UNIVERSITETET I AGDER

# Internal Factors in Professional Service Firms (PSFs) and their Impact on Innovation Output:

A Quantitative Study of Norwegian PSFs

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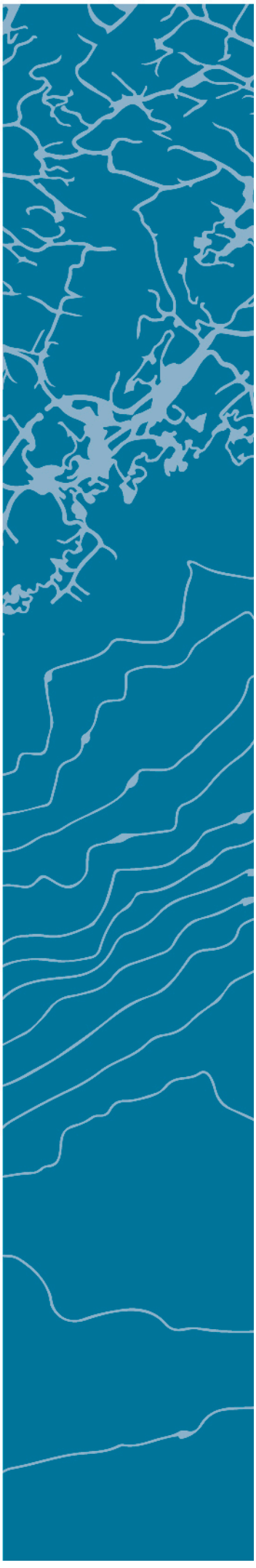


# Forewords and Acknowledgements

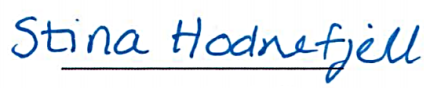
We have written this master thesis as a final part of our two years at the University of Agder, faculty of Business and Law, where we have studied Business Administration. The thesis is a compulsory part of the program and counts for 30 credit points.

First, we would like to thank our supervisor Professor Andreas Erich Wald, who have contributed with knowledge, inspiration and good discussions throughout the period of writing the thesis. He also helped us with methods on how to design the questionnaire and with recommendations on software to analyze the data. Further, we would like to thank the faculty of Business and Law for providing us with relevant knowledge and a safe learning environment throughout the two years of our master's degree. We also want to thank Irene Bredal for her help with proof reading the thesis.

We have learned a lot during this period, and we leave the university with expanded and newfound knowledge on our chosen topic. The master program has given us knowledge within the fields of organizational theory, management, innovation and strategy, which all have been very useful in this process. This period has definitely given us a challenge, but when looking back, we agree that it has been enjoyable and very exciting. Finally, we would like to thank our friends and family who have been very supportive and understanding throughout our last semester.

*"It is not the strongest of the species that*
*survive, nor the most intelligent, but the*
*one most responsive to change"*
Charles Darwin

Kristiansand, 30. Mai 2017



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# Abstract

The purpose of this study is to contribute to the understanding of Norwegian Professional Service Firms (PSFs) by exploring the effect of internal factors' impact on innovation output. The four internal factors selected for this study are (1) organizational inertia, (2) training, (3) human capital and (4) innovation culture. The economy is becoming increasingly knowledge based, and at the same time, the importance of innovation is becoming more prevalent in the business world. Even among PSFs, that are perceived as conservative, innovation is now becoming critical for survival. However, it is challenge to become a successful innovator, as there are many factors that may influence the innovation process. Overall, the research associated with the internal factors' impact on innovation output in PSFs is limited, and this will be the first study on the topic in Norway.

The study has a quantitative approach and investigates innovation behavior by analyzing primary data obtained from 142 classic and neo-classic Norwegian PSFs. Through this study, we have defined a measure on the extent to which the different internal factors exist among Norwegian PSFs and a measure on the level of innovation output among them. We have established that there is a statistical significant relationship between organizational inertia and innovation output, and innovation culture and innovation output. Alongside, we have found that human capital and training is high among all respondents. Further, our study show that size does not have a significant controlling effect on any of the relationships, while age have a significant impact the relationship between innovation culture and innovation output. The last control variable, sub-sector, was only analyzed at the descriptive level, and it is found that there are clear differences between neo-classic and classic PSFs. In addition, the results display that Norwegian PSFs have rather high investment rates in innovation activities, and that there is a positive relationship between the investment rate and innovation output.



Key Words: Professional Services Firms, Innovation, Internal Factors, Innovation Output, Norway

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# 1.0 Introduction

As the world is becoming more globalized, higher demands are made for efficiency, productivity and knowledge. Modern economy can be described as innovation driven, where knowledge, technology and innovation are increasingly assumed to determine the competitiveness of industries (Langeland and Vatne, 2010). Recently, the term knowledge-economy has become a collective term for industries that often are high-tech and innovative with highly educated employees. In Norway, conversion processes and new technology lead the changes towards a reduced need for unskilled labor in an increasing number of businesses in different industries. Therefore, knowledge-intensive firms have lately been facing a rapid growth (Statistics Norway, 2016c). This thesis deals with the challenges of innovation in classic (law, auditing, accounting, architecture) and neo-classic (consulting and advertising) Norwegian Professional Service Firms (PSFs), where we attempt to contribute to knowledge on innovation in PSFs by combining academic and practical findings on internal factors' impact on innovation output.

For a long time, knowledge has been an important driver for technological advances, economic development and growth; a common assumption for industrialized countries is that education will bring out innovation, which leads to increased productivity and development (Aghion et al., 2009). In developed countries, the entire PSF sector is facing an increased importance, both at microeconomic and macroeconomic level (Kaiser and Ringlstetter, 2011). Moreover, according to Kaiser and Ringlstetter (2011), it is the innovative concepts and new services that ultimately make a PSF a market leader. These firms provide a special class of services that during the recent years have become one of the most important industries in the Norwegian economy. Previously, the majority of companies were manufacturing and general service companies, however, during the last few decades the professional service sector has seen a rapid growth (Statistics Norway, 2016b). Between 2008-2013, the PSF sector saw a growth rate of 9.5 %, compared to other industries with 0.4 % (Statistics Norway, 2016c).

According to Langeland and Vatne (2010), Norway have weaker performance than the other Nordic countries in international measurements on innovation activities. While the other Nordic countries are on top in the world, Norway is ranked below the average among the European countries. The topic is relevant considering that Norwegian PSFs are growing, while at the same time performing poorly when it comes to innovation. In spite of the growth and importance of

these firms, they have so far received comparatively little attention in existing literature (Kaiser and Ringlstetter, 2011).

A few years ago, Ostrom et al. (2010) listed service firm innovation among the top-ten research priorities, which confirms the significant gap that exists in the knowledge of the measurement of service firm innovation. Within the service sector, a strong emphasis on the ability to develop non-technological innovation exist in the form of management processes, marketing, design, customized solutions, the use of human capital, and forms of industry collaboration (Djellal and Gallouj, 2001; Drejer, 2004). These issues highlight the importance of the development of a specific measure of PSF innovation output. The research on the way innovation is managed in the PSFs, however, is a rather understudied and new topic (Miles, 2005; Ettlie and Rosenthal, 2011).

As reported by Statistics Norway (2016c), 37 of 86 industries in Norway are considered knowledge intensive. In a professional service context, the ability to provide innovative services and solutions more effectively and efficiently than competitors is known as a way to retain existing clients, expand offerings and obtain new clients (Barr and McNeilly, 2003). Innovation has been seen as a carrier of growth and economic development since Schumpeter in 1931 (Hogan et al., 2011). The ability to innovate gives a strong foundation for firms to obtain superior performance and to survive in competitive markets (Barney, 1991; Day, 1994). This means that they are able to protect themselves in unstable climates, they can respond faster to changes, create new opportunities and exploit existing ones to a greater extent than the competitors (Miles and Snow, 1978; Drucker, 1985).

It is a challenge to become a successful innovator as there are many factors that may influence the innovative efforts of an organization. These may be external or internal factors, however, this study will focus on the internal factors. It is evident from literature that internal factors must be managed at early stages for innovative activities to be successful (Kaiser and Ringsletter, 2011; Amara et al., 2016). In view of a large number of possible variables to study, the model will include a specific set of internal factors recognized in existing literature (Galende and De La Fuente, 2003; Murovec and Prodan, 2009; Thakur and Hale, 2013; Amara et al., 2016). The four factors selected for this study are: (1) organizational inertia, (2) training, (3) human capital, and (4) innovation culture.

To our knowledge, this type of study has never been conducted on PSFs or other industries in Norway (Amara et al., 2016; Thakur and Hale, 2013; Miles, 2005; Nachum, 1996). During the

recent years, the Norwegian economy has experienced fluctuations and a focus on the importance of innovation has emerged (Sørli, 2016). Innovation is now central in the ongoing restructuring and private and public companies are important arenas for the development of the competencies and creativity required for innovative achievements to take place (Sørli, 2016). There is undoubtedly an increased awareness and interest in both PSFs and innovation. Therefore, we wanted to conduct a study on which internal factors that may affect innovation output in an industry associated with being of a conservative character (Baschab, 2004; Maister, 1993). We have remediated some limitations of previous studies on PSFs and knowledge intensive business services (Amara et al., 2016; Thakur and Hale, 2013; Miles, 2005; Nachum, 1996) by focusing on internal factors, hence, given insight into a topic with limited research associated with it.

Following the above, we also seek to reveal which internal factors that have the largest impact on innovation output. A better understanding of internal factors impact on innovation will add to existing theories about a PSFs innovation output. Therefore, our problem statement is: *"Internal factors in Professional Service Firms (PSFs) and their impact on innovation output: A quantitative study of Norwegian PSFs"*. With this statement, the primary research question we will be answering is: *"Does internal factors have an impact on innovation output among Norwegian PSFs?"*

This study will measure to which extent organizational inertia, human capital, training and innovation culture exists among Norwegian PSFs. In addition, we will come up with a measurement on the level of innovation output among them. We will also measure and analyze the controlling effect of sub-sectors, age of firm and firm-size on the variables. We therefore want to answer the following research question: *"Will size, age and/or sub-sector have a controlling effect on the relationship between internal factors and innovation output in Norwegian PSFs?"*.

The paper will be organized in seven chapters: In chapter 1, we have introduced the topic and relevance of the study. Chapter 2 provides the theoretical framework and existing literature on PSFs, service innovation, innovation output and internal factors in innovation. Chapter 3 presents the methodology. In chapter 4, our descriptive results will be presented. Chapter 5 present the results from the PLS-SEM and PLS-MGA analysis. Chapter 6 provides a discussion of the results found from the analysis. Finally, chapter 7 will provide the concluding remarks with our contribution to research, limitations of the study and suggestions for future research.

# 2.0 Theoretical Framework

In this part, the theoretical framework based on literature reviews will be presented. First, we will present some theory on the underlying context. Section 2.1 will map out the theory behind professional service firms, and section 2.2 will describe the concept of service innovation, with a further focus on the distinctiveness of innovation in PSFs. Finally, theory behind the specific variables studied in this paper will be presented.

## 2.1 Professional Service Firms

PSFs are often referred to interchangeably with knowledge-intensive business services (KIBS) (Razmerita, Phillips-Wren and Jain, 2016). Von Nordenflycht (2010), however, have described PSFs as a subgroup of KIBS, particularly characterized by their high degree of knowledge intensity, low-capital intensity and a professionalized workforce. In the literature, PSFs make up a specific segment of the service sector (Fischer, 2011). The main difference between service and manufacturing firms is the tangibility of the products. Manufacturing firms produces tangible goods that can be seen and touched, while the output of a service firm is intangible, and comes in forms of consultancy, maintenance, training etc. A pure business service is one in which the service is the primary entity sold, this is an important distinction because everyone in every type of business sells some element of service (Thomas, 1978).

Most service industries are not as knowledge intensive as they are labor intensive - and this is the main difference between a general service firm and a professional service firm. PSFs are defined by the fact that their core resource is knowledge and information, which is considered to be both their output and input in the production process (Nachum, 1996). Another characteristic is that their clients and customers are other firms and institutions, thus, PSFs are organizations by professionals for professionals (Miles and Kastrinos, 1995).

Hogan et al. (2011, p. 1264) defines PSFs to be *"unique as they are high in credence qualities as their core output is applied knowledge and skills that are difficult for a customer (client) to acquire. Accordingly, clients find it difficult to evaluate the quality of such service, even after use"*

Building on this definition, Chan, Yim and Lam (2010) says that PSFs creates a better basis for value creation for the service provider and the customer due to "high credence qualities, high degrees of customer contact and customization, and high interdependence between customers

and service providers". PSFs therefore create an interesting context to better understand how a firm create value. For the purpose of this study, Hogan et al. (2011) suggests that innovation is a firm's most important capability when it comes to creating value.

In the 1960s, sociologists defined the specific characteristics of a PSF, and therefore made it easier to understand (Scott, 1965; Hall, 1968; Montagna, 1968; Bucher & Stelling, 1969, Kirkpatrick and Ackroyd, 2003; Pinningtong and Morris, 2003; Brock et al., 2007). The PSFs were known for having a slow changing environment; slow changing strategy formulation and decision-making were done consensually (Brock et al., 2007). The archetype concept has been used to describe the changes in PSFs, for example accounting (Kirkpatrick and Ackroyd, 2003) and law firms (Pinnington and Morris, 2003). Archetype theory origins from neo-institutional theory and have been one of the most influential theories for analyzing organizational change. An archetype is *'a set of structures and systems that reflects a single interpretive scheme'* (Greenwood and Hinings, 1993, p.1052). Changes at the end of the 1980s lead to alternative ways of organizing PSFs (Brock, et al. 2007). Many traditional PSFs moved towards an increased professionalism and focus on profits with a more hierarchical structure (Cooper et al, 1996).

In more recent literature, Kaiser and Ringlstetter (2011) states that companies in the PSF sector are companies of the tertiary sector that includes all services which require direct contact between provider and consumer and appear mainly intangible prior to, during and after contact. Other service sectors can be differentiated via resources critical for success. In PSFs, however, there are three different resources that significantly influence their success: (1) knowledge, (2) relational competence and (3) reputation. Knowledge is what distinguishes PSFs from other type of service firms because they often must deal with unstructured problems. Furthermore, the value creation in PSFs is due to knowledge-intensity that will be further discussed in section 2.1.2. Relational competence is considered as the key to successful interaction and integration of clients. Compared to other types of services, professional services integrate the clients into the complex and knowledge-intensive service provision process as an external factor. The final influential resource is reputation, which is considered to be a pre-condition for lucrative contracts and reflect the knowledge and relational competences of a firm (Kaiser and Ringlstetter, 2011).

PSFs are of great interest to the Norwegian economy as they are different from other types of firms in the way that they face a distinctive environment that requires different types of knowledge, management and theories. Furthermore, the distinctiveness of PSFs is making them increasingly relevant also for non-PSFs (Von Nordenflycht, 2010). Many organizations are now experiencing an increased need for knowledge-intensive services such as for: R&D, organizational changes, introduction of new technology, marketing etc. This is a result of decreased product cycles, increased competition and an increased demand for customized products and services (Aslesen and Isaksen, 2007).

Von Nordenflycht (2010) distinguishes between four different types of PSFs: technology developers, neo-classical PSFs, professional campuses and classic PSFs. This study is narrowed down to classic (Law, Auditing, Accounting and Architecture) and neo-classic (Advertising, IT-consulting and Management-consulting) PSFs. These two types are also the ones that is the most familiarized with being knowledge intensive. Classic PSFs combines knowledge intensity, low capital intensity and a professionalized workforce, and are characterized as archetypical, which incorporates both ideology and self-regulation. Neo–classical PSFs on the other hand, differs from the classical PSFs in terms of having a weakly professionalized workforce. This means that neo-classic PSFs have opposed efforts to professionalize by not being members of industry associations and having low support for licensing efforts. Instead, they seek to enhance professionalized work by firm-specific reputation (Von-Nordenflycht, 2010).

During the recent decades, professional service firms have emerged as a major economic evolutionary trend of industrialized countries (Hu et al., 2013). The PSF sector consists of firms that have emerged to help other organizations solve problems that require external sources of knowledge to deal with changing technologies and social conditions (Miles, 2005). Brock et al. (2007) argues that PSFs have experienced considerable change over the past two decades due to their clients being more global, market deregulations, increased competition between professionals and more demanding clients. To illustrate the suggested growth among Norwegian PSFs, Figure 1 shows that all studied sub-sectors have experienced growth in turnovers since 2007 through 2014 (Statistics Norway, 2017a and 2017b).

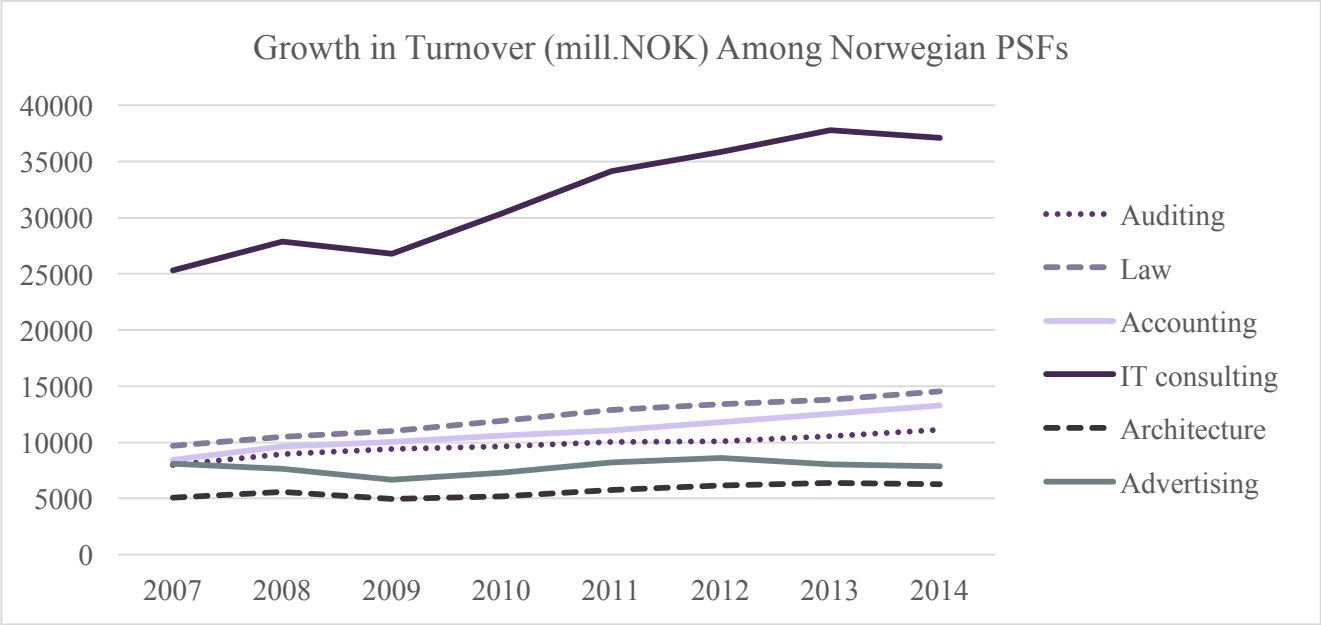



*Figure 1 Growth in Turnover (mill.NOK) among Norwegian PSFs*

Generally, all sub-sectors have performed well in the recent years. However, IT-consulting stands out as the sub-sector that have seen the highest growth in turnover. This is assumed to be a result of firms' need to keep up to date with technological developments, and therefore require IT-consultants to guide them through the implementation process (Land, 2008). Alongside, it is assumed that the growth in all six sub-sectors supports the increasing interest in PSFs. According to Statistics Norway (2017a), numbers of later dates has not yet been confirmed, and are therefore not represented. Moreover, the sector of management consulting is a very broad sector, and it was therefore, according to a representative from Statistics Norway, not possible to find accurate data for this sector, but it is assumed that it is likely that management consulting also had growth in turnover.

One of the key characteristics of PSFs are their high level of knowledge intensity (Von-Nordenflycht, 2010). Empson et al. (2015) defines knowledge intensity as the condition where the production of the firm's output lies on the workers who possess a substantial body of complex knowledge. This knowledge is related to some form of skill that is difficult enough to require through training and reliable enough to produce results. PSFs regularly sell the expertise and services of individuals to their clients, and knowledge intensity is said to be the primary source of homogeneity across professional services (Empson et al., 2015).

PSFs represents extreme cases when it comes to the dynamics of knowledge development as they employ a very high percentage of highly educated people, they are also dependent on their ability to attract, mobilize, develop and transform this knowledge to create value (Løwendahl et al., 2001). When looking at Norway, the amount of people with higher education has seen a tremendous growth over the recent decades. In 1970, only 7.5 % of the population had higher education, while in 2014, this had increased to 30 % (Statistics Norway, 2016c). In business, two types of knowledge are typically defined: tacit and explicit knowledge. According to Nonaka and Takeuchi (1995), the distinction between explicit knowledge and tacit knowledge is the key to understanding the difference between the approach on knowledge. Penrose (1959) provides a theory that explains the role of firm-specific tacit knowledge in the context of firm growth, innovation and diversification. The limitations to the rate of learning at the individual, team, and firm-levels restrict both the rate and the direction of growth and the imitation capability of rival firms.

Managers are now exploring knowledge as human capital and dynamic capabilities that create sources of competitive advantage. A firm with high innovation capability develops know-how that is hard to adopt or imitate by competitors. In PSFs, innovations are made through developing new combinations of old and new knowledge. Thus, the innovations in PSFs should be highly linked to the knowledge of employees in the firm (Doloreux and Shearmur, 2010), and therefore we will now give some insight to the existing theory behind innovation, with a particular focus on service innovation and the characteristics of service innovations in PSFs.

## 2.2 Innovation

Today, innovation is an important and widely discussed topic. The term comes from Latin, *innovare*, and means “to create something new" (Girard, 1990). Innovations have been seen as carriers of growth and economic development since Schumpeter in 1931 (Kaiser and Ringlstetter, 2011). Joseph A. Schumpeter (1983) defines innovation as the commercial or industrial application of something new: a new product, process, or method of production; a new market or a source of supply; a new form of commercial, business, or financial organization. Schumpeter is known for the invention of the term, and meant that the causative effect of the fluctuations in the economic conditions was caused by swarms of innovations and the end phase of the innovation projects. These swarms were the basis for economic growth followed by that the introduction of these innovations in the nature of a routine was a sign of economic downturn. According to Schumpeter (1939), the key factor to change is innovation,

which covers both the process of creating something new and the result this process achieves in a market.

Schumpeter characterized innovation as: *"industrial mutation […] which incessantly revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one. This process of Creative Destruction is the essential fact about capitalism. It is what capitalism consists in and what every capitalist concern has got to live in"* (Schumpeter, 1950, p. 83).

During the 1950s, a series of innovation studies concentrating on the internal characteristics of the innovation process were undertaken. Researchers were now focusing on; the generation of new knowledge, the application of this knowledge in the development of products and processes; and the commercial exploitation of these products and services in term of financial income generation (Trott, 2012). Based on the research on these three topics, new theoretical framework was developed (Carter and Williams, 1957; Simon, 1959). The findings from this research discovered that firms behaved differently and a new understanding of how firms manages these areas and why some are more successful than other was established. Hence, this new framework emphasized the firms' internal activities with regards to innovation. However, the previous research was mainly concerned about the manufacturing industry, while in later years the importance of research on service innovation have become more present. We will now look more into the literature on service innovation, before we move on to innovation regarding PSFs.

### 2.2.1 Service Innovation

In the fourth quarter of 2014, about 77 percent of Norwegian employees worked in the service sector. This sector of the Norwegian economy is growing twice as fast as the industry, and the professional service sector is the one with the highest growth. Despite this, there is less research on the development of service innovation than product innovation (Ettlie and Rosenthal, 2011; Statistics Norway, 2015).

The research on service innovation started in the 1980s, however, there is still gaps in the literature to be filled. Rubalcaba et al. (2012) stresses the fact that research on service innovations is limited, and refers to knowledge intensive business services and public services in specific. The field of service innovation is complex and is examined by many researchers

from different academic disciplines to explore multiple dimensions, unique approaches, and to build conceptual and analytical frameworks. The interest that comes from complexity creates new trends, and make service innovations relevant for not only service organizations. It refers to innovation in any organization through service. Even manufacturing is now adopting service innovation strategies (Von-Nordenflycht, 2010). Service innovations incorporates strategic importance for any organization and creates basis for competitive advantage. Lately, large companies like IBM, Apple and Rolls Royce have all seen the importance of service innovations in manufacturing. It is the continuous need for profit growth and growing demand for customer value that has created this shift (Gebauer et al., 2011). Due to the service-dominant logic, customers now experiences that they can take part in the innovative processes, thereby creating an improved customer value (Rubalcaba et al., 2012). It is said that the most advanced economies in the world are service-sector oriented, and innovations may affect the majority of societies. For services in particular, innovations are very important in order to overcome the myths that are based on old theories. The old theories states that services have low capacity for productivity, innovation, and trade (Gallouj, 2002).

Intangible goods such as data, information and knowledge are especially apparent in the service sector. The distribution of the knowledge requires supportive functions for it to be utilized in the best way. Knowledge intensive service firms such as PSFs, in particular, combines different sources of information and also distribute the information itself. This is also reflected in the development of the service innovation processes (Hipp and Grupp, 2005). Service innovations depends on open processes, often in close cooperation with networks, including customers, various employees and managers. The business model should therefore be encountered in customer values, for the customer to have a more active role in the development processes (Rubalcaba et al., 2012).

During the recent years, a professional perspective has emerged on two different logics of innovation: the service-dominant logic (SDL) and the traditional goods-dominant logic (GDL) (Vargo and Lusch, 2004). For SDL, the consumer has an important role in the innovation process, while in GDL the consumer is considered a passive need satisfier. In other words, in SDL, the consumer is contributing to the creation and development of the actual service, in addition to the understanding of the value creation of the service. Hertog (2000) and DeJong et al. (2003) developed a framework to give a better understanding of innovation in services (figure 2).

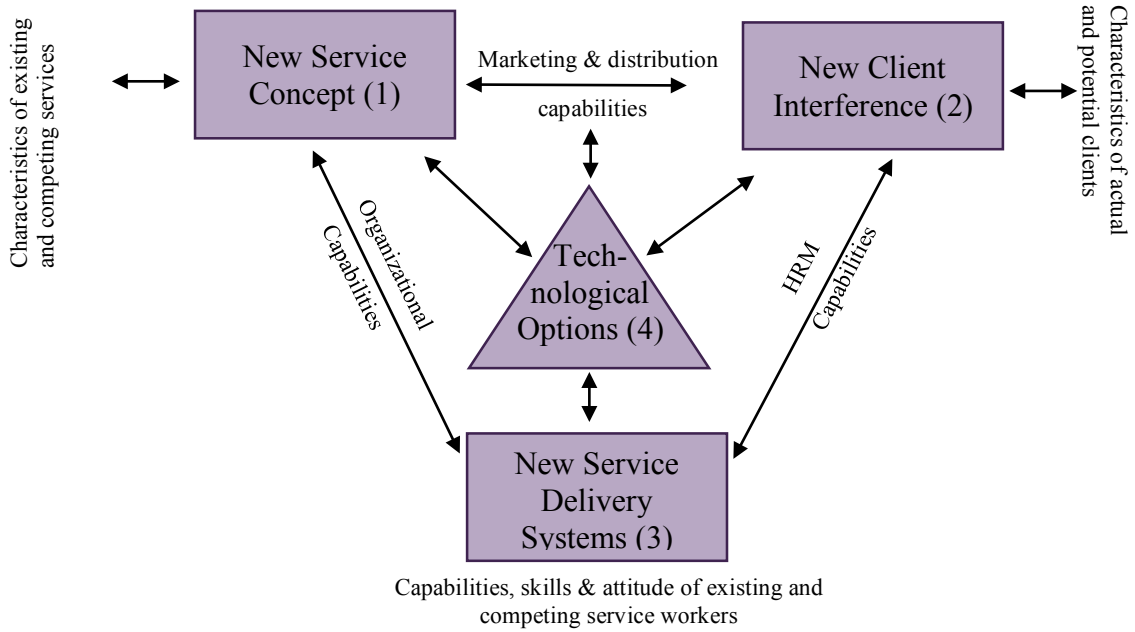



*Figure 2 Dimensions of Service Innovation (Hertog, 2000, p. 4).*

*New service concept* relates to the content and characteristics of the service. A new concept could for example be a combination of already existing services. The concept approach emphasizes that new combinations of services and different variations of imitation is particularly dominant within service innovation. Innovation within the customer contact represent the next dimension, *new client interference.* This dimension is closely related to the market innovation - the service inventor is thinking specifically of each customer, e.g. implementing different pricing strategies. The dimension of *new service delivery system* is about how the service is delivered. The last dimension is technological options as one often see that service innovation is triggered by new technological inventions. Den Hertog (2000) claims that each form of service innovation involves some combination of these four dimension.

We have now introduced service innovation, and the next section will go into innovation in PSFs. PSFs are knowledge intensive firms and is a specific sector within the service industry. Innovation in PSFs therefore builds on the characteristics of service innovation, but has its own sector specific characteristics.

### 2.2.2 Innovation in Professional Service Firms

The research interest in PSFs is growing rapidly, whilst the interest in their organizational structure and innovation is still limited. During the recent years, the strategic context of PSFs has changed. The competitive environment has become more intense together with clients

becoming more demanding in terms of both quality and price. As a result, the conservative behavior of PSFs has changed and they have become more entrepreneurial. To enhance innovative activities, many PSFs have merged with competitors, internationalized and have started strategizing (Fischer, 2011). PSFs are in fact considered to play an important role as innovation intermediaries in an economy. PSFs enable tacit and explicit knowledge that is transferred from one firm to another. The creation of new knowledge is dependent on the transfer and conversion of existing knowledge. Hence, PSFs can act as "co-creators" of innovation and may foster innovation performance of an economy and thereby increase competitiveness (Fischer, 2011). In addition, PSFs may contribute to macroeconomic growth due to the growth of the sector, their innovation output and the complex and challenging working environments. Moreover, innovation is considered a knowledge intensive activity. Hence, studying the innovative behavior of PSFs may provide us with knowledge and insights that can be used in other sectors of the economy (Fischer, 2011).

Compared to technologically oriented processes in the sector of manufacturing, innovation in PSFs is related to certain aspects different from those of manufacturing (Thether and Hipp, 2000, as cited in Schricke, Zenker and Stahlecker, 2012):

- Human capital is seen as very important
- Production and consumption can be seen as a simultaneous process
- Innovations in services are often of intangible matters
- Customer contact is considered of special importance

In the service sector, there is a high diversity when it comes to innovation processes, and there are no distinct patterns to be detected. The nature of the innovation processes in PSFs is often project-based, interactive and appears ad hoc. This underbuilds the human factor as the key factor to innovation success. According to Strambach (2008, p.161), the importance of the human factor stems from that knowledge is "embodied in people and embedded in networks". In line with the special characteristics of innovation in PSFs, PSFs also have got some challenges distinct from other industries when it comes to their growth opportunities. Ross (2016) identifies five different trends that are challenging the growth in PSFs:

- Clients are seeking better value: price pressures
- New entrants due to deregulation
- Service commoditization through the application of standardization and IT
- Globalization: increased competition from lower-cost countries

- Lower-cost online services from new internet enabled businesses

Further, Ross (2016) argues that firms need to respond to the challenges above by innovating their processes and services. This could possibly lead to growth, and may be the solution to keep steady growth in the PSF sector. The innovations should enable firms to reduce their costs by more effectiveness and increased value to clients. Some professions however, mainly the classic ones, have experienced monopoly due to regulations and licenses, hence leaving innovation of less priority. The competitive trends of today's environment suggest that disregarding innovation is no longer possible if a firm wants to survive. Thus, even the most conservative firms have now put innovation on their agenda to be operationalized (Ross, 2016).

Kaiser and Ringlstetter (2011, p. 61) divides innovation in PSFs into dimensions of object, subject and intensity (figure 3). Firstly, the object dimension displays the degree of novelty of innovation that refers to various objects. Secondly, the subject dimension suggests that various subjects can be further differentiated, in the way in how people and groups perceive novelty. Differentiations therefore need to be made between company, client and market innovation. Finally, in the intensity dimension, a distinction between incremental and radical innovation is made due to that innovations often differ in terms of intensity. Service innovation can be classified according to the degree of novelty of the innovation outcome: Radical innovation outcome help create new services that are known for disrupting the market both for organizations and their customers. Incremental innovation refers to changing a system by adding new service aspects incrementally based on customer needs.


*Figure 3 Dimensions of professional service innovation*

The first sections have introduced the fundamental theories behind PSFs and innovation. Next, we will look at the existing literature for the particular variables to be studied in this paper, starting with the dependent variable, innovation output.

## 2.3 Innovation Output

For analysis purposes, the term 'innovation output' will in this study be used to combine the six types of innovation into one measure. Innovation output will be measured as the extent to which a company has been able to successfully introduce and implement new ideas during the last three years of operations (Amara et al., 2016) (see appendix A for the indicators). According to Meyer-Krahmer (1984) innovation output is often measured quantitatively based on new developments introduced during a certain period.

Previous studies have had their main focus on technological innovations in a firm, particularly looking at product and process innovations. Recent studies, however, look towards the non-technological innovation types, represented by delivery, managerial, strategic and marketing innovation (Amara et al., 2016). There is now a strong consensus that innovation in the service industry cannot rely only on technological innovation. The assimilation approach to innovation suggest that manufacturing and service innovation is of similar character, but with recent studies kept in mind this approach has to be disregarded. Another approach, the demarcation approach claims that future studies must focus on new definitions and new measures to distinguish between technological and non-technological innovation (Amara, Landry and Doloreux, 2009). Many researchers therefore call for a synthesis approach that will integrate the two previous approaches.

A synthesis approach brings two major advantages (Amara et al., 2016). First, it considers technological innovations, which thereby allows for a comparison between manufacturing and service innovations. Second, by combining the two approaches light will be shed on both technological and non-technological dimensions and thereby opening up for a multidimensional view on innovation. In our study, we adopt the synthesis approach to innovation in order to distinguish between two technological and four non–technological forms of service innovation (Howells and Tether, 2004; Amara, Landry and Doloreux, 2009; Amara et al., 2016).

The six types of innovations will be defined as follows (Amara, Landry and Doloreux, 2009, Amara et al., 2016):

- Product innovation: relates to the introduction of a new or significantly improved product into the market. Product innovation regards both products and services, where services are most prominent in this context. However, new products may also be

introduced by firms considered to be service firms, e.g. the development department of an IT-consultancy firm who introduce a new software or business intelligence solution.

- Process innovation: relates to introducing a significantly improved or completely new process of production.
- Delivery innovation: relates to how the firm choose to deliver its goods/services to its clients. Examples of different delivery strategies can be just-in-time or e-commerce.
- Strategic innovation: relates to the introduction of significantly improved or new strategies in the firm, which may be to target a new market or create new missions. Examples may be targeting different markets or the implementation of modified missions.
- Managerial innovation: relates to the implementation of modified or new techniques of managing the firm. Examples include the introduction of new practices for knowledge management or quality circles.
- Marketing innovation: relates to the introduction and implementation of modified or new strategies to marketing in the firm.

The different types of innovation are all linked together; innovation in one type requires development in some or all of the other types of innovation (Den Hertog, 2010; Hipp, Tether and Miles, 2000). For example, if a firm wants to develop a new product (good or service), processes often have to be developed alongside. This again might impact on the delivery and marketing, or even strategy innovations (Amara, Landry and Doloreux, 2009).

A firm's innovation output must be seen in relation to its level of investments in innovation. The average percentage of investment in innovation activities among firms in the OECD countries is 1-2 % (OECD, 2010a). According to literature (Mansfield, 1988; Shields and Young, 1994; Archibugi, Evangelista and Simonetti, 1995; Camacho and Rodriguez, 2005; Canepa and Stoneman, 2008; Elche and Gonzalez, 2008), firms who are investing heavily in research, development and improvements of structures will obtain better technological capabilities and then be able to produce more innovations. It is particularly the investment in social capital, such as resources, training etc. that is considered the most important. Investments in organizational members is crucial to maximize a firm's strategic resource for innovation. The lack of these types of investments may limit both management skills and other personnel skills to implement service innovations in an effective way (Thakur and Hale, 2013).

It is a challenge to become a successful innovator as there are many factors that may influence the innovative efforts of a firm. A firm is likely to be affected by a set of factors, external and internal to the firms' innovation activities (Galende and De La Fuente, 2003; Antonelly, Crespi and Scellato, 2013; Thakur and Hale, 2013; Amara et al., 2016). The following sections will look into academic literature on internal factors in innovation with a further elaboration on the specific four factors selected for this study.

## 2.4 Internal Factors in PSFs

Previous studies distinguish between the internal and external factors a firm may face in their innovative processes (Galende and De La Fuente, 2003; Antonelly, Crespi and Scellato, 2013; Thakur and Hale, 2013; Amara et al., 2016). Identifying the internal and external factors that may determine the innovative performance of a firm is relatively new in the literature on firm innovativeness (Vega-Jurado, 2008). In general, economists tend to focus on the external factors more than the internal (Hadjimanolis, 2003). External factors are those factors that are outside of the firm's control and are often associated with a higher level of risk. These factors can be risk of imitation, regulatory factors, financial factors and general market factors (Thakur and Hale, 2013).

Internal factors on the other hand, are the factors that a firm has control over and which are related to their own abilities. Innovation activities and overall success are both reliant on a variety of skills and capabilities. These may be called the internal factors of a firm, and may act as hinders or enablers of firm innovativeness (Thakur and Hale, 2013). Internal factors may relate to the characteristics of the organization, the organizational members and the organization of the change process (Hadjimanolis, 2003). The process of obtaining such resources is tough and costly, and it is therefore suggested that firms must have "absorptive capacity" to avoid that the internal factors acts as barriers. According to Cohen and Levinthal (1990, p. 128), absorptive capacity is a firm's "ability to recognize the value of new information, assimilate it, and apply it to commercial ends". They used the concept of "absorptive capacity" to explain the effect of structural characteristics of an industry on the R&D intensity. Their study concluded that R&D activities contributes to new knowledge and enhances a firm's ability to exploit and assimilate the new knowledge outside the firm. They further suggest that heavy investments in innovation will improve a firm's absorptive capacity, and thereby their innovation output. Following Cohen and Leventhal's work, several studies have been conducted to find empirical support for a positive relationship between these two factors (Veugelers, 1997; Becker and Peters, 2000;

Nieto and Quevedo, 2005). However, little work has been done on the effect of either external or internal factors effect on innovation output (Thakur and Hale, 2013; Amara et al., 2016). Following Amara et al. (2016) suggestion for future research, this study will be concerned about the internal factors a PSF meet in their innovative activities.

This study focuses on intangible factors, which are often more difficult to measure, and therefore have limited empirical literature associated with it. However, the intangible factors impact on innovation can be of high significance (Galende and De La Fuente, 2003). It is thought that many factors influence firms' innovation output, not only those external to the firm, but also those internal to the firm. Hence, the resource based view (RBV) will act as a fundament in this study. The RBV have an internal view on innovation and its main characteristic is that it is information based, and may therefore be developed over time. The latter resource is a foundation for competitive advantage within the firm, due to its value and scarcity and because it does not depreciate with time (Itami, 1987; Barney, 1991).

Internal factors may act as either a barrier or an enabler (Thakur and Hale, 2013). A barrier to innovation is something that may negatively influence the innovativeness of a firm. It may stop innovation completely, increase the costs associated with it, or delay innovation (Hadjimanolis, 2003). Enablers of innovation are factors who positively influences the innovativeness, but even these can in fact become barriers if not treated correctly. The general impression of a barrier to innovation is that it is exclusively negative, however, they may turn into positive factors, stimulating the firm's' innovativeness (Hadjimanolis, 2003).

Internal factors as enablers of innovation may be seen in relation to success factors. The concept of success factors was first introduced by Ronald Daniel (1961) who discussed the problem of inadequate management information for setting objectives, shaping strategies and making decisions. Firms will not be able to innovate effectively unless some underlying success factors are present (Govindarajan, 2011). Therefore, these factors must be given continual attention in order to ensure future success and achieve high performance (Boynton and Zmud, 1986). The success factors in this study will be: the level of training and human capital, and the presence of innovation culture within the responding firms. On the other hand, there are obstacles, which can be considered as predictors of failure. Oppositely from success factors, obstacles hinder the firms' innovation capability. Firms should focus on limiting such factors in order to facilitate for more innovation output (Cohen and Levinthal, 1990; Kaiser and Ringsletter, 2011; Amara

et al., 2016). In this study, one of the internal factors, organizational inertia, may be seen as a barrier to innovation.

Being aware of, and handling the internal factors in a firm can provide a better understanding of their impact on innovation. First, it would help to understand why some firms are pursuing innovation activities and why some do not. Secondly, better evidence could help firms to overcome obstructing factors, hence increasing non-innovative firms to embark on innovation activities. It may also increase the innovation intensity of already innovative firms (Amara et al., 2016). Innovation activities are important for firm strategy, development and survival. It is also seen as key to competitive advantage and sustainable development. Nevertheless, there is as mentioned limited research on which internal factors that may influence innovation.

In order to become more innovative and to develop new knowledge, it is important to be aware of the internal factors impact on innovation irrespective of the level of creativity in the firm. Especially, in PSFs, where innovations may be prevented due to power displays. PSFs are known for using partner models and this may be the reason for why innovation is especially difficult in these firms. Several partners may seek autonomy and control with regards to their client base. Contrary to firms considered to be 'normal', there is often a lack of a central body in PSFs, which holds the resources required to engage in innovative activities. Internal factors who acts as hinders to innovation should therefore be identified as soon as possible, and discussed with the respective partners and associates of the firm. Communication is often key to solve such issues (Kaiser and Ringlstetter, 2011).

The underlying idea of this study is that the ability to produce innovation output depends on the internal factors of the PSFs. In view of a large number of possible variables to study, the model will include a specific set of internal factors that are most recognized in existing literature (Galende and De La Fuente, 2003; Murovec and Prodan, 2009; Thakur and Hale, 2013; Amara et al., 2016). The four factors selected for this study are: (1) organizational inertia, (2) training, (3) human capital, and (4) innovation culture. It is believed that sufficient resources within the internal factors will intensify the interaction between the people in the firm and the firm itself. This will strengthen existing knowledge and contribute to the creation of new knowledge, which is linked to the production of innovation (Galende and De La Fuente, 2003). On the opposite, lack of sufficient resources within the different internal factors will create barriers.

We have now introduced internal barriers in innovation and we will in the following sections further elaborate on the selected internal factors to be measured for this study.

### 2.4.1 Organizational Inertia

The term 'inertia' comes from the Latin word *iners*, which means "lazy and idle". Inertia may prohibit innovation as organizational practices reacts based on experience and thereby cause a resistance to change. In fact, organizational inertia exists among most firms. (Huang et al., 2012). Scholars believe that organizational practices become fixed when they are bound to habits of behavior and set rules. Managers have a strong tendency to stick to the firm's history, rules, processes and procedures, thereby fostering organizational inertia. It becomes characterizations of daily activities and produce rigidity in the firm and causes the firm to be resistant to change and risk averse (Nelson and Winter, 1982; Edmondson et al., 2001; Huang et al., 2012; Thakur and Hale, 2013). Common characteristics of organizations with internal inertia are inability to plan ahead and respond to external changes. Often, firms are confronted with issues of institutional pressure, which may create organizational inertia. Nijssen et al. (2006) suggests that organizational inertia is in fact more important in new service development, than in new product development. As a result, capabilities within envisioning, energizing and enabling have become very important. A firm's ability to reduce intra-organizational conflicts and power struggles have also seen increased importance.

The increase of knowledge intensive workers and their high degree of mobility have contributed to that firms now moves toward open innovation, instead of closed innovation that have been the traditional model. This creates room for more ideas coming into the open and erases previous borders to innovation. Through licensing and cooperation, firms can create value in a different way than with the closed model (Huang et al., 2012). This creates an increased need to overcome inertia as it becomes more visible in a constantly changing business world with more innovative activities among firms. For PSFs in particular, inertia is important to overcome due to their reputation of being a conservative industry (Baschab, 2004; Maister, 2012).

As displayed in previous studies, organizational inertia will have a negative influence on innovation. Even in firms regarded as being innovative, rigidity will exist within innovation. This stems most likely from a rigid organizational strategy and structure (Blumentritt and Danis (2006). Matthyssens et al. (2006) states that despite of the obvious triggers firms now experiences to engage in innovative activities, firms are still struggling to overcome

organizational inertia. Even the largest and most successful companies are having troubles with organizational inertia in their business models. They are rooted in previously successful business models, and therefore fail to adapt to changes in the environment (Chesbrough, 2006). According to some researchers (Hannan and Freeman, 1989; Barnett and Carroll, 1995), organizational inertia will increase with firm growth. This is due processes and workflows become more standardized as the firm becomes larger. In other words: large organizations with solid and saturated structures, are hard and slow to change. On the contrary, Huber et al. (1993), argues that large organizations actually are more likely to change, so the theories on this subject are mixed.

Organizational inertia must be overcome in order for a firm not to continue on its current trajectory and safe fields of operations, and also to safeguard change and innovation (Nijssen et al., 2006). Nijssen et al. (2006) suggests that innovativeness in a firm will be low if there is a strong degree of inertia, hence the firm will be unable to develop innovative services and products. Based on the above, firms seem to be risk averse and retain to already existing practices. This is signs of resistance to change which lead to inertia. For this study, we therefore hypothesize the following:

$H_1$: The degree of organizational inertia will have a significant negative impact on innovation output

### 2.4.2 Training

Training is considered by Thakur and Hale (2013) as one of the most important internal factors in service innovation. Employees and management need continuous training in different fields of operation. This is to stay up to date on trends in the market and to ensure the development of employees' capabilities. It ensures that employees are skilled to perform their tasks and roles in an effective way. In firms that seeks to foster innovation, training is very important so that employees have the skills to critically evaluate tasks to create proposals for change. It is also important for a firm to have employees that are trained in problem solving techniques, as this boost innovative thinking (Shipton et al., 2006).

In PSFs, a significant amount of staff is often made up by university graduates. Graduates bring new knowledge and new ways of thinking into a firm, and combined with firm specific training, this can bring new developments. In PSFs, the most talented graduates are often 'hand-picked'

from top qualified institutions in order to safeguard for better learning capability, and therefore enhanced innovation. After the graduates enter the firm, firms often provide extensive training programs inn skills and firm specific capabilities. Training, development and selective staffing are all characteristics of PSFs (Fu et al., 2015). Researchers enhance the importance of later investments in firm specific training as critical to build on education (Murovec and Prodan, 2009). In addition, appropriate financial investments are important to ensure planning and organized training to promote employee skills.

Thornhill (2006) have had some interesting research on the relationship between training and innovation. He suggests that the importance of training varies among industries, but that high investments in training of employees very often leads to greater innovation. In addition, he addresses the link between knowledge and training. Knowledge is something that creates competitive advantage only when worked on, and kept on levels above the competitors. Knowledge have a tendency to decay over time and thereby loses its power to confer a competitive advantage (Thornhill, 2006). Hence, as PSFs are knowledge intensive firms, they must invest highly in training to keep up with the latest superior knowledge. Training will stimulate the internal flows of knowledge and will help to guide future actions. It will increase the flow of knowledge and information among employees, facilitates a basis for common meanings and existing capabilities will be synthesized and reconfigured (Garud and Nayyar, 1994; Galunic and Rodan, 1998).

This review displays an importance of organized training in PSFs to produce innovation output, and we therefore hypothesize the following:

$H_2$: The degree of training will have a significant positive impact on innovation output

### 2.4.3 Human Capital

Human capital has been studied in different contexts since Adam Smith's introduction of the term in year 1776 (Smith, 1776; Fisher, 1897; Schultz, 1961). Smith (1776) defined human capital as: *"The acquisition of ... talents during ... education, study, or apprenticeship, costs a real expense, which is capital in [a] person. Those talents [are] part of his fortune [and] likewise that of society"*.

Human capital is seen as a way of creating competitive advantage within industries in terms of skills, expertise and willingness to work. The current fluctuations in the Norwegian economy is making human capital more important than ever, as firms need to make use of what they already have (McGuirk, Lenihan and Hart, 2015). Education has been discussed as of important means to assess level of skills in the workforce of a firm. Hofheinz (2009). found that employment, potential of earning and further training are all dependent on education, and are likely to be higher for employees with higher levels of skills. The level of education affects innovation in two ways; firstly, new technologies can be invented and developed by graduates and, secondly, technological progress is likely to be higher (Lundvall and Johnson, 1994).

Leiponen (2005) argues that a firm without sufficient professional skills is less likely to benefit from innovation activities, as the firm will not have the necessary capacity or capabilities to manage it. Human capital can therefore be seen as an important factor to innovativeness in a firm. It is worth bearing in mind the structure of many PSFs when talking about human capital, as many are built up around partnerships. In a framework like this, the employees that are the most effective in gaining, using or applying new knowledge are after some time rewarded the partner status, which thereby gives them stakes in the firm. The individual skills the professionals accrue during the time is considered as valuable human capital, and is the firms´ most important resource (Hitt et al., 2001). The partnership structure goes beyond the scope of this study, and will not be further investigated.

It is likely to believe that there will be differences in terms of human capital due to some sub-sectors having a high proportion of graduates, whom can be regarded as unexperienced with less skills. Furthermore, some of the sub-sectors, the classic in particular, have a very senior-oriented and authenticity-oriented resourcing, and can therefore be expected to have higher levels of human capital (Doorwaard and Meihuizen, 2000). Whilst the neo-classic PSFs often have a more junior-oriented resource base. Doorwaard and Meihuizen (2000) distinguishes between classic 'traditional' PSFs and neo-classic PSFs in terms of their HRM-systems, and name them 'expertise oriented' and 'efficiency oriented' respectively (See table 1).

| | **Expert – oriented** | **Efficiency-oriented** |
|---|---|---|
| *PSF – type* | Classic ('traditional') | Neo-classic |
| *Resourcing* | Authenticity<br>Senior-oriented | Junior – oriented |

*Table 1 Expert and Efficiency Oriented PSFs*

Doorwaard and Meihuizen (2000) points out that there are several differences between classic and neo-classic PSFs in terms of human capital. They display it by showing that classic-PSFs have a higher degree of knowledge intensity due to a 'helicopter view' from active interaction between seniors and juniors. This give the professionals in classic-PSFs an opportunity to always keep up with new trends and knowledge. The mentoring relationship goes both ways, because of the exchange of ideas and different forms of expertise and perspectives (Doorward and Meihuizen, 2000). This will give the expert oriented classic PSFs a more in-depth knowledge and expertise, whilst the neo-classic PSFs will settle with standard firm specific procedures to increase efficiency. The expert-oriented PSFs typically seeks for senior employees with heavy education and experience, while efficiency-oriented PSFs seeks for juniors who can learn quickly. As a result of this, these arguments among others makes us expect a spread in the report of human capital, but academic literature points towards a positive relationship between human capital and innovation output.

Human capital can be seen in relation to capabilities, where innovation in a firm is dependent on dynamic capabilities such as the capability of independent thinking; intensive thinking; collaboration; maintaining trust; solving problems in teams; networking; maintaining strong relationships (Van Kleef and Roome, 2007). Moreover, including this as variable when studying PSFs is recommended by several researchers (Amara et al., 2016; Thakur and Hale, 2013) thus, we hypothesize the following:

$H_3$: The level of human capital will have a significant positive impact on innovation output

### 2.4.4 Culture for Innovation

In existing literature, organizational culture is identified as one of the factors that stimulates innovative behavior in the organization (Valencia, Valle and Jiménez., 2010). Having an established culture for innovation may lead employees to accept innovation as a fundamental value of the organization thus making the organizational culture a source of competitive advantage. Although culture have been identified as an important stimulant for innovation, the research on the topic have remained somewhat limited and is mainly conducted in non-Norwegian contexts (Valencia, Valle and Jiménez, 2010).

Brettel and Clevel (2011, p. 255) defines innovation culture as "*the degree to which an organization are predisposed to learn continuously and to develop knowledge with the intention to detect and fill gaps between what the market desires and what the firm currently offers*". Innovativeness in a firm requires a culture for innovation that can guide all employees through the innovation process (Ahmed, 1998). Possession of positive cultural characteristics provides the organization with the necessary ingredients to innovate. An innovative culture means that the firm is more innovative and contains higher ability to adapt to environmental changes. Therefore, these firms have a higher chance of surviving in an unstable climate. Intangible resources such as, talented employees, knowledge skills, entrepreneurial thinking, mission, vision and reputation are all factors that contributes to building a culture for innovation (Jan, Shah and Khan, 2014). Previous researchers hold the common belief that a culture for innovation will support and enhance innovation propensity (Ahmed, 1998; Mumford, 2000; Higgins and McAllaster, 2002; Jassawalla and Sashittal, 2002; Martins and Terblanche, 2003; Lau and Ngo, 2004; Jamrog et al., 2006). The main reason for this belief is that a good culture for innovation will make employees accept innovation as a basic value of the firm, and this might thereby foster commitments amongst members of the firm (Valencia, Jimenez and Sanz-velle, 2010).

The most challenging part of building up a culture for innovation can be drawn from Nelson and Winter (1982) who states that an organization, intentionally or unintentionally, builds up certain organizational routines which over time becomes their culture; this is not easy to change. Thus, culture has both the ability to hinder and enhance the innovation output in an organization. Seegy et al. (2008) suggests that there must be a sufficient strategic management framework for the good ideas to be transformed into new and well-functioning services. Hence, a good culture is not enough in itself.

From this literature, we hypothesize the following:

$H_4$: The degree of innovation culture will have a significant positive impact on innovation output.

We have in the previous sections provided literature on the internal factors to be studied in this research. Table 2 offers a summary of the internal factors effect on innovation output with the related researchers of empirical studies on the different subjects.

| ***Factor*** | **Theoretical Arguments** | **Empirical Studies** |
|---|---|---|
| *Organizational Inertia* | Negative: resistance to change, risk averse, nonresponsive to change, conservative industry, | Nelson and Winter, 1982; Edmondson et al., 2001; Baschab, 2004; Blumentritt and Danis, 2006; Chesbrough, 2006; Huang et al., 2012; Maister, 2012; Thakur and Hale, 2013 |
| *Training* | Positive: development, capabilities, skills, efficiency, problem-solving, knowledge, learning, | Garud and Nayyar, 1994; Galunic and Rodan, 1998; Shipton et al., 2006; Thornhill, 2006; Murovec and Prodan, 2009; Thakur and Hale, 2013; Fu et al., 2015 |
| *Human Capital* | Positive: skills, expertise, education, technology, reputation, capacity, efficiency, knowledge-intensity, dynamic capabilities | Smith, 1776; Fisher, 1897; Schultz, 1961; Lundvall and Johnson, 1994; Doorward and Maihuizen, 2000; Hitt et al., 2001; Leiponen, 2005; Van Kleef and Roome, 2007; Hofheinz, 2009; McGuirk, Lenihan and Hart, 2015 |
| *Innovation Culture* | Positive: acceptance, competitive advantage, adapt to changes, survival, talent, knowledge, entrepreneurial thinking, reputation, | Nelson and Winter, 1982; Ahmed, 1998; Momford, 2000; Higgins and Mcallaster, 2002; Jassawalla and Sashittal, 2002; Martins and Terblanche, 2003; Lou and Ngo, 2004; Jamrog, 2006; Seegy et al., 2008; Valencia, Valle and Jiménez, 2010; Brettel and Clevel, 2011; Jan, Shah and Khan, 2014 |

*Table 2 Internal Factors and Innovation*

## 2.5 Control Variables

To avoid drawing spurious conclusions on our proposed hypotheses it is important to control for other likely predictors on the relationship between internal factors and innovation output. Oerlemans et al. (1998) looked at the relationship between internal resources and innovation processes and found that relationships like these are highly influenced by other predictors, such as sector. Drawing especially on previous research on the topic of innovation, we include size of firm expressed in number of employees, age of firm and sub-sector as control variables (Becheikh, Landry and Amara, 2006). This further builds on the old contingency theory where size and age in particular have been considered as important contingent variables. It is said that an organizations effectiveness, viability and efficiency are all dependent on these contingent variables (Birkinshaw, Nobel and Ridderståle, 2002).

Size of firm has been widely discussed in relation to innovation, and goes back to Schumpeter's fundamental work. The Schumpeterian hypothesis suggested a more than proportionate effect of size on innovation activity (Schumpeter, 1942). Alongside, large firms may benefit from economies of scale in research and development (R&D), marketing and production. This contradicts other studies conducted on size in relation to innovation, which suggest that R&D activities increases less than proportionally with firm size (Love and Ashcroft, 1999; Balasubramanian and Lee, 2008). We consider the relationship between size and innovation as complex, and therefore include it as a control variable. When it comes to size, it is also discussed in relation to internal factors and researchers suggests that internal factors impact on innovation will vary among small and large firms. The size of the firm will decide the nature and the importance of the internal factors, with small firms being more affected than the large ones. It is further suggested that the factors faced in large firms are mainly the internal factors, because larger firms often have the capacity and resources to handle external factors. The internal factors arise due to their complexity and causes problems with communication and incentives in particular (Vossen, 1998).

The relationship between age and innovation is a less studied topic. Sørensen and Stuart (2000) were the two first to study this relationship, and little research has been done since. Interestingly, they found that the relationship between age and innovation varies among sub-sectors. The literature is unclear on whether there is a clear relationship between the variables or not, as some researchers have found a positive relationship and others a negative relationship (Balasubramanian and Lee, 2008). Francis and Smith (1995; as cited in Huang et al., 2012),

studied the relationship between agency costs and innovation, and found that older companies are more likely to be affected by inertia and rely on past experiences and thereby hindering innovation activities. However, the latest years has seen a growing focus on the phenomenon of young innovative firms (Schneider and Veugelers, 2010; Czarnitzki and Delanote, 2013; Audretsch et al., 2014). They are considered entrepreneurial spirits that are fast growing and job creating, and therefore close to the Schumpeterian ideal type. Europe have less young innovative firms than the U.S and it has been suggested by European policy makers to seek for these types of firms (Veugelers and Cincera, 2010).

In addition, the sub-sectors included in this study distinguishes between classic and neo-classic PSFs. Studies on this very subject suggests that the knowledge base and knowledge capabilities of different industries vary significantly (Amara, Landry and Doloreux, 2009). We have included a set of sub-sector as a control variable to see how innovation patterns vary across the professional service sector: law, auditing, management consulting, IT consulting, accounting, architecture and advertising. Moreover, the literature suggests that internal factors will vary among sub-sectors. Some internal factors may be firm specific for some sub-sectors and not for others. It is believed that innovative activities have much higher appearance in high-technology sectors against low-technology because of less interference of hindering factors (Hadjimanolis, 2003).

The research question derived from the theory above is: *"Will size, age and/or sub-sector have a controlling effect on the relationship between internal factors and innovation output in PSFs."*

With the independent variables, dependent variable and control variables kept in mind, we now want to present our problem statement with following research questions and research model.

## 2.6 Problem Statement

All information about innovation and professional services stated in the theoretical background, had to be narrowed down for it to fit within the given time and capacity constraints. We have in this study shown the increasing interest of both PSFs and innovation, and how important these two subjects are for economic growth and development. However, there are few studies combining these two subjects. We therefore want to conduct a study on this topic, where we introduce internal factors and innovation output as the two constructs to be studied. There are

few studies on innovation in PSFs, and research on internal factors impact on innovation is to our knowledge non-existing. We will in this study therefore try to establish whether or not there is a relationship between our independent variables, Organizational Inertia ($X_1$), Training ($X_2$), Human Capital ($X_3$) and Innovation Culture ($X_4$), and our dependent variable Innovation Output (Y). Innovation output will in this study be represented by six types of innovation, namely; product, process, delivery, strategic, managerial and marketing.

Our problem statement is therefore: *"Internal factors in Professional Service Firms (PSFs) and their impact on innovation output: A Quantitative Study of Norwegian PSFs."*

As presented in the theoretical framework, we can see that different internal factors are described to have a relationship with innovation. Internal factors may prevent or enable innovation output to be produced in a firm. It is critical to manage the internal factors due to the increasing importance of innovative activities among knowledge intensive firms. We will therefore through this study try to establish whether there is a relationship between internal factors ($X_1$, $X_2$, $X_3$, $X_4$) and innovation output (Y). The primary research question for this study will be: *"Does internal factors have an impact on innovation output among Norwegian PSFs?"*

For us to be able to measure internal factors impact on innovation output among Norwegian PSFs, we must establish the degree of innovation output among them. The output from this measurement will be used in the statistical analysis to find if there is a relationship between our variables ($X_1$, $X_2$, $X_3$, $X_4$, and Y). The following research question will be answered in relation to innovation output: *"What is the degree of innovation output in Norwegian PSFs?"*
Theory states that heavy investments in innovation is crucial for a firm's ability to produce innovation output. This study has measured the respondents' investments rate in monetary terms and it is therefore interesting to discuss the actual relationship between investments in innovation and innovation output. We will therefore answer the following research question: *"Are investment in innovation activities positively related to PSFs' propensity to produce innovation output?"*

This study's purpose is to investigate internal factors impact on innovation output among Norwegian PSFs. We must therefore establish the extent to which the studied variables exist among them. The following research question will therefore be presented: *"To which extent*

*does organizational inertia, training, human capital and innovation culture exist among Norwegian PSFs?"*.

By answering the primary research question, another question arises. We believe that it can be of interest to management to know which internal factor that has the largest impact on innovation output. This may prove as guidelines for managers when introducing innovative activities in a PSF, as they will have an opinion of which internal factors to pay particular attention. Therefore, we seek to answer the following research question: *"Which internal factor has the largest impact on innovation output?"*. This is not the primary focus of this study, but will be answered to build further on the hypotheses set for the study.

We will also investigate three different control variables and how they affect the relationships. Size (Z) will be studied due to its roots in old contingency theory and also to test Schumpeter's work from 1931, as explained earlier. Age (V) will also be investigated to build on the limited research currently associated with it, and to get a clearer picture of the mixed opinions on the subject. Lastly, sub-sector (W) will be studied as theory states that internal factors will differ among industries, and therefore also likely to affect innovation output in different ways. We will try to answer the following research question regarding the control variables: *"Will size, age and/or sub-sector have a controlling effect on the relationship between internal factors and innovation output in Norwegian PSFs?"*. For us to be able to answer this research question, we also had to answer to questions related to it; *"What is the degree of internal factors among different sub-sectors, ages and sizes of firms in Norwegian PSFs?",* and *"What is the degree of innovation output among different sub-sectors, ages and sizes of firms in Norwegian PSFs?"*. There will be no hypotheses concerned with the control variables.

To further build on the theoretical framework, our hypotheses will be stated as follows:

$H_1$: The degree of organizational inertia will have a significant negative impact on innovation output
$H_2$: The degree of training will have a significant positive impact on innovation output
$H_3$: The level of human capital will have a significant positive impact on innovation output.
$H_4$: The degree of innovation culture will have a significant positive impact on innovation output

In this study, ρ represents the correlation between the independent variables and the dependent variable. Our hypothesis can be statistically expressed as follows:

$H_1$: $\rho < 0$ (negative correlation)

$H_2$: $\rho > 0$ (positive correlation)

$H_3$: $\rho > 0$ (positive correlation)

$H_4$: $\rho > 0$ (positive correlation)

If the hypotheses are to be rejected at the significance level of 0.05, this will be statistically expressed as follows:

$H_0$ : $\rho = 0$ (indicating no relationship)

As a conclusion and to further build on the theoretical framework, the following research model is presented:

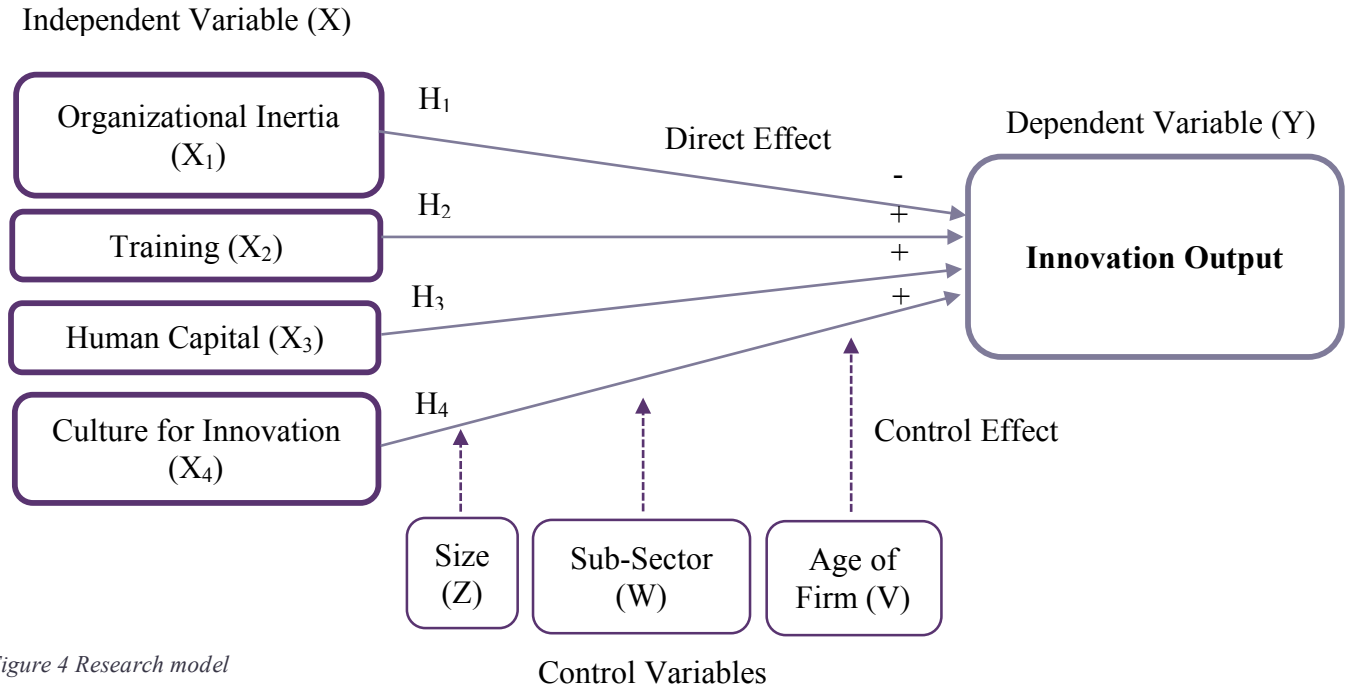



*Figure 4 Research model*

# 3.0 Data Collection and Methodology

In this chapter, we will present the methods used to obtain and analyze data in our study. For this purpose, we decided to use an online questionnaire. Our main reason for pursuing an online questionnaire instead of interviews was due to the challenge of obtaining a sufficient sample size within the given time constraints. Also, we wanted our sample to give a good representation of the situation of Norwegian PSFs and therefore needed a high number of respondents for our study to be representable for the sector. For this reason, we chose to do a quantitative study. Alongside, it gave us first-hand primary data, which were desirable as there is no previous research available with internal factors as independent variables in the chosen context.

A contact list with 600 PSFs around Norway was obtained from Proff Forvalt (2017). A total of 152 companies responded to the questionnaire, which makes up a percentage respondent rate of 25.2 %. The percentage rate is satisfying considering the limited time the respondents had to complete the questionnaire. The high respondents' rate shows a high relevance of innovation in the service sector and in PSFs in specific. The questionnaire we used for this study is enclosed in appendix A.

We used the software 'SmartPLS' to perform analysis through a method called Partial Least Squares SEM (PLS-SEM). According to Hair et al. (2014), this is a process that combines different aspects of factor and regression analysis into multivariate techniques and is becoming a key research method. By using this method, it is possible for us to combine two steps of analysis at the same time. At the same time as we examine the relationship between the independent and dependent variables, we may also investigate the relationship between the variables and the indicators that measure them. We can therefore develop both a structural model and a measurement model in the same analysis. In addition to PLS-SEM, SPSS was used to test common method bias in chapter 3.2.7 as PLS-SEM is not able to run this type of analysis.

## 3.1 Methods of obtaining data

We obtained primary first-hand data by creating a questionnaire that we designed with the use of previous measurement scales used for similar research (see section 3.1.2). All measurements and variables used in our questionnaire are previously tested for validity and reliability, and all questions were selected and put together to best suit the purpose of our study. We wanted to test whether there is a relationship between the internal factors of a firm ($X_1$, $X_2$, $X_3$, $X_4$) and

the six types of innovation, innovation output (Y). Amara et al. (2016) have previously conducted a similar study in Canada on external factors affecting innovation among knowledge-intensive business services (KIBS). In their suggestions for future studies, they recommend to further investigate the importance and impact of internal factors to innovation. Therefore, the aim of this study is to investigate this among Norwegian PSFs, which as mentioned makes up a large sub-section of KIBS (Von-Nordenflycht, 2010).

We used SurveyXact to create our survey, which was both convenient and easy to use for our purpose. The next section will explain our method of data collection in further details.

### 3.1.1 Online Questionnaire in SurveyXact

Our questionnaire was put together with the help of an online survey program called SurveyXact. This was very convenient for us to ensure a sufficient sample size relatively quickly. We made a contact list that we used for our survey, and all possible respondents were collected from Proff Forvalt (2017). Proff Forvalt is a database containing market information from over 80,000 Norwegian companies. The database was easy to use and it allowed us to filter the specified sub-sectors of our interest. The sample is random with three requirements (1) firm has six or more employees, (2) firm is within our chosen sub-sectors, and (3) that we could obtain email addresses to a specific member of the firm. Our questionnaire was distributed to as many respondents as possible. The email addresses used were mainly to contact CEO's, daily-managers, board members or appointed contact persons. This was to avoid that the emails ended up unopened and to be able to nudge the respondents. Due to our requirement of a certain email address, our possible population was reduced quite significantly. This gave us a certain security of what kind of respondents we could expect, but also a quite increased amount of work.

However, a short time after distributing the survey, we decided to include two additional sub-sectors for it to be consistent with the theoretical framework. We added "advertising" and "architecture" to the four sub-sectors (accounting, auditing, law and consulting) that already had received the questionnaire. Due to time constraints, these contact lists were derived directly from "Proff Forvalt" (2017) without ensuring that the e-mail addresses were directly to selected members of staff. Therefore, two sub-sectors lack the security of knowing who the respondent would be and we cannot be sure if the respondents of these two sub-sectors are reliable or not.

From appendix B, one can see that the minimum sample size to perform such an analysis in SMART-PLS is 75. With 75 observations, we can ensure for a 5 % significance level and a $R^2$ values of at least 0.25. Alongside, this will ensure for a statistical power of 80 %. We have a maximum number of six arrows pointing at the constructs, and this is the background for knowing how many observations we need in the sample. With our 142 observations, we are well within the range that Hair et al. (2014) suggests as a minimum (See chapter 3.2.1 for analysis preparation).

After some discussion, we decided to distribute the questionnaire through our personal university email account. This was done to better be equipped to personalize the email and to make it seem more convincible. We distributed it English only, which was done for our convenience when analyzing the data and writing the thesis. Our impression is that the average of the Norwegian population has sufficient English skills to understand the questionnaire.

We cannot ensure that our sample do not have coverage errors as it was difficult to filter out our desired sub-sectors. In addition, we set the limit of six employees minimum, however, in some cases, Proff Forvalt (2017) seemed to have the incorrect numbers of employees, so all company websites were doubled checked to ensure that only the firms with more than six employees were included in the population. Another disadvantage with the use of an online questionnaire is that we cannot under any circumstances clarify the questions for the respondent, which may lead to misinterpreted answers.

### 3.1.2 Questionnaire design

As mentioned, we have designed the questionnaire by using previously studied measurement items and applying them to our context of research. The measurement items used to measure the different constructs are shown in Appendix A. There are five underlying constructs (four independent and one dependent variable) to be measured in our study. The internal factors to be studied as independent variables are (1) organizational inertia, (2) training, (3) human capital and (4) innovation culture. Huang et al. (2012) provided us with items to measure organizational inertia. The research conducted by Chen and Huang (2009) provided us with items to measure training. Human capital was measured by items adopted from Skaggs and Youndt (2004) and Subramaniam and Youndt (2005). Our fourth independent variable, innovation culture, was measured with three items from Hogan and Coote's (2014) and two items from Jagharh, Ghorbanpanah and Nabavi (2012). We made some minor adjustments to the items to increase

readability and to fit better with our purpose. For the dependent variable, innovation output (Y), we used the items provided by Amara et al. (2016). We were therefore able to adopt the synthesis approach for six types of innovation that is recommended for service innovation. This is previously explained in section 2.2.2.

The survey is divided into four parts, A-C, to make it simple and easy to understand for us and the respondents (see appendix A). Following Amara et al. (2016) example, our respondents were asked to respond to a 5-point Likert scale consisting of the following:

1 = Strongly disagree
2 = Disagree
3 = Neither
4 = Agree
5 = Strongly agree

SurveyXact was both the recommended and preferred method of obtaining data due to its high level of anonymity and its fast delivery time. In addition, it was easy to access as we were provided license from the university. To ensure the respondents anonymity, we chose "anonymous survey" as a setting in SurveyXact. To protect personal data from being used inappropriately, the University has appointed the Norwegian Social Science Data Services (NSD) as their official protection. NSD is therefore the ones that treat all messages. It is a legal requirement that all research conducted at the University of Agder must be approved through NDS systems and hold their standards. If the study under any circumstances uses personal data, the researcher is obliged to notify NSD. We completed the NSD notification test, and was thereby ensured that our research is not "subject for notification" (See appendix C).

## 3.2 Method of Analyzing Data

In this section, we will describe all adjustments that were made to the dataset in order to prepare it for the analysis. In addition, the following sections will provide methods, choices and measurements used to perform descriptive analysis, and analysis in Smart PLS.

### 3.2.1 Analysis preparation

When the data collection was completed, we were left with 152 respondents. Some of the respondents did not answer the whole survey, and therefore had to be removed from our data set. Other than this, we also had to do some adjustments in the dataset due to some

misunderstandings and abnormal responses. We went through all the different responses and noticed that some used different amounts of decimals when answering the questions about total turnover and net income, and changed those that were clearly misunderstood. Further, we had to remove some of the respondents as some stated that they worked in other sub-sectors than we have narrowed our study down to. Among those who answered "other", they were asked to specify what other sector they belonged to, and we got the following responses: oil and gas, consulting engineering, marketing, project management, recruitment, design, construction, facility management and software. In order to get a correct dataset for our research, we removed those who answered sub-sectors that were not suitable for our study. This led to no respondents within the 'other' category. Therefore, we were left with a number of 142 respondents in our final dataset.

After the removal, we were left with a total number of 142 respondents in our final dataset. For research purposes, this might for some seem as a small sample size, but bearing in mind our requirements of (1) minimum six employees, (2) within classic or neo-classic PSFs, and (3) direct e-mail address, it is sufficient. Similar research is conducted with more or less the same sample size. Furthermore, it is worth keeping in mind that Norway is a small country with few companies respectively. From our contact list of approximately 600 firms, 152 firms responded, resulting in a 25.2 % response rate, which is in fact considered to be very high (Berenson, Levine and Krehbiel, 2012).

### 3.2.2 Descriptive Analysis Method

The next step in the analysis was to do some general descriptive analysis, which can be found in chapter 4. This was done after the data was prepared for analysis, as explained in the previous section. The descriptive analysis gave us an overview of what the respondents had answered in the questionnaire and helped us understand the relationship between our variables a bit more. The descriptive analysis was primarily conducted with the use of SPSS and Excel. We asked the respondent to answer the questionnaire on behalf of their company and its entire Norwegian operations.

The respondents of the questionnaire answered on a 5-point Lickert scale. For us to better handle the analysis, we had to bulk the scales into three: agree, disagree and neither. The respondents could choose between agree (1-2), disagree (3-5) and neither (4). For agree and

disagree, we must clarify that the respondents answer will be of varying degrees, due to the bulking.

The research question will be analyzed at the sub-sector level within the sector of professional services, with a focus on classic and neo-classic PSFs. Furthermore, we had to bulk size into two groups, small and large. After having a quick scan of the sample, we noticed that very few companies had above hundred employees, which were our first thought of large companies. We therefore decided to lower the number to 50 employees. Our definition of small companies is therefore those with up to 50 employees (not including 50), and large companies as those with 50 employees or more. This decision is supported by Altinn (2016), who uses the same division of small and large companies. Altinn is the Norwegian online portal for cooperation between business, private persons and government agency, with over 1 million registered businesses. Alongside, we had to bulk age of firm into two groups, young and experienced. We have used the scales provided by the European Union (Rob, 2002; Navaretti, Castelani and Pieri, 2014; Coad, Segarra and Teruel, 2015) in order to distinguish young and experienced firms from one another. These suggests that young firms are firms up to 5 years old (not including 5), and experienced firms as those who are 5 years or older. We agree with this, and define the same for our analysis.

We also wanted to analyze the hypothesized relationship between our variables. For this purpose, we inserted the relevant data into Smart-PLS, as recommended by Professor Andreas Erich Wald. The upcoming sections will go further into the procedure of analyzing data in this program.

### 3.2.3 PLS-SEM: Structural and Measurement Models specification

The first step in the analysis when applying PLS- SEM, we had to prepare a diagram illustrating the research hypotheses and the different relationships to be studied. This diagram is called a path model (Hair et al., 2014), and is illustrated in figure 5. The structural model is the ’inner model’, whilst the measurement model is the ’outer model’. The circles are the constructs/variables to be measured. The indicators (small rectangle figures), are the directly measured proxy variables that all contain raw data. All the relationships between constructs and their respective indicators are shown as arrows (Hair et al., 2014). The model presented in figure 5 is the original path model before we tested the models for validity and reliability.

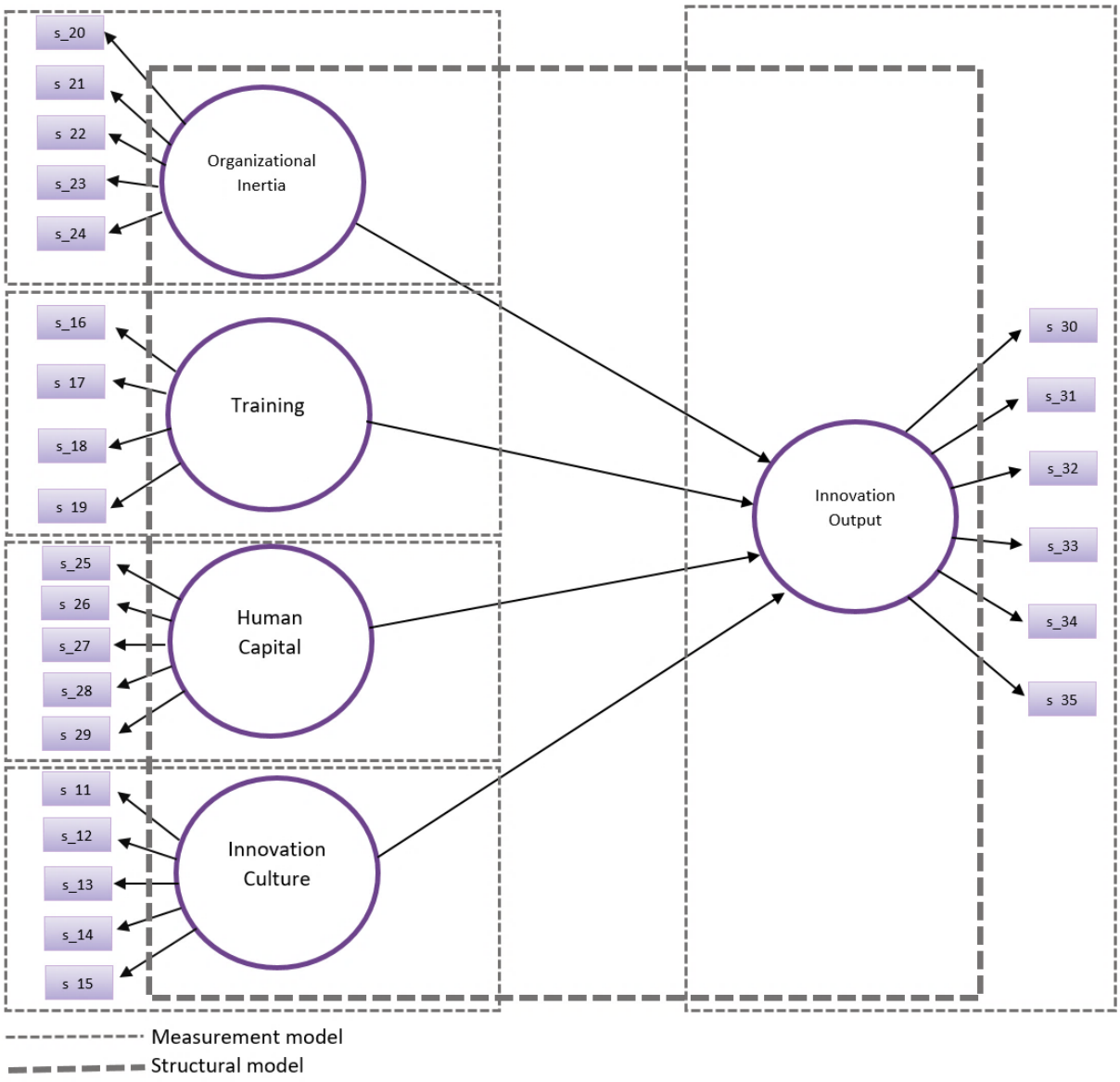



*Figure 5 Structural and Measurement Model*

Before developing the measurement model, we had to consider two broad types of measurement specification: formative measurement models and reflective measurement models. Our study is a reflective measurement model, which has a long tradition in social sciences and is directly linked to the classic test theory (Hair et al., 2014). With this model, the measures represent the effects of an underlying construct. Causality is established from the construct to its indicators. In addition, the different indicators are somewhat overlapping each other, and the reflective measurement model seeks to maximize this. This is distinctive from the formative measurement models who seeks to minimize these overlaps (Hair et al., 2014).

First, we had to establish the structural model, which displays the relationship between the constructs (Hair et al., 2014). This is represented by the thicker dark grey dotted lines. It shows the relationship between our four independent variables and the dependent variable. Secondly, we had to specify the measurement models, which represents the relationship between the variables and their assigned indicators (Hair et al., 2014). Each of the variables got their own measurement model, and this is represented with the thin light grey dotted lines.

The measurement models representing the independent variables will be explained further in this paragraph. The model representing the independent variable, organizational inertia ($X_1$), consists of five indicators, ranging from S_20 to S_24. Training ($X_2$) as the second independent variable consist of four indicators. The next independent variable, human capital ($X_3$), also consists of five indicators. Lastly, the independent variable, innovation culture ($X_4$), got five indicators. All independent variables and respective indicators are represented by questions in section C of the questionnaire. Furthermore, the measurement model representing the dependent variable, innovation output (Y), consists of six indicators. The six indicators are to be found in section B of the questionnaire, and they represent the six different types of innovation as explained in section 2.2.4. Combined, these six types of innovation make up the innovation output.

The next sections will give further description of the structural model and the measurement model.

### 3.2.4 Data Normality

When analyzing data, it is important to know whether or not the data is normally distributed. In this study, we examine two measures of distribution, which allow us to assess to what extent the data deviate from normality. The two measures used to assess normality in this study is skewness and kurtosis, as recommended by Hair et al. (2014). Since PLS-SEM is a nonparametric statistical method, it does not require the data to be fully normally distributed. However, for statistical purposes it is important to verify that the data is not too far from normal. If the data is extremely non-normal, this will lead to problems when assessing the significance of parameters. Skewness assess the degree of symmetry in the distribution. If the distribution stretches towards the left or right side of the tail, we say that it is skewed. Kurtosis on the other hand, measures whether the distribution seems to be too peeked (Hair et al., 2014).

The pattern of the distribution is considered normal when both kurtosis and skewness is close to zero. However, this almost never happens. Therefore, Hair et al. (2014) suggests that a general guide would be that both skewness and kurtosis should lie between -1 and +1. For skewness, they further suggest that if the number is greater than +1 or lower than -1, this is an indication of a substantially skewed distribution. For kurtosis, they suggest that if the number is higher than +1, the distribution is too peeked, whilst if it is less than -1, the distribution is too flat.

When studying the total of our dataset we can see that a majority of all indicators lies within this range (See table 3 and 4). When looking at the independent variables, one can see that all constructs apart from "Training" are within somewhat normal distributions. "Innovation Culture" have one indicator, S_11, being above +1, but as it is measured by several indicators, not only the one, we see this as unproblematic, and the indicator is therefore retained. When it comes to "Training", there are some issues with indicator S_16 and S_18. However, also for this construct there are several indicators measuring it and it is later on in this chapter tested for validity and reliability, which both are satisfying. We therefore retain these indicators. After running the algorithm several times with S_16 and S_18 being removed one at the time, we did not experience any major impacts on other variables, or reliability and validity, and it is therefore no troubles with leaving them in.

When looking at the dependent variable, innovation output, the data is very close to normally distributed, with only kurtosis for a few indicators being slightly above +1. This is very close to 1, and with Hair et al. (2014) suggestion that it should not be too far from normal, we accept this slight exceedance and include all indicators in our further analysis.

| **Organizational Inertia ($X_1$)** | | | | | |
|---|---|---|---|---|---|
| | **S_20** | **S_21** | **S_22** | **S_23** | **S_24** |
| **N valid** | 142 | 142 | 142 | 142 | 142 |
| **Kurtosis** | 0.011 | -0,473 | -0.995 | 0.122 | 0.424 |
| **Skewness** | 0.752 | 0.533 | 0.213 | -0.683 | 0.737 |
| **Human Capital ($X_2$)** | | | | | |
| | **S_25** | **S_26** | **S_27** | **S_28** | **S_29** |
| **N valid** | 142 | 142 | 142 | 142 | 142 |
| **Kurtosis** | 0.096 | 0.959 | 0.519 | -0.063 | 0.392 |
| **Skewness** | -0.751 | -0.704 | -0.937 | -0.527 | -0.507 |
| **Training ($X_3$)** | | | | | |
| | **S_16** | **S_17** | **S_18** | **S_19** | |

| | | | | | |
|---|---|---|---|---|---|
| **N valid** | 142 | 142 | 142 | 142 | |
| **Kurtosis** | 2.408 | 0.162 | 3.096 | 0.563 | |
| **Skewness** | -1.180 | -0.598 | -1.285 | -0.608 | |
| **Innovation Culture ($X_4$)** | | | | | |
| | **S_11** | **S_12** | **S_13** | **S_14** | **S_15** |
| **N valid** | 142 | 142 | 142 | 142 | 142 |
| **Kurtosis** | 1.844 | 0.394 | 0.596 | -0.726 | -0.446 |
| **Skewness** | -0.905 | 0.774 | -0.847 | -0.327 | -0.506 |

*Table 3 Normality of the independent variables (X1, X2, X3 and X4)*

*Innovation Output (Y)*

| | **S_30** | **S_31** | **S_32** | **S_33** | **S_34** | **S_35** |
|---|---|---|---|---|---|---|
| **N Valid** | 142 | 142 | 142 | 142 | 142 | 142 |
| **Kurtosis** | -0.969 | -1.060 | -0.885 | -1.030 | -0.916 | -1.097 |
| **Skewness** | -0.324 | 0.078 | -0.294 | -0.284 | -0.118 | 0.024 |

*Table 4 Normality of dependent variable, innovation output (Y)*

In this section, we have found that our sample is fairly normally distributed. With the use of Smart-PLS, there should be no troubles with performing the analysis as this program does not require the distribution to be fully normal (Hair et al., 2014). The next section will assess the path model created through PLS-SEM.

### 3.2.5 PLS Path Model Estimation

In this section we will discuss how we ran the PLS-algorithm. We will show and discuss all implications and considerations associated with performing the algorithm. The PLS-SEM algorithm will estimate all unknown elements of the PLS path model. The algorithm is the 'heart' of the PLS-SEM method, and will estimate the scores of all latent variables in the models, which thereafter are responsible for estimating all path model relationships (Hair et al., 2014).

Before starting the analysis, we had to ensure that none of our 30 indicators involved more than 5% missing values. As suggested by Hair et al. (2014), we chose to use the default setting of the program, namely mean replacement. This was due to that none of the indicators in our sample included any missing values, and we therefore disregarded this as any issue. In addition to ensuring no missing values, we also set the algorithm to be a path-weighting scheme and to have data metric option to standardize the z-values for data input for the PLS-SEM indicator variables (Hair et al., 2014).

### 3.2.6 Evaluation of the measurement models

For further analysis, we will now present the validity and reliability of our model. For this purpose, we will look at convergent and discriminant validity, together with indicator and consistency reliability. This is as mentioned done with the use of PLS-SEM. In addition, the data will be checked for common methods bias, an analysis conducted with the help of SPSS.

Before analyzing reliability and validity, we had to check if the algorithm converged. As suggested by Hair et al., 2014, we defined 300 as the maximum number of iterations in the PLS-SEM algorithm parameter settings. The algorithm should converge less than 300 times, or else the algorithm would not be able to find a stable solution. This means that the model is set to stop at a stop criterion of $1x10^{-5}$. It is further suggested by Hair et al. (2014) that models almost always converge, it is only in extreme cases that the algorithm does not converge. In our models, calculations show that the algorithm converged after eight iterations, so this check had a satisfying result and we can proceed with the analysis.

The first criterion to be evaluated is called internal consistency reliability. Traditionally, Cronbach's alpha is used for this purpose, as it provides an estimate of the reliability based on inter-correlations of the indicators. However, this criterion has several limitations to it, which resulted in us using a different method for assessing internal consistency reliability. Limitations of Cronbach's alpha are that it assumes all indicators equally reliable, it is sensitive to the number of items in the scale, and it often underestimate reliability (Hair et al., 2014). Due to these limitations, we will use composite reliability to measure internal consistency reliability in this study.

Composite reliability considers all indicators by their individual reliability, and is therefore our preferred choice. Composite reliability varies between 0 and 1, where the higher values indicates a higher reliability of the dataset. Hair et al. (2014) suggests that for exploratory research, values of 0.60 to 0.70 are considered satisfying. For more advanced research, values between 0.70 and 0.90 are acceptable. As seen in table 5, the composite reliability is high for all variables in our models. The independent variables have composite reliability that ranges from 0.742 to 0.896, which are all considered high. For the dependent variable, the value is 0.863, also this suggesting that the model has a high level of internal consistency reliability.

| | Composite reliability |
|---|---|
| Organizational Inertia ($X_1$) | 0.853 |
| Training($X_2$) | 0.896 |
| Human Capital($X_3$) | 0.795 |
| Innovation Culture($X_4$) | 0.878 |
| Innovation Output (Y) | 0.863 |

*Table 5 Composite Reliability*

The outer loadings in the models are shown as numbers on the arrows between the variables and the respective indicators, in figure 6. The outer loadings are useful when assessing the indicator reliability, and should all be above the threshold value of 0.708, as suggested by Hair et al. (2014). This number will ensure an explanation of approximately 50 % ($0.708^2$). In our models, we have four outer loadings that are considered below the threshold value. These are indicators, S_21 with 0.691, S_28 with 0.686, S_34 with 0.574 and S_35 with 0.692. However, their AVE (Average Variance Extracted) values are above 0.5 (see AVE discussion below), together with their composite reliability being sufficient, we therefore include them in further analysis. To be sure, we checked if removal of these variables would have a significant impact on the other indicators. We found that it did not have a significant effect, further supporting our decision. See table 7 for all the squared loadings.

Thirdly, we will assess convergent validity, which measures the extent to which the measures correlate positively with alternative measures of the same construct (Hair et al., 2014). This is measured by the use of AVE which is considered as the *"grand mean value of the squared loadings of the indicators associated with the construct"* (Hair et al., 2014, p. 103).

As a rule of thumb, the value of AVE should be above 0.50 (Hair et al., 2014), as the constructs then explains more than half of the variance of its indicators. In our models, we experienced a few issues with the AVE values. When running the algorithm without removing any indicators the AVE was too low for both 'human capital' and 'organizational inertia', with 0.258 and 0.406 respectively. We therefore looked at the outer loadings, which should be above 0.708. According to Hair et al. (2014), outer loadings between 0.40 and 0.70 should be considered removed from the data set in order to increase the AVE above the threshold value of 0.50. We therefore started by removing the indicator with the lowest outer loading, which was S_27. We thereby removed both S_26 and S_25 to get 'human capital' over the threshold value of 0.50. It ended up with an AVE of 0.664.

We thereby did the same for 'organizational inertia', starting with the lowest outer loading, namely S_22 and thereby S_23. After removing these two indicators, 'organizational inertia' ended up with an AVE of 0.662. For the two other independent variables, 'innovation culture' and 'training', they had AVEs of 0.592 and 0.648 respectively, both satisfying the threshold value of 0.50. As a final adjustment, we removed indicator S_12 from the models as it had an outer loading of -0.709, which is considered very low, and should always be deleted (Hair et al., 2014). The AVE value of 'innovation culture' therefore increased to 0.643, together with composite reliability as shown in table 8.

Lastly, we assess discriminant validity, which measure the distinctiveness between constructs by empirical standards. Discriminant validity therefore explains whether a construct is unique and does not carry phenomena represented by other constructs in the same model (Hair et al., 2014). For this purpose, two different methods may be used, namely the Fornell-Larcker criterion or one can check the cross loadings. According to the Fornell-Larcker criterion, the square root of each construct should be higher than its highest correlation with any other construct in the model (Hair et al., 2014). In our model, the square roots of AVE are as follows:

| **Construct** | **Square root of AVE** |
|---|---|
| Organizational Inertia ($X_{1)}$ | 0.814 |
| Training ($X_2$) | 0.827 |
| Human Capital ($X_3$) | 0.815 |
| Innovation Culture ($X_4$) | 0.802 |
| Innovation Output (Y) | 0.718 |

*Table 6 Square root of AVE*

As seen from the Fornell-Larcker criterion analysis below (Table 7), overall, the square roots of the AVEs are all higher than the correlations of the constructs with other latent variables in the model. This is therefore a satisfying result.

| | Human Capital ($X_3$) | Innovation Culture ($X_4$) | Innovation Output (Y) | Training($X_2$) | Organizational Inertia ($X_1$) |
|---|---|---|---|---|---|
| Human Capital ($X_3$) | 0.815 | | | | |
| Innovation Culture ($X_4$) | 0.380 | 0.802 | | | |
| Innovation Output (Y) | 0.288 | 0.626 | 0.718 | | |
| Training ($X_2$) | 0.351 | 0.124 | 0.139 | 0.827 | |
| Organizational Inertia ($X_1$) | -0.327 | -0.429 | -0.464 | -0.075 | 0.814 |

*Table 7 Fornell-Larcker Criterion*

As mentioned, one may also look at the cross loadings to assess discriminant validity. Discriminant validity is established when the loading of an indicator on a construct is higher than all cross loading with other constructs in the model. In our models, this is fulfilled. This means that all the indicators have a higher relevance for the intended variable than other variables (Hair et al., 2014). Please see appendix D for the cross loadings. Both the Fornell-Larcker criterion and the cross loadings check shows that we have established discriminant validity in our models.

| Latent Variable | Indicator | Loadings | Indicator Reliability | Composite Reliability | AVE | Discriminant Validity? |
|---|---|---|---|---|---|---|
| **Human Capital ($X_3$)** | S_28 | 0.686 | 0.471 | 0.795 | 0.664 | yes |
| | S_29 | 0.926 | 0.857 | | | |
| **Innovation Culture ($X_4$)** | S_11 | 0.786 | 0.618 | 0.878 | 0.643 | yes |
| | S_13 | 0.819 | 0.671 | | | |
| | S_14 | 0.800 | 0.64 | | | |
| | S_15 | 0.820 | 0.672 | | | |
| **Innovation Output (Y)** | S_30 | 0.77 | 0.593 | 0.863 | 0.515 | yes |
| | S_31 | 0.77 | 0.593 | | | |
| | S_32 | 0.71 | 0.504 | | | |
| | S_33 | 0.77 | 0.593 | | | |
| | S_34 | 0.57 | 0.325 | | | |
| | S_35 | 0.69 | 0.476 | | | |
| **Training ($X_2$)** | S_16 | 0.883 | 0.80 | 0.896 | 0.684 | yes |
| | S_17 | 0.879 | 0.773 | | | |
| | S_18 | 0.742 | 0.551 | | | |
| | S_19 | 0.795 | 0.632 | | | |
| **Organizational Inertia ($X_1$)** | S_20 | 0.832 | 0.692 | 0.853 | 0.662 | yes |
| | S_21 | 0.691 | 0.477 | | | |
| | S_24 | 0.904 | 0.817 | | | |

*Table 8 Summary of the evaluation of the models*

After removing the necessary indicators (S_12, S_22, S_23, S_25, S_26, S_27), we ended up with the final measurement models as shown in figure 6. The indicators and their respective questions can be found in appendix A.

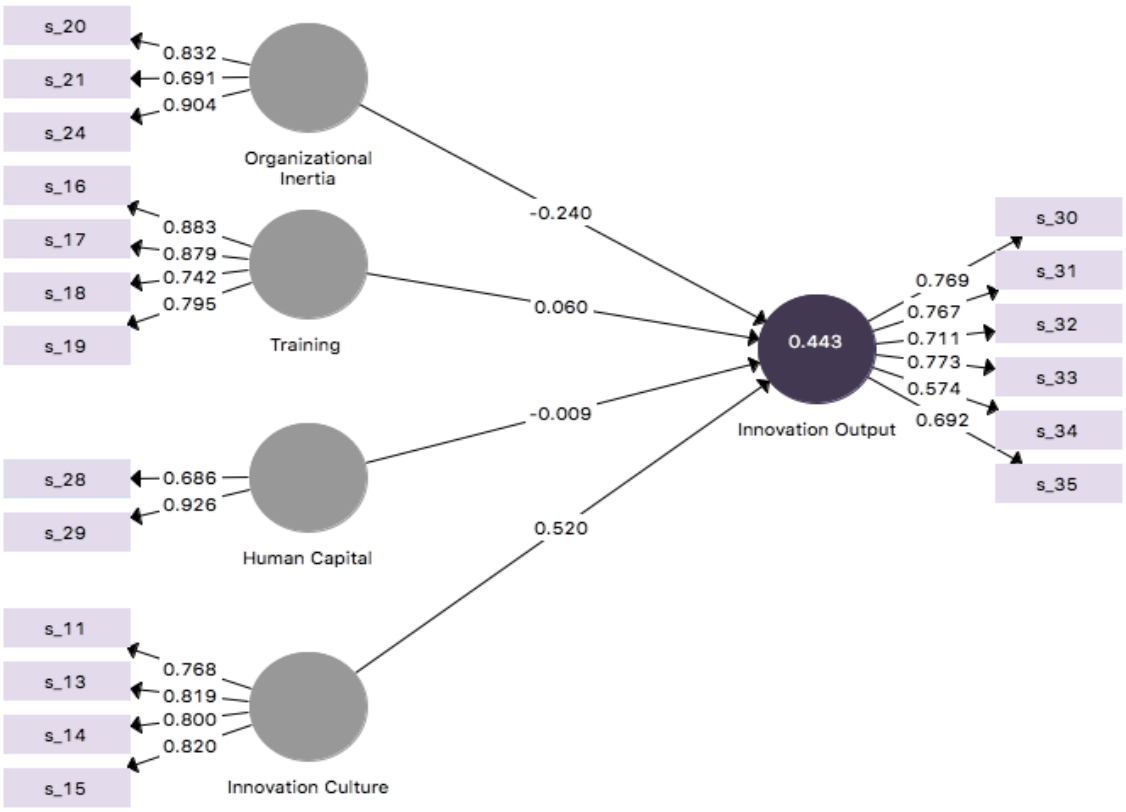



*Figure 6 Measurement model of independent and dependent variables*

In this section, we have evaluated validity and reliability for the measurement models. We have through this analysis established a model that has internal consistency reliability, indicator reliability, convergent validity and discriminant validity. Table 8 summarizes our results for this section and we conclude that our models are both reliable and valid, with the adjustments that had to be made.

### 3.2.7 Common Method Bias

Our study is based on information gathered through a questionnaire where individuals have answered on behalf of entire firms. This may lead to a common method bias, which says that the observed variance may be attributed partly to the chosen method of measurements instead of the actual constructs (Doty and Glick, 1998). As suggested by Tyssen, Wald and Heidenreich (2014) we have therefore controlled our data for common method bias. To do this we used an approach to combine procedural and statistical remedies to control our models for method bias. First, on the procedural level we made sure that the independent and dependent variables were clearly separated in the questionnaire. In addition, we also made sure that all questions were laid out as simple as possible and thereby reduced the ambiguity of each individual item. Moreover, all items were carefully drawn from existing academic literature and was therefore tested in other studies before conducting this study.

On the statistical level, we applied the Harman's single factor test. This was done by loading all the variables into an exploratory factor analysis, and had to be conducted through SPSS. First, we had to check our sampling adequacy and sphericity to see if it was worth proceeding with the analysis. From the KMO and Bartless Test, we found that the sampling adequacy was 0.829 and that the p-value was 0.0001. As suggested by Hinton, McMurray and Brownlow (2014) the general rule of thumb is that the KMO value should be above 0.5, and that the p-value should be below 0.05. In our study, the variables are therefore essentially independent, and hence not highly correlated so we can easily distinguish between them. We set 1 as the criterion for the eigenvalues, and found that we have five factors that cumulative explain 65.348% of the total variance in the data. From the factor analysis, we found that none of the factors emerged, and the first factor counts for only 29.76 % of the total variance. This is below the suggested threshold value of 50%, which indicated that the model is without common method bias (Podsakoff et al., 2003). We cannot conclude with complete certainty, but the results suggest that it is rather unlikely that the research is biased and we may proceed with the analysis. Please see appendix E for the complete SPSS output.

### 3.2.8 Structural Model – Additional Assortments

When assessing the structural model, PLS-SEM will give us the path coefficients, which is the relationship between the latent variables and the structural model (Hair et al., 2014). Alongside, it will give us the coefficient of determination ($R^2$), of the dependent variable (Y). These are both assessments of the model's ability to predict (Hair et al., 2014). All results regarding the two coefficients can be found in chapter 5.1.

Along with PLS-algorithm, we used the bootstrapping and blindfolding procedure. The bootstrapping procedure tests the coefficients for significance. Due to that Smart-PLS does not assume normality of distributions, regression cannot be used. When conducting the bootstrapping procedure, we followed Hair et al. (2014) suggestions, and ran the models with 5000 subsamples and 0.05 significance. With 5000 subsamples we ensure stability of the results, as subsamples are drawn from randomly selected original set of data. In settings, we chose the one tailed test as our hypotheses clearly predicts the directions of the relationships. In addition, we conducted the blindfolding procedure which allowed us to test the predictive relevance of our models ($Q^2$). We used the omission distance of seven, as suggested by Smart-PLS, which implies that every seventh data point of the target construct's indicators are

eliminated in a single blindfolding round. It is important that the chosen omission distance does not create an integer when divided by the number of observations, but in our study, 142/7 = 20.28, and it is therefore no issues regarding this.

When using hypotheses testing, one has to be aware of the risk of reaching the incorrect conclusion. The null hypothesis might wrongly be rejected, or a null hypothesis might be wrongly *not* rejected. These risks are called type I and type II errors. A type I error ($\alpha$), level of significance, occurs if the null hypothesis is rejected when it actually is true. The level of significance is chosen by the researcher, and is traditionally a choice between 0.01, 0.05 and 0.10, with 0.05 being the most common used. A significance level of 5 % is also the chosen level for this study. A type II error ($\beta$), risk, occurs if the null hypothesis is not rejected when it in fact should have been rejected (Berenson, Levine and Krehbiel, 2012).

Before looking at the results of the analysis, a natural step is now to assess the structural model for collinearity. The issues regarding collinearity can be investigated through assessing the Variance Inflation Factors (VIF). According to Hair et al. (2014), each predictor construct's tolerance VIF value should all be above 0.20, but not above 5.00. In our models, all constructs have collinearity with the dependent variable within the acceptable range (see table 9). We can therefore precede with the analysis of the models, and do not have to remove or merge predictors into a single construct.

| | **VIF – Values in relation to Innovation Output (Y)** |
|---|---|
| Organizational Inertia ($X_1$) | 1.277 |
| Training ($X_2$) | 1.143 |
| Human Capital ($X_3$) | 1.367 |
| Innovation Culture ($X_4$) | 1.330 |

*Table 9 Collinearity Assessment*

### 3.2.9 Advanced Analysis Through PLS-MGA

To be able to examine the control variables (size [Z], firm age [V] and sub-sector [W]) impact on the relationship between the variables, we had to conduct some advanced analysis. This was done by running a PLS-SEM Multi-Group analysis (PLS-MGA). The PLS-MGA was run with a significance level of 0.05 and 5000 subsamples.

When it comes to sub-sector (W), we used the categories as provided in the questionnaire (see appendix A). For control variable (Z), size, we had to divide the data in to two groups, namely

small and large firms. We chose to base size on the number of full time equivalent employees each firm had. Small firms are defined as those with up to 50 employees (50 not included), and large firms those with 50 employees or more.

For control variable (V), age of firm, we also divided the observations into young firms, being those that were up to 10 years (10 not included), and experienced, for those being aged 10 or more (Navaretti, Castelani and Pieri, 2014; Coad, Segarra and Teruel, 2015) For the analysis itself, we used the same settings as for the algorithm and the bootstrapping procedures explained in previous sections. When running the PLS-MGA analysis, we get the absolute difference of the path coefficients associated with each of the individual groups. The results found through the PLS-MGA analysis is to be found in chapter 5.2.

We have in this chapter shown the methodology for the data collection and the analysis procedure. Further on, chapter 4 will display the descriptive results of the analysis.

# 4.0 Descriptive Results

This chapter will present our descriptive results with a focus on representation within our sample and descriptive results regarding the independent and dependent variables. It will also display the results regarding the control variables. Descriptive statistics is about how quantitative data is presented: how the different values are divided as well as the relationship between the different variables. Rugg (2007) recommend that descriptive statistics are done initially in order to get an overview of the lowest and highest responses and means. This presentation is done due to the fact that descriptive statistics allows us to summarize and arrange numerical data for it to become more comprehensive and easier to analyze (Saunders et al., 2003; Zikmund et al., 2010).

## 4.1 Representation Within the Sample

In this section, the distribution of our sample will be illustrated with the use of figures and tables. We will show the respondents' characteristics when it comes to sub-sector, size and age. We will also display results about for example the respondents' position in the firm, the average number of employees and the average age of firm among others. The first figure shows the frequency of respondents per sub-sector.

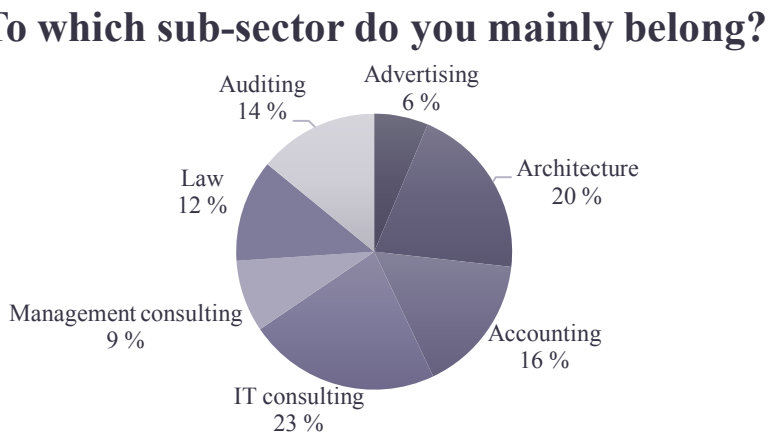



*Figure 7 Frequency per sub-sector*

Figure 7 illustrates the frequency of respondents within the different sub-sectors. The IT-consulting sector has the largest proportion with a total of 33 (23.08 %) responding firms. Architecture has the second largest proportion of respondents with a total of 29 respondents (20.28 %), further, one can see that accounting stands for 23 (16.08 %) respondents, auditing has 20 (13.99 %) respondents, law has 17 (11.89 %) respondents, management consulting has

12 (8.39 %) respondents and advertising has 9 (6.29 %) respondents. This makes up a total of 142 responding firms. Apart from IT-consulting that is neo-classic, the responding rate is overall larger among the classic PSFs.

Figure 8 display that over 50 % of the respondents have a CEO position in their firm. Furthermore, we can see that most of the remaining respondents have high positions within the firm such as CFO, Business Developer and Daily Manager. The 'other' proportion consists of different positions, but it is quite low compared to the total respondents. We will therefore argue that the credibility of our respondents is enhanced, as they probably know the firms they are answering on behalf of.

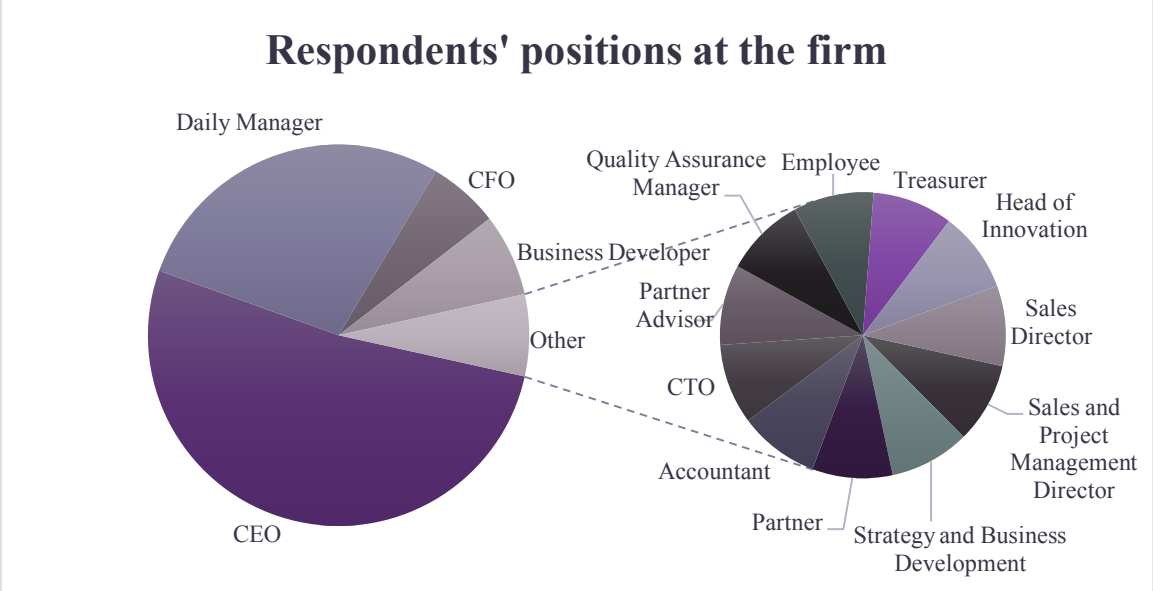



*Figure 8 Respondent's positions*

As mentioned, the size of the firms is devided into two categories: small/medium and large. Small/medium firms have up to 50 empolyees (not including 50), while large firms have 50 or more employees. After grouping the dataset, we had 37 large companies and 105 small/medium companies (see figure 9). From figure 9, one can see that the small to medium firms has the largest proportion of respondents with a share of 74 %, while large firms stands for 26 % of our final dataset. The average number of employees from our sample equals 103.5 employees. In addition to this, we also looked at the age of the firm (figure 10). The firms are categorized into two groups: young firms (younger than 10 years) and experienced firms (10 years or older). As figure 10 shows, young firms only constitute 15 % of our sample (21 firms). The average age of firm from our sample equals 39.84 years.

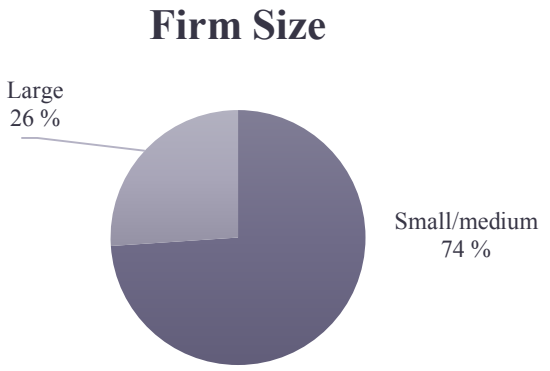



*Figure 9 Firm Size*

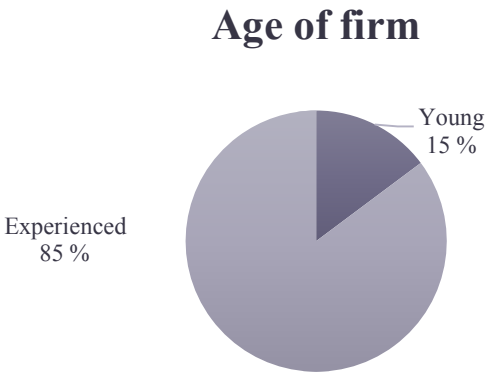



*Figure 10 Age of firm*

According to Statistics Norway (2016b), the professional service industry of Norway had 3,873 firms with 5-50 employees and 669 firms with 50 or more employees (table 10). Comparing this to our dataset, the respondents accounts for 2.71 % of the small/medium firms and 5.53 % of the large firms in Norway. Out of the total firms with 5 or more employees of 4,572, our sample represents 3.11 % of the population regarding size. When interpreting these numbers, it is important to bear in mind that this study only concerns six sub-sectors and not the whole population of PSFs. Also, our sample only represent the PSFs that have 6 employees or more. 3.11 % is therefore not completely representative as there are more than six sub-sectors in the industry.

**Companies by size and industry, 2016**

| | Total firms | No employees | 1-4 employees | 5-9 employees | 10-19 employees | 20-49 employees | 50-99 emplyees | 100-249 employees | 205 and more employeees |
|---|---|---|---|---|---|---|---|---|---|
| **PSF industry** | 25,561 | 17,196 | 4,096 | 1,528 | 1,119 | 953 | 392 | 212 | 65 |

*Table 10 Statistics Norway (2016b): Companies by size and industry*

In this section, we have discussed the representation within the sample, looking at the different sub-sectors, size and age of the firms. We will now look at the results regarding the investment in innovation activities by the PSFs.

## 4.2 Current Degree of Investment in Innovation

For analysis purposes, we will now discuss the respondents' level of investments in innovation. The results of our survey show that there are differences between the various sub-sectors and their investment in innovation activities (figure 11). Evidently, the IT-consulting sector are

highly investing in innovation activities with a percentage of 10.67 on average compared to the other sectors, while auditing firms have less focus on investing in innovation with a percentage of 2.76 %. According to OECD (2010a), the average spending on innovation-related activities is 1-2 %, but this share exceeds 5 % for large firms in some countries. The same report also states that higher levels of firms' investment in innovation lead to higher innovation sales and productivity.

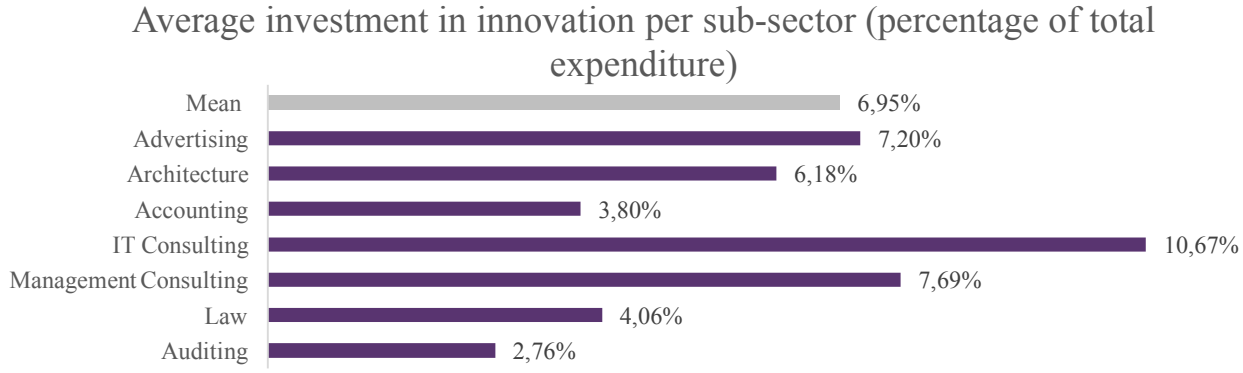



*Figure 11 Average Investment in innovation per sub-sector*

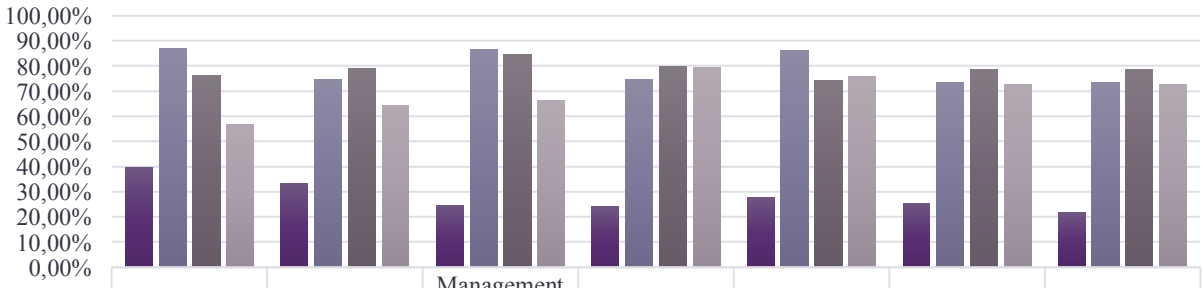
Further, the figure shows that advertising has an investment rate of 7.20 % of their total expenditure, architecture has a rate of 6.18 %, accounting has a rate of 3.80 %, management consulting has a rate of 7.69 % and law has a rate of 4,06 %. This tell us that the Neo-Classic PSFs (IT-consulting, Management Consulting and Advertising) are those who on average invest the most in innovative activities.

## 4.3 Independent Variables

In this part, we will show the results regarding the independent variables ($X_1$, $X_2$, $X_3$, $X_4$): organizational inertia, training, human capital and innovation culture. We will map out to which extent the internal factors exist among the responding firms. All the results will be illustrated in connection to sub-sector (W), size (Z) and age (V). The following research questions will be answered:

*"To which extent does organizational inertia, training, human capital and innovation culture exist among Norwegian PSFs?".*

*"What is the degree of internal factors among different sub-sectors, ages and sizes of firms in Norwegian PSFs?".*




| | Auditing | Law | Management Consulting | IT consulting | Accounting | Architecture | Advertising |
|---|---|---|---|---|---|---|---|
| Organizational Inertia X1 | 40,00% | 33,67% | 24,74% | 24,19% | 28,00% | 25,78% | 22,00% |
| Degree of training X2 | 86,90% | 75,00% | 86,54% | 75% | 86% | 73,39% | 73,39% |
| Degree of human capital X3 | 76,19% | 78,89% | 84,62% | 80% | 74,40% | 78,71% | 78,71% |
| Culture for innovation X4 | 57,14% | 64,44% | 66,15% | 79,39% | 76% | 72,90% | 72,90% |

*Figure 12 Survey Results – relationships between sub-sectors and internal factors*

Our first independent variable is organizational inertia (X1), and was measured through five different questions (question 20-24 in appendix A). Figure 12 show which firms that reported that they are affected by organizational inertia, and therefore are considered to be resistant to change. The sub-sectors with the highest degree of organizational inertia within their firms were Auditing and Law, with respectively 40.00 % and 33.67 %. The sub-sectors with the least organizational inertia is advertising, IT-consulting and management consulting, with only 22.00 %, 24.74 % and 24.74 % respectively of responding firms. The trend is that the neo-classic PSFs are more open to change than the classic PSFs

Our second independent variable ($X_2$), training of employees, was measured through four questions (question 16-19 in appendix A). Figure 12 shows that all of the sub-sectors have a considerable degree of training within their firms. Over 70 % of all the studied firms across the sub-sectors reports high levels of training.

The third independent variable, human capital ($X_3$), were also measured through five different questions (question 25-29 in appendix A). As the results display, over 74 % of firms in all sub-sectors seem to have high levels of human capital. Interestingly, IT-consulting and management consulting seems to have the highest degree of human capital among their firms. Correspondingly, for the results for organizational inertia, the neo-classic firms once more, seem to perform better than the classic PSFs, with a higher level of human capital.

Our final independent variable is innovation culture ($X_4$), and was measured through five questions in our questionnaire (question 11-15 in appendix A). The results show that innovation culture is represented in various degrees among the different sub-sectors. Further, we can see

that IT-consulting, accounting, architecture and advertising have a better culture for innovation than auditing, law and management consulting. This display a tendency towards the same pattern as we saw for our first independent variable, organizational inertia.

As seen from our research model in chapter 2.5, we have illustrated that we will investigate both size and age of firm alongside with sub-sectors. As we may see from figure 13, small and large firms do not differ much in their levels of the different internal factors. Small firms report slightly lower numbers for all factors. This indicates that small firms have on average slightly lower degree of training, human capital, culture for innovation and organizational inertia. When it comes to organizational inertia, this is good news. However, for the other factors, the smaller firms have on average a small disadvantage with regards to the level of resources. For example, a small firm with lower levels of human capital will most likely face larger obstacles in their innovation process, than the ones with higher levels of human capital. The difference between small and large firms is most prominent for degree of training, suggesting that smaller firms have lower degrees of training than the larger firms. One could expect that levels of investment in innovation therefore would be higher for larger firms, however our calculations show that large firms invest on average 6.786 % and small firms 6.302%. This is a very small difference and should therefore not affect the level of training between small and large firms.

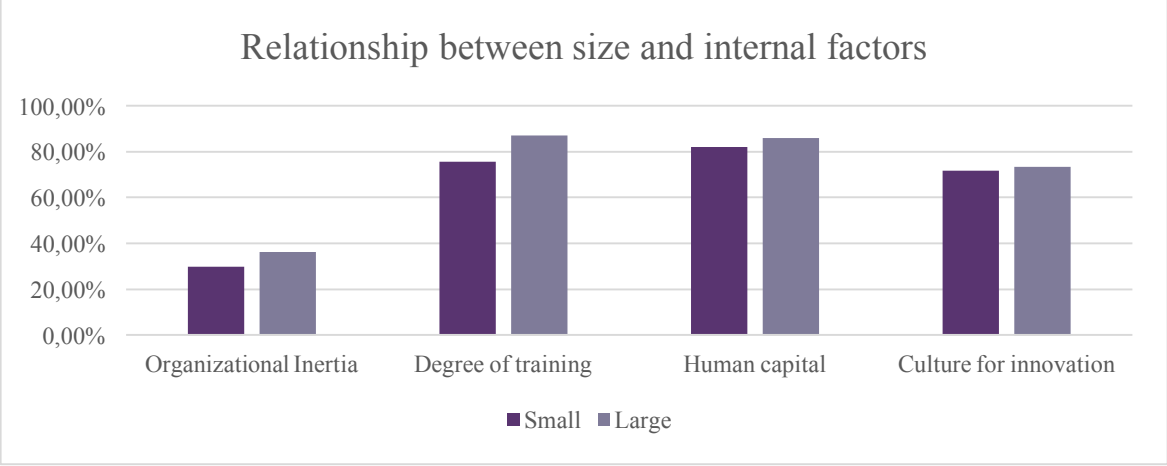



*Figure 13 Relationship between size and internal factors*

When looking at the difference between young and experienced firms, we may see that also here the results are quite similar between the two. For organizational inertia ($X_1$), figure 14 show that the degree of organizational inertia is almost equal between young and experienced firms, with young firms having slightly higher levels of inertia. Training ($X_2$) is almost equal for both experienced and young firms, indicating that employees should be similarly equipped

to handle innovation activities. For human capital ($X_3$), the difference between experienced and young firms is 11.43 %, with young firms having the highest degree. The largest difference between experienced and young firms can be found in our fourth independent variable, culture for innovation ($X_4$). Young firms seem to have quite a significant better culture for innovation than experienced firms. When looking at these results, it is important to bear in mind that only 21 out of the 142 responding firms are considered young (>10 years old).

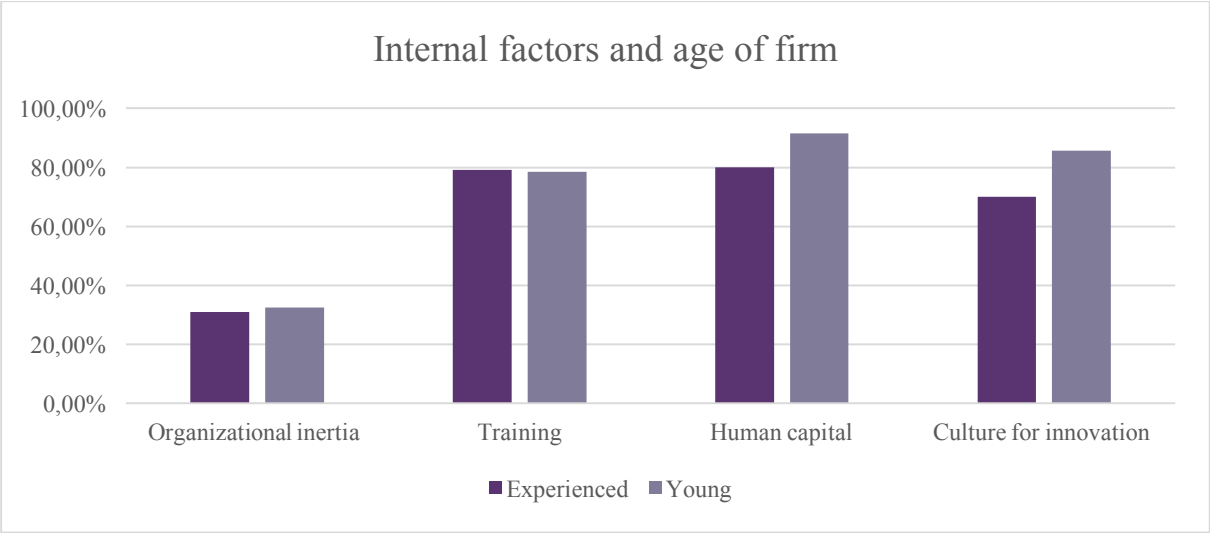



*Figure 14 Relationship between age and internal factors*

From the results above, we can now answer the following research questions; *"To which extent does organizational inertia, training, human capital and innovation culture exist among Norwegian PSFs?"*. The findings suggest that human capital and training are the two internal factors that on average have the largest existence among Norwegian PSFs. The results are more spread for organizational inertia and innovation culture. However, there exists a clear link between the two latter factors. High levels of organizational inertia seem to have a relationship with a weak culture for innovation.

We may also answer the following research question: *"What is the degree of internal factors among different sub-sectors, ages and sizes of firms in Norwegian PSFs?"*. Between sub-sectors, we may see that the extent to which the internal factors exists varies quite significantly. For organizational inertia, auditing is the sub-sector with the most alarming results, were 40 % of the firms reported high levels. Auditing is followed by Law, were 33.67 % of the firms reported high levels of organizational inertia. The same two sub-sectors have the lowest percentage of firms who reports a good culture for innovation; 57.14% for auditing and 64.44% for Law. Our study suggests that the more organizational inertia, the less culture for innovation

a firm seems to have. Human capital and training are the two internal factors that seem to be the least challenging for Norwegian PSFs, as the clear majority report that they have high levels of both. Auditing and Management consulting are the two sub-sectors with the most firms reporting high levels of training, with 86.90 % and 86.54% respectively. Management consulting have the highest degree of human capital, with 84.62% of the firms. IT consulting have the definite strongest culture for innovation, by as much as 79.39% of the firms reporting a good culture for innovation. On average, it is the classic PSFs that performs the weakest, whilst the neo-classic PSFs on average have quite satisfying results.

When it comes to size, the variety of internal factors between small and large firms is rather low. Organizational inertia varies between 29.90 % and 36.22 %, training between 75.71 % and 87.16 %, human capital between 82.10 % and 85.95 %, and culture for innovation varies between 71.62 % and 73.51 %. For age, the variations are more visible from the graph, with larger spreads among young and experienced firms. Organizational inertia varies between 32.38 % and 30.90 %, training between 78.57 % and 79.13 %, human capital between 91.43 % and 80.00 % and lastly innovation culture between 85.71 % and 70.08 %.

## 4.4 Dependent Variable – Innovation Output

In this section, we will look at the results on the dependent variable: innovation output (Y). This section will answer the following research questions:

*"What is the degree of innovation output in Norwegian PSFs?"*

*"What is the degree of innovation output among different sub-sectors, ages and sizes of firms in Norwegian PSFs?"*

*"Are investment in innovation activities positively related to PSFs' propensity to produce innovation output?"*.

The dependent variable is divided into six different types of innovation, and we used one question for each of these innovation types in the questionnaire. The innovation types and questions we included in the survey can be seen in the table below (table 11, Amara et al., 2016).

| Dependent variable: Types of Innovation | Description: During the last three years, did your business unit… | % within types of innovation (N) |
|---|---|---|
| **Product innovation (s_30)** | Introduce onto the market any new or significant improved products and services? | 54.23 (77) |
| **Process innovation (s_31)** | Introduce any new or significantly improved production processes? | 40.14 (57) |
| **Delivery innovation (s_32)** | Implement changes in how the firm deliver its goods/services to its clients? | 48.59 (69) |
| **Strategic innovation (s_33)** | Implement new or significantly modified business strategies? | 54.23 (77) |
| **Managerial innovation (s_34)** | Implement new or significantly modified managerial techniques? | 38.73 (55) |
| **Marketing innovation (s_35)** | Implement new or significantly modified marketing strategies and concepts? | 42.25 (60) |

*Table 11 Descriptive statistics, note: total number of observations for each question is 142.*

Table 11 presents the distribution of PSFs regarding the different types of innovation. The respondents who answered 'agree' or 'strongly agree' are regarded as having introduced new innovations, and are combined in the table above. As one can see, 77 firms (54.23 %) indicated that they introduced new or significantly improved products or services. 57 (40.14 %) indicated that they introduced new or significantly improved production processes. 69 (48.59 %) indicated that they implemented changes in how the firm deliver its goods/services to its clients. 77 (54.13 %) indicated that they implemented new or significantly modified business strategies. 55 (38.73 %) indicated that they implemented new or significantly modified managerial techniques, and 60 (42.25 %) indicated that they implemented new or significantly modified marketing strategies and concepts.

Figure 15 summarizes the results from question 30 to 35 in our survey. These questions regarded the level of innovation output amongst the studied sub-sectors.

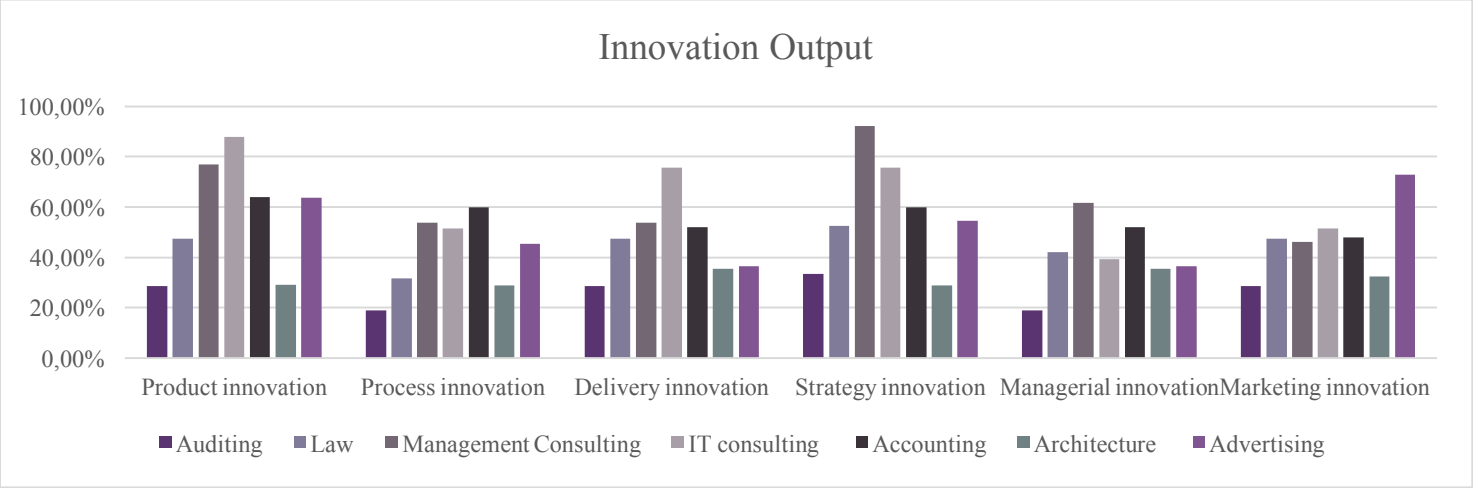



*Figure 15 Innovation input in the different sub-sectors*

The firms with "low degree of innovation output" answered that they strongly disagreed or disagreed on the six questions about innovation output and vice a versa for "high degree of innovation output". The figure shows the percentages within the different sub-sectors who answered strongly agree or agree on the questions. For the convenience, we used SurveyXact's analysis tools for the descriptive results, which still includes the 6.57 % of the data set we removed due to the sub-sector stated in 'other' being outside of our set requirements. When it comes to the different types of innovation, one can see that product innovation and strategic innovation has the highest scores (figure 15).

To sum up, the degree of innovation output varies between the different sub-sectors. Altogether, we can see that there is a pattern where IT-consulting, accounting, advertising and management consulting seem to have the highest degree of innovation output within the firm, while auditing, law and architecture seems to have lower degrees. This can further be seen in relation to innovation investments (see figure 16).

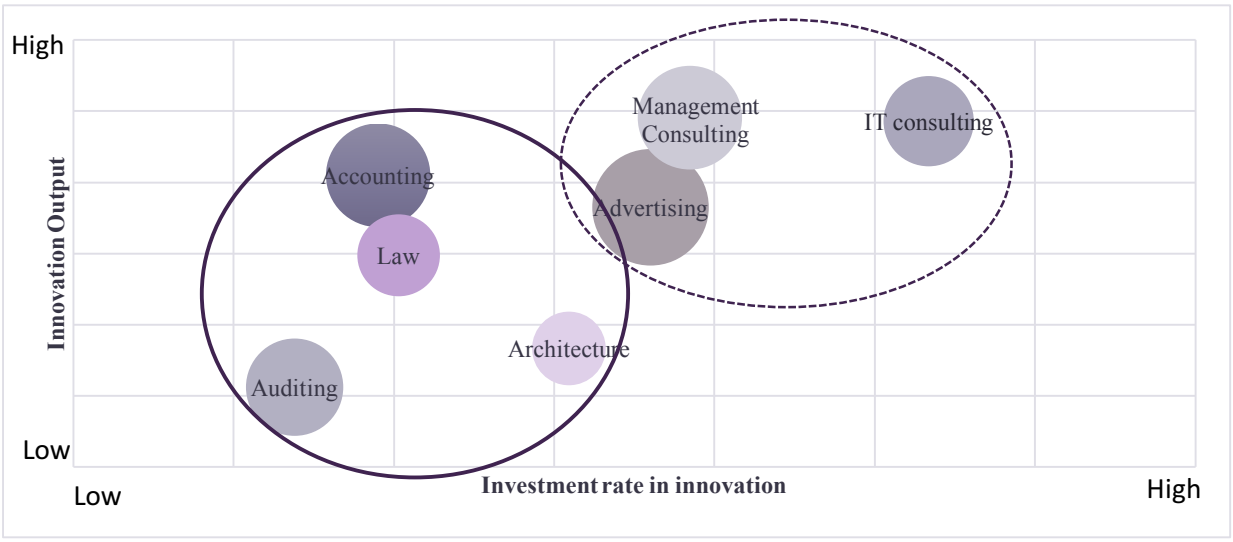



*Figure 16 Innovation output and innovation investment rate for each sub-sector*

The solid purple circle shows the classic PSFs, while the dotted circle shows the neo-classic PSFs. As one can see, there is a clear pattern. Undoubtedly, the neo-classic PSFs are investing more heavily in innovation activity while at the same time producing more innovation output than the classic PSFs.

We now want to answer another of the research questions; *"What is the degree of innovation output in Norwegian PSFs?"*. By adding the total innovation output within each of the six types of innovation, we found that the average innovation output equals 46.36 %. This gives an indication that 46.36 % of Norwegian PSFs created innovation output during the last three years, in other words, less than half of Norwegian PSFs produces innovation output. The section shows that there are differences in the degree of innovation output in Norwegian PSFs, and more firms agree rather than disagree that they have innovation output within each of the six types of innovation.

Alongside, we want to answer the following research question: *"Are investment in innovation activities positively related to PSFs' propensity to produce innovation output?"*. We see clear tendencies that the higher innovation investments, the higher innovation output.

### 4.4.1 Size in relation to the dependent variable

Figure 17 shows the percentages that agreed they had some innovation within the six different innovation categories, and the difference between small and large firms.

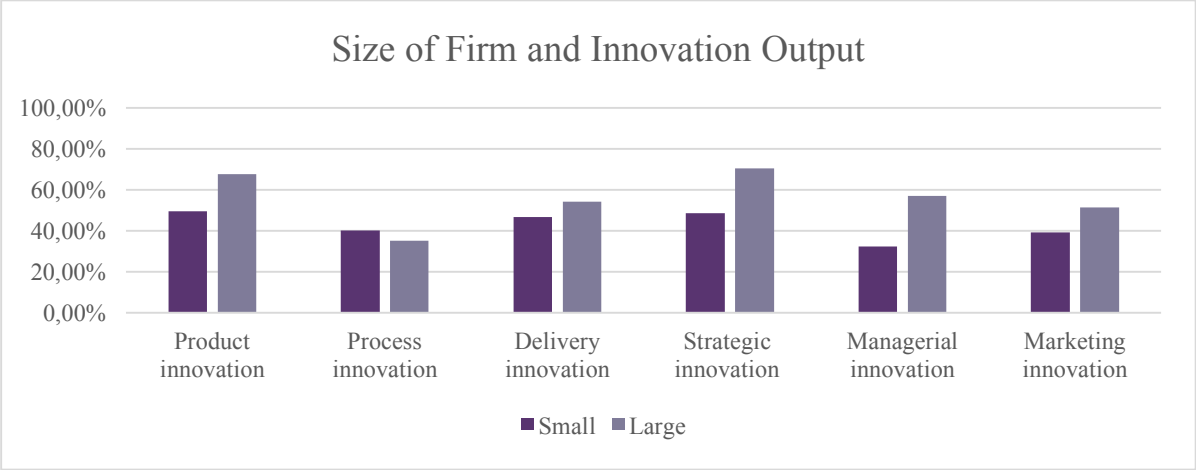



*Figure 17 Size of firm and Innovation Output*

As the figure shows, large firms identify themselves as more innovative than small firms in all innovation categories except for process innovation. When it comes to product innovation, 49.52 % of the small firms said they had innovation, while 67.57 % of the large firms answered that they had innovation. In process innovation, 40 % of small firms agreed and 35.14 % of large firms agreed. In delivery innovation, 46.67 % of small firms agreed and 54.14 % of large firms agreed. In strategic innovation, 48.57 % of small firms agreed and 70.27 % of large firms agreed. In managerial innovation, 32.38 % of small firms agreed and 56.76 % of large firms agreed. In marketing innovation, 39.05 % of small firms agreed and 51.25 % of large firms agreed. The results show that there are differences between the small and the large firms in our sample.

### 4.4.2 Age of Firm in relation to the dependent variable

Our results show that young firms have more innovation output in all the different innovation types expect from process innovation (figure 18). The figure compares the innovation output for young and experienced firms.

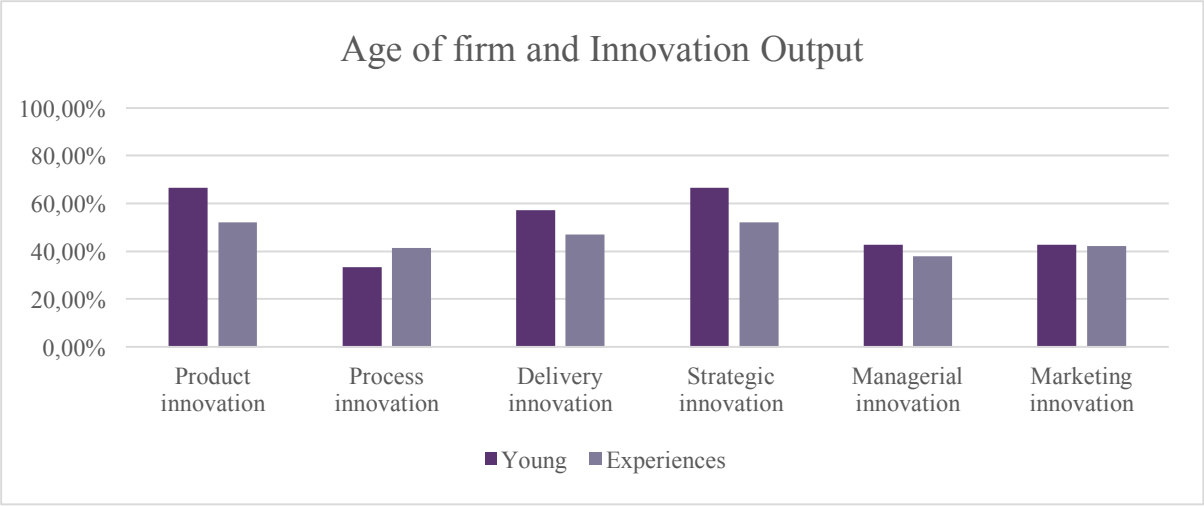



*Figure 18 Age of firm and Innovation Output*

When it comes to product innovation, 66.67 % of young firms answered that they agreed that they had product innovation and 52.07% of experienced firms answered that they agreed. In process innovation, 33.33% of young firms agreed and 41.32% of experienced firms agreed. In delivery innovation, 57.14% of young firms agreed and 47.11% of experienced firms agreed. In strategic innovation, 66.67% of young firms agreed and 52.07% agreed. In managerial innovation, 42.86% of young firms agreed and 38.02% of experienced firms agreed. In marketing innovation, 42.86% of young firms agreed and 42.15% of experiences firms agreed. These results show that there are in fact differences between the young and experienced firms.

Section 4.4.1 and 4.4.2 answers the following research question: *"What is the degree of innovation output among different sub-sectors, ages and sizes of firms in Norwegian PSFs?"* By the results above, we can conclude with that there are differences both when it comes to size and age of the firms. Large firms on average reports higher innovation outputs than smaller firms. For age, young firms seem to be more innovative than experienced firms, as they on average reports higher innovation outputs.

# 5.0 Results for Hypothesized Relationships and Control Variables

We will in this chapter present the results of the PLS-SEM and PLS-MGA analysis. This will give an answer to our four proposed hypotheses and also an understanding of the control variables impacts on the four proposed relationships.

## 5.1 PLS-SEM: Hypotheses Results

In figure 19, some results regarding our four hypotheses, $H_1$, $H_2$, $H_3$ and $H_4$ are displayed. PLS -algorithm tell us something about the relationship between the four independent variables and the dependent variable. The numbers presented on the arrows pointing towards the dependent variable are called path coefficients. The number presented within the dependent variable (purple circle), 0.443, represents the coefficient of determination, $R^2$.

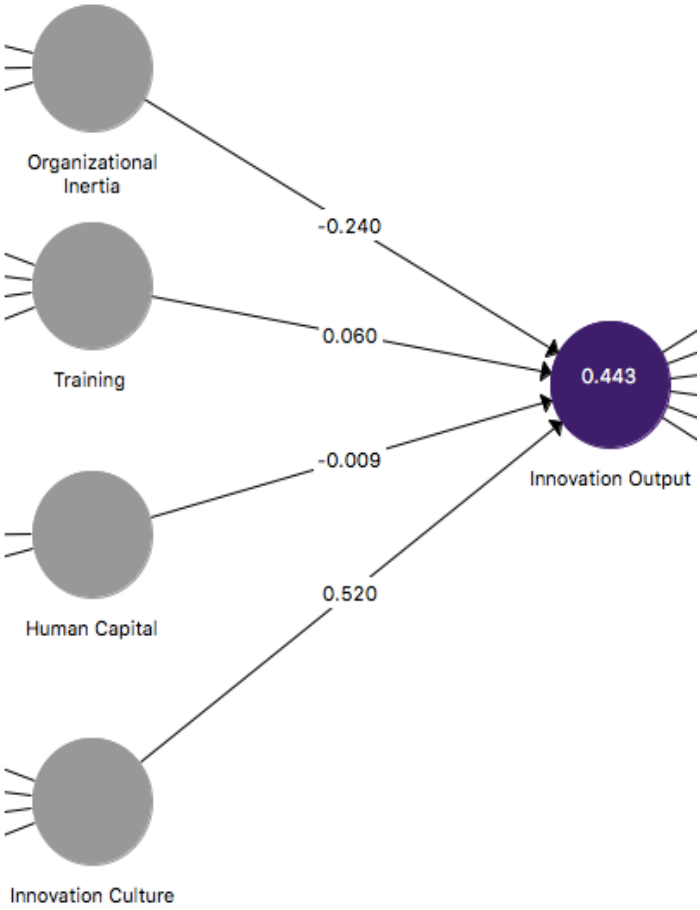



*Figure 19 Structural model*

The $R^2$ is the most common method of evaluating the structural model. It measures the predictive accuracy of the model and represents the independent latent variable's effect on the dependent latent variable when combined. Due to it being squared, it also measures the amount of variance of the dependent constructs explained by the independent constructs that are linked

to it (Hair et al., 2014). The $R^2$ ranges from 0-1, where the predictive accuracy is higher, the higher the $R^2$. According to Hair et al. (2014), it is very difficult to provide rules of thumbs when it comes to $R^2$. However, scholarly research within marketing have defined $R^2$ values of 0.75, 0.50 and 0.25 for the dependent variable to be high, moderate and weak respectively (Hair et al., 2014). Bearing this in mind, our $R^2$ value of 0.443 can be considered as very close to moderate. This means that the independent variables has a moderate predicting effect on the dependent variable, with an explanation degree of 44.3 %.

In addition to evaluating the magnitude effect of $R^2$ to assess predictive accuracy, researchers should also evaluate Stone-Geisser's $Q^2$-value (Geisser, 1974; Stone, 1974; Hair et al., 2014). This measure the models predictive relevance. In our models, we have a total $Q^2$ of 0.201, which is a satisfying result. According to Hair et al. (2014), the predictive relevance should be above zero, suggesting that 0.201 is an acceptable result. In accordance to these results, it would have been a natural next step to assess effect size ($f^2$) and relative predictive relevance ($q^2$). In our study, we only have one dependent, endogenous variable, and any further analysis of $f^2$ and $q^2$ is therefore not applicable in this instance (Hair et al., 2014).

The path coefficients have standardized values between -1 and +1. If the path coefficients are close to +1, they represent a strong positive relationship (vice a versa for negative relationships). The closer the coefficients are to zero, the weaker the relationship. If there are path coefficients very close to zero, one can usually regard them as nonsignificant. When looking at the path coefficients in this model, we see that all relationships apart from between Human Capital ($X_3$) and Innovation Output (Y), acts as proposed by the correlations in the hypotheses. The latter have a slight negative relationship; however, it is very close to zero, which according to Hair et al. (2014) therefore can be regarded as non-significant. See further discussion in chapter 6.0. For the other relationships, our proposed correlations in the hypotheses matches the results from the PLS-algorithm procedure. The relationship between Training ($X_2$) and Innovation Output (Y) have a positive path coefficient, however it is very low indicating a weak relationship. As for the relationship between Organizational Inertia ($X_1$) and Innovation Output (Y), the relationship is stronger, with a path coefficient of -0.240, indicating a negative relationship, as proposed. The strongest path coefficient is found in the relationship between Innovation Culture ($X_4$) and Innovation Output (Y), with a value of 0.520, indicating a rather strong relationship. The next step is now to check whether or not the relationships are significant. To perform this analysis, we use the bootstrapping procedure in PLS-SEM. This procedure gave us the

following T-values for the different relationships:

| *One-Tailed T-test* | T-Value | Critical Value | P-Value | Accepted/ Rejected |
|---|---|---|---|---|
| *Organizational Inertia ($X_1$) → Innovation Output (Y)* | 3.276 | 1.645 | 0.001 | Accepted |
| *Training* ($X_2$) → *Innovation Output (Y)* | 0.951 | 1.645 | 0.171 | Rejected |
| *Human Capital ($X_3$) → Innovation Output (Y)* | 0.117 | 1.645 | 0.453 | Rejected |
| *Innovation Culture* ($X_4$) → *Innovation Output (Y)* | 8.393 | 1.645 | 0.000 | Accepted |

*Table 12 Results from bootstrap*

As seen in appendix F (Berenson, Levine and Krehbiel, 2012), when performing a one-tailed test, with a significance level of 5 % and over 120 observations, the critical value to compare with is 1.645. When comparing the critical value to the T-value, we find that only two relationships are significant, as the T-value should be larger than the critical value. Looking at the P-values, we can see that the two same relationships have statistical significance with p-values below 0.05. This indicates that the relationship between Organizational Inertia ($X_1$) and Innovation Output (Y), and the relationship between Innovation Culture ($X_4$) and Innovation Output (Y) is statistical significant at the significance level of 5 %.

We had four hypothesized relationships:

$H_1$: The degree of organizational inertia will have a significant negative impact on innovation output

$H_2$: The degree of training will have a significant positive impact on innovation output

$H_3$: The level of human capital will have a significant positive impact on innovation output.

$H_4$: The degree of innovation culture will have a significant positive impact on innovation output

We have found that there are varying statistical significance between variables. For $H_1$, the T-value of 3.276 is higher than 1.645, suggesting that there is a significant relationship between the two variables. We can therefore accept $H_1$, and conclude that organizational inertia will have a significant negative impact on innovation output. For $H_2$, the T-value of 0.952 is lower than the critical value, suggesting that there is no relationship between the two variables. We therefore have to reject $H_2$ at the 5 % level. A T-value of 0.117 and a critical value of 1.645 suggest no relationship between human capital and innovation output, and we therefore have to reject $H_3$ as well. Lastly, for $H_4$, the T-value of 8.393 is larger than 1.645, suggesting that there

is a significant positive relationship between innovation culture and innovation output. We therefore conclude that $H_4$ is accepted, with the strongest statistical significance of all four relationships. This suggests that innovation culture is the factor that has the largest effect on a PSFs innovation output. Further suggesting that the absence of a good culture for innovation may create an obstacle. Organizational inertia is a close follower.

Based on the discussion above, we have found proof at the significance level of 5 % to accept $H_1$ and $H_4$. However, $H_2$ and $H_3$ are both rejected at the significance level of 5 %. As explained in the methodology, there is a 5 % chance that our conclusions are wrong.

## 5.2 PLS-MGA: Control Variables

### 5.2.1 Size as a Control Variable

| SIZE | Relationship | Path Coefficient | $R^2$ |
|---|---|---|---|
| **Less than 50 employees** | Organizational Inertia ($X_1$) → (Y) | -0.165 | 0.491 |
| | Training ($X_2$) → (Y) | 0.044 | |
| | Human Capital ($X_3$) → (Y) | -0.033 | |
| | Innovation Culture ($X_4$) → (Y) | 0.614 | |
| **50 or more employees** | Organizational Inertia ($X_1$) → (Y) | -0.351 | 0.457 |
| | Training ($X_2$) → (Y) | 0.171 | |
| | Human Capital ($X_3$) → (Y) | -0.043 | |
| | Innovation Culture ($X_4$) → (Y) | 0.442 | |

*Table 13 Size as a control variable*

To conduct the PLS-MGA analysis to assess whether or not size has a significant impact on the relationship between the variables, $X_1$, $X_2$, $X_3$, $X_4$, and Y, we had to group the firms into small and large. Small firms are considered as those with less than 50 employees, and large firms are those with 50 or more employees. The table above shows that the predictive effect ($R^2$) is close to moderate for both small and large firms, with $R^2$ values being 0.491 and 0.457 respectively. It is worth noticing that small firms have a slightly higher $R^2$ than the large firms, indicating that small firms have a higher predictive relevance on the dependent variable.

Furthermore, we now have to assess the statistical results from the multi group analysis (PLS - MGA). To do this, we have to look at both the difference in path coefficients for small and large firms, and also the p–values. The figures provided in table 14 below is the difference between small and large firms:

| Relationship | Path coefficient differences | P-value |
|---|---|---|
| Organizational Inertia ($X_1$) → Innovation Output (Y) | 0.186 | 0.850 |
| Training ($X_2$) → Innovation Output (Y) | 0.127 | 0.212 |
| Human Capital ($X_3$) → Innovation Output (Y) | 0.010 | 0.526 |
| Innovation Culture ($X_4$) → Innovation Output (Y) | 0.172 | 0.817 |

*Table 14 Path coefficients and p-values*

First, one may see that the difference between path coefficients differs among the relationships. The absolute difference between the groups has the strongest impact on the relationship between Organizational Inertia ($X_1$) and Innovation Output (Y). One may also see that the absolute difference between the groups has the weakest impact on the relationship between Human Capital ($X_3$) and Innovation Output (Y). The p-values in the table above are the PLS-MGA probabilities and show us whether or not the group specific differences are significant in this study. As suggested by Hair et al. (2014), the p-values should be above 0.95 or below 0.05 for it to be significant. As seen from the table, none of the p-values are significant, suggesting that size has no effect on the four different relationships studied in this research. Whether the company is small or large does not have a controlling effect on organizational inertia, training, human capital or innovation culture's impact on innovation output.

### 5.2.2 Age as a Control Variable

PLS-MGA was also conducted with age as a control variable. As mentioned, young firms are defined as those up to 10 years old (not including 10), whilst experienced firms are defined as those with 10 or more employees.

| Age | Relationship | Path Coefficient | $R^2$ |
|---|---|---|---|
| **Less than 10 years** | Organizational Inertia ($X_1$) → (Y) | 0.014 | 0.825 |
| | Training ($X_2$) → (Y) | -0.060 | |
| | Human Capital ($X_3$) → (Y) | 0.134 | |
| | Innovation Culture ($X_4$) → (Y) | 0.895 | |
| **10 years or more** | Organizational Inertia ($X_1$) → (Y) | -0.277 | 0.398 |
| | Training ($X_2$) → (Y) | 0.096 | |
| | Human Capital ($X_3$) → (Y) | 0.003 | |
| | Innovation Culture ($X_4$) → (Y) | 0.444 | |

*Table 15 Age as a control variable*

From table 15, we can see that there are quite large differences in the $R^2$ of young and experienced firms. Less than 10 years old firms (young) have a $R^2$ that can be considered high, and therefore have a high predictive accuracy on the dependent variable. Firms that are 10 years or more (experienced) have a low to moderate predictive accuracy. This further suggests that

young firms have a larger impact on the relationships between the independent variables ($X_1$, $X_2$, $X_3$, $X_4$) and dependent variable (Y). Alongside, it is worth noticing that the $R^2$ of young firms is higher than the total value of 0.443, whilst the $R^2$ value of experienced firms is lower.

| Relationship | Path coefficient differences | P-value |
|---|---|---|
| Organizational Inertia ($X_1$) → Innovation Output (Y) | 0.291 | 0.927 |
| Training ($X_2$) → Innovation Output (Y) | 0.156 | 0.176 |
| Human Capital ($X_3$) → Innovation Output (Y) | 0.130 | 0.759 |
| Innovation Culture ($X_4$) → Innovation Output (Y) | 0.452 | 0.987 |

*Table 16 Path coefficients and p-values*

Furthermore, for age we also have to look at the statistical results from the PLS-MGA analysis, looking at both the differences in path coefficients and the p-values (see table 16) The absolute difference between the groups has the strongest impact on the relationship between Innovation Culture ($X_4$) and Innovation Output (Y), with 0.452. The absolute difference between groups has the weakest impact on the relationship between Human Capital ($X_3$) and Innovation Output (Y), with 0.130. Not surprising, the latter relationship saw the smallest impact of both size and age due to the relationship not being statistical significant as seen in section 5.1. One may also see that Training ($X_2$) is weakly impacted by age, whilst Organizational Inertia ($X_1$) is more impacted.

The p-values suggests that three of the relationships ($X_1$, $X_2$, $X_3$) are not affected by age as a controlling variable. The p-values are all in between 0.05 and 0.95, suggesting no statistical significance at the level of 5 %. However, interestingly, the relationship between Innovation Culture ($X_4$) and Innovation Output (Y) has a p-value of 0.987, which is above 0.95 and therefore significant at the 5 % significance level. It also has the strongest difference in path coefficients. With a very strong path coefficient for young firms, we can conclude that innovation culture is in fact impacted by age, suggesting that young firms have a more innovative culture and therefore a higher innovation output. Innovation culture seem to be a larger obstacle for experienced firms than for younger firms.

### 5.2.3 Sub-Sector as a Control Variable

When looking at sub-sector as a control variable, we refer to chapter 4 for the descriptive analysis. Unfortunately, three of the sub-sectors defined in this study did not have enough observations for the PLS-MGA analysis to run in Smart-PLS. As suggested by Hair et al. (2014), to perform PLS-MGA there are strict requirements regarding the number of

observations in the different groups. We can therefore not conclude with at a significance level of 0.05 if sub-sector has an impact on the four relationships or not.

We have now presented the results that allow us to answer the following research question: *"Will size, age and/or sub-sector have a controlling effect on the relationship between internal factors and innovation output in Norwegian PSFs?".* Our results indicate that size have no significant impact on any of the relationships. Age, however, affects the relationship between innovation culture ($X_4$) and innovation output (Y). Younger firms seem to have a better culture for innovation than experienced firms. Sub-sector had too few observations in each group and could not be analyzed through PLS-MGA.

## 6.0 Discussion of Results

The first chapters provided detailed insights into existing theories and our results. This chapter will discuss our results in relation to the theoretical framework presented in chapter 2.0. The discussion will primarily concern the research questions investigated in this thesis. They will be discussed with main focus on the statistical results and hypothesis testing which will be further supported by the descriptive results from chapter 4.0. The breakdown of the chapter follows the research questions for this thesis (figure 20):

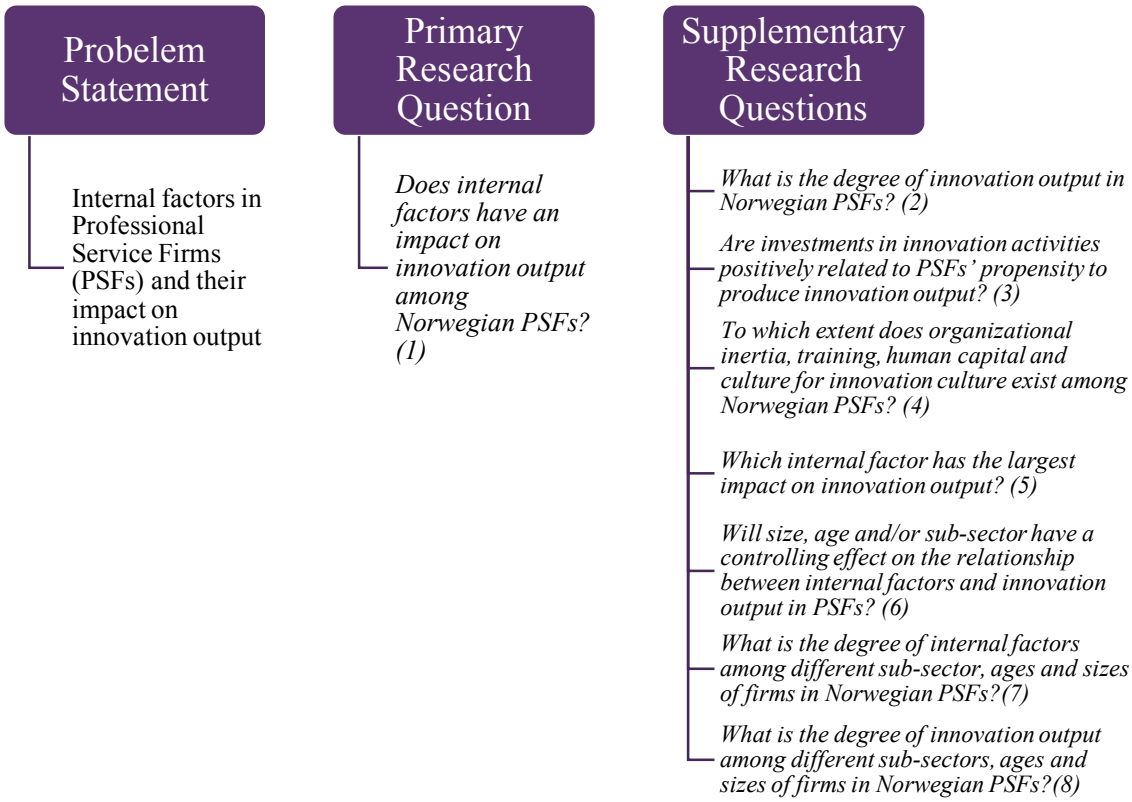



*Figure 20 Breakdown of Research Questions*

The purpose of this study is to contribute to the understanding of innovation within Norwegian PSFs by assessing the impact of a certain set of internal factors. It aims at determining whether or not there is a relationship between organizational inertia, training, human capital and innovation culture and the firms' innovation output. The thesis is set out to remediate some limitations of previous studies (Amara et al., 2016; Thakur and Hale, 2013; Miles, 2005; Nachum, 1996), and give more insight to a topic with limited research associated with it. To our knowledge there are no previous studies conducted on this topic, and it is therefore hard to directly compare all the results with existing research. Our research is the first attempt to empirically define and quantify internal factors' impact on innovation output among Norwegian PSFs. The findings are therefore mainly discussed in relation to existing literature on the

different variables and the surrounding context. However, we have supplemented with some additional academic literature in order to strengthen a few of our arguments.

For our primary research question (1), we have established a significant positive relationship between innovation culture (X4) and innovation output (Y). This is in line with previous research on culture for innovation, and as suggested, this study proves that a good culture for innovation will enhance the levels of innovation output created in a PSF (Ahmed, 1998; Mumford, 2000; Higgins and McAllaster, 2002; Jassawalla and Sashittal, 2002; Martins and Terblanche, 2003; Lau and Ngo, 2004; Jamrog et al., 2006; Valencia, Valle and Jiménez, 2010). A good culture for innovation is the main key success factor of PSFs to succeed with their innovations and produce innovation output; it should therefore be the main focus of managers in Norwegian PSFs. We see from the descriptive results that a good culture for innovation varies among the sub-sectors, and it is mainly the classic PSFs that seem to have the weakest culture for innovation. In their cases, they might have a culture with barriers towards innovations and innovative thinking, and is something managers in these firms should focus on. Boonstra and Vink (1996) argued that the cultural aspect and the behavior of management is closely related and might be serious impediments to change. Therefore, we will suggest that managers of firms that scores low on innovation culture, through activities, policies and procedures, generate values that builds on creativity and innovation – and their innovative capacity will subsequently improve (Tesluk et at., 1997).

Furthermore, a negative relationship between organizational inertia (X1) and innovation output (Y) has been established. As suggested by Nelson and Winter (1982), Edmondson et al., (2001), and Huang et al., (2012), inertia will produce rigidity in a firm and make them resistant to change. Organizational inertia and resistance to change are explaining much of the same context. We believe that change and innovation go hand-in-hand and the negative relationship we have established therefore proves the theory right (Nelson and Winter, 1982; Edmondson et al., 2001; Huang et al., 2012; Thakur and Hale, 2013): Our results indicate that the higher level of organizational inertia, the lower the level of innovation output. Furthermore, our results show that the neo-classic PSFs are more open to change than the classic PSFs. We argue that this must be seen in relation to conservatism and the traditional view on classic PSFs. Auditing and law are both traditional PSFs, and it was therefore, expected based on the theoretical framework that classic and archetypical PSFs would have a more conservative attitude towards innovation and change (Baschab, 2004; Maister, 2012).

For the two remaining variables, training ($X_2$) and human capital ($X_3$), the results reveal high levels of both, resulting in low variance and no effect on the dependent variable. However, the theoretical framework gives us reasons to assume that both variables will in fact have a positive impact on innovation output. It is suggested in the literature that lack of resources may lead to internal obstacles (Cohen and Levinthal, 1990; Hadjimanolis, 2003). Our study show that the respondents have sufficient resources within training and human capital, and therefore possibly low obstacles with these factors. It is therefore natural to assume in line with Cohen and Levinthal (1990) research that the firms' level of absorptive capacity within these two internal factors is high. This may be explained by the overall high innovation investments among all sub-sectors in this study. High investments in innovation is said to improve absorptive capacity (Cohen and Levinthal, 1990). This seem to be in line with the results of this study and show a positive tendency for future work on innovation.

The high levels of training among the respondents is in accordance with the existing theory stating that a high degree of training is one of the main characteristics of PSFs (Fu et al., 2015). Despite this, Thakur and Hale (2013) suggest that training is the most important internal obstacle to innovation. Our results indicate that Norwegian PSFs are highly focused on training their employees and managers, which ensures the development of their capabilities, while at the same time keeping them up to date on trends in the market. In addition, Thornhill (2006) found that investments in training of employees often leads to greater innovation and therefore creates competitive advantage. Despite the fact that training will lead to greater innovation, and a vast majority of firms in the studied sub-sectors report high degree of training, we still see big differences in the degree of innovation output. This indicates that training alone is not enough to obtain sufficient innovation output.

The third relationship studied is between human capital ($X_3$) and innovation output (Y). This relationship also had no statistical significance at the 5 % level, which is in contrast to some of the previous literature stating that there should be differences in the level of human capital among sub-sectors of PSFs (Doorwaard and Meihuizen, 2000; Hadjimanolis, 2003; Harlacher, 2010, Von Nordenflycht, 2010). As the results display, over 74 % of firms in all sub-sectors seem to have high levels of human capital. For PSFs, human capital is considered a key characteristic, which supports our results. Interestingly, IT-consulting and management consulting seems to have the highest degree of human capital. This contradicts the literature

that says that human capital is considered to be higher among the classic and more traditional types of PSFs (Doorward and Meihuizen, 2000). Even though the spread in percentages is not high, the tendency is still clear, with auditing and law being the sub-sectors with the lowest levels of human capital.

As the growth and importance of the industry have emerged rapidly the recent years, human capital may now be considered just as present in all the different sub-sectors. Especially management consulting and IT-consulting might have a greater focus on hiring employees with a high level of education than they had before, which may be a reason for these unexpected results. We have in this first part of the chapter discussed our research questions regarding internal factors and research question 1, 4 and 5.

We will now discuss the results regarding our second research question (2) about innovation output in Norwegian PSFs. Our study show that Norwegian PSFs engage in different types of innovation and that 46.36 % of them had innovation output in the last three years. The results reveal that the responding firms engage in both technological (product and process) and non-technological (delivery, strategic, managerial and marketing) innovations as proposed in the theoretical framework. A synthesis approach in this type of research therefore seem to have been the right choice, as PSFs are engaged in service innovations, which differ from the traditional manufacturing innovation (Thether and Hipp, 2000, as cited in Schricke, Zenker and Stahlecker, 2012; Hogan et al., 2011).

With the use of the same measurement scales for innovation output, Amara et al. (2016) did a similar study on Canadian KIBS. However, their focus was on external factors impact on the six types of innovation. For clearance, PSFs is as mentioned a sub-sector of KIBS (Von Nordenflycht, 2010), and therefore, does not create the perfect basis for comparison. However, PSFs makes up such a large part of KIBS, that the foundation still is quite strong. In Canada, the innovation output registered over the last three years were on average almost the same, with a percentage of 47.06 %.

We would also like to comment on some interesting results regarding what type of innovation that is most prominent in the two countries. In fact, both in Norway and in Canada, it is “product innovation” (goods and services) that is most frequent. This show that new services are introduced on a regularly basis in both countries. The innovation type that is the least present

among Norwegian PSFs is “managerial innovations”; while for Canadian KIBS it is “process innovation”. According to the theoretical framework, product and process innovations in particular should be linked together (Den Hertog, 2010; Hipp, Tether and Miles, 2000). This does not seem to be the case for either of the countries. Also in Norway, process innovations are low compared to product innovations. Canada is a western developed country; therefore, these data could be used for comparison. Even though Canada is a large country compared to Norway, the sample used for research is of same size compared to the total population. We can see that the results indicate similarities, but can only be used to generalize the results and a conclusion may not be drawn. Due to the very similar character of results, there are reasons to believe that this may apply to other economies with western characteristics.

This study has also proved a clear relationship between innovation culture, innovation investments and innovation output. IT-consulting is the sub-sector with the highest investments in innovation, who have the largest proportion of firms with a culture for innovation, and also the sub-sector with the definite highest innovation output on average. The opposite appears for auditing, who have the least investments in innovation, the lowest percentage of firms with a culture for innovation and the lowest innovation output. Our results therefore suggest that higher investments in innovation may lead to a better culture for innovation, and thereby increased innovation outputs. This is in line with previous studies, which suggest that investments in innovation will lead to an increased level of innovative activities, thereby a higher output (Mansfield, 1988; Cohen and Levinthal, 1990; Shields and Young, 1994; Archibugi, Evangelista and Simonetti, 1995; Camacho and Rodriguez, 2005; Canepa and Stoneman, 2008; Elche and Gonzalez, 2008).

Furthermore, our third research question (3) is concerned with the relation between investment in innovation activities and innovation output. We found that Norwegian PSFs have quite high investment rates in innovation activities compared to the average of OECD firms. Statistics Norway (2017) found that the investments among Norwegian corporations measured in absolute numbers are almost the doubled for service-firms compared to manufacturing firms, with 33 and 17 million respectively in 2014. As our theoretical framework suggested, the growth of PSFs in Norway is higher than for any other service sector. It is therefore natural to assume that a vast amount of the 33 million stems from PSFs in order for them to experience such a growth. As suggested by Schumpeter (1939), growth comes from innovations.

Innovation and growth must be supported with investments, and the high investment rates among Norwegian PSFs might therefore be explained by the latter discussion.

The results also suggest that the firms with the highest investment rate had the greatest innovation output. These investments should therefore be prioritized. We can therefore argue that the top managers' commitment to innovation activities is important in order to produce innovation output. The results on investment rates also confirmed the existing theory (Baschab, 2004; Von Nordenflycht, 2010; Maister, 2012), and we can see that the neo-classic firms are investing more in innovation while at the same time having a higher innovation output than the classic PSFs. Higher investments in innovation are believed to have a positive impact on reducing internal obstacles associated with innovation (Cohen and Levinthal, 1990). It may lead to better training programs and initiatives to improve the culture for innovation in a firm. The general impression is that managers of Norwegian PSFs are proficient in investing in innovation. They seem to manage the investments well as there is found to be a link between high investments and high degree of innovation output.

Now, to our final research questions (6, 7 and 8) that deals with the effect of the control variables. For the effect of sub-sectors, we would like to discuss the difference between classic and neo-classic PSFs as suggested by Von-Nordenflycht (2010). In order to give an illustration on the relationship between innovation output and internal factors in the different sub-sectors, figure 21 shows all the independent variables from a negative perspective (i.e. it shows lack of training, lack of human capital and an absent innovation culture). The classic PSFs (auditing, law, architecture and accounting) show a clear tendency to have higher internal obstacles and therefore lower innovation output than the neo-classic PSFs (IT-consulting, management-consulting and advertising). Interestingly, Accounting, which is considered a classic PSF distinguishes itself from the other PSFs by having the lowest degree of internal obstacles among all respondents. As a result, it would be natural to assume that accounting therefore should have the highest degree of innovation output. However, from figure 21, we can see that both IT-consulting and Management consulting have higher innovation output than accounting, even with higher degrees of internal obstacles. Literature suggest that classic PSFs are more traditional in their way of thinking than the neo-classic PSFs (Doorward and Meihuizen, 2000; Ross 2016,). Our results support this and suggests that innovation with change and reconfigurations might not be the main focus of classic PSFs. Managers of classic PSFs should seek to find solutions for how to increase their resources in the relevant internal factors to

decrease the internal obstacles, as this seem to hamper innovation output among them. As discussed in the theoretical framework, Ross (2016) argues that firms who are innovative have higher chances of experiencing growth due to the elimination of a set of challenges. Our results therefore indicate that the neo-classic PSFs will have less challenges and therefore experience higher growth.

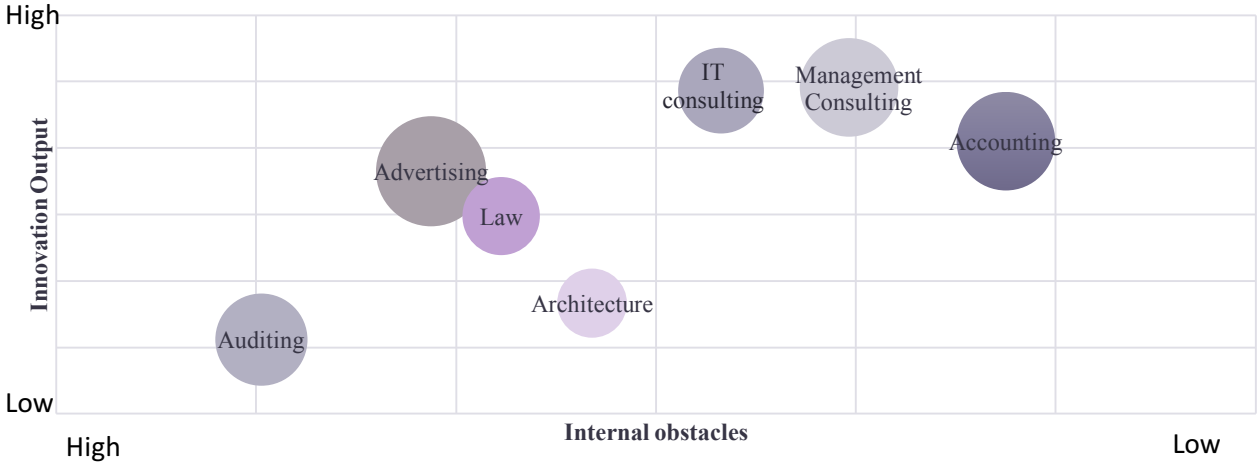



*Figure 21 Classic and Neo-classic PSFs differences*

For the control variable, size, we found that it does not have a statistical significant impact on any of the four relationships. Across the firms studied in this research, the average number of employees of the firms that are considered large is quite high. We are therefore a bit surprised that the results show no impact. However, we must bear in mind that Norway is a small country, with small organizations. There are therefore not large differences among organizations in Norway when it comes to size as one may experience in larger countries.

In appendix G, an overview of the internal factors in relation to firm size is enclosed. We found that all professional service firms, regardless of size, has high degree of training and human capital. When it comes to innovation culture, large firms might have a strong structure, investments in R&D and high quality workers which results in a strong innovation culture, while small firms may face more flexibility, specialization and strong ties with clients that also results in a strong innovation culture (Moohammad, Aini and Kamal, 2014). Therefore, even though firm sizes differ, they have a different set of attributes that either way affect their culture for innovation. For the last internal factor, organizational inertia, we found that the effect of size did not have a significant effect, which contradicts the existing literature (Hannan and Freeman, 1989; Barnett and Carroll, 1995) stating that larger firms has more inertia. The reason for this might be that they have done their research on firms of even larger sizes, and in the bigger picture, a large Norwegian firm is not considered as large in a global context.

We assume that the importance of the different internal factors of a firm change in accordance with the growth of the firm. Hence, both small and large companies end up with more or less the same degree of internal factors of different varieties. Based on this, we reject the Schumpeterian hypothesis for the theoretical framework stating that size has a more than proportionate effect on innovation output (Schumpeter, 1942). In addition, we confirm the work of more recent researchers arguing that innovation activities increase less than proportionately with firm size (Love and Ashcroft, 1999; Balasubramanian and Lee, 2008).

Furthermore, age has been a control variable in the study. It is found to impact on one of the relationships: innovation culture (X4) and innovation output (Y). As suggested by Francis and Smith (1995; as cited in Huang et al., 2012), older firms are more affected by inertia and therefore have a lower culture for innovation. Our results support this with a much higher R2 and path-coefficient for young firms. This indicates that young firms have a better innovation culture than experienced firms and thereby produce higher levels of innovation output. According to Moohammad et al. (2014), the studies on age of firm in relation to innovation culture is rather limited and traceable back to Schumpeter (1934). The same authors also argue that younger firms are less constrained by the risk of destabilizing core competencies. Young firms may benefit from a fresh start with a new perspective of the industry which enables them to spot new market opportunities without being hindered by barriers such as inertia. Oppositely, experienced firms may be hindered by risk averseness and established routines when it comes to creating a culture for innovation (Coad, Segarra and Teruel, 2015). Looking at the remaining relationships, age does not seem to have any significant impact. This may be explained by the fact that the business world is becoming increasingly aware of the importance of innovation (OECD, 2010a; Hogan et al., 2011). One may therefore assume that both young and experienced firms focuses on building a sufficient base of resources to support their innovative activities, resulting in similarities among the two groups when it comes to innovativeness.

To sum up, this discussion has shown that parts of our results confirms the existing literature, however, we also have results that contradicts the literature. In addition, some of the results from our research and analysis have given contribution to research, which will be discussed in chapter 7.1.

# 7.0 Concluding Remarks

In this chapter, we will present our concluding remarks consisting of our contribution to research, limitations of our study and suggestions for future research.

## 7.1 Contribution to Research

The aim of this study was to investigate which internal factors that have the greatest impact on innovation output, and provide managers of Norwegian PSFs with a deeper knowledge on where to focus in order to succeed when it comes to innovation. The selected factors were: organizational inertia, training, human capital and innovation culture.

We approached the study by reviewing the literature on innovation, service innovation and innovation in PSFs. We have remediated some limitations of previous studies, which have mainly been concerned about external factors to innovation. The existing literature on the impact of internal factors on innovation output is very limited and close to non-existing, which is why the aim was to give some enlightenment on the importance of this subject. In accordance with the defined research gap, we put together a problem statement and a primary research question with a set of related sub-research questions.

Primary data was obtained from 142 individual PSFs. The concluding answer for our primary research question, "Does internal factors have an impact on innovation output among Norwegian PSFs?" is: two of the relationships studied has are statistical significant, suggesting that innovation culture and organizational inertia are the areas in which managers should put their main focus to enhance the possibility of producing innovation output. In addition, we also found that age has a significant impact on this relationship as opposed to the other relationship where age was non-significant. Our results suggest that younger PSFs have a better innovation culture than experienced firms. Further suggesting that younger PSFs have a greater opportunity to create higher levels of innovation output.

We have in this study established a measure on the level of innovation output among Norwegian PSFs. We have also found that the internal factors exist in all sub-sectors, to a varying degree. However, the classic PSFs seem to have on average the lowest scores within the different internal factors, and the lowest levels of innovation output. We have also found that the higher innovation investments, the higher levels of innovation output the PSFs produce. In addition, we conclude that there exists links between different types of internal factors. For example,

there is a tendency towards that the firms with high degrees of organizational inertia also have a weak culture for innovation.

Our results show that the neo-classic PSFs on average have higher investments in innovation and higher innovation output. Further, we have found contradicting results concerning human capital in PSFs, which was suggested in literature to be higher among classic PSFs. This does not seem to be the case for Norwegian PSFs. There are other interesting differences among classic and neo-classic PSFs, for example that innovation investments and innovation output are larger among the neo-classic PSFs.

Furthermore, we also looked at how firm size impacts on the proposed relationships. The results are somewhat surprising, as size does not seem to have any significant impact on any of the four relationships. The unexpected results for size of firm further reveal that innovation output is on average higher among larger firms. Moreover, when it comes to internal factors, size does not seem to have an impact.

We cannot conclude whether the character of the internal factors will change over time or become different in the future, nor if innovation output will increase or decrease. However, literature suggests that the importance of innovation will increase in the future, illustrating that innovation output should increase. We can however conclude that different internal factors have different impact on innovation output. We can see that the existence of the internal factors varies among the studied sub-sectors However, all sub-sectors have certain levels of resources within the different internal factors, which either hamper or increases levels of innovation output.

Finally, to sum up, the creation of innovation output within Norwegian PSFs is supported by a strong culture for innovation and openness to change. In addition, high investment rates in innovation activities also seems to result in greater innovation output. This study has provided broader knowledge on the status in Norwegian PSFs when it comes to the degree of internal factors and their impact on innovation output.

## 7.2 Limitations of Our Study

Throughout the process of collecting data and writing the thesis, we have met some smaller and larger problems. This section will elaborate on the limitations of the study. These are limitations with the design and the methodology that might have affected the interpretation of the findings from the research.

First, one limitation to the study is that we chose to only look at classic and neo-classic types of PSFs, as indicated by Von Nordenflycht (2010). Engineering and hospitals are other types of PSFs that could have been studied for a more accurate result. Further, as suggested in the theoretical framework, innovation is relatively new in PSFs. We might therefor have lost some respondents due to lack of understanding and knowledge.

Another limitation was our decision of only distributing the questionnaire in English. Some respondents took the time to send us an email addressing the issue with the English language. We explained to them that it was done that way for us to better be able to analyze the data, and also for the reason that the thesis would be written in English. However, after 10 days we sent a follow-up email to remind possible respondents about the questionnaire. We included a description of choice of language in this email. This situation may have caused biases, if our population consisted of people with limited English skills. To avoid issues like this, we could have done all data collections by using interviews. However, due to time constraints this did not seem as possible at the time.

The quality of the data collected through the questionnaire depends on how well our respondents understand the questions and items. This type of understanding is affected by their reading level, cultural perspective and language skills (Passmore et al. 2002).

In addition, we asked the respondents to estimate their investment in innovations. For many respondents, this might have been great estimates, but for some respondents it might be also be a wild guess, leading to wrong data. We started out with only four sub-sectors of activity, namely accounting, law, IT/management consulting and auditing. After a while we added architecture and advertising as they are both considered a part of either classic or neo-classic PSFs. For the first four we made sure that the email-addresses used for distribution were directly to a specific member of staff (CEO, daily manager or innovation manager etc.) For the last to sub-sectors of activities we did not ensure for this as the time were running out. Therefore, we

cannot be completely sure who answered the questionnaire even though we provided a question where they had to answer this question. We therefore just had to trust that it was a qualified person who was filling out the questionnaire.

Some of our questions were asked in millions of NOK, which clearly confused some of the respondents. Some respondents answered in full numbers (e.g. 1,000,000), and others answered in millions of NOK (e.g. 1). This gave us some extra work and we had to anticipate that the respondents had misunderstood and we adjusted their answers. Further, the information we gained through this question was not very useful for our study as we chose to measure size through number of full time employees instead of turnover. In fact, we experienced that many of the respondents who did not complete the questionnaire stopped when they came to this question. Maybe we could have gotten a larger sample if we chose to leave this question out.
Another limitation is that there are other internal factors than human capital, training, organizational inertia and innovation culture that might affect innovation output in a firm. Due to time constraints, we chose to look at these four as they were the ones most frequently mentioned in the literature.

As a final limitation, we did not get to analyze 'sub-sector' at a satisfying level. This was due to few observations in three of the sub-sectors. PLS-MGA has minimum size requirements, and therefore prevented us from conducting the analysis with the use of Smart-PLS. From Hair et al. (2014), we got confirmation that our sample in some of the groups were in fact too small. We therefore did not analyze this control variable at the significance of 0.05. It was analyzed in descriptive results (chapter 4) only. We can therefore not conclude if 'sub-sector' has a statistical significant impact on the hypothesized relationships in this study. If we did not have time constraints, we could have left the questionnaire out for longer and maybe gained more respondents in each group. This would definitely have strengthened the results of the study.

## 7.3 Suggestions for Future Research

Through our study we have provided further knowledge on the impact of internal factors on innovation output through a quantitative approach. However, there might be other methods that are more accurate in measuring the level of internal factors and innovation output. We therefore recommend that further studies are conducted by the use of in-depth-interviews or case-studies. Moreover, it could be beneficial to look at a broader selection of internal factors faced by PSFs and their impact on innovation output.

We want to suggest that further research should be conducted on external factors impact on innovation among Norwegian PSFs. Among external factors we find lack of financing, cost of innovation, long payback period etc. (Amara et al., 2016). This will give a broader perspective on what affects innovation output among Norwegian PSFs.

Our study indicates a positive relationship between innovation investments and innovation output. To get a deeper understanding and more comprehensive results, it would be interesting to include this as a control variable or even a moderator variable in future research. Furthermore, as we found a significant relationship between innovation culture and innovation output, a deeper study should be done in order to map out how firms can organize themselves to get a better culture for innovation. What are firms that have succeeded in establishing a culture for innovation doing differently than those where such culture is not as present?

This study has briefly mentioned the partner-model that is very common among PSFs, in particular among the classic ones (Ross, 2016). A very interesting approach to look at the internal factors would be to do a qualitative study on the impact of the partnership structure and thereby management implications. It is said that the partnership structure of many PSFs are hampering innovation due to conservatism. Is this really the fact? Moreover, with the growing interest in both PSFs and innovation, it would be interesting to do the same study in the future to observe the progress of innovation output among Norwegian PSFs. Will the innovation output rate of 46.36 % increase in the future?

In addition to focusing on PSFs, it would also be interesting to conduct a similar study on other service sectors and thereby compare them to see if there are any differences in levels of internal factors and innovation output. The synthesis approach to innovation even open up for comparison between service and manufacturing. It would therefore be interesting to see whether

service or manufacturing firms are most successful with their innovation activities with regards to the impact of internal factors. Also, one could compare if the factors impacts on innovation output in other ways for other industries.

With the above discussion kept in mind, we suggest the following problem statements as basis for future hypotheses:

- *"Does external factors have an impact on innovation output among Norwegian PSFs?"*
- *"How does the partnership - structure of Norwegian PSFs influence on the innovation output"*
- *"Have the innovation output rate among Norwegian PSFs seen growth in the latest years?"*
- *"What is the importance of innovation investments to reduce internal factors and increase innovation output?"*

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# 9.0 Appendices

## Appendix A – Questionnaire

surveyXact

**"Internal Factors in Professional Service Firms (PSFs) and its impact on innovation capacity: A Quantitative Study of Norwegian PSFs."**

**Aims and Scope of the study:**

- Innovation is becoming increasingly important, however, the research on innovation in PSFs is limited.
- This study is carried out by researchers at the School of Business and Law at the University of Agder.
- The aim is to identify the most common internal factors impacting the innovation capacity in Norwegian PSFs.
- If you are working for an international company, bear in mind that this is a survey for Norwegian PSFs. Please answer on behalf of your operations in Norway.

**Duration:**
Approximately 10-15 minutes.

**Confidentiality:**
We treat all personal and company data as private and strictly confidential. The data will be used for scientific purposes. Your responses will not be identified with you personally, nor will anyone be able to determine which company you work for.

**Contact:**
Do not hesitate to contact the research team is you have any questions regarding this survey.
Interviewer: Stina Hodnefjell (Master Student) Stinh15@uia.no
Interviewer: Charlotte Øverbekk (Master Student) Charlo15@uia.no

*Thank you for your participation.*

A: General settings / firm size / firm type

## To which sector of activity do you mainly belong?

- [ ] Auditing
- [ ] Law
- [ ] Management Consulting
- [ ] IT Consulting
- [ ] Accounting
- [ ] Architecture
- [ ] Advertising
- [ ] Other. Please specify:

## What position do you have at your firm?

- [ ] CEO
- [ ] Daily Manager
- [ ] CFO
- [ ] Business Developer
- [ ] Other, please specify:

## Please state the number of full time equivalent employees in your firm (for operations in Norway only)

Number of employees (Norway)

## How old is your company?

Years:

## For the year 2016, how large was your share of investment in innovation activities compared to total expenditure? Please state an estimate in %.

Percentage of investment in innovation activities:

## Please indicate the following company data (in Norway) for the year 2016.

Total turnover (NOK)

Net income (NOK)

## Please indicate to what extent these statements relates to your firm.

| | Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |
|---|---|---|---|---|---|
| Our organizational structure is relatively flat | ○ | ○ | ○ | ○ | ○ |
| There are few levels of organizational hierarchy in our firm | ○ | ○ | ○ | ○ | ○ |

**B: Types of innovation**

B1: Different types of innovation

## During the last three years, did your firm:

| | Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |
|---|---|---|---|---|---|
| Introduce onto the market any new or significantly improved products and services? | ○ | ○ | ○ | ○ | ○ |
| Introduce any new or significantly improved production processes? | ○ | ○ | ○ | ○ | ○ |
| Implement change in how the enterprise delivers its products to its customers? | ○ | ○ | ○ | ○ | ○ |
| Implement new or significantly modified business strategies? | ○ | ○ | ○ | ○ | ○ |
| Implement new or significantly modified managerial techniques? | ○ | ○ | ○ | ○ | ○ |
| Implement any new or significantly modified marketing strategies and concepts? | ○ | ○ | ○ | ○ | ○ |

## C: Internal Factors

C1: Innovation Culture

### Please indicate to what extent these statements relates to your firm.

| | Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |
|---|---|---|---|---|---|
| The company welcomes initiatives and innovations | ○ | ○ | ○ | ○ | ○ |
| The management prefer to do things in a typical way or without innovation | ○ | ○ | ○ | ○ | ○ |
| We make an effort within this firm to acknowledge and reward the implementation of new services and way of doing things | ○ | ○ | ○ | ○ | ○ |
| We are encouraged to be the most creative and innovative firm in our market | ○ | ○ | ○ | ○ | ○ |
| High levels of knowledge supporting innovation are expected within this firm | ○ | ○ | ○ | ○ | ○ |

C2: Training of Employees

### Please indicate to what extent the availability of staff training is present in your firm.

| | Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |
|---|---|---|---|---|---|
| Availability of formal training activities | ○ | ○ | ○ | ○ | ○ |
| Availability of comprehensive training policies and programs | ○ | ○ | ○ | ○ | ○ |
| Availability of training for new hires | ○ | ○ | ○ | ○ | ○ |
| Availability of training for problem-solving ability | ○ | ○ | ○ | ○ | ○ |

C3: Organizational Change

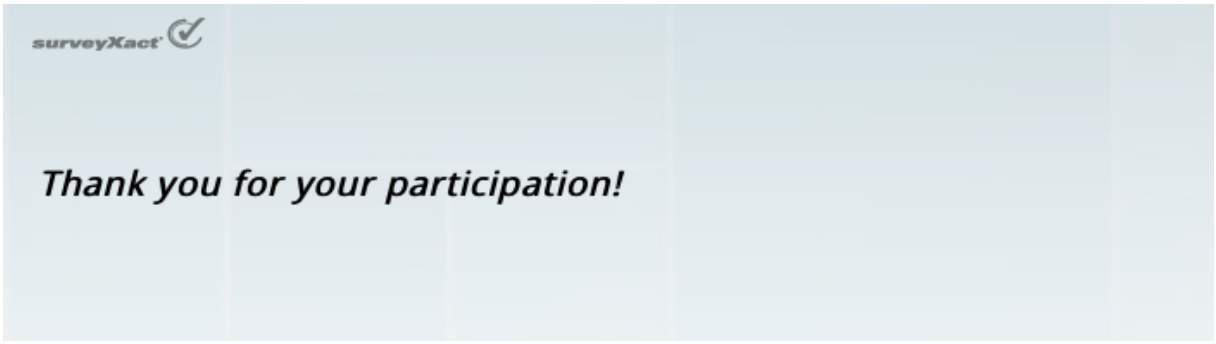
## To what extent does the following statements relate to your organization?

| | Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |
|---|---|---|---|---|---|
| We feel threatened by any organizational changes | ○ | ○ | ○ | ○ | ○ |
| Company employees like the current processes and do not like to change | ○ | ○ | ○ | ○ | ○ |
| Our company encourages innovative activities and will not utilize external knowledge and information | ○ | ○ | ○ | ○ | ○ |
| Our company has a deep-rooted organizational culture | ○ | ○ | ○ | ○ | ○ |
| We feel defensive when there are any organizational changes | ○ | ○ | ○ | ○ | ○ |

C4: Human Capital

## Compared to our competitors, our company:

| | Strongly Disagree | Disagree | Neither | Agree | Strongly Agree |
|---|---|---|---|---|---|
| Hires employees with rich work-related experience | ○ | ○ | ○ | ○ | ○ |
| Hires employees with previous training in relevant fields | ○ | ○ | ○ | ○ | ○ |
| Hires employees with high level of education | ○ | ○ | ○ | ○ | ○ |
| Our employees are experts in their field | ○ | ○ | ○ | ○ | ○ |
| Our employees develop new ideas and knowledge | ○ | ○ | ○ | ○ | ○ |




Questions and their respective indicators

| Headline | Indicator | Question |
|---|---|---|
| B – Types of Innovation | S_30 | Introduce onto the market any new or significantly improved products and services? |
| | S_31 | Introduce any new or significantly improved production processes? |
| | S_32 | Implement change in how the enterprise delivers its products to its customers? |
| | S_33 | Implement new or significantly modified business strategies? |
| | S_34 | Implement new or significantly modified managerial techniques? |
| | S_35 | Implement any new or significantly modified marketing strategies and concepts? |
| C1 – Innovation Culture | S_11 | The company welcomes initiatives and innovations |
| | S_12 | The management prefer to do things in a typical way or without innovation |
| | S_13 | We make an effort within this firm to acknowledge and reward the implementation of new services and way of doing things |
| | S_14 | We are encouraged to be the most creative and innovative firm in our market |
| | S_15 | We are encouraged to be the most creative and innovative firm in our market |

| | | |
|---|---|---|
| C2 – Training of Employees | S_16 | Availability of formal training activities |
| | S_17 | Availability of comprehensive training policies and programs |
| | S_18 | Availability of training for new hires |
| | S_19 | Availability of training for problem-solving ability |
| C3 – Organizational Change | S_20 | We feel threatened by any organizational changes |
| | S_21 | employees like the current processes and do not like to change |
| | S_22 | Our company encourages innovative activities and will not utilize external knowledge and information |
| | S_23 | Our company has a deep-rooted organizational culture |
| | S_24 | We feel defensive when there are any organizational changes |
| C4 – Human Capital | S_25 | Hires employees with rich work-related experience |
| | S_26 | Hires employees with previous training in relevant fields |
| | S_27 | Hires employees with high level of education |
| | S_28 | Our employees are experts in their field |
| | S_29 | Our employees develop new ideas and knowledge |

**Exhibit 1.7** Sample Size Recommendation a in PLS-SEM for a Statistical Power of 80%

| *Maximum Number of Arrows Pointing at a Construct* | *Significance Level* | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *1%* | | | | *5%* | | | | *10%* | | | |
| | *Minimum $R^2$* | | | | *Minimum $R^2$* | | | | *Minimum $R^2$* | | | |
| | *0.10* | *0.25* | *0.50* | *0.75* | *0.10* | *0.25* | *0.50* | *0.75* | *0.10* | *0.25* | *0.50* | *0.75* |
| 2 | 158 | 75 | 47 | 38 | 110 | 52 | 33 | 26 | 88 | 41 | 26 | 21 |
| 3 | 176 | 84 | 53 | 42 | 124 | 59 | 38 | 30 | 100 | 48 | 30 | 25 |
| 4 | 191 | 91 | 58 | 46 | 137 | 65 | 42 | 33 | 111 | 53 | 34 | 27 |
| 5 | 205 | 98 | 62 | 50 | 147 | 70 | 45 | 36 | 120 | 58 | 37 | 30 |
| 6 | 217 | 103 | 66 | 53 | 157 | 75 | 48 | 39 | 128 | 62 | 40 | 32 |
| 7 | 228 | 109 | 69 | 56 | 166 | 80 | 51 | 41 | 136 | 66 | 42 | 35 |
| 8 | 238 | 114 | 73 | 59 | 174 | 84 | 54 | 44 | 143 | 69 | 45 | 37 |
| 9 | 247 | 119 | 76 | 62 | 181 | 88 | 57 | 46 | 150 | 73 | 47 | 39 |
| 10 | 256 | 123 | 79 | 64 | 189 | 91 | 59 | 48 | 156 | 76 | 49 | 41 |

*Source*: Cohen, J. A power primer. *Psychological Bulletin*, 112, 155–519.

# Appendix C – Approval from NSD

**Resultat av meldeplikttest: Ikke meldepliktig**

Du har oppgitt at hverken direkte eller indirekte identifiserende personopplysninger skal registreres i forbindelse med prosjektet.

Når det ikke registreres personopplysninger, omfattes ikke prosjektet av meldeplikt, og du trenger ikke sende inn meldeskjema til oss.

Vi gjør oppmerksom på at dette er en veiledning basert på hvilke svar du selv har gitt i meldeplikttesten og ikke en formell vurdering.

Til info: *For at prosjektet ikke skal være meldepliktig, forutsetter vi at alle opplysninger som registreres elektronisk i forbindelse med prosjektet er anonyme.*

*Med anonyme opplysninger forstås opplysninger som ikke på noe vis kan identifisere enkeltpersoner i et datamateriale, hverken:*

- *direkte via personentydige kjennetegn (som navn, personnummer, epostadresse el.)*
- *indirekte via kombinasjon av bakgrunnsvariabler (som bosted/institusjon, kjønn, alder osv.)*
- *via kode og koblingsnøkkel som viser til personopplysninger (f.eks. en navneliste)*
- *eller via gjenkjennelige ansikter e.l. på bilde eller videoopptak.*

*Vi forutsetter videre at navn/samtykkeerklæringer ikke knyttes til sensitive opplysninger.*

Med vennlig hilsen,

NSD Personvern

NSD – Norsk senter for forskningsdata AS Harald Hårfagres gate 29 Tel: +47-55 58 21 17 nsd@nsd.no Org.nr. 985 321 884
NSD – Norwegian Centre for Research Data NO-5007 Bergen, NORWAY Faks: +47-55 58 96 50 www.nsd.no

## Appendix D – Cross Loadings

| | Human Capital | Innovation Culture | Innovation Output | Lack of Training | Organizational Ine |
|---|---|---|---|---|---|
| s_11 | 0.131 | 0.768 | 0.512 | 0.033 | -0.383 |
| s_13 | 0.387 | 0.819 | 0.483 | 0.140 | -0.360 |
| s_14 | 0.379 | 0.800 | 0.538 | 0.064 | -0.334 |
| s_15 | 0.323 | 0.820 | 0.469 | 0.169 | -0.295 |
| s_16 | 0.225 | 0.110 | 0.132 | 0.883 | -0.023 |
| s_17 | 0.293 | 0.087 | 0.131 | 0.879 | -0.052 |
| s_18 | 0.302 | 0.012 | 0.059 | 0.742 | -0.057 |
| s_19 | 0.377 | 0.165 | 0.112 | 0.795 | -0.127 |
| s_20 | -0.139 | -0.388 | -0.400 | 0.019 | 0.832 |
| s_21 | -0.311 | -0.243 | -0.244 | -0.144 | 0.691 |
| s_24 | -0.368 | -0.388 | -0.449 | -0.090 | 0.904 |
| s_28 | 0.686 | 0.172 | 0.151 | 0.305 | -0.125 |
| s_29 | 0.926 | 0.397 | 0.291 | 0.292 | -0.355 |
| s_30 | 0.296 | 0.601 | 0.769 | 0.178 | -0.332 |
| s_31 | 0.181 | 0.482 | 0.767 | 0.070 | -0.410 |
| s_32 | 0.103 | 0.408 | 0.711 | -0.001 | -0.335 |
| s_33 | 0.263 | 0.446 | 0.773 | 0.069 | -0.389 |
| s_34 | 0.184 | 0.275 | 0.574 | 0.198 | -0.254 |
| s_35 | 0.187 | 0.409 | 0.692 | 0.101 | -0.257 |

# Appendix E – Exploratory Factor Analysis

**KMO and Bartlett's Test**

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .829 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 1105.832 |
| | df | 171 |
| | Sig. | .000 |

**Total Variance Explained**

| Factor | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | |
|---|---|---|---|---|---|---|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 5.653 | 29.754 | 29.754 | 4.997 | 26.302 | 26.302 |
| 2 | 2.929 | 15.416 | 45.170 | | | |
| 3 | 1.453 | 7.650 | 52.820 | | | |
| 4 | 1.340 | 7.052 | 59.871 | | | |
| 5 | 1.040 | 5.476 | 65.348 | | | |
| 6 | .879 | 4.626 | 69.974 | | | |
| 7 | .773 | 4.068 | 74.042 | | | |
| 8 | .677 | 3.562 | 77.604 | | | |
| 9 | .578 | 3.043 | 80.647 | | | |
| 10 | .558 | 2.936 | 83.584 | | | |
| 11 | .535 | 2.814 | 86.398 | | | |
| 12 | .443 | 2.331 | 88.729 | | | |
| 13 | .400 | 2.105 | 90.834 | | | |
| 14 | .365 | 1.923 | 92.757 | | | |
| 15 | .334 | 1.759 | 94.515 | | | |
| 16 | .303 | 1.596 | 96.112 | | | |
| 17 | .267 | 1.405 | 97.516 | | | |
| 18 | .253 | 1.331 | 98.848 | | | |
| 19 | .219 | 1.152 | 100.000 | | | |

Extraction Method: Principal Axis Factoring.

# Appendix F – Critical values

TABLE E.3
Critical Values of $t$ (*continued*)

| Degrees of Freedom | Cumulative Probabilities | | | | | |
|---|---|---|---|---|---|---|
| | 0.75 | 0.90 | 0.95 | 0.975 | 0.99 | 0.995 |
| | Upper-Tail Areas | | | | | |
| | 0.25 | 0.10 | 0.05 | 0.025 | 0.01 | 0.005 |
| 49 | 0.6795 | 1.2991 | 1.6766 | 2.0096 | 2.4049 | 2.6800 |
| 50 | 0.6794 | 1.2987 | 1.6759 | 2.0086 | 2.4033 | 2.6778 |
| 51 | 0.6793 | 1.2984 | 1.6753 | 2.0076 | 2.4017 | 2.6757 |
| 52 | 0.6792 | 1.2980 | 1.6747 | 2.0066 | 2.4002 | 2.6737 |
| 53 | 0.6791 | 1.2977 | 1.6741 | 2.0057 | 2.3988 | 2.6718 |
| 54 | 0.6791 | 1.2974 | 1.6736 | 2.0049 | 2.3974 | 2.6700 |
| 55 | 0.6790 | 1.2971 | 1.6730 | 2.0040 | 2.3961 | 2.6682 |
| 56 | 0.6789 | 1.2969 | 1.6725 | 2.0032 | 2.3948 | 2.6665 |
| 57 | 0.6788 | 1.2966 | 1.6720 | 2.0025 | 2.3936 | 2.6649 |
| 58 | 0.6787 | 1.2963 | 1.6716 | 2.0017 | 2.3924 | 2.6633 |
| 59 | 0.6787 | 1.2961 | 1.6711 | 2.0010 | 2.3912 | 2.6618 |
| 60 | 0.6786 | 1.2958 | 1.6706 | 2.0003 | 2.3901 | 2.6603 |
| 61 | 0.6785 | 1.2956 | 1.6702 | 1.9996 | 2.3890 | 2.6589 |
| 62 | 0.6785 | 1.2954 | 1.6698 | 1.9990 | 2.3880 | 2.6575 |
| 63 | 0.6784 | 1.2951 | 1.6694 | 1.9983 | 2.3870 | 2.6561 |
| 64 | 0.6783 | 1.2949 | 1.6690 | 1.9977 | 2.3860 | 2.6549 |
| 65 | 0.6783 | 1.2947 | 1.6686 | 1.9971 | 2.3851 | 2.6536 |
| 66 | 0.6782 | 1.2945 | 1.6683 | 1.9966 | 2.3842 | 2.6524 |
| 67 | 0.6782 | 1.2943 | 1.6679 | 1.9960 | 2.3833 | 2.6512 |
| 68 | 0.6781 | 1.2941 | 1.6676 | 1.9955 | 2.3824 | 2.6501 |
| 69 | 0.6781 | 1.2939 | 1.6672 | 1.9949 | 2.3816 | 2.6490 |
| 70 | 0.6780 | 1.2938 | 1.6669 | 1.9944 | 2.3808 | 2.6479 |
| 71 | 0.6780 | 1.2936 | 1.6666 | 1.9939 | 2.3800 | 2.6469 |
| 72 | 0.6779 | 1.2934 | 1.6663 | 1.9935 | 2.3793 | 2.6459 |
| 73 | 0.6779 | 1.2933 | 1.6660 | 1.9930 | 2.3785 | 2.6449 |
| 74 | 0.6778 | 1.2931 | 1.6657 | 1.9925 | 2.3778 | 2.6439 |
| 75 | 0.6778 | 1.2929 | 1.6654 | 1.9921 | 2.3771 | 2.6430 |
| 76 | 0.6777 | 1.2928 | 1.6652 | 1.9917 | 2.3764 | 2.6421 |
| 77 | 0.6777 | 1.2926 | 1.6649 | 1.9913 | 2.3758 | 2.6412 |
| 78 | 0.6776 | 1.2925 | 1.6646 | 1.9908 | 2.3751 | 2.6403 |
| 79 | 0.6776 | 1.2924 | 1.6644 | 1.9905 | 2.3745 | 2.6395 |
| 80 | 0.6776 | 1.2922 | 1.6641 | 1.9901 | 2.3739 | 2.6387 |
| 81 | 0.6775 | 1.2921 | 1.6639 | 1.9897 | 2.3733 | 2.6379 |
| 82 | 0.6775 | 1.2920 | 1.6636 | 1.9893 | 2.3727 | 2.6371 |
| 83 | 0.6775 | 1.2918 | 1.6634 | 1.9890 | 2.3721 | 2.6364 |
| 84 | 0.6774 | 1.2917 | 1.6632 | 1.9886 | 2.3716 | 2.6356 |
| 85 | 0.6774 | 1.2916 | 1.6630 | 1.9883 | 2.3710 | 2.6349 |
| 86 | 0.6774 | 1.2915 | 1.6628 | 1.9879 | 2.3705 | 2.6342 |
| 87 | 0.6773 | 1.2914 | 1.6626 | 1.9876 | 2.3700 | 2.6335 |
| 88 | 0.6773 | 1.2912 | 1.6624 | 1.9873 | 2.3695 | 2.6329 |
| 89 | 0.6773 | 1.2911 | 1.6622 | 1.9870 | 2.3690 | 2.6322 |
| 90 | 0.6772 | 1.2910 | 1.6620 | 1.9867 | 2.3685 | 2.6316 |
| 91 | 0.6772 | 1.2909 | 1.6618 | 1.9864 | 2.3680 | 2.6309 |
| 92 | 0.6772 | 1.2908 | 1.6616 | 1.9861 | 2.3676 | 2.6303 |
| 93 | 0.6771 | 1.2907 | 1.6614 | 1.9858 | 2.3671 | 2.6297 |
| 94 | 0.6771 | 1.2906 | 1.6612 | 1.9855 | 2.3667 | 2.6291 |
| 95 | 0.6771 | 1.2905 | 1.6611 | 1.9853 | 2.3662 | 2.6286 |
| 96 | 0.6771 | 1.2904 | 1.6609 | 1.9850 | 2.3658 | 2.6280 |
| 97 | 0.6770 | 1.2903 | 1.6607 | 1.9847 | 2.3654 | 2.6275 |
| 98 | 0.6770 | 1.2902 | 1.6606 | 1.9845 | 2.3650 | 2.6269 |
| 99 | 0.6770 | 1.2902 | 1.6604 | 1.9842 | 2.3646 | 2.6264 |
| 100 | 0.6770 | 1.2901 | 1.6602 | 1.9840 | 2.3642 | 2.6259 |
| 110 | 0.6767 | 1.2893 | 1.6588 | 1.9818 | 2.3607 | 2.6213 |
| 120 | 0.6765 | 1.2886 | 1.6577 | 1.9799 | 2.3578 | 2.6174 |
| ∞ | 0.6745 | 1.2816 | 1.6449 | 1.9600 | 2.3263 | 2.5758 |

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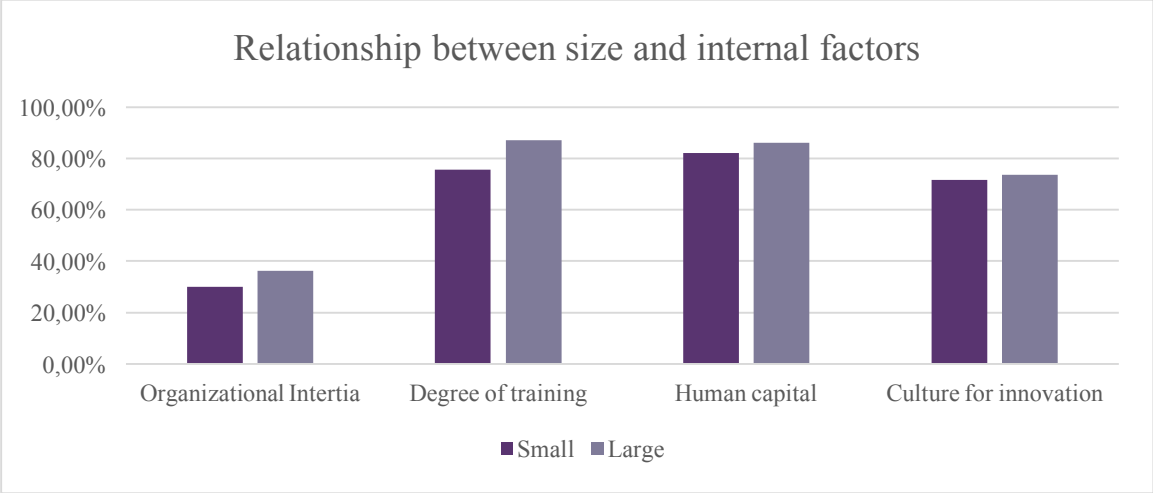
## Appendix G – Difference in internal factors in relation to size of firm



## Appendix H – Reflective Log – Stina Hodnefjell

In this appendix, I will reflect on our master thesis and its relation to three core subjects of Business Administration, namely; innovation, internationalization and responsibility. This will contribute as a part of the module BE-501, and will finalize my master's degree.

The aim of our master thesis was to investigate whether or not internal factors have an impact on innovation output among Norwegian Professional Services Firms (PSFs). The study was narrowed down to classic (accounting, law, auditing and architecture) and neo-classic (consulting and advertising) PSFs. Our study is quantitative and we have obtained primary data from 142 unique Norwegian PSFs. The data was obtained through an online questionnaire that was compiled based on measurement scales previously used in journal articles. To be able to perform the analysis, we had to measure the PSFs level of innovation output, and this was done by measuring the output within six types of innovation during the last three years. A synthesis approach to service innovation suggested that the six types of innovation are; marketing, management, strategic, delivery, process and product. This distinguishes service innovation from manufacturing innovation which is mainly focused on technological innovations. Alongside, we had to establish which internal factors to investigate, and as suggested by academic literature, we ended up with four different: (1) organizational Inertia, (2) training, (3) human Capital and (4) innovation culture. For the analysis, we have used a program called Smart-PLS, which performs PLS-SEM and PLS-MGA analysis. This is a program that is convenient as it allows us to perform both the factor-analysis and multiple regression analysis at ones.

Our analysis show that the innovation output among Norwegian PSFs is quite high, distributed throughout the six types of innovations. The table below shows the distributions:

| ***Dependent Variable: Type of innovation*** | **% within types of innovation (N)** |
|---|---|
| *Marketing Innovation* | 56.58 (86) |
| *Management Innovation* | 42.11 (64) |
| *Strategic Innovation* | 50.66 (77) |
| *Delivery Innovation* | 54.61 (83) |
| *Process Innovation* | 40.13 (61) |
| *Product Innovation* | 44.74 (68) |
| *TOTAL* | 46.36% |

Alongside we found evidence to support two of our four proposed hypotheses. There is found to be a statistical significant relationship between organizational inertia and innovation output (negative), and innovation culture and innovation output (positive). The latter relationship has the definite strongest path-coefficient and T-value and is therefore the internal factor that has the highest influence on innovation output among Norwegian PSFs. For the two other relationships, there was not established significance as the respondents reported very similar data. The results showed that all sub-sectors have high degrees of human capital and training. This resulted in low variance and therefore no influence on the dependent variable. We have, however concluded on the descriptive level that both human capital and training will have a positive impact on innovation output, as the sub-sectors with the highest levels of these also have the highest innovation output.

We have in this study showed that the interest in both PSFs and innovation is increasing, and both are becoming more important to the Norwegian economy as a whole. This is also the trend in the international market. Innovations in PSFs is a rather understudied topic, but I believe that it will become more interesting as the world is becoming more knowledge intensive, and many countries are moving towards knowledge based economies. It exists widespread agreement among researchers that knowledge has become a main source of competitiveness, and innovation and learning main processes of competitiveness. The growth of PSFs worldwide has given them high power and it is therefore important to give PSFs more attention in research. Innovations is also becoming more important, due to the rapid development of technology among others. International PSFs actually provide a unique challenge to governments as they directly and indirectly influence policy development, problem solving and implementation (Simon and Welsh, 2010). For PSFs, it is as seen in our thesis always a necessity to stay ahead of current trends in the sub-sector where they operate. They must continuously integrate new technologies, new knowledge, and the structure is therefore critical. A PSFs performance is highly influenced by its ability to rapidly adopt innovations to improve productivity. As a result of this, a PSFs structure presents challenges for host countries and also the governments engaged in them (Simon and Welsh, 2010). We have established a high degree of innovativeness among Norwegian PSFs, and there are reasons to believe that this is the case also for PSFs in other countries in Scandinavia and the western world in particular. This may therefore create issues due to the high power of PSFs nowadays. Law firms are typical PSFs, whom are able to affect local institutions by adopting traditions from other countries and thereby affecting the development of the legal system of its own country. It is found that

internationalizing PSFs may in fact result in decreasing returns, starting off with an initial inverted u-shaped effect and then followed by negative returns (economies, then diseconomies). It is however found that this differ between countries and sub-sectors.

Bringing internal factors into consideration with international questions is difficult, as the previous research on this topic is very limited. However, I believe that internal factors in innovative efforts in PSFs will be similar in other countries with the same characteristics as Norway. Therefore, I believe that we will have to look to the developing countries to find major differences in how PSFs experiences internal factors in relation to innovation.

Moving on to the core subject of innovation, I believe that this thesis have already contributed to research on this very topic. However, I want to reflect a bit on the importance of future research on innovations in PSFs, as this is becoming one of the most important subjects in the business world. PSFs play a very important role as innovation intermediaries in an economy. Tacit and explicit knowledge are transferred from one firm to another and is the basis for the creation of new knowledge (Nonaka and Takeuchi, 1995). This is distinctive for PSFs compared to other service sectors. Innovation in PSFs should therefore be of interest to policy makers who are concerned with performance as a result of innovation and to increase competitiveness in the economies. In addition, innovations in PSFs are contributing to macro-economic growth in the economy (Von-Nordenflycht, 2010; Ross, 2016). PSFs have changed from loosely controlled groupings of independent partners to more "business-like" organizations. This has created the need for development of management practices and other processes. It is therefore important to have an understanding of both internal and external factors impact on innovation to better understand how to approach innovative activities in PSFs. First, it would help to understand why some firms are pursuing innovation activities and why some do not. Secondly, better evidence could help firms to overcome hindering factors, hence increasing non-innovative firms to embark on innovation activities. It may also increase the innovation intensity of already innovative firms (Amara et.al, 2016). Our master thesis has contributed with knowledge on four different internal factors in Norwegian PSFs, but it is important that further studies are conducted on external factors and also a broader selection of internal factors.

In recent years, the issue of Corporate Social Responsibility (CSR) has become very important. It is important for both the sustainability of the individual organization and the society as a whole. It increases firms' value and competitiveness in the global market. For a PSF to succeed

with its innovations it has to take into account the social and environmental impact of their operations, cooperate with its suppliers and clients and other business partners. CSR can contribute to reducing the risk of innovative activities, as an implemented CSR strategy will enhance creditability towards legislation and stakeholders. Lately, terms like social innovation, eco-innovation and social entrepreneurship has arisen, with the purpose of meeting upcoming needs and improve people's lives. Rexhepi, Kurtishi and Bexheti (2013) mention CSR in innovation as "social innovation", and suggest that companies should do more to contribute to the issues concerning poverty, climate change and social justices. The businesses that will succeed in the future are those who see these challenges as opportunities and not risks. Literature suggests that firms who have incorporated CSR in their ethical framework are more likely to succeed with their innovative activities. This will enhance resource utilization and most likely increase firms' level of innovation output. CSR went beyond the scope of our thesis, but Norwegian PSFs will as all other firms benefit from a focus on CSR.

The process of writing the thesis has definitely given me a real challenge, but it has been very exciting at the same time. I have got to work on a topic of my interest, and a topic that is becoming increasingly important throughout the business world. It has fitted with my master's specialization and my bachelor degree which both have been concerned with strategy and management, where innovation form a relevant part of many modules. We have established two rather strong relationships, and are very happy with that. Moreover, it was a bit disappointing that two of the hypotheses had to be rejected, but we are still excited about the results. It has been a long process with small and major changes throughout, but looking back, it has been very interesting and provided me with a lot of new knowledge.

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## Appendix I – Reflective Log – Charlotte Øverbekk

We have written a thesis concerning the Professional Service industry in Norway, focusing on classical (law, auditing, accounting and architecture) and neo-classical (IT-consulting, management consulting and advertising) Professional Service Firms (PSFs). The purpose of the thesis was to assess the degree of innovation within these firms and look at what internal factors that are affecting their innovation output the most. We chose to narrow the study down to four different factors, as recommended by other researchers: organizational inertia, training, human capital and culture for innovation. After gathering and analyzing our data, which we collected through a questionnaire, we found that the two factors that impacts innovation output the most is the degree of organizational inertia, which affect innovation output negatively, and a culture for innovation, which affected the innovation output positively. Furthermore, we also included research questions which consisted three controlling variables: size of firm, sub-sector and age of firm. The result on these tests were that size of firm did not have a significant effect on the relationship between any of the independent variables (organizational inertia, training, human capital and culture for innovation) and the dependent variable (innovation output). For sub-sectors, we did see some differences, especially between the classical and neo-classical firms. Finally, age of firm had an impact on the relationship between innovation culture and innovation output, and indicated that younger firms had a better culture for innovation and created more innovation output.

### International:

Globally, the topic of our thesis is considered understudied. The globalization of the economy and the intensity of competition leads to increased pressures on firms for quick adaption to changes, innovation and a faster pace of the production processes. Dawson (2011) argues that PSFs deals with increased competition due to the availability of online information, imitation of innovation ideas and industry convergence. Based on this, on can say that today's competition not only is intense, but global. National boundaries have become irrelevant as suppliers, clients, information and ideas flow easily across borders (Dawson, 2011). Therefore, their focus on innovation activities is more important than ever before. International competitors might have more developed technology and lower costs. Furthermore, another international trend is the emergence of a global labor market. According to Nachum (2012), a study by OECD reports that foreigners account for 20-25 % of the professional labor in

Australia, Canada and Switzerland, and 10 % in the U.S. and U.K. which is a consequence the wage gap has been shrinking rapidly (Nachum, 2012).

In relation to Norwegian PSFs, I will argue that they are increasingly affected by the emergence of a global market and the global economic situation. They might be impacted by clients searching for services overseas due to lower labor costs, however, they might also benefit by attracting clients from overseas. In addition, the global economic situation can be threatened or benefit the PSFs, depending on the situation being bad or good. During financial crisis, some types of PSFs might be especially threatened, such as advertising, which is one of the cost companies cut down first in the event of financial distress. In order to get a more throughout analysis of the industry PSFs are competing in, I would have conducted a PESTEL analysis or looked at Porter's Five Forces, which are two key tools I have learned to use during my years as a business student. These tools have been in focus in many of my courses, such as: international management, international marketing and strategic management. These tools are well-known in business theory and is used to analyze situations and help firms improve their competitive positions. The PESTEL analysis identifies macro environmental factors that affects organizations and their competitiveness in relation to: political, environmental, social, technological, economic and legal factors. Porter's Five forces, on the other hand, explores the balance of power in industries: supplier power, buyer power, competitive rivalry, threat of substitutes and threat of entry.

Lastly, I will add that other countries might find inspiration from this research and implement it for their countries. The findings are especially relevant for countries with similar traits as Norway, like the other Scandinavian countries and other developed Western countries. If one look at the European Union, professional service firms account for 9.8% of total employment and 8.6% of total economic output (Huggins, 2011), therefore, deeper knowledge on this type of service firms is highly relevant outside Norway as well.

## Innovation:

As the type of firms we have studied offers such a broad range of services, I will not point out any specific gaps for new ideas and practices. The thesis' relevance to innovation is obvious, as this is the topic for the whole study. We find it important to broaden the existing research and theories on innovation as it is an increasingly important topic. Especially for the industry we have studied in this paper, we find it important to broaden the knowledge as the research on

innovation in PSFs is limited. Innovation is important for firms in order to gain competitive advantage and for survival. Writing this thesis have provided me with deeper knowledge on innovation and built upon the existing knowledge I obtained in one of my master courses: Innovation through design and entrepreneurship. The course provided me with insight into the field of innovation and improved my entrepreneurial skills. As the world is becoming more globalized and technological advanced, the need for innovations is more present than ever before, despite this, many PSFs are still considered to be conservative. We have looked at internal factors when it comes to both success factors and internal obstacles to highlight what factors that have the largest impact on the firms' innovation output, and therefore should be in focus of Norwegian managers. Innovation should enable firms to reduce their costs as they become more effective and gain increased value for clients. The classic and conservative PSFs have experienced monopoly due to regulations and licenses, which have led to less priority for innovation activities. The competitive trends in today's environment suggest that to not prioritize innovation is no longer possible if a firm wants to survive, which again highlights the importance of better knowledge and theories on the field.

## Responsibility:

As we have written about seven different types of PSFs, who are providing different types of services, it is difficult to generalize and talk about responsibility for all PSFs. However, in general, many PSFs have realized the benefit of corporate social responsibility (CSR) practices. As these firms are highly dependent on their reputation and profile, they use involvement in initiatives that benefit communities as a way to attract and retain clients. Such responsible management practices, therefore provides the possibility for competitive advantage. One of the ethical dilemmas that relates to this type of service sector, is that some of the innovations happening within these firms today is based on artificial intelligence. This might lead to issues such as unemployment and inequality. As jobs get more and more automated the need for human labor decreases and therefore the level of unemployment is forecasted to increase and so are the inequality between the rich and poor. Both within the PSFs itself and in the firms of their clients, less human labor will be needed as they become more digitalized, nowadays, this is a very relevant and hot topic which have raised a lot of concern.

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