used at the end of the project, when the project needs to be “polish” and that person need to examine errors, to compare with standards of quality. In our point of view and according to characteristic of Completer Finisher, this person is appeared when everything is already done. But these roles, specifically Completer Finisher activities, could be done by some other members in the team as an addition.

As a result from the Appendix 1, interviewees had an opportunity to choose and indentify themselves with roles, as well as encounter some new roles, which have not been mentioned and should be added.

The first interviewee Shekhar Singh (Sandvik Coromant) identified himself with almost all roles from the Appendix 1 except the role of the gatekeeper. The position of Shekhar, as the only one engineer in automation in his team, required to dispose of all
those roles, due to the fact that he needs to be able at the same time to coordinate, lead, and as well manage the project. Whereas, Cristian Pastor Villa (Ubisoft) could measure the roles which can characterized him, as 80% of idea generator and 20% of the champion role. And the third interviewee Ernesto Ganuza (CSIC) associated himself as a plant, implementer, and project-leading (or co-ordinator). As a result we can see that actually all three interviewee have different roles in the innovation team.

During the analysis we found that in both theories of Roberts and Fusfeld (1981) and Meridith Belbin with her nine roles, and according to Salomo and Gemunden (2010) it is possible when team member has more than one role. Salomo and Gemunden (2010) named this as a multiple role combination (Salomo & Gemunden, 2010, p. 265).

Other roles

During the interview we also asked about any other roles which they met in the innovation team and there are requirements in such other roles. Shekhar Singh (Sandvik Coromant) mentioned that other roles which can help to the innovation project in its further success are roles of idea generation, championing, teamwork, specialist, plant, and project leading. He also suggested that the role of implementer and sponsoring (or coaching) is not so important because these roles need only when the project is done and ready for the implementation. Whereas, according to Shekhar the role of implementer is the same as the role of project leading, due to the fact that it is the same person, in his point of view.

Ernesto Ganuza (CSIC) defined the same roles which indentified himself, as plant, implementer, project-leading or co-ordinator. For example, he chose such roles as a project-leading, because in his opinion there is a need in person who will be able to lead the project, who will be “mature and open-minded”. However, Cristian Pastor Villa (Ubisoft) had another point of view rather than two other interviewees. And Cristian though that there are too many other roles.

Switching roles

All three interviewees confirmed that in their companies it is quite common when people switch roles and the most often reason is because of the promotion. Another possible reason according to Ernesto Ganuza (CSIC) could be if someone needs to be change for sometimes, it could be because of different reason. Ernesto Ganuza assumed that in such situation someone else from the team could replace that person and distinct it as “a logical team behavior”. Shekhar Singh (Sandvik Coromant) also fined the process of switching roles as an opportunity to learn more about his or her field inside the company. Shekhar said that when the person switched roles he or she becomes “a multitasking person”. Furthermore, Shekhar assumed that knowledge and experience are consequences when he or she is working in a specific field for long time.
Innovation success

During the analysis of three interviews we found that Shekhar Singh (Sandvik Coromant) and Ernesto Ganuza (CSIC) identified that both the team and the team leader are contributed to the success of an innovation project, where the team and the team members could be named and equal as teamwork. Such an assumption could be supported by Hoegl and Gemuenden (2001) that teamwork is one of the most important factors in the success of the project (Hoegl & Gemuenden, 2001, p. 435). We think that Shekhar (Sandvik Coromant) provides good example about teamwork. According to Shekhar both the leader and the team are important, it does not matter if the leader efficient when the team is doing nothing because of the laziness. And vice versa, when team is good in it performance, but the leader mismanage. In this case, according to Shekhar team will be “very unhappy”. There is also a possibility to have another situation when one of team members is ineffective and doing nothing, in this case such behavior could irritate other team members.

Whereas, Cristian Pastor Villa (Ubisoft) thinks that initially the leader is responsible for the success of the project. He also argued that if the team leader could be able to build “a strong team” and motivate it during the whole project in that case team “will respond doing a larger contribution than the leader can do by her/himself”. Barczak (2010) argued that the team leader is responsible for the success or the failure of the project, and also for team members (Barczak, 2010, p. 225).

After analyzing the interviews we found that actually all three interviewees have different measurements of success. According to Shekhar (Sandvik Coromant) success can be measured by results, by a company’s profitability after project implementation. Shekhar also measured such results by ethics, match rules of the company and the way in which the project should be done. While Cristian Pastor Villa (Ubisoft) stated that in Ubisoft the success is measured by customers’ feedback, their acceptance or cancellation of the product. But such criteria of measuring success in Ubisoft is modifying during the time “when a new market of occasional players emerges”, which provides more access to the game all over the world. In CSIC success is also measured by the customers’ satisfaction. Ernesto Ganuza (CSIC) also added another interesting kind of evaluation, which shows how repeatedly the project and team members appeared in the media.

As was talked about previously in the team members’ characteristics part, knowledge is one of the key factors which contribute to the further success of innovation project. Ernesto Ganuza (CSIC) pointed out that there is a necessity to have a wide range of knowledge, and Shekhar Singh (Sandvik Coromant) added that it is important that every team member will use this knowledge properly, as well as there is a need also to invest in new knowledge. Shekhar noticed that “sometimes the people are less in number, but more in quality of knowledge”. According to Tiffan (2011) experience and knowledge are needed to achieve success (Tiffan, 2011, p. 80).

We can also add that the team and its characteristics influence the success of the project as well. Almost all following characteristics were mentioned previously, however
due to the fact that interviewees pointed them out specifically in the section “Innovation success” we will mention those characteristics again. Firstly, Shekhar Singh (Sandvik Coromant) mentioned such factors as hard working, effectiveness and communication, which are related to the success of the innovation project. Secondly, Cristian Pastor Villa (Ubisoft) pointed out that success was affected directly by the team, that it is important to “have a nice team”, where all team members integrate with each other and have good relationships, as well as share the vision of the project. However, the third interviewee Ernesto Ganuza (CSIC) had a totally different view on factors which contributed to the success of an innovation project. Ernesto Ganuza pointed out that all team members should be brave and empathic with everyone.

Team training, which was suggested by Shekhar Singh (Sandvik Coromant), could also be a reason for the further success of the innovation project. According to Smith-Jentsch, Salas and Brannick (2001) continuous training of the team is vital to create and keep competitive advantage (referred in Hollenbeck, DeRue & Guzzo, 2004, p. 358). Moreover, during their research Liang, Moreland and Argote (1995) found that team training shows greater training callback and team performance rather than when it is only individual training (Ibid.).

However, there are also factors which inhibit the success of an innovation project. During the interview each interviewee points out one of the most important factors. According to Shekhar Singh (Sandvik Coromant) it is lack of human resources, which all the time slows down the project. In Cristian Pastor Villa’s (Ubisoft) point of view it is bad communication, which makes working in the project difficult. According to scientific research “the lack of a shared mental model within the team” could lead to low levels of team performance (Hollenbeck, DeRue & Guzzo, 2004, p. 358). “A lack of a shared mental model” could be the result of bad communication within the team, or when team members do not share one common vision, beliefs or ideas. The opposite point of view is from Ernesto Ganuza (CSIC), he points out that the project could be unsuccessful if the expectations of team members are not reached.

5.3. Summary

During the analysis and based on the answers from three interviewees we found that teams from Sandvik Coromant, Ubisoft and CSIC could be identified as Skunk works teams. Based on the interview from Shekhar Singh (Sandvik Coromant) and Cristian Pastor Villa (Ubisoft) team could be associated as “pseudo Skunk works”, whereas Ernesto Ganuza’s (CSIC) team could be identified as a “true Skunk works” (Brown, 2004, p. 138).

In the analysis we found confirmation that the quality of team members can directly influence on the innovation team, as well on its further success. During the interviewing we asked interviewees to find main characteristics of the team leader, who is the “champion”, and the rest of the team. Firstly, it is important to take into consideration several main characteristics of team members, such as to have enough knowledge, be
able to think “out of the box”, which means creativeness, as well able to be a hard worker. Secondly, it is important to mention main characteristics of the leader which have been found during the research. It is important to take into consideration that the leader should be devoted by the project and at the same time motivated, that the leader will be able to encourage the whole team. Also it is necessary to mention the importance of personal characteristics, such as imaginativeness, tolerance and creativeness, whereas creativeness can characterize team members as well. In addition, it is necessary to take into consideration the importance to be collaborative, as well as to work with others. The ability to learn, to get more knowledge, to be challenge could characterized the whole team.

Another crucial finding was the optimal size of the team. After analyzing we found that the optimal number of team members varied between 4 and 10 people. Based on our study about team and team members we decided that it is important to take into consideration the roles in the Skunk works innovation team. After analyzing results it was interesting to find how interviewees could characterize themselves, that some of their roles intersected with other viewpoints. Shekhar Singh (Sandvik Coromant) associated himself with all roles except the role of gatekeeper. However, it was interesting to notice that Cristian Pastor Villa (Ubisoft) chose the same roles as Shekhar Singh (Sandvik Coromant), such as idea generator and the role of the champion. However, Ernesto Ganuza (CSIC) selected another composition of roles, such roles as plant, implementer and the role of co-ordinator, which coincided with Shekhar choice as well. Due to differentiation in choosing roles we can conclude that the roles depend on the team by itself, as well on the industry. However, we found that the geographical position is not influence on the choice, due to the fact that Cristian Pastor Villa (Ubisoft) and Ernesto Ganuza (CSIC), which are both from Spain preferred different roles.
VI. Conclusion

In this section of the thesis we will continue to discuss analysis and results which we get during the interview. Also research questions conceived to fulfill the purpose of the research. Moreover, we will present theoretical and managerial implication.

6.1. Research questions

The research questions which have been created to fulfill the purpose are:

**RQ 1: What is the composition of the Skunk works team?**

**RQ 2: What are the roles and size of Skunk works team?**

The intention of the research questions is to know how the Skunk works, which is a type of innovation team, compose. Hence, firstly by composition we mean team members of innovation project, which could be split by the leader and other team members. Also we were interested in specific characteristics of the team members in the Skunk works team. Secondly, the composition of Skunk works team include the size of the team and roles which are required, as well how both these features influence on the success of Skunk works innovation projects.

The results which we observed after the collection of primary data and its further analysis showed how important the leader and team members in Skunk works innovation team. How all team members influence on the further success of innovation project. Moreover, we found characteristics which are required for the leader and the team members.

Due to the definition of Skunk works team, which is a small isolated team, highly skilled fulfilled, with the high level of knowledge in diverse required fields, we can assert that innovation teams are composed by hardworking and multipurpose team members. Those team members fulfill the knowledge which are required and benefit their creativity to use that knowledge in different ways. These teams are lead by a person, who is the leader, with great capacity of human relations, who is energetic, creative, enthusiastic, confident, and empathic. The leader should be able easily emerge team members, posses good communication between each team member; as well as be a good motivator and supporter for the team. Based on previously mentioned factors we can conclude how the combination of the leader and the team, which could be named as teamwork, influence on the success of the innovation project. While success can be described in different ways, such as profitability, sales or even appearance in the media, as one of the interviewee suggested. However, from all previously mentioned successful measurements we can conclude that money is particular way which sustains the existence of any type of the organization.
Furthermore, from our findings we concluded that the optimal number of team members should be between four and ten members and not more. These numbers are optimal due to the fact that each team member execute particular his or her tasks, it is easier to trust each other than the size of the team is not so big, as well as team members can easily communicate and cooperate with each other. The number of team members should not exceed more than 10 people, due to avoidance of misunderstanding and low rate of productivity. However, it is important to take into consideration the fact that the size of the team depends on the project, the amount of work, as well its level of innovativeness.

Another field of our research which has been done is about roles in Skunk works innovation team. Based on our findings we can conclude that properly chosen roles can influence on the further success of an innovation project. According to answers from interviewees we found that roles, which are essential for the team, do not depend on the industry or geographical position of the project. We also found which roles are necessary or some kind compulsory for the Skunk works team and which could be additionally. Based on findings during our research we can conclude that it is common when a team member can have more than one role. Our interviewees also confirmed the assumption about switching roles between team members as well. As a result, we can conclude that the composition of Skunk works team can influence on the further team productivity and success of the project.

6.2. Theoretical implications

Skunk works phenomenon is a field which is not studied sufficiently, because it was connected with military projects and information was in secrecy. Despite the fact that nowadays information about Skunk works becomes more available, it is still complicated to find enough researches in this field. During our research we found that there were no studies about Skunk works as a special type of innovation team. We believe that our study could contribute to the field of research on Skunk works teams.

6.3. Managerial implications

Despite the difficulties to find information about Skunk works from companies known by this type of innovation projects because of the secrecy, we believe that the empirical findings we discussed in this thesis will help to the “champions” or innovation project leaders, and their other team members, to have a better understanding on what these teams must be composed and the features which all the members must possess. If the team can do this, the innovation projects will be closer to success in the market.
6.4. Future research

Despite the fact that our research is a starting point in the field of Skunk works teams’ composition, we think that our study can encourage scholars to develop further knowledge about Skunk works teams and how it can work during the whole innovation process. We have developed this topic using information from diverse fields and applied them into the Skunk works field according to its characteristics. Therefore, we hope that our research will encourage future scholars to study forward this field and will come up with deeper knowledge about how Skunk works teams and also specified innovation teams, have to work to be more likely to success. Our suggestions for future research might be to use quantitative research methods, as well as combination of research methods, and large samples, which can follow the work of Skunk works teams from staffing to completion of their project. As well as to see more how roles are changing and how the dynamics of the team influence on the Skunk works teams composition.
VII. References


CSIC. Information source available at: http://www.csic.es/web/guest/presentacion


Appendixes

- Appendix 1

Roles and personal characteristics

<table>
<thead>
<tr>
<th>Roles</th>
<th>Personal characteristics</th>
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| Idea generation              | Expert in one or two fields  
Enjoys conceptualization; comfortable with abstractions  
Enjoys innovative work  
Usually is an individual contributor  
Often will work alone |
| Championing/Resource investigator | Strong application interests  
Possesses a wide range of interests  
Less propensity to contribute to the basic knowledge of a field  
Energetic and determined; puts self on the line |
| Project leading/Co-ordinator/Motivator | Focus for decision making information, and questions  
Sensitive to the needs of others  
Recognizes how to use the organizational structure to get things done  
Interested in a broad range of disciplines and in how they fit together (e.g., marketing, finance) |
| Gatekeeping                  | Possesses a high level of technical competence  
Is approachable and personable  
Enjoys the face-to-face contact of helping others |
| Sponsoring or coaching       | Possesses experience in developing new ideas  
Is a good listener and helper  
Can be relatively objective  
Often is a more senior person who knows the organizational ropes |
| Teamworker                   | Co-operative, perceptive and diplomatic  
Listens and averts friction |
| Plant                        | Creative, imaginative, free-thinking  
Generates ideas and solves difficult problems in unconventional ways |
| Implementer/Analyzer         | Practical, reliable, efficient  
Turns ideas into actions and organizes work that needs to be done |
| Specialist                   | Single-minded, self-starting, dedicated  
Provides knowledge and skills in rare supply |
Appendix 2

Interview guide:

We are interested in investigating how the role of “champion” (who is a leader) and other roles in an innovation team are influencing the success in a Skunk works team. Skunk works is a type of innovation team which is defined as follows:

“A small isolated group of people (team), who are highly skilled, with the high level of knowledge in their own field, and who are participating in an innovation project. Skunk work teams work on innovation projects in short periods of time with a high level of efficiency during this time. The Skunk work team is separated from the rest of the organization and is led, managed and supported by a person who has authority in the formal organization and serves as an "advocate" of the innovation, developed by the Skunk work team”.

Questions:

Introduction:

1. Do you think that your team can be identified as a Skunk works team? (definition of Skunk works team is at the beginning of the interview guide)
2. What is your position in the company? How long have you been working at this position? Have there been any changes to your position? How long have you been working at the company? How many years experience do you have in the industry?
3. Have you previously worked on innovation projects? If yes, how many? How have the projects been organized?
4. Have you ever been a leader of innovative projects? Can you describe your responsibilities in such a leadership role?
5. What are your most important personal characteristics that contribute to being a good leader of an innovation project team? Can you point out at least 5 of them?
6. What are yours most important personal characteristics for working on innovative projects? Can you point out at least 5 of them?

Innovation success:

7. How is success of an innovation project defined in your company? What are the criteria that were used to determine if the innovation projects that you have been working on were successful or not? Who decides on these criteria?
8. Have these criteria been modified in the last 5 years? If yes, how and why?
9. What are the key factors that have contributed to the success of innovative projects you have been part of? For example key factors such as communication between champion and the team, knowledge in several fields etc.

10. What are the key factors that have inhibited the success if the innovative projects you have been part of?

The leader (a champion) and other roles:

11. Can you identify yourself with one or several roles from the table below?

12. Throughout your experience and participation in innovation teams, have you encountered any other roles? If yes, could you please describe them and why those were needed in the innovation team? Point out their strengths and weaknesses.

13. Who is the main contributor to the success of an innovative project – the team or the leader? Why?

14. According to you, what are key other roles that contribute to the success of innovation projects? In what way do these roles influence the success of the project?

15. Do you switch roles between team members in your innovation team? How often does it happen?

Innovation team:

16. According to your own experience, how are innovation teams selected/staffed in your organization?

17. Usually how is the size of the innovation team determined at your company? Why?

18. If a member of the innovation team is leaving, how is their position replaced? What are the consequences of losing a team member on an innovation project? How are these consequences handled?

19. In your organization, who chooses a champion? What are the main selection criteria for choosing a champion? Can you describe the process of selecting a champion?

Thank you! We really appreciate your time!
<table>
<thead>
<tr>
<th>Roles</th>
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| Idea generation              | Expert in one or two fields  
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Enjoys innovative work  
Usually is an individual contributor  
Often will work alone |
| Championing/Resource         | Strong application interests  
Possesses a wide range of interests  
Less propensity to contribute to the basic knowledge of a field  
Energetic and determined; puts self on the line |
| investigator                 | Focus for decision making information, and questions  
Sensitive to the needs of others  
Recognizes how to use the organizational structure to get things done  
Interested in a broad range of disciplines and in how they fit together (e.g., marketing, finance) |
| Project leading/Co-ordinator| Possesses a high level of technical competence  
Is approachable and personable  
Enjoys the face-to-face contact of helping others |
| Motivator                    | Possesses experience in developing new ideas  
Is a good listener and helper  
Can be relatively objective  
Often is a more senior person who knows the organizational ropes |
| Sponsoring or coaching       | Co-operative, perceptive and diplomatic  
Listens and averts friction |
| Teamworker                   | Creative, imaginative, free-thinking  
Generates ideas and solves difficult problems in unconventional ways |
| Plant                        | Practical, reliable, efficient  
Turns ideas into actions and organizes work that needs to be done |
| Implementer/Analyzer         | Single-minded, self-starting, dedicated  
Provides knowledge and skills in rare supply |
Appendix 3


1. The Skunk Works manager must be delegated practically complete control of his program in all aspects. He should report to a division president or higher.

2. Strong but small project offices must be provided both by the military and industry.

3. The number of people having any connection with the project must be restricted in an almost vicious manner. Use a small number of good people (10% to 25% compared to the so-called normal systems).

4. A very simple drawing and drawing release system with great flexibility for making changes must be provided.

5. There must be a minimum number of reports required, but important work must be recorded thoroughly.

6. There must be a monthly cost review covering not only what has been spent and committed but also projected costs to the conclusion of the program. Don’t have the books ninety days late and don’t surprise the customer with sudden overruns.

7. The contractor must be delegated and must assume more than normal responsibility to get good vendor bids for subcontract on the project. Commercial bid procedures are very often better than military ones.

8. The inspection system as currently used by the Skunk Works, which has been approved by both the Air force and navy, meets the intent of existing military requirements and should be used on new projects. Push more basic inspection responsibility back to subcontractors and vendors. Don’t duplicate so much inspection.

9. The contractor must be delegated the authority to test his final product in flight. He can and must test it in the initial stages. If he doesn’t, he rapidly loses his competency to design other vehicles.

10. The specifications applying to the hardware must be agreed to well in advance of contracting. The Skunk works practice of having a specification section stating clearly which important military specification items will not knowingly be complied with and reasons therefore are highly recommended.

11. Funding a program must be timely so that the contractor doesn’t have to keep running to the bank to support government projects.
12. There must be mutual trust between the military project organization and the contractor with very close cooperation and liaison on a day-to-day basis. This cuts down misunderstanding and correspondence to an absolute minimum.

13. Access by outsiders to the project and its personnel must be strictly controlled by appropriate security measures.

14. Because only a few people will be used in engineering and most other areas, ways must be provided to reward good performance by pay not based on the number of personnel supervised.