Leadership Style, National Culture and Employee Satisfaction: Empirical Evidence from European R&D Companies

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Abstract

The purpose: Both academics and practitioners have demonstrated a keen interest in the topics of leadership style and employee performance within research and development (R&D) organisations. Much of the interest in these topics centres on claims that leadership style and local culture are linked to R&D performance. However, while the links between leadership and performance, leadership and culture, and work performance and employee satisfaction have been examined independently, few studies have investigated the association between all of these concepts. This study examines the relationship between leadership study and employee satisfaction in European R&D settings and provides empirical evidence that the leadership style is influenced by the national culture that is present. The paper presents a number of implications for theory and practice.

Methodology: A quantitative study was carried out across a number of European R&D organisations, with the primary source of data obtained through the use of established surveys distributed to researchers and R&D leaders.

Findings: Transformational leadership was found to be positively correlated with employee satisfaction in European R&D organisations and the scales of individualised consideration and inspirational motivation to exhibit the highest correlations with the researchers’ satisfaction among all of the leadership dimensions. Transactional leadership was found that does not support employee satisfaction, although the dimension of active management by exception contributes to researchers’ satisfaction. Leadership style and its individual dimensions were found to be dependent on the geographic location around Europe as a result of the effect of national culture. Whilst in Northern and Central European R&Ds transformational and transactional leaders have equal share, in the Southern European R&Ds the dominant leadership style was the transaction one, due to the higher power distance and the less flat structure in the society. In Southern European R&Ds the prevalent transformational dimension was idealised influence, while individualised consideration was the dominant one in Northern and Central European R&Ds.

Research Implication: This study contributes to the body of knowledge on cross-national effects of leadership styles on employee satisfaction in European R&D organisations since the existing studies focus primarily on leadership style and performance.

Practicality of the work: This work provides useful information about the effective leadership style, which brings satisfaction to researchers in European R&D organisations, and the prevalent leadership style in a given country as a result of the influence of national culture. Thus, it provides the knowledge required for a R&D organisation to set up appropriate training programs which will produce leaders who will be able get the best out of their researchers by ensuring high levels of employee satisfaction.

Keyword: R&D, leadership style, employee satisfaction, work performance, cross-national, transformational, transactional.
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1. INTRODUCTION

1.1 Background

R&D investment by organisations that are striving to remain competitive can be significant. In order to better manage these investments, firms may elect to set up their R&D sites in geographic locations which afford them a strategic advantage in terms of cost, infrastructure, available local resources or human capital or any combination thereof. R&D places a heavy reliance on human capital whose behaviour and performance is subject to a number of variables, which the organisation must manage effectively. In order to maximise the return on investment and in an attempt to ensure the success of their R&D sites, the technology companies should undertake every possible opportunity to improve the productivity, creativity and performance of their researchers.

Leadership is defined as “the ability to inspire confidence and support among the people who are needed to achieve the organisation’s goals” (DuBrin, 2012, p.2). A commonly known adage, “People don’t leave companies, they leave leaders” illustrates the importance of having the correct leader in place. The leader has the ability to ensure that employees are happy and productive. There are several different styles of leadership; not all leaders employ the same style and there is not a dominant leadership style universally applied in every geographic location. The reason for that is that leadership style is influenced by national culture, so different styles may be applied at different company’s sites. In R&D companies, where the personality traits of researchers as well as their motivators and drivers are different compared to some other types of employees, leaders should focus on applying an appropriate style which can maintain high levels of satisfaction in their teams.

The cultural background of managers has an influence over the manner in which they apply a specific leadership style. If organisations had an insight into the leadership style that results in the highest levels of employee satisfaction, and the most common style followed at a specific location as a result of the influence of national culture, they could take the necessary actions in order to promote the desired style for its leaders and keep their employees satisfied. This study aims to provide organisations with this insight.

1.2 Problem Discussion

If an organisation endeavours to setup up a new R&D operation in a given location somewhere in Europe which would be the most effective leadership style for the local leader to employee in order to increase the chances of organisational success?

Technological advancement is key to the development high quality products, processes and services. Since rivalry among technology companies is high, in order to increase their profitability they focus their efforts on cost minimisation and development of new technologies, products and services. Technology is key to their strategic differentiation since economic pressures have intensified competition among technology owners.

Internationalisation and globalisation of businesses has grown significantly over the last 20 years (Fougère and Moulettes, 2007). Companies have adopted a global approach to strategy by recognising the global landscape as a requirement for understanding their own technical and
commercial position (Porter, 1990). Almost all of these companies have production facilities and R&D departments in countries all over the world, in order to take advantage of the lower wage rates and local natural resources, and they further develop cost effective processes and advanced products with superior properties. In order to accomplish this goal there is an increasing need for organisations to enhance their knowledge of cultural differences between countries and any cross-cultural issues, which may arise (Fougère and Moulettes, 2007). However, this knowledge cannot only mitigate commercial disaster, it can also be applied to provide further competitive advantage and maximise the benefit of the selected location.

According to a survey conducted by Narayanan (2001), a large number of R&D leaders obtain a managerial position not because they exhibit certain leadership skills but because they have technical expertise within the specific scientific field. This is far from ideal but happens because many team leaders in R&D organisations are researchers who have not been trained in management or leadership practices. According to Elkins and Keller (2003), these leaders have to deal with performance targets and uncertain goals even though they exhibit more technical experience rather than managerial skills.

Since R&D team leaders manage more educated and creative employees, there are a large number of publications, which highlight the importance of certain leadership traits for running a successful R&D organisation. According to these studies, managing creative people and leading them to innovate with the accompanying success of the R&D organisation requires certain skills. The leader's responsibilities include making decisions, motivating employees, initiating new assignments and providing proper instructions (Kosiol, 1976).

Nowadays, organisations are very concerned with establishing an effective leadership style capable of motivating researchers to innovate and perform, with the concomitant success of their R&D departments. A large number of published papers have focused on studying the leadership style the supervisors should have to stimulate innovation and work performance (Howell and Higgins 1990; Howell and Avolio, 1993; Gupta et. al., 2000; Grosse, 2007; Paulsen et. al., 2009; Eisenbeis and Boerner, 2010).

Thamhain (2003) highlighted the difficulty in measuring performance, either at an organisational level, task team or individual contributor level. The design of performance measures is fraught with complexities. Jenkins (2012) identifies numerous factors, which can impact effective performance measurement, including the measurement of the wrong thing and the change in behaviour of those being measured as a result of their awareness that they are being measured. In order to overcome this complexity and focus more heavily on the other dimensions of this study, we have leveraged the proven link between employee satisfaction and performance, which was thoroughly investigated by Siggins (1992) and Judge et al. (2001), to develop a theory based on employee satisfaction rather than work performance.

In order for R&D firms to utilise their resources effectively, it is important that an appropriate leadership style, which can bring satisfaction to the employees and therefore success to the organisation, is employed. Employee satisfaction is a key element for ensuring organisational success. A number of studies have concluded that there is a strong correlation between employee job satisfaction and work performance in R&D environments (Keller et. al., 1996; Coccia, 2001). Work performance is a prerequisite for increasing profitability and sales. In addition, employee satisfaction is a determinant of organisational commitment as addressed by many published papers in the field (Vandenberg and Lance, 1992; Russ and McNeilly, 1995; MacKenzie et al., 1998; Curriana, 1999; Lok and Crawford, 1999; Randeree and Chaudhry, 2012). In turn, organisational commitment is highly important because it can influence other organisational outcomes like turnover intentions, company sales and profitability (Benkhoff,
1997). Nowadays that the global economic environment is so highly evolving it is particularly important that companies demonstrate flexibility to organisational and strategic changes in order to survive rivalry with competitors. Thus, it is beneficial for each company to ensure employee commitment in order to adapt easily to these required changes.

Even though there are a considerable number of studies on the relationship between leadership style and employee satisfaction in general, there is only a little focus on R&D (Berson and Linton, 2005). This relationship in R&D settings does not necessarily follow the general trend due to the special behavioural characteristics of researchers who are motivated by higher needs. As an example, Berson and Linton (2005) showed that transformational leaders have a more positive impact on overall employee satisfaction in R&D settings compared to non-R&D ones.

In today’s highly evolving global economic environment, the existence of different sites (e.g., production facilities) at different locations around the globe is a prerequisite for companies to survive intense competition. For this reason, it is advantageous for organisations to be cognisant that a given geographic location will have a prevalent leadership style as a result of the influence of national culture. However, the prevalent leadership style may not always be the leadership style, which generates the highest levels of employee satisfaction. Armed with this understanding, the organisations are then able to hire the most appropriate leader or train managers to develop the desired leadership style in its overseas R&D sites.

The cross-national effect of leadership style on job satisfaction within organisations in general has been studied (Lok and Crawford, 2003; Tsai et. al., 2009). However, although a multitude of R&D organisations face these challenges, limited research has examined the cross-national influence of leadership style on employee satisfaction within this type of organisation.

1.3 Problem Formulation and Purpose

Over the last decades, Europe has achieved much success in scientific research and technological developments, which resulted in R&D being an integral element of the European economy. Companies are running R&D sites at different locations around Europe, as a result of the special technological background, the existence of production sites or even raw materials at each location. The leadership style applied at the various R&D locations around Europe will depend on the national culture, which influences the behavioural characteristics of its leaders.

Managing an R&D organisation efficiently is crucial for achieving effectiveness and gaining a competitive advantage over other firms. The application of an appropriate leadership style can result in a positive working environment with satisfied employees, which, in turn, can contribute to the overall organisational success. Moreover, in R&D settings, where researchers exhibit special behavioural characteristics and are motivated by higher needs, achieving employee satisfaction and well-being has a significant impact on R&D success.

The above considerations led us to the following research question:

‘Do European R&D team leaders apply a leadership style which maximises employee satisfaction?’

The purpose of this study is to identify the leadership style, which is most effective in terms of employee satisfaction for R&D environments and compare the findings with available studies
from the open literature on R&D and non-R&D organisations. For any given location there will naturally be a prevalent leadership style present as a result of the influence of national culture in this location. Therefore, the scope will be to examine how differing leadership styles in each country lead to employee satisfaction in R&D organisations and to highlight where there is a disparity between the most effective leadership style and the prevalent leadership style in a given location. If an R&D company desired to set up an operation in a given location what leadership style should its local managers possess in order to enhance the probability of success? Is it likely that a hired local manager would need to be trained to apply a different leadership style from his or her own natural one? Such information would prove invaluable to organisations considering setting up new R&D sites in the European region.

1.4 Thesis’ structure

This thesis is organised in the following manner:

Chapter 1 - Introduction

This introductory chapter provides a high level overview of some of the challenges affecting R&D organisation and how the findings from this study relating to leadership style and employee satisfaction can be leveraged by European R&D organisation to enhance their organisational efficiencies and increase their chances of success.

Chapter 2 - Theory

The existing theory and research related to this study is collated and described within this chapter. In the beginning, the definitions of the various known leadership styles are presented in detail. The chapter then continues describing the relationship between a leader’s style and the performance of his/her employees. This is a fundamental element of this study and is one of the pillars on which the research is based. As this thesis funnels towards our overall objective, the relationship between leadership style and innovation and performance within R&D organisations is discussed.

Chapter 3 - Theoretical Framework

The effect of leadership style on employee satisfaction, which is the main topic of this thesis, is addressed, while an attempt to link the employee satisfaction with work performance is made based on findings from the open literature. Although employee satisfaction exhibits a weak correlation with work performance in general, the completely opposite trend was observed in R&D organisations as a result of the special nature of the research working environment. Based on this finding, the influence of a leader’s style on researchers’ job satisfaction is presented. Finally, taking into consideration the personal values and behaviours of managers and employees and the effect that the national culture has on these traits, the cross-national effect of leadership style on employee satisfaction is discussed relying mainly on the previous research work focused in different types of organisations.
Chapter 4 - Method

The method chapter commences by providing an overview of the various research designs which current literature supports and discusses the adopted strategy. As it was deemed impossible to conduct research on the entire population of R&D companies and the teams therein, a sampling approach was devised. The sampling approach was influenced by recommendations provided in reviewed literature and described in this chapter. The list of selected organisations is included.

The questionnaires used in the study are described and discussed and the successful research, which has likewise used these questionnaires, is highlighted. This chapter goes on to describe how data will be collected and measurements captured. It is fundamental that the data be checked for validity and that reliability is ensured so that the sample is demonstrated to be a reasonable generalisation of the populations. The method for achieving this is discussed.

Chapter 5 - Results and Discussion

The results chapter examines the data received from the leadership style surveys and breaks it down to provide a view on the leadership dimensions related to each leadership style. The findings for each of these leadership dimensions are then re-assembled in order to determine the leadership style employed by each surveyed manager. Employee survey data is reviewed and scored to provide multi-dimensional satisfaction scores. Intrinsic, extrinsic and general satisfaction at the team level are all determined through the reviewed scores.

This chapter provides an analysis of the team level scores for employee satisfaction and the team manager leadership styles. These findings are then correlated in order to lead towards the main purpose of this study and identify which leadership style provides employee satisfaction in R&D settings. More granular analysis at the leadership factor level is also carried out using regression analysis techniques.

Chapter 6 - Data Analysis

In this chapter, the results obtained by the statistical analysis conducted in Chapter 5 are analysed while their relation with the theory and the existing studies in this field is discussed. Main focus is given on the correlation between leadership style and its individual dimensions, and the level of employee satisfaction. Moreover, the effect of the geographic location of the R&D organisation on the leadership style is analysed based on existing theories, which address the effect of national culture on the human behavioural characteristics.

Chapter 7 - Conclusions

This chapter draws together the results and the analysis in order to present the final findings of this study. How these findings relate to the open literature is identified throughout to add further support to this literature where appropriate. Limitations of the extent of this study are described in this chapter accompanied by a comprehensive list of challenges, which have impacted or had a restrictive effect on the scope and results of this study. To the extent to which it was able to be carried out, an indication is given as to what further research this work may lead on to.
2. **THEORY**

2.1 **Leadership Styles**

The manner in which a person leads an organisation, department, team or individual is referred to as their leadership style. Leadership is a complicated term, consisting of many definitions and qualities (Grimm, 2010). Leadership can be defined as ‘a multifaceted process of identifying a goal, motivating other people to act, and providing support and motivation to achieve mutually negotiated goals’ (Porter-O’Grady, 2003). Different styles are needed for different working environments and each leader needs to know when to adopt a particular leadership approach.

There are many ways of categorising these styles; the basic leadership styles include **Autocratic**, **Bureaucratic**, **Democratic**, and **Laissez-Faire**. Goleman (2000) defined six leadership styles **Commanding**, **Visionary**, **Affiliative Democratic**, **Pacesetting** and **Coaching**. Burns (1978) described two leadership styles namely transformational and transactional. Other leadership styles include **Creative**, **Corrective**, **Change**, **Intelligence**, **Participative**, **Pedagogical**, **Servant**, **Bridging**, **Purposeful** (Unpan, 2014). The present study focuses on three different styles, which have attracted much of the research attention over the last 30 years, namely **Transformational**, **Transactional** and **Laissez-Faire**.

Burns (1978) was the first to introduce the concepts of transformational and transactional leadership in his treatment of political leadership. Transformational leadership, which has attracted much attention of late, has been proven to be a very effective leadership model for work performance and organisational success. Bass (1985) defined transformational leaders as those who motivate their employees to perform more than they originally anticipated and lead them to exceed their own self-interests for the good of the team or the organisation. They also increase their level of awareness about important matters, increase their level of needs from need for security or recognition to need for achievement or self-actualisation, making them reach the top of Maslow’s pyramid of hierarchy of needs (Maslow, 1943). ‘Transformational leaders can move followers to exceed expectations, to exert extra effort, creativity, and productivity’ (Bass, 1995, p.468). According to Howell and Avolio (1993), transformational leaders can be characterised as visionary and enthusiastic who exhibit the ability to motivate their subordinates. They encourage creativity and are concerned with individual needs and development. Moreover, transformational leadership includes **inspirational motivation**, risk sharing and **intellectual stimulation**.

According to Bass’s theory, there are four different dimensions of the transformational leadership style namely **inspirational motivation**, **intellectual stimulation**, **individualised consideration** and **charisma** or **idealised influence** (Judge and Piccolo, 2004). According to **inspirational motivation**, the leader provides a vision that inspires their followers. Leaders with **inspirational motivation** are optimistic regarding achieving future goals and transmit this optimism to their followers, stimulate followers with high needs, and provide meaning to the task to be accomplished. **Intellectual stimulation** is the dimension of transformational leadership where the leader takes risks, and requests his followers to provide ideas. Intellectually stimulating leaders encourage and stimulate creativity and innovation in their followers. Regarding the dimension of **individualised consideration** the leader eavesdrops on the followers’ needs, listens to their concerns, acting as a coach or mentor to the follower. Finally, **charisma** or **idealised influence**, is the dimension of transformational leadership in which the leader behaves in an admirable way which causes the employees to become similar to their leader. Charismatic leaders take stands, display conviction, and appeal to followers on an emotional level.
Bass and Avolio (1994) compared the transformational leadership style with the transactional one. The transactional leadership style is based on drawing up an agreement with the employees on what needs to be done and what the employee should expect after fulfilling the agreement. The difference between the two above-mentioned styles relates to what the leader offers to his employees (Conger and Kanungo, 1998). The transformational leader offers a purpose, which focuses on higher, intrinsic needs, surpassing short-term goals. In contrast, the transactional leader is concerned with the efficient allocation of resources. In other words, the transformational leader makes the employees aligned with the needs of the leader; however, the transactional leader provides something to the employee so that they align with the leader’s needs (Kuhnert and Lewis, 1987).

According to Bass’s theory, there are three different dimensions of the transactional leadership style namely contingent reward, management by exception (active), and management by exception (passive) (Judge and Piccolo, 2004). In the contingent reward leadership style, the leader establishes the goals, defines the rewards and exchanges the goals for rewards for his followers. The leader establishes the goals, provides the expectations and sets up the followers’ rewards for meeting their goals. In general, Management by Exception is a style of leadership where corrective action takes place by pointing out the mistakes employees should avoid. According to Howell and Avolio (1993), the difference between management by exception (active) and management by exception (passive) lies in the timing of the leader’s intervention. Active leaders apply proactive actions by monitoring followers’ behaviour and taking corrective actions, preventing problems before facing serious consequences. Conversely, passive leaders are more reactive than proactive by evaluating the results of the followers’ behaviour and taking corrective actions, after the fact, if necessary.

The last form of leadership style based on Bass’s theory is the so-called passive leadership or laissez-faire leadership style (Judge and Piccolo, 2004). According to ‘passive leadership,’ which represents a non-leadership style, leaders abstain from taking action or interfering when their leadership is necessary. Laissez-faire leaders hesitate in taking any action, have difficulties or even avoid making decisions, and in general they are absent when they are needed. Researchers claim that since the passive leadership style represents the lack of both transformational and transactional leadership styles, it should be treated as a separate leadership style. Table 1 summarises the definitions for the different leadership styles.
Table 1: Definitions of Leadership Styles (Bass et. al., 2003, p.208)

<table>
<thead>
<tr>
<th>Leadership Style</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transformational</strong></td>
<td></td>
</tr>
<tr>
<td>Charisma or Idealized Influence</td>
<td>Leaders of this category are admired, respected, and trusted. Followers identify with and want to emulate their leaders. Among the things the leader does to earn credit with followers is to consider followers’ needs over his or her own needs. The leader shares risks with followers and is consistent in conduct with underlying ethics, principles, and values.</td>
</tr>
<tr>
<td>Inspirational Motivation</td>
<td>Leaders behave in ways that motivate those around them by providing meaning and challenge to their followers’ work. Individual and team spirit is aroused. Enthusiasm and optimism are displayed. The leader encourages followers to envision attractive future states, which they can ultimately envision for themselves.</td>
</tr>
<tr>
<td>Individualized Consideration</td>
<td>Leaders pay attention to each individual’s need for achievement and growth by acting as a coach or mentor. Followers are developed to successively higher levels of potential. New learning opportunities are created along with a supportive climate in which to grow. Individual differences in terms of needs and desires are recognized.</td>
</tr>
<tr>
<td>Intellectual Motivation</td>
<td>Leaders stimulate their followers’ effort to be innovative and creative by questioning assumptions, reframing problems, and approaching old situations in new ways. There is no ridicule or public criticism of individual members’ mistakes. New ideas and creative solutions to problems are solicited from followers, who are included in the process of addressing problems and finding solutions.</td>
</tr>
<tr>
<td><strong>Transactional</strong></td>
<td></td>
</tr>
<tr>
<td>Contingent Reward</td>
<td>Contingent reward clarifies expectations and offers recognition when goals are achieved. The clarification of goals and objectives and providing of recognition once goals are achieved should result in individuals and groups achieving expected levels of performance.</td>
</tr>
<tr>
<td>Management by Exception</td>
<td>The leader specifies the standards for compliance, as well as what constitutes ineffective performance, and may punish followers for being out of compliance with those standards. This style of leadership implies closely monitoring for deviances, mistakes, and errors and then taking corrective action as quickly as possible when they occur. In its more passive form, the leader either waits for problems to arise before taking action.</td>
</tr>
<tr>
<td><strong>Non-Leadership</strong></td>
<td></td>
</tr>
<tr>
<td>Laissez-faire</td>
<td>The leader takes no action at all. Such passive leaders avoid specifying agreements, clarifying expectations, and providing goals and standards to be achieved by followers.</td>
</tr>
</tbody>
</table>
2.2 Leadership Style and Work Performance

Extensive research has been conducted in the past in order to identify effective leadership styles, which lead to work performance in organisations. Many studies have found that transformational leadership and more specifically its three dimensions charisma, individualised consideration and intellectual stimulation, are strong predictors of work performance at individual and organisational level. Conversely, transactional leadership style may have a positive or negative effect on followers' performance, depending on the type of organisation and specific conditions. The transactional dimension of contingent reward has been related with work performance, but this relationship is less evident compared to the transformational dimensions. The transactional dimension of management by exception (both active and passive) has weak correlations with work performance and sometimes negative.

Howell and Avolio (1993), measured the effect of leadership on unit performance of 78 managers. The results of this study showed that transformational leadership was positively correlated with business-unit performance. More specifically they showed that three dimensions of transformational leadership (i.e., charisma, intellectual stimulation, and individualised consideration) were directly related to the goals that managers achieved. The authors explained that providing inspiration to the followers to achieve challenging objectives and contributing to the followers' development of higher capabilities lead to a positive influence on the goals accomplished by the managers. They also suggested that managers should develop transformational leadership behaviours for increased revenues for their respective organisational units. Conversely, transactional leadership styles, including all three dimensions (i.e., contingent reward and management by exception active and passive), had a negative effect on business-unit performance. This result was unexpected since previous studies revealed that a positive relationship exists between contingent reward leadership and work performance (Bass and Avolio, 1990). The explanation relies on the work of Tsui (1982) who pointed out that if managers transact with followers by setting up the goals and rewards beforehand but do not consistently fulfil what they agree with them, contingent reward leadership style becomes less effective. Moreover, the effectiveness of the transactional leadership style depends on the type of organisation (Bass, 1990). In a highly evolving organisational environment, a purely transactional leadership style may have unexpectedly adverse effects and be counterproductive.

The work of Lowe et. al. (1996) concurs with the above findings. The authors conducted a meta-analysis of the transformational leadership literature integrating a wide range of findings regarding the relationships between leadership styles and effectiveness, by using the Bass & Avolio (1990) Multifactor Leadership Questionnaire (MLQ). The results revealed that the degree of association between leadership style and performance was higher for the transformational dimensions than for the transactional ones. Charisma provided the strongest correlation for the different criteria used. In contrast, management by exception showed the weakest correlation with effectiveness and work performance. Surprisingly, the authors found that the correlation coefficients for the three dimensions of transformational leadership were higher in public organisations than in private ones, which was contradictory to the previous research studies. Moreover, the results showed that all three dimensions of transformational leadership exhibited stronger correlations with effectiveness in low-level managers compared to high-level ones. Regarding the transactional leadership style, it was observed that the dimension of management by exception was more pronounced in lower level management compared to higher level.
In addition to the well-established positive impact of transformational leadership on work performance, several authors have proved the existence of a linkage between transformational leadership and team performance (Balthazard et al., 2002; Kahai et al., 2000). In addition, there are specific dimensions of transformational leadership such as inspirational motivation, individualised consideration and intellectual stimulation which can positively affect the interpersonal processes between team members, leading to increased team performance. According to Dionne et. al., (2013) the above-mentioned dimensions of transformational leadership can develop intermediate states of team commitment, shared vision and an empowered team environment which can increase cohesion and communication between the team members.

The effect of leadership styles on work performance based on the literature review is summarised in the research model depicted in Figure 1, below.

### 2.2.1 Leadership Style and R&D Innovation and Performance

A large number of published papers have focused on studying the leadership styles the supervisors should have to enhance innovation and work performance in R&D organisations. According to these studies, managing creative people and leading them towards innovation with the resultant success of the R&D organisation, requires certain skills. According to Grosse (2007), who conducted a survey within a successful German R&D organisation, among the features that an efficient leader should have, knowledge, creativity, experience and self-confidence are the most important. Successful R&D project leaders use the leadership style of ‘management by objectives.’ In other words, the leader, in co-operation with the employee, sets the project’s goals. In this way, the employee can choose their path of success. ‘Management by objectives’ increases the motivation of scientists who like to work independently. Gupta et. al. (2000), after conducting a study on 68 high-R&D effective firms and 49 low-R&D effective firms, concluded that in order to obtain a positive impact on organisational performance, knowledge and skills are of profound importance.

Recent studies have focused on transformational and transactional leadership styles and how they can improve R&D performance. Keller (1992) studied the effect of transformational leadership on work performance, and more specifically on project quality, in three R&D organisations. He found that transformational leaders are effective at promoting project quality. The results from this work indicated that effective R&D leaders encourage followers in new and creative ways of thinking and problem solving. They also provide inspiration on the mission and stimulate the team members to exceed what is expected of them to deliver. Moreover, a transformational leadership style can help the followers to set aside personal self-interest and develop the interpersonal processes towards a better cooperation between the members of the team and increased team performance. Transformational leadership can positively influence well-educated employees who have a high motivation for professional development and desire for challenging work. The work of Pinto and Slevin (1989) is in the same vein, pointing out that leadership style of mission awareness is related to the success of R&D projects, especially in their conceptual phase.

Transformational leadership is a strong predictor of both individual and organisational indices of work performance (Howell and Avolio, 1993). The authors emphasised the positive influence of charisma on unit performance in conditions of both high and low support for innovation. They
explained that charismatic leaders are expected to have followers who have adopted the leader's values and goals and are more prone to pursue the leader's mission and goals.

Thite (2000) investigated the relationship between leadership style and technical quality, cost performance, meeting deadlines, customer satisfaction, and work performance in Information Technology (IT) projects. Thite, utilised the MLQ, which has been extensively applied in R&D settings. The results showed that intellectual stimulation and inspirational leadership are strong predictors for successful projects. Moreover, it was concluded that transactional contingent reward leadership is also related to successful projects, however, to a lesser extent.

Innovation is a significant factor for organisations in order to create a sustainable competitive advantage over their competitors (Kim et al., 1999). Numerous research studies have indicated that transformational leadership is the key ingredient for R&D innovation (Maidique, 1980; Burgelman, 1983). All these studies pointed out the champions’ capability to inspire followers with their vision and persist in promoting their vision despite strong resistance, to show confidence in themselves and their mission, and to gain the followers’ commitment towards innovation. Howell and Higgins (1990) who analysed the results from questionnaires and interviews from 25 matched pairs of champions and non-champions, argued that champions of innovation have characteristics of transformational leaders. Champions exhibit transformational leadership behaviors related to all four dimensions of charisma, inspiration, intellectual stimulation, and individualised consideration to a much greater extent compared to non-champions.

Since organisations promote teamwork (Dumaine, 1994; Ilgen et al., 2005), it is of high importance to identify the ideal leadership style for the firms’ management, which should be adopted in order to enhance team innovation. Paulsen et. al., (2009), conducted a large study within an R&D organisation in order to investigate the effects of the charismatic dimension of transformational leadership in R&D groups. The results from this study revealed that charismatic leadership is of profound significance since it has a positive effect on innovation and team interactions. Transformational leadership styles create a sense of belonging within a team, which results in a positive effect on the way the team cooperates.

The above conclusions are merely in accordance with the findings of Eisenbeis and Boerner (2010), which were based on data from 52 R&D teams within different international companies. More specifically, the sample was very broad, comprising of one research institute and seven international R&D companies related to different industries (i.e., automotive, semiconductor, packaging, machinery, consumer goods, and scientific instruments). A total of 52 team leaders and 256 employees participated in the study. The results of this data analysis showed that a non-linear relationship exists between transformational leadership and R&D team innovation. R&D team innovation was found to be considerably higher under both high and low levels of transformational leadership. Conversely, R&D team innovation was low under moderate levels of transformational leadership. The question arising from this observation is that since R&D teams are creative and innovative under low and high levels of transformational leadership, are high levels of transformational leadership necessary? The answer to the above dilemma is trusting in R&D team members’ high intrinsic motivation to innovate and their expert knowledge is as effective as applying high levels of transformational leadership. Moreover, R&D team members inherently have high intrinsic motivation for creativity, and thus, by giving them as much intellectual autonomy and as little guidance as possible, can lead to creativity and innovation.

Liu et. al. (2011) conducted a survey of 90 Chinese work teams, comprising 90 team leaders and 462 employees in order to identify if transactional leadership has an effect on team
innovation. The results of their study indicated that transactional leadership can contribute to team innovation, depending on the level of emotional labour. In working environments with low emotional labour, transactional leadership has a positive effect on team innovation. However, when the emotional labour is high, transactional leadership limits team innovation. The authors pointed out that, in general, transactional leadership is neither a destructive nor a constructive factor of innovation. Its effectiveness largely depends on the context in which it occurs. Transactional leaders can adopt specific management styles like contingent reward and management by exception in order to ensure that employees will follow their goals, however, the effect on innovation depends on the degree of emotional labour required by the job. In the case of low emotional labour, the leader can provide the followers with incentives in order to work in the way the leader desires (Kuhnert and Lewis, 1987; Song et al., 2009). In conclusion, transactional leadership contributes to rewarding followers’ efforts and commitment, taking actions to correct mistakes, shaping strategies and promoting better team innovation under the proper conditions.

2.3 Summary

It is clear that leadership style has a profound effect on work performance in various organisations, as it has been proven by many publications related to this topic, that are summarised in the previous paragraphs. Considerable research has been conducted on evaluating the impact of transformational and transactional leadership styles on work performance and innovation in R&D settings. These studies have concluded that transformational leadership, and all of its dimensions, play a major role in enhancing many different aspects of performance in R&D environments such as project quality, success of R&D projects, cost performance and meeting deadlines. Transformational leaders can also boost innovation and creativity by providing vision and inspiring their followers. Transactional leadership may also lead to work performance and innovation in R&D, however, the degree of its influence is less pronounced than transformational leadership. In addition, the extent of its effectiveness towards innovation depends on other factors such as emotional labour.

However, even if there are a large number of studies, which address the effect of leadership style on work performance and innovation within R&D, there is not sufficient research on the role of leadership on creating researchers’ satisfaction, which is essential for the operation of R&D. Thus, the scope of the present research study is to investigate the effectiveness of transformational and transactional leadership as predictors of researchers’ satisfaction in high-technology companies. In the next paragraphs, we will investigate if there is a similar trend related to the effect of leadership style on employee satisfaction within R&D organisations. Moreover, we will examine how the national culture can affect the leadership style applied at a given location, as a result of the cultural influence on leaders’ behavioural characteristics. We believe that the correlation between leadership style and employee satisfaction is at the basis of an increase in efficiency of R&D departments with the concomitant advancement of high-technology companies and entire nations.
3. THEORETICAL FRAMEWORK

3.1 Leadership Style and Employee Satisfaction

Due to the difficulty in measuring performance, either at an organisational level or a task-team or individual contributor level (Thamhain, 2003), the relationship between work performance and employee satisfaction is investigated. The possible existence of a link between work performance and employee satisfaction in R&D environments is significant since, in this case, one leadership style can be applied throughout the whole research organisation which can bring both employee satisfaction, work performance and success to the organisation. Researchers are very valuable asset for companies so it is of significant importance for organisations to ensure they have high levels of job satisfaction.

Robbins and Judge (2009, p.83), provided a definition of job satisfaction as “a positive feeling about a work resulting from an evaluation of its characteristics.” George and Jones (2008, p.84) offered the definition as “the collection of feelings and beliefs that people have about their current jobs”. According to Hughes et. al. (2006), job satisfaction is related to how much an employee likes his job or the task he is doing and is not related to how the work can be done well, or how much effort is required in order to do the work. Employees' levels of job satisfaction can vary from extreme satisfaction to extreme dissatisfaction. Nelson and Quick (2009, p.56) define job satisfaction as “a pleasurable or positive emotional state resulting from the appraisal of one’s job or job experiences” whilst Kreitner and Kinicki (2007), only define it as the extent to which a person enjoys their work. Based on a literature review, the results of work satisfaction as discussed below are: (1) organisational commitment, (2) organisational citizenship behaviour, and (3) employee well-being. However, the results of job dissatisfaction are: (1) absenteeism, (2) turnover intentions, and (3) turnover (George, 1992; George and Jones, 2008; Ghazzawi, 2008; Ghazzawi and Smith, 2009; Judge and Locke, 1993; Robbins and Judge, 2009; Rue and Byars, 2005).

In order for R&D firms to utilise their resources efficiently, an appropriate leadership style, which can bring satisfaction to the employees and therefore success to the organisation, should be employed. A considerable number of published papers deal with the relationship between leadership style and employee satisfaction. Lowe et. al., (1996) showed that transformational leaders have followers who are more satisfied with their work compared to employees who report to other leaders. Moreover, they demonstrated that transactional leadership is related to employee satisfaction, although to a lesser extent than transformational leadership. Bass (1997) argued that transformational leadership compared to transactional leadership is a stronger predictor of individual and organisational outcomes including cultures, organisational levels and types of jobs. Conversely, Pawar and Eastman, (1997) pointed out that, in general, transformational leadership can have a stronger influence compared to transactional leadership, however, the complexity, the uncertainty and the novelty of working environment increase organisational receptivity to transformational leadership. R&D is such a working environment. Ahmad et. al., (2013) argued that transformational leadership has a higher contribution towards job satisfaction of nurses working in Malaysian hospitals than does transactional leadership.

Consistent with the above research, Hamidifar (2009), identified the various leadership styles which lead to employee job satisfaction. The author asserts that employees are more satisfied with transformational leadership over any other leadership style. The outcome of this work is in agreement with the findings of subsequent studies, such as the work of Fatima et. al. (2011), which supports the premise that transformational leadership has a positive effect on overall job
satisfaction. The positive influence of transformational leadership style on work success and career satisfaction was also supported by Riaz and Haider (2010). The authors state that transformational leadership style exhibits a positive correlation with job success and career satisfaction. Even though work success was found to be more dependent on both transformational and transactional leadership, career satisfaction was more dependent on transformational leadership. The above findings are in line with Berson and Linton (2005), Iwan et. al., (2005) and Amarjit et. al., (2010). We agree with the above findings and believe that a transformational leadership style is responsible for higher levels employee satisfaction than transactional leadership style.

Madlock (2008) conducted a study including 220 participants from a number of different companies in the Midwest, in order to examine the effect of leadership style and a leader's communication competence on employee job and communication satisfaction. He found that employee satisfaction was high in cases where supervisors were exhibiting both a relational and task oriented leadership style.

Nielsen et. al., (2009) conducted a study in two elderly care centres in Denmark to evaluate the effectiveness of transformational leadership for the health and welfare of staff. The staff consisted of 274 elderly care employees including health care assistants, nurses and other healthcare-related professions. The outcome of the work revealed that both team and self-efficacy can act as mediators of the connection between transformational leadership and employee satisfaction and well-being. More specifically, it was found that team efficacy partially mediates the correlation between transformational leadership and job satisfaction while it fully mediates the relationship between transformational leadership and well-being. Conversely, self-efficacy was found to mediate, totally, the relationship between transformational leadership and well-being. These results confirmed the findings in other relevant studies (Nielsen and Munir, 2009; Munir and Nielsen, 2009).

Rothfelder et. al., (2012) examined the influence of the different leadership styles of hospitality managers in Germany on employee job satisfaction. The authors utilised the leadership model proposed by Bass (1985) for conducting the study. It was found that German hotel employee job satisfaction is strongly affected by leadership behaviour and that transformational leadership on employee job satisfaction differs from transactional and non-leadership behaviour. According to this study, the most preferable leadership styles positively influencing employee job satisfaction are transformational and contingent rewarding.

Specific dimensions of transformational leadership style such as *inspirational motivation* were found to have a profound effect on job satisfaction and organisational commitment. Hanaysha et. al., (2012) conducted a survey on 320 employees in three universities located in Kedah and Perlis in Malaysia, to identify the effect of the various transformational leadership dimensions on employee job satisfaction. The results from this study showed different levels of effectiveness between the different leadership dimensions. *Intellectual stimulation* was one of the dimensions that exhibited a pronounced effect on job satisfaction. This result confirms the works of Tseng et. al., (2008), Lee et. al., (2011) and Mohammad et. al., (2011). In contrast, *individualised consideration* was found to be negatively correlated to employee satisfaction. *Idealised influence* was found to have a positive effect on employee job satisfaction but to a lesser extent than *intellectual stimulation*. These findings are also consistent with the work of Lee et. al., (2011). The overall findings of the work of Hanaysha et. al., (2012) also concur with the findings of the study conducted by Emely and Barker, (2007). The latter study demonstrated a positive correlation between *intellectual stimulation* and job satisfaction but no significant relationship between *idealised influence* and job satisfaction. We agree with the above findings that different
dimensions of transformational leadership will exert different levels of employee satisfaction within R&D settings.

3.1.1 Leadership Style and Employee Satisfaction in R&D Environments

Even though there are a considerable number of studies on the relationship between leadership style and employee satisfaction, there is little focus on R&D. Berson and Linton (2005), investigated the connection between leadership style and quality environment and employee satisfaction in an R&D environment. The authors derived their findings on an empirical study of 511 research engineers and scientists from a telecommunication company in Israel. The authors used the MLQ from Bass and Avolio (1990), in order to measure the leadership style. They showed that a transformational leadership style is strongly correlated to overall satisfaction and employee satisfaction in an R&D setting. Moreover, it was found that transactional contingent reward and management by exception are strongly related to employee satisfaction; however, this relationship is weakened in cases where transformational leadership is included in the model. In the latter case, both transactional leadership styles exhibit a very weak correlation with employee satisfaction.

Berson and Linton’s study is in full agreement with the results reported by Bass and Avolio (1994), which showed that the effect of transactional leadership decreased when transactional contingent reward was considered together with the dimensions of transformational leadership. This finding confirms the results from other published works such as Lowe et.al. (1996), Bass (1997), Pawar and Eastman (1997), Marnis (2012) and Rothfelder et. al. (2012). However, according to Berson and Linton (2005), the correlation between overall satisfaction and transactional leadership became negative when the dimensions of transformational leadership were considered in the structural model.

Munir et al. (2012) concurred with previous studies, finding that transformational leadership exhibits a strong, positive, linear correlation with employee satisfaction in academic environments, by conducting research in four affiliated colleges in Klang Valley. More specifically, it was found that all four dimensions of transformational leadership were considered the most important characteristics of leadership and contributed to high employee job satisfaction.

Organisations focus on developing transformational leadership in their leaders because it leads to better organisational performance. The above-mentioned studies found that specific leadership styles are important for ensuring employee job satisfaction and commitment. With respect to R&D settings, which are the main topic of this study, we believe that transformational leadership will have the highest positive effect on employee satisfaction. Since researchers are driven by intrinsic motivation, stimulation and innovativeness, the leadership style should focus on inspirational motivation, intellectual stimulation and individualised consideration. Moreover, the nature of the work is related to high complexity, which requires a transformational leadership style (Pawar and Eastman, 1997). Based on the above findings, the following hypothesis was constructed:

H1: Transformational leadership style has a strong positive influence on employee satisfaction within R&D organisations.
It is also expected that transactional leadership style will have a positive effect on employee satisfaction. However, the result of contingent reward and management by exception depends on the emotional labour required by the job (Liu, 2011). Bass and Avolio (1994) proposed that transactional leadership offers the contractual basis on, which, the transformational leaders form the emotional basis. For this reason, it is strongly believed that the transactional leadership style will have a positive effect on employee satisfaction in R&D settings, but to a lesser extent compared to transformational leadership.

H2: Transactional leadership style has a positive influence on employee satisfaction within R&D organisations but to a lesser extent than transformational leadership.

It is expected that the different dimensions of transformational leadership style will exhibit different levels of influence on employee job satisfaction. We believe that researchers are employees with special needs driven by intrinsic motivation and stimulation. Thus, leaders following inspirational motivation and individualised consideration leadership style will keep their followers satisfied with their work and result in their perform meeting or even exceeding expectations.

H3: Among the various transformational leadership dimensions, inspirational motivation and individualised consideration are related to the highest levels of employee job satisfaction in R&D settings.

All the above considerations are summarised in the research model, which is illustrated in Figure 1, below.
3.1.2 The Relationship between Employee Satisfaction and Work Performance

A number of studies have concluded that there is a strong correlation between employee satisfaction and work performance in R&D settings (Pelz and Andrews, 1976; Keller et. al., 1996; Coccia 2001). Pelz and Andrews (1976) argued that since stimulation is the primary ingredient in R&D work, employee satisfaction might well be related to performance. According to the work of Keller et. al. (1996), the climate and job satisfaction variables are robust predictors of R&D productivity while this trend has been proved globally. The results from this work suggested that the team productivity in R&D depends on the interactions between team members, and that team members who are satisfied may be more inclined to work towards accomplishing team goals than if they were dissatisfied. Coccia (2001) studied the relationships between work involvement, job satisfaction, commitment and performance in research organisations and more specifically in ten institutes of the Italian National Research Council (CNR). The results showed a strong correlation between job satisfaction and work performance.
This strong correlation can be explained by the fact that the motivation required for performing in a research environment comes from the satisfaction employees feel with their work.

However, job satisfaction in organisations, in general, does not always lead to performance. Vroom (1964), showed that there is a weak correlation between job satisfaction and performance. Iaffaldano and Muchinsky (1985) also confirmed the above finding.

3.2 The Effect of National Culture on Leadership Style

It was seen from the previous paragraphs that there are several published studies focusing on the relationship between leadership style, work performance and employee satisfaction. There are also a considerable number of studies dealing with the influence that the leadership style has on innovation, creativity and performance in research environments. However, the effect of national and organisational culture on leadership style and the subsequent effect of the latter on researchers’ satisfaction have been poorly investigated.

In today’s highly evolving global economic environment, the existence of different sites (e.g., production facilities) at different locations around the globe is a prerequisite for companies to survive intense competition. For this reason, it is beneficial for organisations to understand the influence that the leadership style has on employee satisfaction in order to maximise the benefit derived from each human resource at each site. Moreover, they require an awareness of how national culture affects managers’ behaviour and leadership style, and then try to embed an appropriate style that will assist in reaching the organisational goals.

With respect to R&D settings, the prevalent leadership style is expected to differ in the various locations. Organisational culture includes all the embedded beliefs and values existing within the organisation. The employees’ values and beliefs for their work will affect their behaviour and attitude (Staniland, 1985). Thus, the national culture, which affects organisational culture, will influence employees’ values, attitudes, behaviours and beliefs. Since managers bring their personal values, behaviours, attitudes and beliefs into the working environment, the prevalent leadership style may differ from one location to another. The organisations, armed with this knowledge, will be able to hire or train leaders to adopt specific styles in their R&D environments.

A number of studies conducted in the past have demonstrated that national culture can influence leadership style and employee work satisfaction. Job performance and employee behaviour may be different across different national cultures (Redding, 1990). Westwood and Posner (1997), claimed that managers coming from different cultures may exhibit different work and business-related values. The reason for this stems from the fact that personal values are shaped by the cultural environment where a person is socialised.

National culture also influences the way an organisation is structured and managed (Hofstede, 1991; Chen, 2001). The organisational culture, in turn, can influence leaders’ behaviour and style and how people perform and set personal and professional goals. According to Hansen and Wernerfelt (1989) and Schein (1990), organisational culture affects the way that an employee acts, thinks and makes decisions. Peters and Waterman (1982) have suggested that the organisational culture can impact employee performance and commitment. Tsai et. al., (2009), showed that the organisational culture has a pronounced effect on leadership style.
Many researchers have argued that significant differences are observed between the Eastern and Western cultures (Hofstede, 1980; El Kahal, 2001; Chen, 2001). Chen and Francesco (2000), showed that culture has a strong influence on employee behaviour and that Chinese employees behave differently to those coming from Western cultures. They explained that personalism and personal relationship networks are the main cultural variables, which explain the above differences.

The cross-national effect of leadership style on employee job satisfaction in organisations is an important area for study. Lok and Crawford (2003), examined the effects of organisational culture and leadership style on an employee’s organisational commitment and job satisfaction in samples of Hong Kong and Australian managers, to represent the differences between east and west. For both samples, it was shown that innovative and supportive cultures, and an *individualised consideration* leadership style exhibited a positive effect on both job satisfaction and commitment. However, supportive organisational cultures were found to be higher among the Australian sample than the Hong Kong sample.

Wallach (1983) proposed three major types of organisational culture namely bureaucratic, supportive and innovative. Pye (1985) and Chen (2001) argued that a high power distance, central decision-making, hierarchical and bureaucratic culture is observed in Eastern organisations. Authority, obedience, respect and loyalty are the major values between the employees working in these firms (Chen, 2001; El Kahal, 2001). Few people take decisions while orders are given from the higher levels to lower levels of the organisational hierarchy. Employees’ promotion is related to networks and family connections (Sommer et al., 1996; Chen, 2001; El Kahal, 2002).

On the other hand, professional managers mainly run Western companies while public shareholders own them. Western cultures are flat in structure with less bureaucratic procedures, they support individualism and innovation, decision-making is decentralised and their workers are more empowered. According to Conger and Kanungo, (1988) and Malone (1997), employees who feel empowered by their managers exhibit increased work performance, commitment and satisfaction. In contrast to Eastern companies, promotion is often related to employees’ competencies and not family connections or network (Chen, 2001; El Kahal, 2002).

Even though the most significant cultural differences are observed between Eastern and Western societies, differences can also be found between European countries as well. For example, Southern European countries (e.g., Greece, Spain, Portugal) score average values of power distance in Hofstede’s cultural model (The Hofstede Centre, 2014). This means that these countries show a tendency towards power distance where hierarchy should be respected and inequalities amongst people are acceptable. The different distribution of power within the Southern European countries shows that the more powerful enjoy more benefits than the less powerful within the society. Hierarchy in organisations promotes inequalities, followers expect to be told what to do, the boss is an autocrat and centralisation is very common (The Hofstede Centre, 2014).

Additionally, Northern European countries (e.g., UK, Finland, Sweden, Norway and Denmark) and Central European countries like Germany and Austria, exhibit low score values of power distance in Hofstede’s cultural model (The Hofstede Centre, 2014). This means that these societies are flat, power distance is low, power is decentralised, all employees have equal rights and they are more autonomous and independent. The managers are accessible, empower, facilitate and coach their followers, while they rely on the experience of their team members.
Attitude towards managers is informal, communication is direct and control is disliked (The Hofstede Centre, 2014).

We agree with the findings of Tsai et. al., (2009) and we expect that the organisational culture which depends on national culture will influence the leadership style applied by managers to their followers. According to Whitley (1997) and Chen (2001), transformational leadership style is often related to flatter organisational structures and low power distance. Since Central and Northern European firms are flat in structure and leaders keep less distance from their followers, we believe that transformational leadership will be the most prevalent style within companies operating in these countries.

H4: Transformational leadership is the most prominent style in Central and Northern European R&D organisations.

Furthermore, since Southern European countries are less flat in structure, there is a tendency towards power distance and hierarchy is respected, we believe that transactional leadership will be the most prevalent leadership style within these firms.

H5: Transactional leadership is the most prominent style in Southern European R&D organisations.

We believe that in Central and Northern European cultures, where flat organisational structures are followed, promotions are based on personal competencies, employees are treated as company assets, and managers are supportive, the individualised consideration leadership style will be the most prominent dimension among the dimensions of transformational leadership. Lok and Crawford (2003) have already shown that individualised consideration was more pronounced in such cultures. Moreover, Tsai (2009) argued that a hierarchical culture is positively correlated with charismatic leadership. The above arguments lead to our final hypotheses.

H6: Individualised consideration is the most prominent transformational leadership dimension in Central and Northern European R&D organisations.

H7: Idealised influence is the most prominent transformational leadership dimension in Southern European R&D organizations.
4. **METHOD**

4.1 **Research approach**

According to Creswell (2013), the research framework consists of three components: Research Design, Inquiry Strategies and Research Methods. Research design is the high-level plan which describes the methods and procedures for collating and analysing the pertinent information for the research study. It describes how the data will be collected and from where it will be collected. It will also describe how variance will be controlled. Singh (2006) describes research design as a mapping strategy, which "...includes objectives, sampling, research strategy, tools and techniques for collecting the evidences, analysing the data and reporting the findings". Kerlinger (1964) suggested that the purpose of research design is twofold: to provide answers to a research question and to control the variance.

Whether or not research design is considered good or not is judged by the degree of accuracy, which is achieved along with the level of relevancy of the evidence sought. Literature reviews of related research papers are an important aspect of the design (Singh, 2006, p.77). These literature reviews are described in Chapters 2 & 3 above.

Saunders et al. (2000) begin by discussing the philosophy behind any given research. They suggest that research philosophy is dependent on the view of how knowledge is developed and go on to describe two distinct and mutually exclusive philosophies, Positivism and Phenomenology. Positivism is prevalent when research leans towards working with clearly visible, real cases, with an output which is a generalisation which can be laid down as a solid rule. This philosophy relies on the ability to carry out statistical analysis on quantifiable observations. Conversely, phenomenology’s foundation is based on the belief that situations are complex and unique and cannot be generalised into a set of laws. Instead they are due to a "...particular set of circumstances and individuals" (Saunders et al., 2000). The authors believe that the data gathered during this research will permit generalisations to be made and hence a philosophy of positivism will be prevalent in this study according to the definitions provided by Saunders et. al (2000).

Determining the research approach for this study was straightforward. Saunders et al. (2000), affirm that the selection of the research approach is dependent on whether research sets out to test a theory and hypotheses or whether a theory emerges from collected data. This study, from inception, had a clearly defined theory and hypotheses as described in Chapter 3.

Research design is fundamentally of three types: *qualitative, quantitative and mixed*. Qualitative and quantitative are not dichotomies but rather they are different ends on a continuum (Newman and Benz, 1998). A study typically leans more toward quantitative than qualitative or vice-versa. Mixed method research lies around the centre of this quantitative-qualitative continuum (Creswell, 2013). In determining which research design to adopt Creswell (2013) suggests that the research problem, the researcher’s personal experiences and the research target audience are all factors, which play a part in the decision.

The current research study aims to determine the relationship between leadership style and employee satisfaction by producing a numerical rating of employee satisfaction and mapping it against the leadership style. Creswell (2013) asserts that quantitative research aims to identify relationships among variables, which are being measured in a numerical manner permitting analysis using statistical procedures. Therefore, the authors deemed that quantitative research would be the most appropriate research strategy in this case. The numerical rating is provided
by the use of a set of closed-ended questions relating to leadership style and another set of
closed-ended questions relating to level of satisfaction. Depending on the respondent’s answer
a numerical value is derived which can then be interpreted to determine the level of satisfaction
or the type of leadership style employed, respectively.

The final element of the research framework, research method, concerns the forms of data
collection along with the form of analysis and interpretation of that data. Mouly (1971) proposed
three types of research method: Survey, experimental and historical methods. The survey
method deals with the present and its purpose is to disclose the status of the phenomena being
investigated. The experimental method is oriented towards discovery of basic relationships
between phenomena. The historical method deals with the past and aims to leverage
information from the past as a means for determining the present prospective. The survey
method in the case of this research is the most appropriate as the study aims to determine the
present levels of employee satisfaction within R&D organisations and how it is affected by the
current leadership style in a given location. In order to carry out the survey either questionnaires
or structured interviews can be used as asserted by Babbie (1990). This research relies on
questionnaires in order to capture relevant information for the sample population. This is
described in more detail below.

4.2 Sampling

This research aims to study the impact of leadership style on employee satisfaction within R&D
organisations. Studying the whole population of R&D organisations is neither practical nor
possible so sampling is an indispensable technique. Although this research aims to consider
employee satisfaction in various countries across Europe it is not feasible to undertake this from
either a cost, time or resource perspective. However, to ensure the generalisability of our
findings a sample of organisations in countries in different parts of Northern, Southern and
Central Europe was selected.

Of the various approaches to sampling available, (e.g. random sampling, cluster sampling etc),
judgement sampling was considered as a potentially suitable approach. Singh (2006) describes
judgement sampling as non-parametric sampling, which involves the selection of candidates
based on available information deemed to provide a representation of the entire population. This
method relies on the judgement of the investigator, i.e. the authors. However, Singh also
describes another form of sampling, which is called purposive sampling. This form of sampling
involves selection by an arbitrary method where the sampled population is deemed to be
representative of the population as a whole. The authors employed judgement sampling,
selecting organisations known to have a significant focus on R&D and which had departments
dedicated to these R&D activities. The organisations were selected where a personal contact
was available within the organisation. The reason for this was that initial ‘cold-calling’ of a wide
range of organisations, from small to large size, provided extremely low response rates from the
target organisations. By leveraging a person known to the authors, response rates were
increased significantly as described in section 4.6 below.

The authors anticipated that only a subset of the selected sample groups would respond and
this impacted the size of the initially chosen sample to take into consideration this fact. The
sampling cycle depicted in Figure 2, supported the authors’ belief.
Singh (2006), asserts that a good sample should be representative of the population and free from any bias. The selected sample meets both of these criteria. The companies were chosen because they were known to carry out R&D activities and because it was believed that the personal connection would increase the chances of a response from the companies. There was no knowledge prior to carrying out the surveys as to the leadership styles employed nor the level of employee satisfaction within the organisations.

Singh (2006) puts forward a recommendation that as large a sample size as possible be used and asserts that samples should ideally be in excess of 30 as this enables the application of large sample statistics. In addition to this, a larger sample size results in a smaller standard error. Saunders et al. (2000) reinforce the importance of achieving as high a response rate as possible in order to ensure that the sample is representative.

In total, four organisations across six countries covering Northern, Southern, and Central Europe, formed the chosen sample consisting of 30 R&D units, which is a value equal to the minimum required sample size according to Singh (2006). Each of these organisations consisted of a number of R&D teams each with several researchers and one research manager/leader.

4.3 Questionnaires and Measurements

Surveys were conducted on employees from each R&D organisation and each location. A questionnaire was constructed in order to capture the data necessary for the research. The scope was to examine the effect of leadership style on employee satisfaction and how the prevalent leadership style changes from country to country across Europe as a result of the cultural influence.

The survey was conducted in the form of a questionnaire. Barr et. al., (1953) describe a questionnaire as being “a systematic compilation of questions that are submitted to a sampling
population from which information is desired". The advantages of a questionnaire, according to Singh (2006) are that it provides a wide coverage with low effort and cost. This enables both a wide geographical spread and a large sample size. A questionnaire is effectively a paper-based interview. Care must be taken in constructing the questionnaire as, being impersonal, there is a risk that questions will be misunderstood and there is no interviewer present to clarify any ambiguities. With a questionnaire it is necessary to anticipate the range of possible answers, more so than in an interview (Singh, 2006, p.191).

There are other problems with questionnaires. Planning a questionnaire and then carrying out the actual development poses a considerable challenge. To drive adequate responses requires careful design. Ideally the questionnaire should be tried and tested several times and further refined to ensure it is producing useable data. All of this requires significant amounts of time. In order to determine the leadership style being employed by a manager and also the level of satisfaction perceived by a worker there are tried and tested questionnaires available which have undergone rigorous design and been refined over the years to ensure that useable data is produced.

Within R&D settings the Bass and Avolio’s (1990) Multifactor Leadership Questionnaire (MLQ) has been utilised many times over and is regarded in some circles as the definitive leadership style questionnaire. The MLQ was used successfully by Thite (2000), who conducted empirical research aimed at identifying successful leadership styles for managers of Information Technology/Systems R&D projects, and also Berson and Linton (2005), who used the MLQ to examine the relationships between leadership style, quality, and employee satisfaction in R&D versus administrative environments.

When it comes to job satisfaction questionnaires, Karsten (2008) noted that several hundred different types of these have been used since the 1960’s. Satisfaction questionnaires come in two forms; they can be either facet-specific or facet-free. Facet-free questionnaires are concerned wholly with the question “How satisfied am I with my job?” (Hinkin, 1995). Whereas facet-specific questionnaires determine which specific facets of a job provide satisfaction. For the purpose of this research we utilised a facet-free questionnaire so that we could obtain an absolute value, which could then be compared with other scores. There are a number of popular tools for measuring facet-free job satisfaction which have gained widespread use. These are namely, the Job Diagnostic Survey (JDS), the Job Descriptive Index (JDI), the Job Satisfaction Survey (JSS), the Michigan Organisational Assessment Questionnaire, the Minnesota Satisfaction Questionnaire (MSQ), and the Job in General Scale (JIG) (Karsten, 2008). This research will leverage the MSQ, which is easy to use, has a concise short form, can be utilised in any organisation and is applicable to managers, employees and supervisors alike. In order to maximise the response rate the authors felt it important that a questionnaire that is available in a concise form with a reduced number of questions should be leveraged.

Each of the questionnaires submitted to the invitees contained additional questions to collate demographic information. The R&D location, the employee’s country of origin and the length of time employed within the organisation were all collected to enable the drawing of conclusions regarding the national effect on the results. In addition to the demographic information capture, team names were requested in both questionnaires to provide the link between a manager’s MLQ responses and their teams MSQ responses.
4.3.1 The Multifactor Leadership Questionnaire (MLQ)

The MLQ by Bass and Avolio (1996), is leveraged to determine an individual manager's style of leadership. MLQ is a self-assessed questionnaire consisting of a total of 36 questions, the first 18 of which pertained to how the managers believe they currently behave and the later 18 questions pertain to how the managers believe they ought to behave. The MLQ is a proven methodology to determine the leadership style of an individual, based on nine leadership dimensions. It has been used extensively in numerous published studies to determine leadership style and is deemed to conform to reliability standards. Each one of the permissible responses to the MLQ questions is on a scale spanning five points as shown in Table 2, below:

Table 2: Five-Point Response Scale in the MLQ

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
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<tbody>
<tr>
<td>Not at all</td>
<td>Once in a while</td>
<td>Sometimes</td>
<td>Fairly Often</td>
<td>Frequently, if not always</td>
</tr>
</tbody>
</table>

The Bass and Avolio (1990) MLQ highlights the extent to which a manager has a certain leadership style. The manager's tendency towards employing a transformational leadership style is determined by the average score for questions 2, 3, 6, 7, 9, 10, 12, 14, 15 and 18. Transactional leadership tendencies are determined by the greater of the average scores for questions 4 and 17, 11 and 13 or 5 and 8. The remaining questions determine the non-leadership style, Laissez-faire found by taking the average of the summed scores for questions 1 and 16.

Within each identified leadership style, scores are generated for individual dimensions relating to those leadership styles. For example, within Transformational leadership style, Intellectual Stimulation and Individualised Consideration are impacting dimensions. The complete list of dimensions, and the leadership style to which they are related, is shown below:

- **Transformational Leadership**
  - Idealised Influence Attributed
  - Idealised Influence Behaviour
  - Inspirational Motivation
  - Intellectual Stimulation
  - Individualised Consideration

- **Transactional Leadership**
  - Contingent Reward
- Management-by-Exception (Active)
- Management-by-Exception (Passive)
- Non-leadership style
  - Laissez-faire Leadership

For each manager the scores corresponding to the three leadership styles (i.e., Transformational, Transactional and Laissez-Faire) are then compared. The style with the highest score is the most prominent leadership style for that manager. It should be noted that if either contingent reward or management by exception (Active) or management by exception (Passive) have the highest overall score, Transactional Leadership is the most dominant style employed by the manager (Figure 3).

**Figure 3:** Relationship of Leadership Dimensions to Leadership Styles
4.3.2 The Minnesota Satisfaction Questionnaire (MSQ)

In the current study, the MSQ was utilised in order to obtain an individualised result on employee satisfaction. The Minnesota Satisfaction Questionnaire (MSQ), developed by Weiss et al. (1967) for measuring employee satisfaction comes in two forms (i.e., long and short). The measurement method shows evidence of validity, meets the reliability standards and has been extensively used in several studies in the past to measure the level of employee satisfaction within organisations.

The long form of the MSQ consists of 100 questions and a more concise form consists of only 20 questions. In either case the questionnaire has a five-point scale, shown in Table 3.

Table 3: Five-Point Response Scale in the MSQ

<table>
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<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very dissatisfied</td>
<td>Dissatisfied</td>
<td>Neither dissatisfied nor satisfied</td>
<td>Satisfied</td>
<td>Very satisfied</td>
</tr>
</tbody>
</table>

The authors believed that in order to maximise the response rate for the MSQ and produce a large dataset to analyse, the short form of 20 questions should be used. The rating scale is a useful approach to ascertain a respondent’s feelings towards a given scenario. Van Dalen (1979) states “a rating scale ascertains the degree, intensity, or frequency of a variable”. Provided that the range of options is not too broad and the difference between ratings is not too arbitrary, a rating scale can be an invaluable aid to completing questionnaires.

The MSQ is a means of measuring employee job satisfaction by taking into account various aspects of the working environment. It takes less than five minutes to complete the questionnaire and submit the results and is easy to read. The short form of the MSQ questionnaire which was utilised in the present study follows the same directions as the long form and includes three scales namely ‘Intrinsic Satisfaction,’ ‘Extrinsic Satisfaction’ and ‘General Satisfaction.’ General satisfaction is measured from the answers obtained from all 20 questions. Extrinsic satisfaction is measured and assessed from the answers given to questions 5, 6, 12, 13, 14 and 19, while intrinsic satisfaction is measured from the answers given to the rest of the questions (Weiss et al., 1967).

Intrinsic satisfaction includes dimensions such as activity, independence, variety, social status, moral values, security, social service, authority, ability utilisation, responsibility, creativity, working conditions, co-workers and achievement. Extrinsic satisfaction includes dimensions such as supervision - human relations, supervision - technical, company policies and practices, compensation, advancement, and recognition. General satisfaction includes all the above-mentioned dimensions (Weiss et al., 1967).

Responses to MSQ questions are summed to give a score for each employee. Then the average from the scores of employees within a team is taken to create a total score for the team. The lower the total team score, the lower the level of satisfaction. More specifically, according to MSQ (Weiss et al., 1967) a score higher than 75 represents a high level of employee satisfaction, while a score lower than 25 indicates a low level of employee satisfaction and a score between 25 - 75 an average level of satisfaction.
4.4 Unit and Level of Analysis

In this study, the authors collected data from individual researchers within a given research team. These individual researchers constituted the unit of observation and provided data related to employee satisfaction. The individual R&D managers constituted the unit of observation for leadership style. The information on employee satisfaction provided by the researchers was aggregated at the team level and linked to the data on leadership style in effect within that team so that the R&D team as a whole became the unit of analysis for this research.

4.5 Data Collection

Data collection is the collation of specific evidence, which a researcher is able to analyse. The “quality of data determines the quality of research”. This data collection is used to validate the hypotheses (Singh, 2006, p.212). Email was selected as the primary form of communication with the chosen sample of organisations. This proved to be an efficient method to reach a large number of companies in a relatively short period. An invitation letter (see Appendix F), in electronic form, was drafted and sent to the personal contacts within the chosen sample of organisations. A template letter was initially created and used as the basis for all correspondence. The template allowed for a small number of customization, which permitted a more personalised communication. The invitation letter outlined the purpose of the study and the time commitment required to complete the questionnaire. An assurance of anonymity of the results was also given. Once agreement to participate had been received, the questionnaire was shared with the organisations for further distribution to the R&D team managers and researchers within the firms.

The questionnaires themselves were created using Google Forms to permit the individuals to complete the questionnaires online. This provided several advantages. Firstly, the respondents were able to complete the questionnaire at a time which was convenient to them and were able to complete the form in stages should they not have sufficient time to complete the form all in one go. The online questionnaire was also a more efficient approach for both the respondents and the authors. The respondents did not need to complete the questionnaire in one application and then attach it to an email to return it. This likely increased the response rate. The authors, likewise, had all the responses available in one centralised location, which eliminated the need to handle responses on an individual basis. Google Forms automatically collated all the responses submitted online to a spreadsheet, which could then be downloaded into Microsoft Excel format and later imported into statistical analysis software.

Participating organisations were encouraged to contribute on the basis that all submissions were anonymous and the findings, once published, would be shared with them and would provide them with invaluable information should they be seeking to expand their R&D activities in other locations. The data collected would also enable organisations to determine the most effective leadership style to apply to R&D teams.

Singh (2006) highlights several potential issues with the questionnaire technique of data collection. The technique relies on willing cooperation of the respondents. These respondents may not deliver their responses if they perceive no value in the research or if they consider they have no time available to dedicate to this effort. Likewise, if the respondents are not interested in the research topic and have not been motivated sufficiently by the introductory letter
responses may not be forthcoming. Another potential issue is that some questionnaires may not be completed correctly. Depending on the design of the questionnaire this may invalidate these respondents’ data entirely.

In order to avoid leaving the researchers waiting indefinitely it is imperative that the introductory letter set out a clear timetable when surveys will be distributed and the deadline for return of the completed surveys. There are several important points, which must be considered and addressed in the data collection process. These have been discussed by Singh (2006):

- The welfare and dignity of the human subjects must be protected.
- Confidentiality of collected data must be ensured
- Respondents right to decline participation must be respected
- The responsibility for upholding the above points rests with the researcher.

The authors took into consideration the points raised above by Singh (2006) when crafting the invitation letter which assured confidentiality and set out clear expectations of the time commitment required. Once an organisation had accepted the invitation to participate, links to the online Google Forms were emailed out with a request that responses would be received within 14 working days. However, it became apparent that not all participants had access to Google Forms. Therefore, in addition to the online questionnaire, a spreadsheet-based version, created using Microsoft Excel, was also made available to be used in the event that internal firewalls blocked access to Google Forms. Any spreadsheets returned were manually uploaded into the Google Forms spreadsheet by the authors in order to maintain the centralised data repository.

4.6 Validity, Reliability and Generalisability

When undertaking quantitative research, there are three key concepts to consider: validity, reliability and generalisability. All three concern measurement. Whenever we are conducting quantitative research a question that inevitably arises is: “how well are we measuring what we want to measure?” (Muijs, 2004, p.64).

As has been discussed previously, it proved impractical for the authors to conduct surveys of the whole world’s R&D population. Therefore, the intention was to be able to use the selected sample to draw parallels with the wider R&D population. This is referred to as generalising from the sample to the population (Muijs, 2004, p.64).

“Validity asks the question: are we measuring what we want to measure?” (Muijs, 2004, p.65). Two dimensions that need to be measured within the context of this research are leadership style and employee satisfaction. Neither of these can be measured in a straightforward manner. There is no ruler or yardstick, which can be held up against managers or leaders to measure their style or held up against employees to measure their level of satisfaction. These values cannot therefore be measured directly. Instead they must be measured with the use of instruments, which must be developed. Fortunately, as described above, there is a proven
instrument, which has been used successfully to measure ‘Leadership Style’, the MLQ. Likewise there is no yardstick to measure employee satisfaction and of the many instruments available the MSQ provides a practical mechanism to capture and interpret this information.

Two types of data validity must be considered: Internal (control) and external (sampling) (Kish, 2004). In order to ensure internal validity, it is necessary to accept that the world around us is composed of variables, things which are subject to change. In order to conduct successful research it is imperative to understand the effect of a particular variable on other variables and exercise some form of control over the variables (Singh, 2006, p.81). External validity can be exercised through the selection of a representative sample. This allows the generalisation of the sample findings and demonstrates its applicability on the wider population. This is an essential requisite for survey research and has already been discussed above (Singh, 2006, p.81).

Bias is a further aspect of research which if not addressed may undermine the findings. As has been discussed above, there has been no bias in the selection of the sample. In order to ensure that there was no bias in the interpretation of the responses for the selected samples all responses were evaluated by each of the authors independently in order to cross-validate the scoring. Any conflicts were set aside and reviewed jointly. If after this revision it was still not possible to resolve the conflicting scoring of the questionnaire, the score was removed from the data set.

Rating scales are themselves not without problems. Singh (2006) highlights several such problems (e.g., generosity errors, stringency errors, halo errors, central tendency errors and logical errors). Generosity errors occur where the respondent is loathed to degrade his own people and therefore consistently provides positive ratings. Conversely, stringency errors occur because certain raters have a tendency to rate all individuals low. Halo errors occur where a rating is given on the basis of impressions formed from previous performance irrespective of current performance. Central tendency errors occur due to some raters preferring to be non-committal and always rating in and around the midpoint. Finally, the logical errors occur where the question is misunderstood and the rating was given on the basis of a misunderstanding. As the unit of analysis is not the individual respondent but the team itself it is the authors’ belief that given the sizes of the teams these various errors were diluted and became insignificant.
5. RESULTS AND DISCUSSION

5.1 Data Cleansing

The scope of this work was to conduct a survey in a number of high technology companies with R&D sites at different locations around Europe. These potential candidate companies conduct business in the major financial sectors such as health, automotive, software and internet, computing and electronics, chemical, engineering and banking. From the potential target sample, there were finally four companies, with R&D departments at six different locations across Europe, which accepted our invitation to participate in the survey. Once the answers were received and imported into the Excel file, a cleansing process was carried out in order to avoid analysing any irrelevant or inaccurate data that could weaken the reliability of results. Since the unit of analysis was the individual R&D team, we excluded from our analysis any team input where managers’ and/or employees’ responses were missing. Moreover, in case of erroneous introduction of the team name in the questionnaire, the participants were excluded from the analysis when their team names could not be identified.

5.2 Sample Characteristics

The survey invitation was distributed to 23 companies, with a request that the survey be distributed internally to R&D team managers. Of the 23 companies invited to participate in the surveys four companies responded. This equates to an organisational participation rate of 17%. The R&D settings included in our study are located in Sweden, Finland, United Kingdom, Greece, Austria and Ireland. The total number of employees and managers who participated in the study was 264 out of 524, which corresponds to an employee participation rate of 50.4%. From the 264 employees, 42 were managers and 222 researchers. After data cleansing the number of employees who were included in the data analysis were 30 managers and 157 researchers.

All employees work within an R&D setting. In this study all employees holding an R&D role participated in the study, including researchers with Ph.D. and MSc degrees and technical personnel whose job included R&D activities (e.g., execution of experiments, material characterisation, product development as a result of research work, etc.). Each questionnaire completed by the respondents contained opening questions aimed at providing demographic information on the sample. 67% of the R&D participants were males while 33% were females. 47% of the sample population were employed in the company within the last 1-5 years, 36% within the last 6-10 years and 17% were employed for more than 11 years. This information is summarised in Table 4:
Table 4: Sample Characteristics (after data cleansing)

<table>
<thead>
<tr>
<th>Respondents</th>
<th>Managiers</th>
<th>Researchers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>30</td>
<td>157</td>
</tr>
<tr>
<td>Male</td>
<td>73%</td>
<td>67%</td>
</tr>
<tr>
<td>Female</td>
<td>27%</td>
<td>33%</td>
</tr>
<tr>
<td>Time Employed with the Organisation</td>
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<td></td>
</tr>
<tr>
<td>1-5 years</td>
<td>10%</td>
<td>47%</td>
</tr>
<tr>
<td>6-10 years</td>
<td>53%</td>
<td>38%</td>
</tr>
<tr>
<td>11+ years</td>
<td>37%</td>
<td>17%</td>
</tr>
<tr>
<td>Country of Origin</td>
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</tr>
<tr>
<td>Greece</td>
<td>13%</td>
<td>18%</td>
</tr>
<tr>
<td>UK</td>
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<td>8%</td>
</tr>
<tr>
<td>Finland</td>
<td>13%</td>
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</tr>
<tr>
<td>Sweden</td>
<td>27%</td>
<td>20%</td>
</tr>
<tr>
<td>Austria</td>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td>Ireland</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Other (European)</td>
<td>10%</td>
<td>7%</td>
</tr>
<tr>
<td>Other (non-European)</td>
<td>3%</td>
<td>7%</td>
</tr>
</tbody>
</table>

5.3 Measures

5.3.1 Data on Leadership Style

With data from the MLQ collected and analysed for each manager, scores for each leadership dimension were calculated and entered into a table. The values derived from the cleansed data sample of 30 managers are described in Table A1 in Appendix A. This data clearly indicates that within the sample studied, across six countries, the transactional leadership score being the higher of contingent reward, management by exception (active) and management by exception (passive), dominates all other leadership style scores for the majority of managers. In total 57% of managers exhibited transactional leadership characteristics. An even larger number of managers, 67%, believed they should exhibit traits, which would ultimately demonstrate a transactional leadership style. Most managers believed that their current leadership style was the ideal leadership style (determined by the 'ought' versus 'actual' leadership style scores). 30% of managers believed they should adopt leadership traits, which would result in a leadership style different to their current style. There were no managers within the sample population who neither exhibited nor desired to exhibit a Laissez-faire leadership style.

5.3.2 Data on Employee Satisfaction

Team data received from the six companies was cleansed and decoded and the level of employee satisfaction calculated for 30 different R&D teams based on responses from 157 researchers. Table A2 in Appendix A provides the scores on the three dimensions of employee satisfaction (i.e., general, intrinsic and extrinsic) as calculated for each R&D Team. These scores were extracted by using the Microsoft Excel 2008 software package. As can be seen, the results do not contain low levels of satisfaction (i.e., < 25%). The level of employee satisfaction...
mainly lies in the average level band (i.e., between 25 and 75%). Moreover, high levels of satisfaction (i.e., > 75%) are observed in several of the teams. In general, the levels of intrinsic satisfaction within a team are higher than extrinsic satisfaction.

5.4 Internal Consistency and Reliability

Typically, in order to verify the internal consistency or reliability of a measurement method, a Cronbach’s alpha reliability test is carried out. This test is used to assess the reliability of the individual items of a measurement method such as the individual questions of the two questionnaires, which were utilised in this study to measure leadership style and employee satisfaction. As a general rule the closer the alpha value is to unity, the higher the reliability of the questionnaire items as measuring methods. As a rule of thumb, values higher than 0.7 ensure that the test method is reliable (Nunnally, 1978). Given that the questionnaires have been in existence for many years and been used extensively in numerous studies across the globe in many different fields it is fair to conclude that the questionnaires provide consistent and reliable results. For this same reason factor analysis was not carried out on the questionnaires using the sample data as this analysis has already been carried out by the creators of the questionnaires.

Antonakis et al. (2003) carried out validation of the MLQ questionnaire and their research provided strong evidence in support of its validity and reliability. Their study confirmed, with very large samples, that the nine leadership factor model was indeed viable. Their first study included 3368 subjects, while their second study included 6525 subjects. Even though the sample size of 157 researchers is adequate according to Singh (2006) it is still smaller than some other studies, which have been conducted. The larger the sample size the less the sample variability.

Table A3 in Appendix A, describes the reliability for the two dimensions of employee satisfaction, namely intrinsic and extrinsic satisfaction, which have an adequate sample size. The IBM Statistical Package for the Social Sciences (SPSS) software v.22 was used to calculate the Cronbach’s alpha values of 0.88 and 0.77 for intrinsic and extrinsic satisfaction respectively. These values provide statistical evidence that the data is reliable. By inference, the general satisfaction measure, which is derived from the combination of intrinsic and extrinsic satisfaction, must also be reliable.

Having established the reliability of the questionnaires a high-level exploratory analysis was performed on the general satisfaction measures calculated from researcher responses. SPSS was used and the output is shown in Table A4, Appendix A. A quick glance at the close proximity of Mean and Median for each of the general satisfaction measure suggests that the data is approximately normally distributed. However, on more detailed examination the skewness value indicates that the data is slightly skewed although as the skewness value is less than unity we can conclude that it is not significant. These findings are supported by the general satisfaction Q-Q plot in Figure A1 in Appendix A, where it can be seen that the data points fall closely onto the super-imposed, normal distribution line.

Having determined that there was no significant skew in the general satisfaction data, and that its distribution was approaching normal, an independent samples t-test was carried out to determine if the general satisfaction levels found for transformational managers and those for transactional managers could be generalised across a larger population. Initially ‘Levene’s Test for Equality of Variances’ was carried out to ensure that the variances between the general
satisfaction in transformational manager led groups and those of the transactional manager led
groups were not statistically different, suggesting that the satisfaction levels were due to
chance. The result showed a Significance = 0.285 with \( F = 1.190 \) (see Table A5 in Appendix A).
The significance being greater than 0.05 indicates that the variance between the two groups is
not statistically significant and we therefore proceeded to examine t-values and p-values.

The t-test for general satisfaction (Table A5, Appendix A) provides a t-value equal to -3.844
and p-value equal to 0.001. This low p-value, which is significantly less than 0.05, suggests that the
leadership style and satisfaction results can be generalised across a larger population.

5.5 Data Correlation

The correlation coefficient, \( r \), represents the degree to which two variables influence one
another. It is represented by a decimal number in the range of -1.0 to +1.0. An \( r \) value of 1.0
indicates a perfect positive correlation; an \( r \) value of -1.0 represents a perfect negative
correlation. The closer the \( r \) value is to zero the weaker the correlation, with zero indicating that
there is no correlation whatsoever between the variables. A strong correlation between two
variables is not an assurance that one variable influences another; there could in fact be other
variables, which have a strong correlation and are exerting influence. This study has utilised the
Pearson correlation method to identify where relationships exist between variables.

Table 5 provides the correlations between the different employee satisfaction dimensions (i.e.,
general, intrinsic and extrinsic) and the leadership dimensions. As can be seen, employee
satisfaction exhibits the strongest positive correlation with the transformational leadership
dimensions of *inspirational motivation* (i.e., \( r = 0.332 \)) and *individualised consideration* (i.e., \( r =
0.375 \)), however, these correlations, whilst being positive are not overly strong. *Idealised
influence (attributed and behaviour), management by exception (active) and intellectual
stimulation* all exhibit a weak positive correlation with general satisfaction with \( r = 0.113, r =
0.021, r = 0.163 \) and \( r = 0.165 \), respectively. Negative correlations are observed between
general satisfaction and *contingent reward* (\( r = -0.471 \)), the passive form of management by
exception (\( r = -0.183 \)) and laissez-faire management with \( r = -0.283 \).
Table 5: Correlation between Employee Satisfaction and Leadership Dimensions

<table>
<thead>
<tr>
<th></th>
<th>G-General Satisfaction</th>
<th>E-Intrinsic Satisfaction</th>
<th>IS-Extrinsic Satisfaction</th>
<th>MA-Idealised Influence (attributed)</th>
<th>MB-Idealised Influence (behaviour)</th>
<th>IC-Individualised Consideration</th>
<th>IS-Intellectual Stimulation</th>
<th>MA-Inspirational Motivation</th>
<th>CR-Contingent Reward</th>
<th>MSEA-Management by Exception (Active)</th>
<th>MSEP-Management by Exception (Passive)</th>
<th>LF-Laissez-Faire</th>
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<tr>
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<td>Pearson Correlation</td>
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</table>

With respect to the intrinsic dimension of employee satisfaction, similar trends were observed as for general satisfaction, with individualised consideration again exhibiting the strongest positive correlation with intrinsic satisfaction (i.e., r = 0.359) and inspirational motivation having the second strongest correlation (i.e., r = 0.295). Furthermore, contingent reward likewise exhibits the strongest negative correlation with intrinsic satisfaction (i.e., r = -0.470).

In the case of extrinsic satisfaction the results are again similar. The transformational leadership dimension of individualised consideration exhibits the strongest positive correlation with extrinsic
satisfaction (i.e, $r = 0.362$). The dimensions of *idealised influence* (behaviour), *intellectual stimulation*, *contingent reward*, *management by exception* (passive) and *laissez-faire* all show negative correlations, of varying degrees, with extrinsic satisfaction.

The correlation matrix was also tested in terms of *multicollinearity*. Multicollinearity refers to correlations or multiple correlations of sufficient magnitude to have the potential to adversely affect regression estimates. In other words, if two independent variables (e.g., two different leadership style dimensions), are strongly correlated (e.g., $r > 0.7$), then there is a case of collinearity. If more than two independent variables are strongly correlated with each other then we have multicollinearity. In this study multicollinearity between the independent variables (i.e., leadership style dimensions) was not observed.

The individual leadership dimensions were summarised into the appropriate leadership styles and the correlation was executed a second time. Table 6 shows that transactional leadership style has a negative correlation with both intrinsic and extrinsic and hence general satisfaction. Likewise, the *laissez-faire* leadership style has also a negative correlation with general satisfaction. For the sample selected in this study only transformational leadership style had a positive correlation with all three dimensions of satisfaction.

In Tables 7 and 8 the relationship between Employee Satisfaction, Leadership Style and Geographic location is depicted. As can be seen in Table 7, the effect of transformational leadership on employee satisfaction is more profound compared to transactional leadership in the Northern and Central European R&Ds, while in these regions no prevalent leadership style was identified (i.e., the number of transformational leaders was equal to the number of transactional ones). However, in the Southern European R&Ds, it is clear that the prevalent leadership style was the transactional one since there were no transformational leaders identified.

As can be seen in Table 8, the transformational leadership style is the one which brings employee satisfaction in all countries involved in the research, with the exception of Greece where there were no transformational leaders identified. Another notable finding is that while in Finland and Ireland transformational leadership was the prevalent style, in Austria, United Kingdom and Greece the prevalent style was transactional leadership. In Sweden no style was prevalent since the number of transformational leaders was equal to the number of transactional ones.
Table 6. Correlation between Employee Satisfaction and Leadership Styles

<table>
<thead>
<tr>
<th></th>
<th>G</th>
<th>I</th>
<th>E</th>
<th>TF</th>
<th>TC</th>
<th>LF</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Satisfaction</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Sig. (2-tailed)</td>
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<tr>
<td>N</td>
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<tr>
<td>Intrinsic Satisfaction</td>
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<tr>
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<td>Extrinsic Satisfaction</td>
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<tr>
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<td>.883 *</td>
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<tr>
<td>TF-Transformational Leadership</td>
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<td>.251</td>
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<td>Sig. (2-tailed)</td>
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<td>-.318</td>
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<td>LF-Laissez-Faire Leadership</td>
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</table>

Table 7. Relationship between Employee Satisfaction, Leadership Style and Geographic Location (Region-level)

<table>
<thead>
<tr>
<th>Location</th>
<th>Satisfaction Level for Transformational Leadership</th>
<th>Satisfaction Level for Transactional Leadership</th>
<th>Prevalent Leadership Style</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern and Central</td>
<td>77%</td>
<td>70%</td>
<td>None</td>
</tr>
<tr>
<td>Southern</td>
<td>n/a</td>
<td>69%</td>
<td>Transactional</td>
</tr>
</tbody>
</table>

Table 8. Relationship between Employee Satisfaction, Leadership Style and Geographic Location (Country-level)

<table>
<thead>
<tr>
<th>Location</th>
<th>Satisfaction Level for Transformational Leadership</th>
<th>Satisfaction Level for Transactional Leadership</th>
<th>Prevalent Leadership Style</th>
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<td>Austria</td>
<td>81%</td>
<td>70%</td>
<td>Transactional</td>
</tr>
<tr>
<td>Finland</td>
<td>74%</td>
<td>71%</td>
<td>Transformational</td>
</tr>
<tr>
<td>Greece</td>
<td>n/a</td>
<td>69%</td>
<td>Transactional</td>
</tr>
<tr>
<td>Sweden</td>
<td>76%</td>
<td>88%</td>
<td>None</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>77%</td>
<td>72%</td>
<td>Transactional</td>
</tr>
<tr>
<td>Rep. of Ireland</td>
<td>76%</td>
<td>n/a</td>
<td>Transformational</td>
</tr>
</tbody>
</table>
Figure 4: Two-way ANOVA analysis

Figure 4 shows the output from a two-way ANOVA analysis carried out using the SPSS package and providing as input data from Tables A1 and A2 in Appendix A. As can be seen both transformational and transactional leadership are employed in most of the sampled locations with varying degrees of satisfaction. In cases where both transformational and transactional styles of leadership are employed in the same location employee satisfaction levels are higher for those employees being managed by transformational leaders. The plot provides strong support for hypothesis H1 - Transformational leadership style has a strong positive influence on employee satisfaction within R&D organisations.
6. DATA ANALYSIS

The results from the statistical analysis on data correlation (see Table 6) provide support to Hypothesis 1. As it is shown, transformational leadership predicts positively employee satisfaction. This result confirms the outcome from the research studies of Berson and Linton (2005), Munir et. al., (2012), and Marnis (2012) that transformational leadership is positively correlated to general employee satisfaction.

Transformational leaders supervise employees who are more satisfied with their jobs compared to employees who report to other leaders. R&D organisations are complex and uncertain working environments where novelty and innovation are important performance indicators. Such environments can increase the researchers’ receptivity to transformational leadership as proposed by Pawar and Eastman, (1997). Research environments are involved in solving complex scientific problems and generating innovative ideas, which can lead to the organisation’s competitive advantage and success. According to Munir et. al., (2012), transformational leaders motivate their employees to follow alternative routes for the solution of their problems and assist them to develop new ideas. Since research work is related to uncertain goals, it is very important to keep the researchers optimistic, and stimulated. Transformational leaders are optimistic regarding achieving future goals, stimulate creativity in their followers and provide meaning to the task to be accomplished.

Even though the results of the current study support our first Hypothesis, the correlation is not as strong as we initially expected (i.e., $r = 0.328$). Similar studies available in the open literature propose stronger correlations. For example Berson and Linton (2005) propose a value of $r = 0.640$ and Munir et. al., (2012) propose a value of $r = 0.725$.

The data analysis also provides partial support for Hypothesis 2. As expected, transformational leadership predicts employee general satisfaction positively. While the correlation between transformational leadership and employee overall satisfaction was $r = 0.328$, the correlation between transactional leadership style and employee satisfaction was $r = -0.392$. Thus, results from Table 6 do not provide full support for Hypothesis 2. Transactional leadership does not contribute to a happier workforce within R&D settings as we initially expected. The above finding is consistent with the study of Berson and Linton (2005) which suggests that transactional leadership has a weak negative impact on employee satisfaction. This result is also consistent with previous findings from Lowe et al., (1996) and provides further support for the role of transactional leadership in R&D environments. It seems that transactional leadership in R&D does not follow the general trend since it does not positively affect employee satisfaction. It should be also mentioned that even though transactional leadership is negatively correlated with employee general satisfaction, the management by exception (active) dimension exhibits a weak positive correlation (i.e., $r = 0.163$), (see Table 5).

Our initial hypothesis that transactional leadership is positively correlated to employee satisfaction was based on Bass and Avolio’s (1994) proposal that transactional leadership offers the contractual basis on which the transformational leaders form the emotional basis. It seems that even though this linkage may exist in general, for R&D organisations it might not be necessary. R&D organisations are special working environments and researchers are employees who are motivated by higher needs related to new innovative ideas and creativity. Moreover, goals are not clear from the very beginning and there is a high degree of uncertainty in how to achieve them. For this reason any contractual relationship between the leader and the researcher might not show clear benefits for achieving the organisational goals and provide satisfaction to employees. Thus, for R&D environments we may expect a negative correlation.
between transactional leadership and employee satisfaction, as it was found in the current study.

To test our third hypothesis, that individualised consideration and inspirational motivation are the leadership dimensions related to the highest levels of employee satisfaction, we examined the correlation of the dimension with the measures of employee satisfaction shown in Table 5. The results fully support Hypothesis 3 as the correlations between the dimensions of individualised consideration and inspirational motivation, and general, intrinsic and extrinsic satisfaction are shown to be positive, with stronger correlations than any other leadership dimension (i.e., \( r = 0.332, 0.295 \) and 0.343 for inspirational motivation and \( r = 0.375, 0.359 \) and 0.362 for individualised consideration, respectively). The above results are fully aligned with the outcome of Berson and Linton (2005) and Munir et. al., (2012) studies.

As initially anticipated, individual dimensions of transformational leadership were expected to exhibit different degree of influence on employee job satisfaction. Researchers are employees with special needs, driven by intrinsic motivation and stimulation and, thus, the dimensions of transformational leadership like intellectual stimulation can help to satisfy such needs. Intellectually stimulating leaders encourage innovation and creativity in their followers, which are two basic elements of a researcher’s job that can keep them satisfied. Proposing innovative ideas is essential for a researcher’s well-being and, since intellectually stimulating leaders provide inspiration to followers in order to come up with such new ideas, they contribute to their satisfaction. In research work, continuous professional development and knowledge acquisition are significant for the employees if they want to be scientifically updated and follow research developments. Moreover, researchers seek intellectual autonomy since their intrinsic motivation is enough to make them creative and innovative. Thus contributing to the followers’ development for higher capabilities and supporting their needs for autonomy can have a positive influence for their satisfaction and performance.

The observed R&D teams within the sample population correspond to different locations in Europe. Analysis of the data does not support Hypothesis 4 that transformational leadership style is the prevalent style in Northern and Central European R&Ds. More specifically, within the sample surveys, 50% of the R&D teams surveyed demonstrated transformational leadership style, while the remaining 50% of managers seem to adopt transactional leadership. No Laissez-faire styles were observed at all (see Table A1, Appendix A). Even though the Northern and Central European societies are flat, all employees have equal rights, and power distance is low, half of the managers of the teams, which were investigated, were found to be transactional.

An interesting finding of this study was that the result of which style the Northern and Central European managers believed they ought to be following showed that 57% should follow a transactional leadership style and the remaining 43% a transformational one. This outcome shows that organisations and managers are lacking knowledge related to which leadership style they should adopt in order to promote high levels of employee satisfaction and R&D success. Moreover, the above result is not in line with theories by Whitley (1997) and Chen (2001), which show that transformational leadership is often related to flatter organisational structures with low power distance as expected in the Northern and Central European firms.

In contrast to the above findings, the data received from Southern European R&Ds supports Hypothesis 5 that transactional leadership is the dominant style. It was found that 100% of Southern European R&D leaders adopt a transactional style while the result of which style these leaders believed they ought to be following showed that all of them want to be transactional. A reason supporting this finding is that in the Southern European countries the societies are less flat with higher power distance, compared to Northern and Central European ones (The
Hofstede Centre, 2014). Even though the power distance is not as elevated as in Eastern societies like China, hierarchy is respected and inequalities between managers and their followers are acceptable.

To test our last two hypotheses, that *individualised consideration* is the most prominent leadership style in Central and Northern European R&Ds while *idealised influence* is the most prominent style in Southern European R&Ds, we examined the individual dimensions of transformational leadership for the two geographic locations separately. The results fully support Hypothesis 6 since *individualised consideration* scores the highest average value (3.56), followed by *inspirational motivation* (3.37), *idealised influence* (3.05) and *intellectual stimulation* (2.88). A possible explanation for the above trend is that Central and Northern European cultures, where organisational structures are flat, promotions are based on personal competencies and not on personal relationships, the employees are treated as company assets and managers are supportive and consider their professional development as part of the organisational success, *individualised consideration* is the most common transformational style among leaders.

The findings related to Southern European R&Ds support Hypothesis 7 since *idealised influence* was the transformational dimension with the highest average value (2.94) followed by *inspirational motivation* (2.86), *intellectual stimulation* (2.63) and *individualised consideration* (2.38). The results are aligned with Tsai (2009) who pointed out that in hierarchical cultures charismatic leadership is the most prominent style. Southern European cultures favour hierarchies and power distance between leaders and subordinates are more profound. The employees' promotions are based mainly on personal relationships and networks and less on the competencies that the employees possess. This is a possible explanation why *individualised consideration* is the transformational dimension with the lowest average score in contrast to Central and Northern European R&Ds, where it exhibits the highest value. At this point it should be mentioned that even if the results provide support to our last hypothesis, the sample size (i.e., 4 R&D teams) is too small a sample to permit a generalisation regarding the effect of the Southern European culture on the leadership style.
7. CONCLUSIONS

Transformational leadership is an important management style, which promotes work performance and employee satisfaction, as it has already been proven by several relevant research studies in the past (Keller, 1992; Howell and Avolio, 1993; Lowe, 1996; Pawar and Eastman, 1997; Thite, 2000; Nielsen 2009; Paulsen, 2009; Eisenbeis and Boerner, 2010; Liu, 2011; Ahmad, 2013). Regarding the influence that transformational leadership has on employee satisfaction in R&D organisations there are only a limited number of studies in the open literature dealing with this topic (Berson and Linton, 2005; Munir, 2012).

The current research work provides empirical evidence of the importance of transformational leadership on promoting employee satisfaction in R&D environments, which is in line with the existing studies in this field. Transformational leadership was found to be positively correlated with employee satisfaction and the scales of individualised consideration and inspirational motivation to exhibit the highest correlations with general satisfaction among all of the leadership dimensions. Transactional leadership was found not to promote employee satisfaction, although the dimension of management by exception (active) seems to contribute to all three scales of satisfaction. This result does not confirm the findings of studies which investigate the effect of transactional leadership on employee satisfaction in conventional organisations, however it is aligned with studies conducted in R&D organisations (Berson and Linton, 2005), and provides additional evidence that the complexity of such working environments results in different trends from the common ones.

An attempt was also made to examine the effects of national culture on the leadership style, trying to focus on the main cultural differences observed between Northern/Central and Southern Europe. While in Northern and Central European R&Ds the number of transformational managers was found to be equal to the number of transactional ones, in the Southern Europe the transactional leadership style was found to be the dominant one, as a result of less flat structure and higher power distance in the society. The above result confirmed the conclusion, which was drawn by other studies conducted in other types of organisations, that the higher power distance the more prevalent the transactional leadership is (Whitley, 1997 and Chen 2001). However, in Northern and Central European R&Ds, transformational leadership was not identified as the prevalent leadership style as expected based on these studies. A most interesting observation was that the majority of managers believe that transactional leadership should be the style to follow even though the data clearly shows that it does not bring employee satisfaction.

Investigation was also conducted on the individual dimensions of the transformational leadership style in order to find how they vary between the different geographic locations in Europe, as a result of the influence of the national culture. It was found that individualised consideration and inspirational motivation where the dominant dimensions in Northern and Central European R&Ds while idealised influence was the prominent one in the Southern European ones. The above results confirmed the findings of Tsai (2009) who pointed out that in hierarchical cultures charismatic leadership is the most prominent style.

The authors believe that the current study will prove invaluable information to organisations, which consider setting up new R&D sites in the European region, related to the leadership style that the local managers should have in order to keep the employees satisfied. Moreover, it can provide guidance to R&D organisations as to whether or not they should establish or enhance the training given to new or existing managers in order to promote the desired leadership style,
which will bring success to the organisation.

7.1 Implications for Practice

The outcome of the current study suggests the significance of appropriate leadership style in R&D settings. Companies should ensure that transformational leadership style should be promoted through the company’s policies and employee evaluations. Training courses, which would explain the differences between the various leadership styles, stress the efficiency of transformational leadership and, finally, assist and managers to adopt a transformational style should be established. Moreover, a management ranking procedure according to the managers’ style should be followed and communicated throughout the organisation, in order to enhance managers’ need for becoming transformational leaders.

7.2 Limitations, Challenges and Further Research

The limited time available to conduct this study (define and prepare the approach, identify suitable subjects, contact the subjects and receive the completed questionnaires) proved to be a significant challenge. The size and scale of the companies contacted meant that any interaction with external parties, such as researchers, was subject to internal policies and procedures and sometimes involving departments and personnel such as Human Resources, Corporate Communications and Employees Unions. These policies and procedures presented significant ‘red tape’, which introduced lengthy delays before any authorisation to disclose employee satisfaction information could be obtained. This had a significant impact on the ability to obtain substantial data in the time available.

Email, although an extremely rapid and effective method for communicating, has the distinct disadvantage that it is associated with ‘spamming’ and as such may our initial invitation email have lacked credibility or genuineness. In addition to this, as the majority of organisation who responded were those that had a personal contact of the researchers it could be suspected that, in the absence of a desire to assist an acquaintance, all other firms were waiting on the ‘what’s in it for me?’ question to be satisfied. The invitation letter offered no more than to share the final findings of the research, which by many could be considered valuable information but for the majority of firms did not, in and of itself, provide sufficient motivation.

The MLQ is a self-administered assessment of an individual’s leadership style. As with all questionnaires it, is reliant on the questionnaire respondent being frank and truthful in their responses. It is not uncommon, for a person, when faced with a questionnaire, particularly an anonymous one, to project a profile which they would like to have by answering questions in a manner which they believe will correspond to the desired profile. The data analysed herein has been done so on the assumption that all answers are a true and accurate reflection of actual states and behaviours.

An additional limitation of the study could be considered the measuring methodology that was used to determine employee satisfaction. Although the method used was based on a well-established questionnaire the open literature (see section 4.3) asserted that there are, in fact, a multitude of other questionnaires, which could have been used for identifying the level of employees’ satisfaction. Thus, future research studies should examine the correlation between leadership style and employee satisfaction using different measurement methods that will be
applied on different populations to determine which provide the most consistent and accurate assessment.

Organisations today are ever conscious that employees are the foundation of the firm and that their happiness and well-being is a strong determinant of success. To this end, many organisations conduct in house ‘Voice of the Employee’ surveys to gauge employee sentiment and satisfaction. It is entirely possible that firms contacted to participate in this study were unwilling to do so as an additional satisfaction survey could confuse employees or indeed lower participation rates of their own, in house satisfaction survey.

Although Bass & Avolio’s MLQ survey is tried, tested and used widely it does however have its potential limitations. Firstly, the number of questions supporting each leadership dimension is quite limited. This in all likelihood increases completion rates of what it evidently a concise survey, however, it does beg the question, ‘could Cronbach’s Alpha scores be improved with a more extensive spread of question for each dimension?’ Also, there does seem to be some inequality between how each leadership style is measured. Transformational leadership takes results from five individual dimensions, transactional from only three and lastly, Laissez-faire considers only one leadership dimension.
8. References


**Web Sites:**

http://geert-hofstede.com/

## APPENDIX A - SUPPORTING DATA

### Table A1: MLQ Summary Data

<table>
<thead>
<tr>
<th>Manager</th>
<th>R&amp;D location</th>
<th>Manager Origin</th>
<th>Gender</th>
<th>Time with firm</th>
<th>Actual Leadership Style</th>
<th>Perceived Ideal Leadership Style</th>
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<td>General Satisfaction (Mean %)</td>
<td>Intrinsic Satisfaction (Mean %)</td>
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<td>82</td>
<td>75</td>
<td></td>
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<tr>
<td>21</td>
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<td>78</td>
<td>74</td>
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<tr>
<td>22</td>
<td>Greece</td>
<td>68</td>
<td>70</td>
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<tr>
<td>23</td>
<td>Greece</td>
<td>67</td>
<td>70</td>
<td>62</td>
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</tr>
<tr>
<td>24</td>
<td>Austria</td>
<td>78</td>
<td>80</td>
<td>74</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>Rep. of Ireland</td>
<td>76</td>
<td>77</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>Finland</td>
<td>75</td>
<td>77</td>
<td>72</td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>United Kingdom</td>
<td>68</td>
<td>68</td>
<td>57</td>
<td></td>
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<tr>
<td>28</td>
<td>United Kingdom</td>
<td>77</td>
<td>73</td>
<td>75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>Finland</td>
<td>68</td>
<td>70</td>
<td>65</td>
<td></td>
<td></td>
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<tr>
<td>30</td>
<td>Finland</td>
<td>77</td>
<td>77</td>
<td>75</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table A3: Cronbach’s Alpha for Satisfaction Measures

<table>
<thead>
<tr>
<th>Related Questions</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic Satisfaction: Q1, Q2, Q3, Q4, Q7, Q8, Q9, Q10, Q11, Q15, Q16, Q17, Q18 &amp; Q20</td>
<td>0.88</td>
</tr>
<tr>
<td>Extrinsic Satisfaction: Q5, Q6, Q12, Q13, Q14 &amp; Q19</td>
<td>0.773</td>
</tr>
</tbody>
</table>

Table A4: Exploratory Statistics on Satisfaction

<table>
<thead>
<tr>
<th>General Satisfaction</th>
<th>Statistic</th>
<th>Statistic Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>72.90</td>
<td></td>
</tr>
<tr>
<td>Median</td>
<td>74.00</td>
<td></td>
</tr>
<tr>
<td>Skewness</td>
<td>-3.12</td>
<td></td>
</tr>
</tbody>
</table>

Figure A1: General Satisfaction Q-Q Plot
<table>
<thead>
<tr>
<th></th>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Equal variances</td>
<td>1.190</td>
</tr>
</tbody>
</table>
APPENDIX B - MULTIFACTOR LEADERSHIP QUESTIONNAIRE

Actual Form

This survey will help you describe your leadership style as you perceive it. Starting with the first question, judge how frequently each statement fits you. For items 1 through 18, indicate what you actually do. For items 19 through 36, indicate what you ought to be doing. If an item is irrelevant, or if you are unsure or do not know the answer, leave it blank. Use the rating scale below:

<table>
<thead>
<tr>
<th></th>
<th>Not at all</th>
<th>Once in a while</th>
<th>Sometimes</th>
<th>Fairly often</th>
<th>Frequently, if not always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1. I avoid getting involved when important issues arise
2. I talk about my most important values and beliefs
3. I seek differing perspectives when solving problems
4. I discuss in specific terms who is responsible for achieving performance targets
5. I wait for things to go wrong before taking action
6. I talk enthusiastically about what needs to be accomplished
7. I spend time teaching and coaching
8. I show that I am a firm believer in “If it ain’t broke, don’t fix it.”
9. I go beyond self-interest for the good of the group
10. I act in ways that build others’ respect for me
11. I concentrate my full attention on dealing with mistakes, complaints, and failures
12. I consider the moral and ethical consequences of decisions
13. I direct my attention toward failures to meet standards
14. I consider an individual as having different needs, abilities, and aspirations from others
15. I suggest new ways of looking at how to complete assignments
16. I delay responding to urgent questions
17. I express satisfaction when others meet expectations
18. I express confidence that goals will be achieved
Ought Form

Now indicate what you ought to be doing.

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Once in a while</th>
<th>Sometimes</th>
<th>Fairly often</th>
<th>Frequently, if not always</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1. I avoid getting involved when important issues arise
2. I talk about my most important values and beliefs
3. I seek differing perspectives when solving problems
4. I discuss in specific terms who is responsible for achieving performance targets
5. I wait for things to go wrong before taking action
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14. I consider an individual as having different needs, abilities, and aspirations from others
15. I suggest new ways of looking at how to complete assignments
16. I delay responding to urgent questions
17. I express satisfaction when others meet expectations
18. I express confidence that goals will be achieved
Scoring Key - Actual

Scoring: The MLQ scale scores are average scores for the items on the scale. The score can be derived by summing the items and dividing by two. All of the leadership style scales have two items.

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Once in a while</th>
<th>Sometimes</th>
<th>Fairly often</th>
<th>Frequently, if not always</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Idealised Influence (Attributed) total/2 =

Idealised Influence (Behavior) total/2 = Management-by-Exception (Passive) total/2 =

Inspirational Motivation total/2 = Laissez-faire Leadership total/2 =

Intellectual Stimulation total/2 =

Individualised Consideration total/2 =

Management-by-Exception (Active) total/2 =

1. Laissez-faire
2. Idealised Influence (Behavior)
3. Intellectual Stimulation
4. Contingent Reward
5. Management-by-Exception (Passive)
6. Inspirational Motivation
7. Individualised Consideration
8. Management-by-Exception (Passive)
9. Idealised Influence (Attributed)
10. Idealised Influence (Attributed)
11. Management-by-Exception (Active)
12. Idealised Influence (Behavior)
13. Management-by-Exception (Active)
14. Individualised Consideration
15. Intellectual Stimulation
16. Laissez-faire
17. Contingent Reward
18. Inspirational Motivation
Scoring Key - Ought

Scoring: The MLQ scale scores are average scores for the items on the scale. The score can be derived by summing the items and dividing by two. All of the leadership style scales have two items.

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Once in a while</th>
<th>Sometimes</th>
<th>Fairly often</th>
<th>Frequently, if not always</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Idealised Influence (Attributed) total/2 =</td>
<td>Management-by-Exception (Active) total/2 =</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idealised Influence (Behavior) total/2 =</td>
<td>Management-by-Exception (Passive) total/2 =</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inspirational Motivation total/2 =</td>
<td>Laissez-faire Leadership total/2 =</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intellectual Stimulation total/2 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individualised Consideration total/2 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contingent Reward total/2 =</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Laissez-faire
2. Idealised Influence (Behavior)
3. Intellectual Stimulation
4. Contingent Reward
5. Management-by-Exception (Passive)
6. Inspirational Motivation
7. Individualised Consideration
8. Management-by-Exception (Passive)
9. Idealised Influence (Attributed)
10. Idealised Influence (Attributed)
11. Management-by-Exception (Active)
12. Idealised Influence (Behavior)
13. Management-by-Exception (Active)
14. Individualised Consideration
15. Intellectual Stimulation
16. Laissez-faire
17. Contingent Reward
18. Inspirational Motivation
# APPENDIX C - LICENCES FOR QUESTIONNAIRES

**Ship To:**
Christopher Souto  
christopher@souto.net  
07768807300  
40 south parade  
Belfast n/a BT7 2GP  
GB (United Kingdom)

**Bill To:**
Christopher Souto  
christopher@souto.net  
07768807300  
40 south parade  
Belfast n/a BT7 2GP  
GB (United Kingdom)

<table>
<thead>
<tr>
<th>Product</th>
<th>Code</th>
<th>Quantity</th>
<th>Price/Each</th>
<th>Total</th>
</tr>
</thead>
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<tr>
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<td>MLQ-License</td>
<td>1</td>
<td>$100.00</td>
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</table>

Shipping: Online Product Delivery: $0.00  
Sales Tax: $0.00

Order Total: $100.00

Payment method: PayPal

This order has been paid in full.
Appendix D - Minnesota Satisfaction Questionnaire

Ask yourself: How satisfied am I with this aspect of my job?

- **Very Sat.** means I am very satisfied with this aspect of my job.
- **Sat.** means I am satisfied with this aspect of my job.
- **N** means I can't decide whether I am satisfied or not with this aspect of my job.
- **Dissat.** means I am dissatisfied with this aspect of my job.
- **Very Dissat.** means I am very dissatisfied with this aspect of my job.

<table>
<thead>
<tr>
<th>On my present job, this is how I feel about</th>
<th>Very Dissat.</th>
<th>Dissat.</th>
<th>N</th>
<th>Sat.</th>
<th>Very Sat.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Being able to keep busy all the time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The chance to work alone on the job</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>3. The chance to do different things from time to time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The chance to be someone who in the community</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The way my boss handles his/her workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. The competence of my supervisor in making decisions</td>
<td></td>
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</tr>
<tr>
<td>7. Being able to do things that don't go against my conscience</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. The way my job provides for steady employment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. The chance to do things for other people</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. The chance to tell people what to do</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. The chance to do something that makes use of my abilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. The way company policies are put into practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13. My pay and the amount of work I do</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. The chances for advancement on this job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. The freedom to use my own judgment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. The chance to try my own methods of doing the job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. The working conditions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. The way my co-workers get along with each other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. The praise I get for doing a good job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. The feeling of accomplishment I get from the job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Check one: □ Male  □ Female

2. When were you born? ________________ 19__

3. Circle the number of years of schooling you completed:

<table>
<thead>
<tr>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
</table>
| Grade School | High School | College | Graduate or Professional School

4. What is your present job called? ____________________________

5. What do you do on your present job?

   ____________________________

   ____________________________

6. How long have you been on your present job? __________ years __________ months

7. What would you call your **occupation**, your usual line of work? ____________________________

8. How long have you been in this line of work? __________ years __________ months
APPENDIX E - INVITATION LETTER

[Date]
[first name] [last name]
[Address 1]
[City], [State] [Zip]

Dear [R&D Head]:

I am writing on behalf of the Blekinge Institute Of Technology (Karlskrona, Sweden) to ask if you would be interested in participating in an important project. As part of a program to evaluate effectiveness of leadership style within R&D organisations, we are conducting a survey of R&D researchers to ascertain their satisfaction level with given leadership styles in a given location.

Your organisation was selected to be part of this project because of its considerable annual investment in R&D programs. Your contribution will provide invaluable input into this field of research.

If you are not the correct person to contact in regard to this I would be most grateful if you could forward this email to the appropriate person.

If you would be willing for your researchers to participate in the survey please reply to this email providing the name and email address of two or three teams, each with a different manager/leader. I will then forward you a survey for each of these teams. Researchers responses will be completely confidential and anonymous. The only identification required for each survey is the team name, the company name and team location. The results of the survey will be consolidated with organisations across various sectors and analysed. The results for your organisation will be shared with you whilst they will remain confidential and won't be published. What will be published is the overall result including all the R&D organisations that will be studied. These wider results will also be shared with you.

The benefit for your R&D organisation is to identify the current leadership style and level of employee satisfaction and to obtain knowledge on what the effective leadership styles are that lead to employee satisfaction in R&D settings.

The survey is in two parts. The first short survey (36 multiple choice questions) will be distributed to the managers and the second short survey (20 multiple choice questions) will be
distributed to the researchers. Time to complete the surveys is typically in the range of 5-7 minutes.

You will be provided with a link to an online survey to share with your researchers. The surveys will be provided in paper form if you prefer.

Thank you in advance for your participation in this important project. If you have any questions about the administration of the survey, please contact Christopher Souto, chsc12@student.bth.se or Apostolos Krallis, apkr12@student.bth.se

Yours sincerely,

Christopher Souto & Apostolos Krallis