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EFFECT OF ORGANIZATIONAL CULTURE ON INNOVATION IN FINNISH COMPANIES

Master's Thesis

International Business Management

May 2021

UNIVERSITY OF OULU ABSTRACT OF THE MASTER'S THESIS
Oulu Business School

Unit			
Oulu Business School			
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Title			
Effect of Organizational Culture on Innovation in Finnish Companies			
Subject	Type of the degree	Time of publication	Number of pages
International Business Management	Master of Science	May 2021	51+7

Abstract

Innovation is a phenomenon of major importance to companies. Entrepreneurial organizations recognise the necessity of innovation to survive in rapidly changing business environments. However, companies generally feel dissatisfied with their levels of innovation despite the vast resources spent on trying to generate higher levels of innovation.

Researchers have been attempting to understand the processes of innovation within entrepreneurial organizations. Focus on the organizational level has observed how organizational structure and organizational learning capabilities affect the level of innovation in an organization. A corporate survey in 2018 indicated that a significant perceived obstacle to innovation is “cultural issues”.

A significant strand of the literature has studied the effect of organizational culture on innovation. Organizational culture refers to the shared beliefs and attitudes within the organization. Most of the research has utilised the Competing Values Framework (CVF). The CVF identifies four main culture types: adhocracy, clan, market, hierarchy. These culture types are distinguished by their differences in *structure* and *focus*. The prior research mainly uses quantitative methods to observe correlations between each of the culture types and product innovation. The consensus of the prior research: adhocracy facilitates innovation and hierarchy hinders innovation. There have been mixed findings pertaining to clan culture and market culture with some studies also choosing to neglect observation of these two.

This research builds on the previous literature by utilising the CVF and quantitative methods (hierarchical regression analysis) to observe the correlations for each of the four culture types and innovation in Finnish companies. The aim is to identify which culture type is optimal for product innovation. The context of Finland is distinct from previous studies which have primarily been conducted in large European economies such as Germany and Spain. This research solicits responses from executives and C-level employees in Finnish companies to two questionnaires: Organizational Culture Assessment Instrument and Innovation Metric Questionnaire. The responses from these questionnaires indicate predominant organizational culture types and level of innovation performance, respectively.

The findings suggest that adhocracy culture is a positive influence on a firm’s innovation performance, consistent with previous research. However, the lack of significant correlations for the three other culture types suggests that the CVF model lacks explanatory power.

Keywords innovation, organizational culture, organizational structure, organizational focus, competing values framework, adhocracy, clan, hierarchy, market, organizational learning

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1 INTRODUCTION

1.1 Background

Innovation is a process of changing something established via the introduction of something new (Godin, 2008; O'Sullivan and Dooley, 2009). In entrepreneurial organizations, innovation can refer to new products or changes to the production process; internal functions; and organizational structure (Kline and Rosenberg, 2009).

A firm's ability to innovate has a significant effect on organizational performance:

Firstly, it allows firms to sustain their competitive advantage (Huang, Wu, Lu and Lin, 2016). Competitive advantage refers to a company's ability to differentiate from competitors, either through lower price or greater customer value (Stonehouse and Snowdon, 2007). This enables an increase in firm's earnings despite competition (Singh, 2008). Innovation is more essential due to the introduction of foreign competition through globalization (Utterback, 1994; Kaplinsky, 1998). Nowadays, consumers have a wider range of alternatives to choose from, so companies place more emphasis on innovation strategies (Gorodnichenko, Svejnar and Terrell, 2010).

Secondly, innovative firms have a greater adaptive capacity and are more flexible (Naranjo-Valencia, Sanz Valle and Jiménez-Jiménez, 2010). The ability to adapt to changes in external environments facilitates a company's long-term survival (Chakravarthy, 1982). The onset of the COVID-19 pandemic has created a greater impetus for innovation. Consumer behavior has changed significantly including less impulse buying, increase in internet and social media usage and hoarding (Donthu and Gustafsson, 2020). Surviving firms have had to alter or create new product offerings to match these changing consumer needs (Seetharaman, 2020). This enables a firm to maintain its competitive advantage, and therefore provide the best opportunity to maximise revenue (Baker and Sinkula, 2002). Firms unable to adapt have suffered significant losses in revenue or closure leading to greater unemployment.

Companies generally recognize the importance of innovation. In a 2015 Boston Consulting Group survey, 79% of respondents ranked innovation performance as either the top or top-three priority for their companies (Ringel, Taylor and Zablit, 2015).

Research has focused on studying the antecedents of innovation from an organizational perspective: factors such as the degree of centralization and formalization in companies and inter and intra-organizational networks have been emphasized (Ritter and Gemünden, 2003; Jansen and Van Den Bosch, 2006). More recent research has focused on organizational culture as an antecedent, and this is the primary motivation for this research paper.

1.2 Goal of the research and research problems

The motivation to study this topic is fostered on the previous understanding that successful innovation (radical or incremental) is significantly influenced by the degree of coordination within the organization (Koberg, Detienne and Heppard, 2003). The different units of the organization such as R&D and Marketing need to have the same vision to ensure that the product/service has the best chance of being successful.

There has been significant research to identify the key organizational determinants of innovation performance (Koc, 2007; Martin-de Castro, Donate and Guadamillas, 2011). Organizational culture is a common determinant identified by researchers. Organizational culture has generally been defined as the common values, beliefs and assumptions held within an organization (Schein, 2010). The importance of organizational culture has been attributed to the fact that an appropriate organizational culture motivates members of the organization to commit and involve themselves in innovative activities (Hartmann, 2006).

Despite these new insights, there has been a lack of empirical research explaining the direction of the relationship between organization culture and innovation. For instance, the types of organizational cultures improve or hinder innovation performance.

Furthermore, there has been limited empirical research investigating the existence of mediating factors in the relationship between organizational culture and innovation performance.

The importance of understanding innovation performance is crucial for companies. Therefore, it in the interest of managers and executives to understand the factors which can help or hinder innovation performance within their company, so that they can improve sales and revenue and therefore provide stronger job security.

According to an Innovation Leader survey in 2018, conducted with 270 corporate leaders, one of the top obstacles to innovation in large companies is cultural issues (identified by 45% of respondents). In this survey, "cultural issues" was a phrase used to describe the conflict between the members of the organization that are trying to initiate change and those members that actively resist the suggested change. Resistance from certain members of the organization is generally based on the company's previous success. The perception is that certain products, services, processes, and procedures have facilitated a company's prior success. Therefore, they should remain in place because prior success is likely to equal future success. Examining the problem of "cultural issues" requires an understanding of the type of organizational culture that exists.

Organizations respond to proposed changes differently and this may be due to the culture that exists within the organization. For example, a company culture emphasizing trust and communication between employees and managers may be more accepting of change compared to an organization where there is a conflict or absence of trust between employees and managers (Vaishnavi, Suresh and Dutta, 2019). The clan control mechanism theory proposed by Ouchi (1980) asserts that a clan is made up of individuals which share common values. These shared values constitute the culture of the clan. These values guide the organizational decision-making process by focusing decisions on what is best for the collective group. There is pressure for employees to exhibit behavior congruent with the collective values. Those that

conform are rewarded whereas those that exhibit incongruent behavior risk alienation from the rest of the organization (Fortado, 1994; Westphal and Khanna, 2003).

Previous research has attempted to identify different types of organizational culture, yet there is a lack of empirical research investigating the effects of the different types of culture on innovation performance, and the reasons for the positive/negative effects have yet to be studied.

Understanding the effect of organizational culture types on innovation performance is crucial for managers and executives. Managers in underperforming companies, in terms of innovation performance, can identify how the shared assumptions within the organization are preventing change. Once identified, a change in organizational culture can be initiated: facilitating strong innovation performance. In addition, this knowledge can help managers understand why their companies have a strong innovation performance and then reinforce the organizational culture that is helping them perform well.

1.3 Research Gap

The research on the organizational culture and innovation relationship has been fragmented: researchers studying various cultural variables in isolation (Buschgens, Bausch and Balkin, 2013).

One strand of literature focuses on the effect of market orientation on innovation (Han, Kim and Srivastava, 1998; Vázquez, Santos & Álvarez, 2001; Genc, Dayan, Genc, 2019). Market orientation is a philosophy in which all parts of the value chain focus on meeting the target customer's needs (Ho, Nguyen, Adhikari, Miles and Bonney, 2017). Related concepts such as organizational learning have also been studied in relation to organizational culture and innovation.

Other strands of literature have attempted to identify if organizational culture is a significant antecedent of innovation and have established that organizational culture is a significant influence on innovation (Lau and Ngo, 2004; Hogan and Coote, 2014). However, this research has limited practical application for managers. Simply understanding that organizational culture is important for innovation is unlikely to lead to effective change. To facilitate changes that would improve innovation, managers need to understand the optimal culture types for innovation (Buschgens et al., 2013). Previous research has addressed this by utilizing the culture typology from Quinn and Rohrburgh (1983): Competing Values Framework. This framework identifies four culture types: hierarchy, clan, market and adhocracy. The framework assumes that companies fall into one of these culture types. The culture types are distinguished by differences in their focus and structure.

Research (Naranjo-Valencia et al., 2010; Naranjo- Valencia et al., 2011; Hartnell, 2011; Buschgens et al., 2013; Engelen, Flatten, Thalmann and Brettel, 2014) using this framework primarily utilize quantitative methods to observe the correlation between different types of culture and innovation performance. The majority of these studies' findings suggest a positive correlation between adhocracy culture and innovation performance and a negative correlation between hierarchy culture and innovation performance. However, many of these studies have not observed the effects of clan culture and market culture. Therefore, this research will attempt to address this gap by examining the effect of all four culture types of the Competing Value Framework, so that managers and executives have a holistic set of guidelines for their cultivation of their organizational culture.

Furthermore, there is limited study on how moderating factors such as firm size, industry and country affect the relationship between the culture types and innovation performance. Therefore, this study includes company age and company size as control variables.

This research study is conducted in Finland which is a new context. Finland is a small economy with 5.5 million people and relies heavily on foreign trade: In 2019, foreign

trade represented 79% of Finland's GDP and exports of goods and services comprise 40% (World Bank, 2019). This contrasts with the previous research that have been conducted in large economies such as Germany and Spain.

1.4 Research Questions

The main research question has been formulated based upon prior literature and empirical studies:

Q1: *Which of these culture types (adhocracy, hierarchy, market, clan) is optimal for high levels of product innovation*?

To answer this question, a sub question must be answered:

Q2: *Do the individual culture types have a significant effect on product innovation*?

This sub question is important, as it enables analysis of the CVF's explanatory power. If the CVF has no explanatory power, it would be unnecessary to then observe which of the culture types has the strongest positive correlation.

1.5 Used Research Methods

The aim is to identify the optimal organizational culture for high levels of product innovation. This research study will use the four culture types introduced in the Competing Values Framework and observe the relationship of each with product innovation. A quantitative research method will be employed to enable comparison with the previous research. Two questionnaires will be used to calculate each company's score for all four culture types and a score for their innovation performance. This will provide a more precise reflection of the variance amongst the case companies. Using qualitative methods such as interviews or structured observation could make the study susceptible to inter-observer bias. The use of questionnaires also

replicates the previous studies which have used the Competing Values Framework when conducting research into this topic.

1.6 Structure of the study

This research paper consists of four more chapters: Literature Review; Methodology; Findings and Discussion.

The literature review will discuss the main concepts of the research topic: *organizational culture* and *innovation*. It will also provide background of the Competing Values Framework and the findings of previous research using this framework. Based on the findings of the previous research, the hypotheses of this research are formed. The context of Finland is also discussed.

The methodology section provides justification for choosing Finland as the research context. The questionnaires used are discussed in detail. The processes for data collection and statistical analysis are then covered.

In the empirical section, the findings are presented with the use of tables.

The discussion section discusses the findings individually with respect to each hypothesis with comparison to prior research. The limitations of the research and suggestions for future research are provided.

2 LITERATURE REVIEW

This section will discuss the concepts of innovation and organizational culture. Secondly, the competing values framework will be introduced and linked to the research topic. The hypotheses are formed based on the previous literature and the assumptions of the competing values framework.

2.1 Definitions of Innovation

Innovation has been generally defined as an adoption of an idea or behaviour- whether that pertains to a system, process, policy, programme, product or service- which is new to the adopting organization (Damanpour et al., 1989; Hage, 1999). For this research study, product innovation will be the focus.

Product innovation refers to the development of new or improved products or services and successfully introducing them to the market (Tidd et al., 2005). Successful introduction to the market is an important notion because it narrows down the concept of innovation into the generation and adoption of products and services which add new value to society. Therefore, the degree of product innovation cannot be determined solely by the number of successful products introduced, but the aggregate value of the products generated in each period.

Researchers have identified two main types of product innovation: incremental and radical.

Incremental innovation refers to improvements to existing products and extending current product lines, and this is usually a result of refining technology involved in the process of production. Processes such as Total Quality Management have been developed to foster continuous incremental innovation within an organization and empirical research has supported this (Moreno-Luzon et al., 2013).

Radical innovation refers to the creation of completely new products and services and has been characterised as discontinuous. This often involves breaking down the existing structures and processes within the firm and in the market. This type of innovation can also refer to the creation of new markets or introducing a new business model for a specific market. Radical innovation is often made possible by the introduction of a new technology which can greatly improve the firm's ability to satisfy the customers' needs and wants.

There is evidence to suggest that radical innovation and incremental innovation may be competing processes rather than complimentary since the empirical evidence suggests they are optimally facilitated within organic and mechanist organizational structures respectively (Kessler, 2017).

Technical innovation is a concept to describe the process of product innovation: it involves changes in the equipment and processes used to transform raw materials into products and services (Damanpour,1989). While this gives some explanation, it is limited as it does not consider changes in the marketing process. Popodiuk and Choo (2006) extended this concept of administrative and technical innovation by also including "market" innovation.

Market innovation refers to changes in the marketing mix which consists of product, price, promotion, and place. The concept of design thinking emphasises expanding the concept of "product/service": it considers the packaging, design and messaging associated with the product. Position innovation involves introducing an established product in a new context/situation. For example, the Lucozade energy drink was initially marketed and sold as a medical product, but it was later re-marketed and sold as a health drink targeting the fitness industry (Tidd et al., 2005). These types of innovation help to explain how a firm can maintain a competitive advantage in a market where the products are homogenous in function and quality.

In recent years, the definition of innovation is more difficult to define due to changes in the innovation process. Previously, innovation was a process initiated and

maintained with the organization. This has been categorised as “closed” innovation. In the modern context, innovation often involves cooperation of several stakeholders. For example, private firms may collaborate with universities and other public institutions to commercialise new technology and knowledge developed by these other stakeholders.

Much of the recent literature on innovation discusses the importance of creating innovation ecosystems to facilitate greater interaction between different agents so that knowledge and technology can be capitalised on more quickly. In terms of this research, product innovation is the focus and therefore regardless of whether closed innovation or open innovation is utilised by the firm, the outcome should be easy to measure.

2.2 Definition of Organisational Culture

Culture is often a buzzword which is thrown around in the business world: businesses often mention their great “culture” to attract people to work for them or with them. While researchers have defined organizational culture in distinct ways, the consensus is that it involves common beliefs, values, and attitudes in the organization. Pettigrew (1979) was the first to empirically study culture in an organizational context and defined organizational culture as a family of concepts: symbol, language, ideology, belief, ritual, and myth. Most modern literature on the effect organizational culture use the definition by Schein (2010, p.24):

“pattern of shared basic assumptions learned by a group as it solved its problems of external adaptation and internal integration, which has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems”.

This definition assumes that *assumptions* are developed in response to the need to adapt and survive in the business environment, and to ensure that the organization has

a smooth daily functioning. Once these basic assumptions are established, they are then passed on to the future generations of group members.

Schein's (1985, 2010) main contribution to the literature on organizational culture is identifying different levels of culture in an organization. Specifically, this definition identifies three levels of analysis pertaining to organizational culture: *Artifacts*, *espoused beliefs and values* and *basic underlying assumptions* (from superficial to deepest). *Levels* indicates the degree to which the cultural aspect can be seen by the observer. Schein (2010) organizes the concepts identified by Pettigrew (1979) into different layers based on how perceivable they are to the observer.

Artifacts as the most visible level of culture: the language, clothing, and the values which the company publish and promote. These are the first impressions of the company to an observer when entering that environment. While these are quite easy to observe, these aspects are very difficult to decode. For example, an organization can publish a list of words describing the values they have, but only through continued observation will the observer be able to understand the significance and meaning the organizations place upon these words. Two organizations can both claim that they are "innovative", but this may mean very different things, and depends on the environmental context of each company.

Espoused beliefs and values are the common ideals, goals, values, and aspirations, ideologies, and rationalizations. These values and beliefs initiate the decision-making process in a new organisation or in response to a new problem. Initially, beliefs and values of the key decision- makers determine the direction of the organization. However, beliefs or values held by the initial decision maker only becomes shared by the rest of the group if that belief leads to a decision that brings success to the organization. These cultural aspects are consciously held and explicitly expressed by the members of the organization. More importantly, these are the beliefs and values that have yet to have been consistently validated or may be difficult to validate. Not all these shared beliefs and values are directly related to organizational performance and could guide members ethical and moral behaviours instead. These espoused beliefs

and values may not be congruent with the company's basic assumptions and in may be in direct contradiction. This is ultimately a conflict between the conscious drives and the unconscious drives within the organization. A prime example of this is the practice of *greenwashing* in which companies misinform their customers by promoting their accordance with environmental policies while still partaking in practices which go against these environmental policies.

Basic assumptions represent the beliefs and values that have been consistently validated through repeated success after implementing them. For example, a certain hypothesis consistently being supported empirically leads to it being perceived as an undeniable fact (Schein, 2010). These basic assumptions are taken for granted and not consciously thought about, yet they provide the deepest foundation for our decision making. In an organizational context, these assumptions are universally agreed upon by the members of the organization. Because they are unconscious, these assumptions are the hardest to change; they underlie our deepest beliefs about the world. Therefore, changing these assumptions would change our perception of reality. The resistance to changing basic assumptions is because the human mind trusts and chooses the decision or understanding which is readily accessible (Freeden, 2010). In an organizational context, it would be difficult for a firm to change their basic assumptions because these basic assumptions have been formed on the basis of past success.

While Schein's (2010) concept of organizational culture is useful to understand how organizational cultures are formed and the layers within them, it assumes that the organizational culture is an all-inclusive phenomenon which all members of the organization subscribe to. Martin (2002) proposed that concepts of organizational culture fall one of three perspectives: integrationist, fragmented and differentiated. Schein's (2010) interpretation would fall under the integrationist view which assumes that organizations have one culture shared by all. *Fragmented* view argues that members of an organization will not share the same values or place the same meaning on experiences, because members will be at different levels and in different occupations within the organization. The *differentiated* view assumes the existence of sub- cultures in organizations based on occupation, gender, ethnicity, and other

demographic indicators (Schneider, 2013). The most realistic view of organizational culture would be one that takes account of all three of these views. Martin (2002) proposed a three-perspective view of organizational culture in which these perspectives exist simultaneously providing an alternative multi-level concept of culture to Schein's (2010).

The Competing Values Framework has been criticised for not accounting for the multi-level nature of culture itself. Schneider (2012) asserts that quantitative frameworks such as Competing Values Framework can only capture the espoused values of the organization. In addition, this framework has been used in conjunction with questionnaires, so it may also be difficult to identify the unconscious assumptions of the organization. However, observing the deepest level of culture within an organization would require ethnographic research which would be far more time consuming and beyond the limitations of this research project.

2.3 Competing Values Framework: The four culture types

There has been limited empirical study on the types of organizational cultures that facilitate or thwart innovation. Most of the research uses the competing values framework developed by Quinn and Rohrburgh (1983). The framework was developed by finding the common themes contained within Campbell's (1977) list of criteria for organizational effectiveness. First, the list of criteria was reduced from 30 to 17. Then, the 17 criteria were organized using three dimensions: *means-ends, focus* and *structure*. These three dimensions represent the competing values of organizational performance.

2.3.1 Means-ends of the four culture types

Means-ends indicate the organizational behaviors (means) and desired outcomes (end) resulting from the values and beliefs (organizational culture). The means-end axis determines whether an organization places more importance on the processes and

practices (means) within the organization, or the business outcomes resulting from these processes (ends).

While these dimensions have been studied by researchers in isolation, most of the research uses the culture typology derived from the competing values framework (Quinn and Kimberly, 1984). The means-ends for the culture types display the methods synonymous with each organizational culture, and the outcomes achieved in each culture using the respective methods (Cameron and Quinn, 1999):

Adhocracy Culture: The desired outcome is organizational renewal which is achieved by using methods which facilitate transformation.

Clan Culture: The desired outcome is commitment and cohesion within the organization. This is achieved by ensuring that management is responsive to individual employee needs.

Hierarchy Culture: For this culture, the main goal is efficient infrastructure which is achieved by modifying the internal processes to maximize the efficiency within the organization.

Market Culture: The focus is on achieving the bottom-line impacts set by the management. This goal is reached by aligning HR with the business strategy set by management. The means-ends of the adhocracy culture seem to be most congruent with product innovation. Previous research has identified a correlation between innovation and organizational change.

2.3.2 Focus: Internal vs External Orientation

Focus represents the distinction between focusing on internal capabilities and external orientation. Focusing on internal capabilities means ensuring the individual wellbeing and development of members of the organization. An aspect of ensuring everyone's wellbeing is that employees have stability in the workplace. Focus on external

orientation means that the wellbeing of the overall organization takes precedence over the wellbeing of individuals within the organization. The wellbeing of an organization is associated with its competitiveness in the changing business environment. In theory, firms with an external focus are more likely to have positive business outcomes because they will pay attention to changing market needs (Deshpande et al., 1993).

Concepts such as customer orientation and market orientation explain how firms prioritize their relationship with external stakeholders whether they be customers, competitors, or suppliers.

Market orientation and customer orientation refer to the process of organizational learning. The content of this learning can refer to customer needs and wants, competitors, sociocultural trends, new technologies and regulations which may affect the degree to which the firm can satisfy the customers (Baker and Sinkula, 2005). To acquire this information, firms may utilize market sensing tools such as interviews, focus groups and questionnaires to gain more knowledge on customers. This type of market sensing is a fulcrum of innovation strategies such as Outcome-Driven Innovation which involves using surveys and questionnaires to identify the key, unfulfilled needs of the market (Ulwick, 2017).

Market orientation has been identified as a significant antecedent of innovation (Kohli and Jaworksi, 1990; Deshpande et al., 1993). The reasoning is it gives positive psychological and social benefits to the employees of the organization because all parts of that organization are working towards the same goal: to provide value to customers. Value orientation and customer orientation are defined as two separate concepts, yet other researchers have considered both to be important components of market orientation (Dobni, 2008).

Other studies have investigated individual effects of market orientation components on product innovation. Lukas and Ferrell's (2000) findings suggested that customer orientation increases the introduction of new-to-the world products and reduce the

launching of imitator products whereas focusing on competitors increases the introduction of imitator products.

However, research also supports the idea that innovativeness cannot be reduced to market orientation. Understanding of customer needs and wants is only valuable if the right internal conditions exist within the organization. Foss et al. (2011) found that customer orientation does not directly result in greater innovation performance but increases the likelihood of delegation within the organization. Delegation leads to more internal communication and greater use of knowledge incentives. These two factors were found to increase innovation performance.

Alternatively, employees may naturally have more responsibility in customer-oriented organizations because they have more access to customers and the business environment in general, as compared to the top management, and therefore can acquire more accurate knowledge about customer trends, needs and wants.

Empirical study of the relation between market orientation and innovation consequences supports the theoretical assumptions that market orientation leads to better innovation consequences (Grinstein, 2007). Therefore, it seems likely that the culture types with an external orientation (adhocracy and market) will have positive impacts on product innovation whereas the culture types with an internal orientation (hierarchy and clan culture) will have a negative impact on product innovation.

Adhocracy culture has an external focus and a flexible structure, these types of cultures embrace changes in the business environment and see change as an opportunity to develop new ideas and take risks. Like clan culture, employees are given some degree of autonomy. Early definitions of organizational learning assumed there were four sub-processes: Knowledge acquisition, information distribution, information interpretation and organizational memory (Huber, 1991). The characteristics of adhocracy culture should maximize the ability to acquire knowledge (external orientation) and then distribution of information throughout the organization (flexible structure).

Theoretically, the ability to learn and acquire knowledge externally and adapt, should lead to innovation.

Market culture is characterized by an external focus on customers and competitors. However, the organizational structure is controlled, employees have well defined tasks and follow rules and procedures set by management. In theory, the acquiring of customer and competitor information along with systematic implementation should lead to increased market share, profit, product quality, and productivity.

2.3.3 Structure: Flexibility vs Control

Structure represents the dichotomy between *flexibility* and *control*. *Flexibility* prioritizes adapting and changing, *control* prioritizes keeping things the same. Research on the effects of flexibility and control on organizational effectiveness can be traced back to the work of Burn and Stalker (1961) which introduced the concepts of *organic* organizational structure and *mechanistic* organizational structure.

Organic organizational structures are characterized by horizontal communication and ambiguous roles: employees and managers do not have clearly defined roles, or each person's role can change depending upon the situation.

Mechanistic organizational structures are characterized by vertical communication where there is a clear hierarchy and the members each have clearly defined roles and specialized skills and tasks for those roles (Aiken and Hage, 1971).

Theoretically, firms with an organic structure should thrive in a dynamic business environment compared to a firm with a formalized structure because they respond to changes faster (Burns and Stalker, 1961). Empirical studies have supported this hypothesis, but these mainly focus on established firms whereas research into new ventures in dynamic markets found that those with a mechanistic structure fared better (Sine et al., 2006).

Researchers have identified the type of innovation to be a mediating factor in the relationship between structure and innovation: mechanistic structures are positively associated with incremental innovation, and organic structures are positively associated with radical innovation (Kessler et al., 2017).

Clan culture combines an internal focus and emphasis on flexibility. Theoretically, this would lead to high morale and commitment since employees are trusted with greater responsibility leading to greater communication between employees and management. Building trust and communication with employees may result in greater creativity since they feel that their ideas are valued. Enabling open communication may allow employees to express their natural creativity without the fear of being judged (Kelley and Kelley, 2012). The fear of being judged is often discussed in relation to the feelings of humiliation when an individual's ideas are openly rejected by the group. However, in an organizational context, the fear of being judged may function as a mediating factor of the fear of being fired. Conformity in organizations is not only a mechanism to ensure social standing it is also a mechanism of survival, in this context to ensure one maintains their position in the organization and to keep the opportunity for promotion (Dent and Goldberg, 1999; Pech, 2001).

In the context of this research, organizations could alleviate some of the burden by openly encouraging and rewarding the generation of ideas from employees. If employees are rewarded for their contributions, this is likely to give them more confidence to participate and contribute their own ideas (Gilley, Gilley, Dixon, 2008). Hurley and Hult (1998) also found that high levels of innovativeness in organizations are associated with cultures that prioritize participative decision making. The qualities of clan culture seem to align with the idea of participative decision making, therefore suggesting that it could facilitate innovation.

Hierarchy culture combines an internal orientation and a control structure. This culture type emphasizes formalization and routinization, and employees are given clearly defined roles. Conforming and predictable behaviors are prevalent. Conforming behaviors have been linked to poor innovation and creativity (Pech, 2001).

2.4 Previous research using CVF

Researchers have studied the relationship between the four culture types and organizational innovativeness indicators, and mainly using quantitative research methods. Naranjo-Valencia et al. (2010) findings suggest that adhocracy cultures have a significant positive effect on product innovation, whilst hierarchical cultures have a significant negative effect on product innovation. A sidebar is that the type of industry had no moderating effect on the relationship, nor did the age of organization, environmental uncertainty and size (number of employees). However, this research study was limited because they only observed two culture types: adhocracy and hierarchy.

These findings support the assumption of adhocracy culture facilitating innovation, resulting in the following hypothesis:

H1- Adhocracy culture has a positive effect on product innovation

Most studies' (Naranjo-Valencia et al., 2010; Naranjo- Valencia et al., 2011; Hartnell, 2011; Buschgens et al., 2013; Engelen, Flatten, Thalmann and Brettel, 2014) findings conclude that hierarchical cultures are the most significant hindrance to organizational innovativeness, therefore forming the second hypothesis:

H2- Hierarchy culture has a negative effect on product innovation

There have been mixed findings pertaining to the culture that has the strongest positive effect. Individual studies such as those mentioned identify adhocratic cultures as the strongest positive influence on innovation, however meta-analysis studies such as Hartnell et al. (2011) found that market cultures had a stronger positive association with innovation compared to adhocratic cultures. Based on this finding and the literature suggesting market orientation's positive effect on innovation, the third hypothesis can be formulated:

H3- Market culture has a positive effect on product innovation

On the other hand, Buschgens et al. (2013) meta-analysis findings supported the hypothesis of the competing values framework, with innovative organizations predominantly adopting a development culture (adhocracy). It could be argued that the findings of Hartnell et al. (2011) are more valid since they utilized almost twice the number of studies than the latter meta-analysis. They also report conflicting findings on the validity of the Competing Values Framework model, Buschgens et al. (2013) utilize their findings to justify the validity of the model, however Hartnell et al. (2011) suggest that the nomological validity of the model is limited. They explain the lack of validity by suggesting that the values of the framework may be complementary rather than competing. This is implied by the positive coefficients for the bivariate correlations between the different culture profiles. Furthermore, their findings only partially supported the hypothesis formed from the CVF. While adhoc culture was found to have a medium sized positive effect on organizational innovativeness, market culture had the strongest positive effect on innovativeness.

There are mixed findings for the effect of clan culture on innovation. However, the theoretical literature suggest that the characteristics of clan culture are counter-productive to the goal of organizational innovativeness.

H4- Clan culture has a negative effect on product innovation

Furthermore, Engelen et al. (2013) findings indicate a moderating effect of national culture on the relationship between organizational culture and entrepreneurial orientation by comparing differences in the relationships in Germany and Thailand. Strong entrepreneurial orientation is associated with strong product innovation (Lumpkin and Dess, 1996). In particular, the positive correlation between adhocratic culture and innovation culture was stronger in Germany than in Thailand, and Germany was identified as a low power distance- high individualism culture whereas Thailand was identified as a collectivist- high power distance culture. The suggested reason for the difference is that employees' beliefs and values are primarily influenced

by their national culture and bring these beliefs and values into the organization. If their beliefs and values match the organization's beliefs and values, then the employee is likely to be more comfortable behaving according to the organization's expectations (Brettel et al., 2008).

There have been mixed findings on the significance of the influence of age and size on the culture-innovation relationship. Naranjo-Valencia et al. (2010) findings suggest no moderating effect. However, a successive study using similar regressions found that age and size do moderate the relation between observed culture types and innovation: the age coefficients being negative and size coefficients positive (Naranjo-Valencia et al., 2011).
Contrary to this, Engelen et al. (2013) found that both age and size had a significant (90% significance) negative moderating effect on the relation between clan culture, market culture and entrepreneurial orientation. Age and size coefficients were also negative for the adhocracy-entrepreneurial orientation, but only the age coefficient was significant (95% significance) On the other hand, the age coefficient was a significant and positive moderator between hierarchical culture and entrepreneurial orientation.

2.5 National context

Based on Hofstede's six-dimensional model, Finland tends to favour individualism and equality with a relatively high individualism score of 63 and a relatively low score of 33 of power distance. A low power distance score represents an intolerance of unequal distributions of power in society. In the context of organizational structure, this could mean an inclination towards decentralised decision making in which the contributions and knowledge of all members of the organization are valued and acknowledged.

Applying these findings to the Competing Values Framework, this could manifest as a preference for flexible organizational structures in Finnish firms, which may provide part of the explanation for Finland's high level of innovation relative to other developed countries. The prior literature agrees that low power-distance cultures are

more likely to be innovative because employees believe that they have the resources and power to influence change (Tian et al., 2018).

The high individualism score suggests that Finland possesses a culture in which people are primarily concerned with their own and immediate family's wellbeing. Another aspect of the individualism dimension is that people assume high levels of responsibility for themselves and expect others to do the same. Other studies, such as Engelen (2013), have linked individualism with a flexible organizational structure in which employees have broad job descriptions. It is difficult to apply the individualism dimension of the Hofstede model to the CVF because of the difference in the target groups: CVF is based on the executives of companies whereas the dimensions of Hofstede's model were measured using non-executives, employees, and students.

Engelen's (2013) findings suggests that the positive effect of the adhocracy culture is reinforced when the national culture resembles the organizational culture. Furthermore, the study was conducted in Germany which shares cultural characteristics with Finland: based on Hofstede's model, both possess high individualism and low power distance scores.

2.6 Hypotheses

Based on the previous research and theory, four main hypotheses were formulated:

H1- Adhocracy culture has a positive effect on product innovation
H2- Hierarchy culture has a negative effect on product innovation
H3- Market culture has positive effect on product innovation
H4- Clan Culture has negative effect on product innovation

3 METHODOLOGY

This section of the paper will provide justification for the research context and provide information on the questionnaires used. The methods for data collection and statistical analysis are also explained.

3.1 Why Finland?

For some time now, Finland has been considered one of the most innovative countries in the world; it has been ranked in the top 10 of the Global Innovation Index for the last five years. In 2019, it ranked 6th in the world for overall innovation score. This score is an average of the country's scores for Innovation Output and Input.

However, while Finland shows strength in areas such as patents and volume of scientific research articles, the ability to maximise output from the inputs is limited compared to other countries. China and Finland have similar input scores, yet China has a significantly higher level for Innovation Output. This is supported by an OECD report on Finland's innovation policy which asserts that improvements need to be made in organizational capital and branding, and marketing assets. This could suggest that Finnish companies may require a better understanding of how to gain value from their efforts to be innovative and therefore provides a significant incentive for the research to be conducted in this context.

3.2 Questionnaires

This research used two questionnaires: Organizational Culture Assessment Instrument (OCAI) and Product Innovation Metric.

OCAI is a questionnaire used to identify an organization's culture (Cameron and Quinn, 1999). There are six items, with each used to assess a different dimension of organizational culture: *Dominant characteristics*, *organizational leadership*,

management of employees, *organizational glue*, *strategic emphasis* and *criteria of success.*

In each item, there are four descriptions corresponding to the four culture types (adhocracy, clan, market, hierarchy). For each item, participants have 100 points to assign amongst the four descriptions. A higher number of points is assigned to the descriptions that best describe their company. The participants' average scores for each of culture type is calculated by dividing the aggregate score by 6 (mean). The highest mean score represents the organization's predominant culture type. This questionnaire was used because it was designed to be used in conjunction with the Competing Values Framework and has been used by prior researchers (Naranjo-Valencia et al., 2010; Naranjo- Valencia et al., 2011; Hartnell, 2011; Buschgens et al., 2013; Engelen, Flatten, Thalmann and Brettel, 2013). Table 1 displays the questionnaire.

Table 1: Organizational Culture Assessment Instrument

1. Dominant characteristics
A: The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves
B: Dynamic and entrepreneurial place- people are willing to stick their necks out and take risks
C: Results-oriented- A major concern is with getting the job done. People are very competitive and achievement oriented
D: Controlled and structured place- Formal procedures generally govern what people do
2. Leadership style
A: The leadership in the organization is generally considered to exemplify mentoring, facilitating or nurturing.
B: The leadership in the organization is generally considered to exemplify entrepreneurship, innovation or risk taking.

C: The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results oriented focus.

D: The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency

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3. Management of employees

A: Teamwork, consensus and participation

B: Individual risk-taking, innovation, freedom and uniqueness

C: Hard-driving competitiveness, high demands, and achievement

D: Security of employment, conformity, predictability, and stability in relationships

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4. Organizational glue (Bonding mechanism)

A: Loyalty, organizational commitment, mutual trust and teamwork

B: Commitment to innovation and an emphasis on being on the cutting edge

C: Aggressiveness, winning in the marketplace, and goal accomplishment

D: Formal rules and policies- maintenance, and hierarchy importance

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5. Strategic Emphasis

A: The organization emphasizes human development. High trust, openness, and participation persist

B: The organization emphasizes acquiring new measures and creating new challenges. Trying new things and prospecting for opportunities are valued

C: The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace

D: The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important
6. Criteria of Success
A: Development of human resources, teamwork, employee commitment, and concern for people
B: Having the most unique or newest products. It is a product leader and innovator
C: Winning in the marketplace and outpacing the competition- competitive market leadership is the key
D: Efficient-dependable delivery, smooth scheduling, and low-cost production are critical

Source: Cameron and Quinn (1999)

The Product Innovation Metric consists of six questions. Each question has a five-point Likert scale to assess a company's capabilities in each dimension of innovation. For the scale: "1" represents below competitors and "5" represents above competitors. Participants rate their company's performance in each dimension based on the last three years. The scale adopted from Manu (1992) assumes that product innovation consists of three main dimensions: Inputs, Outputs and Timing. The multi-indicator measure is used to ensure that companies' ability to innovate is not underestimated or overestimated. Innovative companies may specialise in different dimensions of innovation. Some companies' innovation can be attributed to their strong R&D, whereas other companies' innovation is attributed to their ability to capitalise on the new knowledge and technology acquired from others to develop products.

Previous researchers have found that this multi-indicator measure of innovation to be internally reliable, which means that the various indicators are related to each other, using split-half measures, or calculating Cronbach's alpha (Naranjo-Valencia et al., 2010). Table 2 displays the questions for the Product Innovation Metric.

Table 2: Product Innovation Metric

Instructions: For each description, rate your company's performance (in the last three years) from 1 to 5. 1= Below Competitors 5=Above Competitors
1. Number of new products/services introduced
2. Desire to introduce new products/services
3. Intelligent response to new products/services introduced by other companies
4. R&D efforts to develop new products/services
5. Efforts to develop new products/services in terms of hours per person
6. Efforts to develop new products/services in terms of teams and training involved

Derived from Manu (1992) and Naranjo- Valencia et al. (2010)

3.3 Data Collection and Sample Selection

The data collection process was conducted from late September 2020 to December 2020. The population for consideration was executives (mainly CEOs) in Finnish companies or companies based in Finland. The reason for limiting respondents to executives was twofold. Firstly, to follow the methods used by the previous researchers. Secondly, to ensure convergent validity. It was assumed that CEOs would be more likely to give an accurate perception of the general culture of the company. Responses taken from subordinates may have resulted in convergent invalidity because their perception of organizational culture may be skewed by the specific department they work in.

Most of the targeted respondents were selected using a variety of company databases: BusinessOulu Company Database, BusinessFinland Young Innovative Companies and companies in Butterfly Ventures Portfolio. From these databases, a list of companies was selected, based on the perceived relevance of the survey questions to the company. A few of the respondents were sourced utilising snowball sampling (Bryman and Bell, 2007) by contacting people with access to multiple contacts. Both methods of non-random sampling were used for convenience.

The process of soliciting responses went through multiple stages.

Initially, a mass email was sent to several companies sourced from the databases, containing weblinks to both questionnaires. This initial method did not generate many questionnaire responses, nor further communication with the target respondents.

Secondly, personalised emails were sent to some of the same companies and new companies. This generated a greater rate of questionnaire responses, but progress remained slow.

Finally, the decision was taken to utilise both self- completion methods and structured interviews. Structured interviews were conducted via phone calls with executives and C-level employees to solicit a response to the *Innovation Metric* Questionnaire. Once a participant had completed the *Innovation Metric* questionnaire via phone call, the weblink to the *Organizational Culture Assessment Instrument* (OCAI) would be sent to the respondent for self-completion. This was done because the *Innovation Metric* Questionnaire was much easier to complete whereas the OCAI required more reflection which would be better suited to self-completion. Follow-up calls were used if the respondent had not completed the second questionnaire within a few days of completing the first questionnaire.

Overall, 18 valid responses were attained from a sample size of 110 giving a response rate of 16%. As previously mentioned, the respondents' companies were mainly sourced from BusinessOulu company directory and the BusinessFinland Young Innovative Companies, so the companies in the list were mainly start-ups with a small number of employees which implies an absence of non-response bias. There were some companies in the list which could be categorised as large companies, but these companies were not contacted.

3.4 Statistical analysis

The research follows the methodology of Naranjo-Valencia et al. (2011) and uses hierarchical regression analysis. Hierarchical regression analysis involves constructing several models with the same control variables and different independent variables. In

this research, the two control variables are company age and company size. The analysis includes five different models:

Model 0 is set up with only the control variables and the dependent variable (innovation score).
Model 1 the independent variable "adhocracy" is added to the model.
Model 2 includes control variables and hierarchy as the independent variable.
Model 3 includes control variables and market culture as the independent variable.
Model 4 includes control variables and clan culture as the independent variable.

The main values of interest are the beta coefficients for the control variables and respective independent variables. These coefficients are used to identify the strength and direction of the relationship between each of the predictor variables and dependent variable (innovation).

To observe the explanatory power of each model, the adjusted R-square value is calculated. The R-square value indicates the proportion of the variance in the dependent variable explained by the predictor variables included in the model.

Hierarchical regression allows for the adding and removing of the independent variables of interest. This enables comparison of the explanatory power of the culture types on the level of innovation in the company. This is done by comparing the changes in adjusted R-squared value when these variables are individually added to Model 0. Adjusted R-squared is utilised to observe if a particular independent variable has influence on the dependent variable. An unadjusted R-squared value always increases when an independent variable is added to the regression model, even if the independent variable has no explanatory power.

Hierarchical regression analysis is ideal for testing the validity of the CVF because the theoretical framework assumes that the values underlying the four culture types are competing rather than complementary. The OCAI questionnaire structure reinforces

the assumption of mutual exclusivity amongst the four culture types. Therefore, separate regression models are required to prevent distortion of the findings.

Two control variables are included: company age and company size. Company size is measured by the number of employees, and company age is calculated using year 2020 as the basis. The inclusion of these control variables prevents overestimation of the coefficients for the culture type variables. For example, a poor innovation performance could be attributed to the company being too large as opposed to having a culture resembling the hierarchy type.

Descriptive statistic analysis is utilised to understand the predominant responses amongst the sample. This provides an understanding of the effect of non- random sampling on the representativeness of the sample group.

Bivariate correlation coefficients are also calculated. Observation of the bivariate correlation coefficients between the four culture types will indicate if the Competing Values Model has nomological validity.

4 FINDINGS

This chapter will first present the descriptive statistics and bivariate correlations. The succedent sub-chapters will present the relevant findings for the individual hypotheses.

4.1 Descriptive statistics

Table 3 shows the descriptive statistics which gives us more information about the characteristics of the sample group. The means for company age and company size indicate that the sample group consist mostly of small companies and start-ups. This was influenced by the primary sources used to compile the lists of companies: BusinessOulu company database, BusinessFinland Young Innovative Companies list and Butterfly Ventures portfolio.

The highest means were adhocracy and clan suggesting that the predominant culture types of the sample group were the clan culture and adhocracy culture. These two culture types are characterised by a flexible organizational structure.

The mean innovation score was 3.65 (2 d.p) out of 5 which suggests that the companies' representatives perceived their innovation to be above their direct competitors.

Table 3: Descriptive statistics

	Mean	Standard. Deviation
Company age	7.67	7.10
Company size	12.94	10.61
Clan	31.79	11.97
Adhoc	32.35	11.39
Market	22.99	9.82
Hierarchy	13.01	6.44
Innovation	3.65	.72

N=18

Table 4 displays the bivariate correlation coefficients for all the variables. The direction of the bivariate correlation coefficient between a given culture type and its direct opposite indicates if these cultures are mutually dependent or mutually independent. Clan culture (flexible structure and internal focus) directly opposes market culture (rigid structure and external focus) and has a negative correlation coefficient which is also statistically significant. Adhocracy culture is characterised by a flexible organizational structure and an external focus, so its direct opposite is the hierarchy culture type (rigid structure and internal focus). The correlation coefficient for adhocracy-hierarchy is negative and is also statistically significant supporting the underlying assumption of the competing values framework (CVF).

The bivariate correlations between innovation and the different culture types support H1, H2, H4. H3 is not supported because the correlation coefficient for innovation-market culture is negative. Considering H3, scores for hierarchy culture and market cultures are positively correlated. While the directions of correlations support H1, H2, H4, none of the relevant correlation coefficients have statistical significance at 0.05 level. The correlation coefficient for innovation- adhocracy is the closest to being significant at the 0.05 level.

Table 4: Bivariate Correlations

	Company age	Company size	Clan	Adhoc	Market	Hierarchy	Innovation
Company age	1	-.021 (.468)	.311 (.105)	.203 (.209)	-.478* (.022)	-.266 (.143)	-.017 (.474)
Company size	-.021 (.468)	1	.007 (.489)	.040 (.438)	-.210 (.201)	.228 (.182)	-.221 (.189)
Clan	.311 (.105)	.007 (.489)	1	-.445* (.032)	-.431* (.037)	-.264 (.145)	-.155 (.270)
Adhoc	.203 (.209)	.040 (.438)	-.445* (.032)	1	-.513* (.015)	-.493* (.019)	.309 (.106)

Market	-.478* (.022)	-.210 (.201)	-.431* (.037)	-.513* (.015)	1	.356 (.074)	-.215 (.196)
Hierarchy	-.266 (.143)	.228 (.182)	-.264 (.145)	-.493* (.019)	.356 (.074)	1	-.068 (.395)
Innovation	-.017 (.474)	-.221 (.189)	-.155 (.270)	.309 (.106)	-.215 (.196)	-.068 (.395)	1

p-value in parentheses, * = Significance at 0.05 level

4.2 Findings for Adhoc culture- Innovation (Hypothesis 1)

Table 5 presents the beta coefficients for the variables in model 0 and model 1, and it also provides information on each model's explanatory power and goodness of fit: R square, Adjusted R square, F change, and Sig. F change. Adding adhocracy score as an independent variable to the base model resulted in a positive change in Adjusted R-Square. This indicates that a greater proportion of the variation in innovation can be explained by the model. The change in the F-ratio was positive but only significant at the 0.20 level. The direction of the beta coefficient for Adhoc is positive, so Hypothesis 1 is supported.

Table 5: Model 0 and 1 coefficients and model statistics

	Model 0	Model 1
Constant	3.860	3.338
Company age	-.021 (.934)	-.090 (.725)
Company size	-.222 (.392)	-.237 (.352)
Adhocracy	n/a	.337 (.200)
R square	.049	.158
Adjusted R square	-.077	-.022
F change	.390	1.808
Sig. F change	.683	.200

p-value in parentheses, *= significance at 0.05 level. Model 0 predictors: Constant, company size, company age. Model 1 predictors: Constant, Company size, company age, Adhoc

4.3 Findings for Hierarchy culture- Innovation (Hypothesis 2)

Table 6 presents the beta coefficients for the respective variables in Model 0 and Model 2: Company age, company size, hierarchy. It also provides information on the goodness of fit and explanatory power of model 0 and 2: R square, Adjusted r square, F change, and sig. F change. The addition of hierarchy as a variable in model 2, decreased the adjusted R square compared to model 0. This indicates that the hierarchy score is an unnecessary variable with no predictive power. This is supported by the fact that there is no significant change in the F ratio when adding adhocracy as a variable to the base model. While the beta coefficient is negative it is extremely insignificant. Therefore, the findings do not support H2.

Table 6: Model 0 and 2 coefficients and model summaries

	Model 0	Model 2
Constant	3.860	3.898
Company age	-.021 (.934)	-.028 (.919)
Company size	-.222 (.392)	-.216 (.433)
Hierarchy	n/a	-.026 (.927)
R square	.049	.050
Adjusted R square	-.077	-.153
F change	.390	.009
Sig. F change	.683	.927

p-values in parentheses, *= significant at 0.05 level Model 0 Predictors: Constant, company age, company size. Model 2: Constant, company age, company size, hierarchy

4.4 Findings for Market culture- innovation (Hypothesis 3)

Table 7 presents the beta coefficients of the variables for model 0 and 3: company age, company size, market. It also provides the model summaries which give information

on goodness of fit and explanatory power: R square, adjusted R square, F change, and Sig. F change. H3 is not supported by the findings which show a negative beta coefficient for Market score. This indicates that market culture may have an adverse effect on a firm's innovation. The coefficient is significant at a level of .215 which is of similar magnitude to significance of adhocracy coefficient. Based on the adjusted R- square, the market variable has more explanatory power than the Hierarchy variable but slightly less than the adhocracy variable.

Table 7: Model 0 and Model 3 Coefficients and Model summaries

	Model 0	Model 3
Constant	3.860	4.711
Company age	-.021 (.934)	-.202 (.486)
Company size	-.222 (.392)	-.305 (.251)
Market	n/a	-.376 (.215)
R square	.049	.152
Adjusted R square	-.077	-.030
F change	.390	1.687
Sig. F change	.683	.215

p-values in parentheses, *=significant at 0.05 level Model 0 Predictors: Constant, company age, company size. Model 3 Predictors: Constant, Company age, company size, market

4.5 Findings for Clan culture- Innovation (Hypothesis 4)

Table 8 presents the beta coefficients for the respective variables in Model 0 and Model 4: company age, company size, clan. It also provides the model summaries which gives information on goodness of fit and each model's explanatory power. While the coefficient for Clan score is negative, the coefficient is only significant at the 0.45 level. Furthermore, when the Clan variable is included, the adjusted R square decreased which indicates that the inclusion of this variable did not lead to greater explained variation of innovation amongst the sample. Therefore, the findings do not support H4.

Both control variables have negative beta coefficients in each of the models, yet the company size variable has far more significance than company age. All four culture variables have more of an impact on innovation than the age of the company. However, the size of the company had more of an impact than the hierarchy and clan variables in their respective models.

Table 8: Model 0 and Model 4 Coefficients and model summaries

	Model 0	Model 4
Constant	3.860	4.131
Company age	-.021 (.934)	.029 (.915)
Company size	-.222 (.392)	-.220 (.408)
Clan	n/a	-.162 (.558)
R Square	.049	.271
Adjusted R square	-.077	-.125
F change	.390	.359
Sig. F change	.683	.558

p-values in parentheses, *= significance at 0.05 level. Model 0 predictors: Constant, company age, company size. Model 4 predictors: Constant, company age, company size, Clan

5 DISCUSSION

In this section, the findings for each culture type will be discussed and compared to the previous literature. The managerial implications of these findings will be explored. Finally, limitations of the research and suggestions for future research are discussed.

5.1 Discussion on adhocracy culture

The main assumption of the CVF framework is that adhocracy cultures are optimal for innovation. While the findings are not significant at the conventional level of 0.05, adhocracy had the most explanatory power relative to the other culture variables and the control variables. This supports much of the past research on this topic which also finds adhocracy culture to have a positive impact on innovation in companies. This indicates that managers and leaders of organizations should focus on developing characteristics of adhocracy culture. However, to be truly applicable to managers and executives, they need to know which specific areas to focus their attention on.

While not observed in this study, previous research has also studied the individual effects of the dimensions of organizational culture on innovation. Their findings indicate that "organizational glue" was the most significant component in the positive relationship between adhocracy and product innovation (Naranjo-Valencia et al., 2011). Organizational glue refers to the bonding mechanisms that bind the organization together. In context of the adhocracy culture, organization glue refers to the "commitment to innovation and an emphasis on being on the cutting edge". This would suggest that the main objective of the manager is to ensure that all the employees in the organization are committed to being innovative. Achieving this is likely to be a matter of motivating employees, setting clear goals and minimizing complacency over the long term.

5.2 Discussion on hierarchy culture

A surprising finding was the fact that hierarchy cultures do not hinder product innovation. This contradicts the prior research's findings. The prior research has observed significant negative correlations between hierarchy culture and innovation. If the assumptions of the CVF were to hold, the effect of the hierarchy culture would be similar in magnitude to the effect of adhocracy cultures, albeit in different directions. However, the findings of this study provide some support to Hartnell's (2011) assumption that the values underlying the different culture types are complementary.

The size of the company had a larger negative effect than the presence of hierarchy culture, suggesting that companies should not be afraid to create rules and structures of hierarchy. On the contrary, creating rules and structures may complement the emphasis on creativity and new ideas. Recent research suggests that blending creativity and control empowers employees to come up with creative ideas. Spekle et al. (2013) examined the relationship between a system of controls, empowerment, and creativity. Using Survey data from 233 Business Unit Managers, they found that the intensity of the Levers of control was positively associated with empowerment and creativity. They suggest that a control system creates a business environment which possesses a high level of information. This information can then be used as the basis for the employees' actions and gives them the confidence to come up with new ideas. Likewise, Leavy (2005) also addresses the importance of combining creativity and discipline to create the best conditions for effective innovation within a company.

These findings suggest that research needs to focus on investigating the relation between creativity and control. For example, Ishak (McKinsey Report, 2017), discussed a concept called "innovation parenting". This concept is based on models of parenting which emphasize the importance of giving children "roots and wings".

Applying this concept to innovation, the employees and innovators within an organization must be given the freedom to develop innovative ideas and think outside the box (wings), however this creative freedom must be grounded in the company's objectives, strategies, and values (roots). The idea is that the combination of roots and

wings will result in more efficient innovation practices because “creative types” will be mindful of the financial implications for the company and therefore concentrate efforts on the most lucrative and worthwhile projects. The structure and formalization present in a hierarchical culture may allow firms to fully capitalize on innovative ideas. Jansen and Van Den Bosch (2006) findings suggest that certain aspects of formalization, extent of rules and procedures, were positively related to exploitative innovation. Exploitative innovation refers to incremental innovation. Further empirical study should be focused upon clarifying the relation between formalization and innovation.

There are also a few other explanations that need to be considered:

Firstly, the predominance of small companies/start-ups in the sample. Many of the companies in the sample are likely to have a single office and relatively low amounts of revenue. As a result, these companies will not be at the stage where creating more specialisation and division of labour is necessary, predisposing these companies to the other culture types. This may have been exacerbated by the descriptions in the OCAI pertaining to the hierarchy culture. For example, associating hierarchy with *bureaucracy* may have been detrimental, since *bureaucracy* often has negative connotations which are usually applied to large, established firms that have become “too big for their own good”. This is especially relevant considering that it was the CEOs giving their reflection on the companies they oversee. A regular employee may be more likely to identify their organization as bureaucratic compared to a CEO.

Secondly, the type of firms represented in the sample. Many of the firms are tech-based rather than being based in manufacturing. Therefore, the notions of standardized processes and precision are unlikely to apply to them, again making them more likely to identify with the other culture types. This points to a larger problem with the data collection, in that the questions in the OCAI present the culture types as quite limited in scope.

A third explanation for the findings may be that larger firms are more predisposed to be hierarchical. A larger firm may indicate a firm that has had some past success allowing them to expand. A successful firm may therefore put structures and rules in place to reinforce the principles and formula which gave them their past success. Previous studies have associated hierarchy with imitation (with the imitation of the processes that brought success (Naranjo-Valencia et al., 2011). However, these studies probably had access to much larger firms than this study, and the effect of hierarchy cultures on innovation may not be universally applicable to all firms regardless of size.

5.3 Discussion on Market Culture

The findings suggest a negative effect of market culture even though the coefficient is not statistically significant (0.05). Market culture has been associated with market orientation which has been found to be a positive determinant of product innovation. Adhocracy and Market cultures are both externally oriented which suggests that it is the difference in structure which results in contrasting effects of the two organizational cultures. In market cultures, the emphasis is on stability and control using targets and tangible objectives to motivate employees and drive performance.

A possible explanation for the negative impact of market culture may be due to the context. Finland and in particular Oulu has very strong R&D funding. Therefore, innovation in Finland may be driven primarily by R&D as opposed to market circumstances. The meta-analysis of Grinstein (2007) indicated that technology turbulence has an adverse effect on the relationship of market orientation and innovation consequences. Their findings also suggest that smaller firms are less able to utilise innovation driven market orientation. The mean company size in the sample was very low. With limited employees and resources, the ability to acquire knowledge on business environment may be limited. Companies participating in innovation funding schemes may be more inclined to utilise R&D as opposed to market orientation methods. The finding could also be a result of the design of the study: To calculate overall innovation scores, the respondent had to give their company ratings for each category based on the performance relative to their competitors. Respondents

that had higher averages for market culture may have been able to provide a more accurate reflection on their company's relative innovation performance. As mentioned before, a market culture is focused on achieving competitive advantage in the market, therefore an accurate reflection of the company's position in the marketplace is essential.

The implications of this study's finding are that a firm must understand its circumstances to understand which mindsets and attitudes to encourage for good innovation consequences. A start-up or small company may be better served with an adhocracy culture because that will allow them to focus their efforts towards developing their own ideas compared to gaining customer intelligence which could delay development of new products (Verhees and Meulenberg, 2004).

5.4 Discussion on Clan Culture

The findings indicate that the presence of clan culture has no impact on innovation in Finnish companies, and this supports the previous literature and research on the topic (Naranjo-Valencia et al., 2016). However, the finding may have been influenced by the nature of the sample. Consisting of mainly small companies with an average size of 13 employees, these companies may be more likely to resemble clan cultures since the employees would likely have access to one another, enabling a cooperative environment. This is consistent with Cameron and Quinn (1999) who assumed that companies generally start with a clan culture. Previous research has found clan culture to be positively associated with job satisfaction (Lund, 2003). Clan culture could have an indirect positive impact on innovation via job satisfaction (Niu, 2014).

5.5 Managerial implications

As mentioned before, the findings only support H1 therefore reinforcing the conclusions of the previous research. Innovation in companies tends to be more prominent when an adhoc culture of flexibility and adaptability is predominant.

However, a new suggestion provided by this study's findings is that the presence of the other culture types (particularly hierarchy and clan) do not influence innovation in the ways suggested by the previous research.

The findings indicate that managers should seek to develop a culture that emphasizes adaptability, flexibility, and orientation towards the future. However, these changes should be presented as an addition to the current organizational environment rather than substitutions for pre-existing modes of behaviour. For example, if a company has a predominant hierarchy culture, leaders should not attempt to immediately eliminate the hierarchical aspects of the organization because this is likely to be met with heavy resistance, and especially in companies that have had prior success. The reason for resistance is uncertainty: the employees may believe that the current way of doing things has brought success, so it follows that will also bring success in the future. This resistance will be stronger if the change agent cannot justify how the alternative will be better than the status quo. Therefore, the change agent should first introduce the new principles of adhocracy with minimal disruption to the hierarchical structure.
For example, a new department in the company could be created with the autonomy to develop ideas for the future. The performance of this new department can be compared with the pre-existing departments. If the adhocracy characteristics are bringing success, then this change can be instituted across the company.

Prior research has attempting to identify the characteristics of managers that successfully initiate organizational change. The concept of transformational leadership introduces a set of four factors which determines a leader's ability to initiate organizational change: *charisma*, *inspirational motivation*, *intellectual stimulation* and *individualized consolidation* (Bass and Avolio, 1995).

Charisma relates to the degree to which the followers identify with their leaders and want to emulate them.

Inspirational motivation pertains to the communication of high expectations from leaders to their followers, motivating them to become committed to their initiatives.

The most applicable factor in this context is *intellectual stimulation* which revolves around the leader's attempts to encourage followers to be creative and innovative (Northouse, 2004).

Previous research indicates that transformational leadership behaviors positively affect employees' creativity through the mediating factor of psychological empowerment. The main reason is that behaviors such as intellectual stimulation and individualized consolidation not only encourage creativity but also set an expectation of employees to apply creativity to come up with solutions for the organization (Gumusluoglu and Ilsev, 2009).

The ideal process of change will depend upon several characteristics: the size of the company, industry, and the business environment. For example, in the context of COVID-19, changing the company culture to adhocracy may be accelerated to ensure the company survives. The current pandemic was unforeseen and the restrictions it has imposed has made traditional business models obsolete. Therefore, the need for adaptability and flexibility within companies is now incredibly important to ensure the company survives through the twists and turns brought by COVID-19. COVID-19 has provided urgency to change which has been identified as a key determinant of successful organizational change (Armenakis, Harris and Mossholder, 1993; Kotter, 1995).

5.6 Limitations

While observing the findings, the ample limitations of the study must be considered. Firstly, the study was cross-sectional which means that it is difficult to establish a causal relationship between the organizational culture types and innovation. For example, an adhocracy culture could be the result of successful innovation rather than the cause. Beliefs and attitudes of a company become predominant after being consistently validated by experience (Schein, 1985; 2010). Therefore, a company that has experienced success with developing and commercialising novel product ideas will structure their organization to facilitate the generation and development of innovative

product ideas more readily. The relationship between organizational culture and innovation is likely to be more complex than a linear relationship of causality in any direction. This study and most of the prior research utilising the CVF have used cross-sectional methods measuring organizational culture and innovation as static variables. The complexity of the culture-innovation relationship cannot be observed through these methods. Therefore, future research should adopt a longitudinal design (using the same surveys) which would enable more causal inferences to be made (Bryman and Bell, 2007).

Secondly, while the findings indicate distinct effects of each of the culture types, the models have very little explanatory power with low values of R-squared and negative values for adjusted R-squared. This has an important implication: the CVF is not very effective for explaining innovation or/and there is significant sampling error. As mentioned earlier in this section, the non-random nature of the sample may have distorted the results of the study. The sample was proliferated with small companies, and primarily in the tech industry. Naturally, the descriptions for certain culture types may not have been applicable, based on the business context rather than the intrinsic nature of the company. For example, the mean scores for hierarchy culture were extremely low compared to the other mean scores for the other culture variables. Ideally, the sample should have consisted of a more equal distribution of culture predominance.

Another potential limitation for the research was the use of only one respondent per company, and the use of CEOs as respondents. The CEO may have not been best suited to give an accurate reflection of the organizational culture. For example, many of the descriptions for the hierarchical culture seemed to have more negative connotations compared to the descriptions for the adhoc culture. As a result, CEOs, as a prime representative of the company, may have given idealistic reflections as opposed to a realistic reflection of the company. This problem could be alleviated by using multiple respondents per company and then calculating the average values.

The use of questionnaires may have affected the convergent validity of the measures. Measurement of organizational culture and innovation were purely based on the respondent's subjective perception which may not reflect the actual organizational culture or innovation in the company. The use of questionnaires was the most convenient method in the context of COVID-19, however future research could also employ structured observation to see if the questionnaire responses are consistent with the observations made by the researcher.

The onset of the COVID-19 pandemic may make for an interesting case study in which the relationship between organizational culture and innovation can be observed in greater detail. As discussed before, the pandemic has likely caused significant changes in the organizational culture in companies, therefore it would be interesting to see how a company's innovation performance has changed. Causal inferences could be made, which is not possible using cross-sectional research.

The literature on the topic up to this date does not consider the complexity of large organizations. These organizations are likely to have sub-cultures which are organized by different departments or different demographic groups within the organization (Hofstede, 1998). Therefore, the challenge is to identify which subculture within the organization is the most influential and predominant.

5.7 Suggestions for future research

Some suggestions for future research have been provided in the previous section, but they are discussed here in more detail. Also new suggestions are provided.

Future research could be better served using a longitudinal design (using the same surveys) which would enable more causal inferences to be made (Bryman and Bell, 2007).

Future research into organizational cultures should explore alternative theories to the CVF. For instance, Dobni (2008) was one of the first to develop an empirically based

measure of innovation culture which consists of four main dimensions. They interviewed and took survey responses from 282 employees in the financial services industry. The four dimensions: Innovation intention, innovation infrastructure, innovation influence and innovation implementation. These four dimensions had been identified by previous researchers as important determinants of an organization's overall innovativeness. This measure of innovation culture overlaps with the CVF, but the structure takes more account of the complexity of organizational culture whereas the CVF is simplistic.

Furthermore, follow-up research should be conducted to address Hartnell's (2011) findings of mutual dependence amongst the different culture types. Utilizing a model of complementary rather than competing values may result in a more accurate reflection of the organizational culture- innovation relationship.

Most importantly, future research should focus on identifying managerial strategies to develop cultures facilitating innovation. The strand of literature relating to change management has rarely been applied to innovation. This would have to involve ethnographic research e.g., case studies, to understand how organizations have transformed their structures and attitudes to be more successful at innovation. This would effectively bridge the gap between theory and practicality.

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