

RELATIONSHIP BETWEEN CULTURAL
DIVERSITY AND INNOVATION
PERFORMANCE IN EUROPEAN UNION
COUNTRIES

Abstract

| | | |
|---|--|--------------------------|
| Author(s) Lavi, Miro | Type of publication Bachelor's thesis | Published Spring 2019 |
| | Number of pages 70 pages, 5 pages of appendices | |
| Title of publication Relationship between cultural diversity and innovation performance in European Union countries | | |
| Name of Degree Bachelor of Business Administration, International Trade | | |
| Abstract <p>This study explores the cultural diversity and innovation performance among the 28 European member countries. The study was conducted with three goals in mind. The first one was to identify whether there was an existing linear relationship between the countries' cultural diversity and innovation indicators. The second goal was to examine if there was a linear relationship between the changes in cultural diversity and the changes in the innovation indicators over time. The third goal was to investigate if foreigners' different occupational groups had a linear relationship to innovation performance.</p> <p>This study is divided into two sections: theoretical and empirical. The theoretical part of the study consists of two parts, in which the terms innovation and cultural diversity are introduced and discussed. The empirical part demonstrates the results, which are divided into the descriptive statistics and the correlation analyses.</p> <p>The data used in the study were comprehensively collected from secondary sources: the databases of Eurostat and Statistics Finland. The study was conducted using quantitative methods and the analyses were performed by IBM SPSS version 25.</p> <p>The results of the study identified a moderate positive correlation between greater cultural diversity and better innovation performance. In addition, change in cultural diversity and change in the "in-house" innovations of the small and medium-sized enterprises indicated a very weak positive correlation between 2010 and 2016. The results were statistically significant. Concerning the foreigners' occupational groups and innovation performance, the results identified a strong positive correlation among the relative change of foreign managers and increase in intellectual properties. However, the P-value was too high, which made this result statistically insignificant.</p> | | |
| Keywords Innovation, Diversity, Cultural, Correlation | | |

Tiivistelmä

| | | |
|--|--|-------------------------|
| Tekijä(t) Lavi, Miro | Julkaisun laji Opinnäytetyö, AMK | Julkaistu Kevät 2019 |
| | Sivumäärä 70 sivua, 5 sivua liitteitä | |
| Työn nimi Monimuotoisen kulttuurin ja innovaatiokyvyn suhde Euroopan Unionin maissa | | |
| Tutkinto Tradenomi (AMK), Kansainvälinen kauppa | | |
| Tiivistelmä <p>Tämä opinnäytetyö käsittelee kulttuurillista monimuotoisuutta ja maiden innovaatiokykyjä 28 Euroopan Union jäsenmaan kesken. Työ koostui kolmesta päätaivoitteesta. Ensimmäisenä oli tarkoitus tunnistaa onko kulttuurillisella monimuotoisuudella ja innovaatioindikaattoreilla yhteyttä. Toisena tavoitteena oli tutkia, onko kulttuurillisen monimuotoisuuden muutoksen ja innovaatioiden muutoksen välillä suhdetta ajan kuluessa. Kolmantena tavoitteena oli ymmärtää Suomessa asuvien ulkomaalaisten eri ammattiryhmien suhdetta innovaatiokykyyn.</p> <p>Tämä tutkimus on jaettu teoreettiseen sekä empiiriseen osaan. Teoreettinen osa koostuu kahdesta osasta, jossa termit innovaatio sekä kulttuurillinen monimuotoisuus selitetään. Empiirinen osa esittelee työn tulokset, jotka ovat jaettu deskriptiivisiin tilastoihin sekä korrelaatioanalyysiin.</p> <p>Työssä käytetyt tilastot ovat toissijaisista lähteistä, peräisin Eurostat:n sekä Tilastokeskuksen tietopankeista. Työ toteutettiin kvantitatiivisena tutkimuksena ja tilastolliset analyysit tehtiin IBM SPSS versiolla 25.</p> <p>Tulokset osoittivat kohtalaisen positiivisen korrelaation suuremman kulttuurillisen monimuotoisuuden ja paremman innovaatiokyvyn välillä. Lisäksi, muutos kulttuurillisessa monimuotoisuudessa ja muutos pien- ja keskisuurten yritysten sisäisissä innovaatioissa korreloi positiivisesti erittäin vähän vuosien 2010 ja 2016 välillä. Tulokset olivat tilastollisesti merkittäviä. Koskien Suomessa asuvien ulkomaalaisten ammattiryhmiä ja innovaatiokyvykkyyttä, työssä tunnistettiin vahva positiivinen korrelaatio ulkomaalaisten johtajien suhteellisessa muutoksessa ja immateriaalioikeuksien muutoksessa, mutta P-arvo oli liian korkea, joka teki tuloksesta tilastollisesti epämerkittävän.</p> | | |
| Keywords Innovaatio, Monimuotoisuus, Kulttuuri, Korrelaatio | | |

CONTENTS

| | | |
|-------|---|----|
| 1 | INTRODUCTION | 1 |
| 1.1 | Research background..... | 1 |
| 1.2 | Thesis objectives and research question | 2 |
| 1.3 | Theoretical framework | 2 |
| 1.4 | Study limitations | 4 |
| 1.5 | Research methodology and data collection | 5 |
| 1.6 | Thesis structure | 6 |
| 2 | INNOVATION | 8 |
| 2.1 | Discovery, invention and innovation..... | 8 |
| 2.2 | Types of innovations..... | 10 |
| 2.3 | Matter of innovation | 12 |
| 2.4 | Intellectual property rights..... | 13 |
| 2.5 | Innovations in the European Union | 15 |
| 2.5.1 | SME innovators | 16 |
| 2.5.2 | Intellectual property | 17 |
| 2.6 | Innovation performance in Finland..... | 18 |
| 2.6.1 | SME innovators | 19 |
| 2.6.2 | Intellectual property | 20 |
| 3 | CULTURAL DIVERSITY | 21 |
| 3.1 | Defining diversity | 21 |
| 3.2 | Advantages and disadvantages..... | 23 |
| 3.3 | Migration..... | 24 |
| 3.3.1 | Migrants in the EU | 24 |
| 3.3.2 | Foreign workforce..... | 26 |
| 3.3.3 | The foreign workforce in Finland..... | 28 |
| 3.4 | Previous studies concerning cultural diversity and innovation | 29 |
| 4 | EMPIRICAL RESEARCH..... | 31 |
| 4.1 | Empirical research and data analyses | 31 |
| 4.2 | Introduction of the data | 31 |
| 4.3 | Descriptive statistics | 34 |
| 4.3.1 | EU28 and the six innovation indicators in 2016..... | 34 |
| 4.3.2 | EU28 natives and foreigners in 2016 | 35 |
| 4.3.3 | Foreign diversity and innovation indicators between 2010 and 2016 | 36 |
| 4.3.4 | Changes of foreigners by occupational groups and genders in Finland | 38 |

| | | |
|-------|--|----|
| 4.4 | Correlations | 40 |
| 4.4.1 | Foreign population, foreign workforce and innovation indicators | 41 |
| 4.4.2 | EU28 change of foreign population, foreign workforce and innovation indicators between 2010 and 2016 | 45 |
| 4.4.3 | Foreigners' occupational groups, genders and innovation performance in Finland | 47 |
| 4.5 | Discussion of the results | 52 |
| 5 | CONCLUSION | 55 |
| 5.1 | Answers to the research questions | 55 |
| 5.2 | Validity and reliability | 56 |
| 5.3 | Suggestions on further research | 57 |
| 6 | SUMMARY | 59 |
| | REFERENCES | 60 |
| | APPENDICES | 1 |

1 INTRODUCTION

1.1 Research background

It is generally accepted fact that the mobilisation of people has increased over the years. While reasons for mobility may vary, it can be stated that the high movement of people creates challenges and opportunities for societies around the world. New ideas, connections or new ways of behaviour may spark in culturally pluralistic societies. On the other hand, if foreigners' adaptation to society and to cultural norms fail, it may lead to inequality, hatred, racism or problematic communities. Above all, the movement of people has significantly shaped the living environment of people throughout history and will do in the future. (Keeley 2009, 3-15.)

Another factor that is shaping life around people are innovations. It can be argued that the ancestors of human beings could not have predicted or even imaged the life people are living today. Inventions of money, democracy, engines, medicines or laws have led to radical innovations that have shaped the life that people are living today. Still today, there is a high need for new innovations to overcome major challenges such as climate change, terrorism, and poverty to mention few. (Hamel 2010, xix.)

It goes without saying that these topics are extensively studied over the years. Governments and policymakers aim to overcome the challenges and gain benefit from cultural diversity. At the same time, companies compete in global markets, where new innovations are pursued to gain competitive advantage. (Keeley 2009, 86-87; European Commission 2019a.) Many large companies aim to hire a more diverse workforce to have different perspectives and new ideas (Nike 2019; Microsoft 2019). It is commonly suggested that there is a link between greater cultural diversity and more creativity (Keeley 2009, 3).

In recent years there has been increased interest to identify cultural diversity and its impact on innovation performance. However, the results are controversial. As Stahl, Maznevski, Voigt, and Jonsen (2010, 699-701) concluded that cultural diversity tends to increase task conflicts and reduce the social interaction among the team members but also increases the creativity that mitigates the previously mentioned disadvantages. Previous researches concerning cultural diversity and innovation performance have tended to focus on team, company or regional level. However, a clear impact between cultural diversity and innovation performance still remains as a question.

1.2 Thesis objectives and research question

The purpose of this study is to examine the relationship between cultural diversity and innovation performance among the 28 countries in the European Union (EU28). Characteristics and changes of cultural diversity and innovation performance are analysed and measured. In addition, the aim is to understand which innovation factors, if any, have a linear relationship between cultural diversity or changes in cultural diversity.

Finland is studied more in-depth to understand if certain attributes of the foreign workforce have a linear relationship with innovation performance. Foreign workforce and its characteristics such as occupational status and gender distribution are described and then analysed against innovation indicators.

Hence, the main research question is:

1. Is there a linear relationship between cultural diversity and innovation performance?

To answer the research question, the five following sub-questions are used:

- a) Is there a linear relationship between countries' cultural diversity and innovation indicators in EU28 in 2010?
- b) Is there a linear relationship between countries' cultural diversity and innovation indicators in EU28 in 2016?
- c) Is there a linear relationship in changes of countries' cultural diversity and innovation indicators between 2010 and 2016?
- d) Is there a linear relationship between changes in foreigners' occupational groups and innovation indicators in Finland?
- e) Is there a linear relationship between changes in foreigners' occupational groups among genders and innovation indicators in Finland?

Throughout these questions, this study aims to identify the relationship between cultural diversity and innovation performance from a sociological perspective rather than individual or company level.

1.3 Theoretical framework

According to OECD & Eurostat (2018, 20, 77), it is possible and important to measure innovation. By adding common reference points for novelty and utility, innovation is

comparable, and its utilization is quite objective. OECD & Eurostat have published Oslo Manual 2018, which aims to clarify the multidimensional nature of innovation and states that the key components of innovation are knowledge, novelty, utility and value creation or the presumed goal of the innovation. While the value creation is subjective and varies a lot between firms, it can be difficult to identify what is innovation and what is not. Therefore, additional data such as economic benefit or the novelty may be helpful in the interpretation of innovation.

European Union produces yearly an extensive innovation study from 36 countries around and near the European continent. In 2018, it consisted of 21 innovation indicators, which were categorised in four different types; framework conditions, investments, innovation activities, and impacts. (European Commission 2018a, 8.) However, in this study, only the 28-member countries will be analysed. In addition, the focus is on already introduced innovations. Therefore, the author chose six innovation indicators from the innovation activities, which can be seen in Table 1 below.

Table 1 The chosen innovation indicators (European Commission 2018c, 8)

| |
|---|
| 3.1.1 SMEs introducing product or process innovations as % of SMEs |
| 3.1.2 SMEs introducing marketing or organisational innovations as % of SMEs |
| 3.1.3 SMEs innovating in-house as % of SMEs |
| 3.3.1 PCT patent applications per billion GDP (in PPS) |
| 3.3.2 Trademark applications per billion GDP (in PPS) |
| 3.3.3 Design applications per billion GDP (in PPS) |

The innovation indicators 3.1.1, 3.1.2 and 3.1.3 represents the new introduced innovations by small and medium-sized enterprises (SME). The first factor, 3.1.1 represents a percentage of SMEs that introduced at least one product or process innovation. Here product innovation means a significantly improved product that increased its capabilities, components, sub-systems or user-friendliness. Process innovation means a significantly improved distribution method, supporting activity or production process. The second factor, 3.1.2 represents a percentage of SMEs that introduced at least one organisational or marketing innovation. Organisational innovation refers to new innovations in business practices when marketing innovations refer to the implementation of significantly improved marketing strategy or concept. The third factor, 3.1.3 represents in-house innovations, which refers to new or significantly improved product or production processes that have

been innovated by themselves or in co-operation with other enterprises or organisations. (European Commission 2018c, 7-8.)

Innovation indicators 3.3.1, 3.3.2 and 3.3.3 represent applications of intellectual properties. The fourth indicator 3.3.1 consists of patent applications at international phase concerning the European Patent Office (EPO). The fifth indicator 3.3.2 indicates the applications of trademarks to the European Union Intellectual Property Office (EUIPO) or World Intellectual Property Office (WIPO). The sixth indicator 3.3.3 design applications represent any handicraft or industrial product that concerns its appearance. (European Commission 2018c, 9.)

Concerning the cultural diversity, Farkas (2017, 9-10) states that “the definitions of racial and ethnic origins are complex”. Measuring ethnicity in the European Union is challenging because it is prohibited in the data protection directive. There are some exceptions, which make it possible, but difficult. As stated in the Principles and Recommendations for Population and Housing Censuses by United Nations (2007, 284) “depending on national circumstances, cultural diversity may be measured by language spoken in the home or community, religion and national and/or ethnic group”.

For these reasons, the author focuses on first-generation migrants and foreign-born populations, which reflects the cultural diversity in this study. The author argues that this group of foreigners is least adapted to the native culture since they have not acquired citizenship or might not have had education in these countries they are living in. In addition, all the population data that will be analysed in this study concerns the age group between 15 and 64 years old. This age group represents the most productive age group since it does not account the retirees and children.

1.4 Study limitations

There are some limitations concerning this study, which are mainly regarding the data availability of innovation indicators and the measurement of cultural diversity.

The European innovation data pilot launched in 2000 and since then the innovation data has been published yearly. However, in some cases, the data from 2010 is non-comparable to previous releases, because of the increased number of the innovation indicators and differences in data gathering methods. (European Commission 2011, 7-11.) All the 28 European countries were included in the study, even though there were some countries that did not have comprehensive data concerning all the six innovation indicators. Missing cases were reported and taken into account on the analyses. Indicators concerning SMEs' innovations (3.1.1, 3.1.2, 3.1.3) are published only every second year, which creates a

data limitation to perform a deeper analysis of Finland. Therefore, the focus is on intellectual properties (3.3.1, 3.3.2, 3.3.3) concerning the analyses of foreigners' occupational groups and representation of foreigners by gender in Finland.

Another limitation concerning this study relates to native citizens from different cultural backgrounds. This group of citizens would increase the overall cultural diversity of the countries, but as mentioned, it would be very challenging to measure. For this reason, the results should not be reflected to represent the countries' cultural diversity as a whole.

Research and development (R&D) is a part of a business or organisation that aims to find ways to enhance existing products and to develop new ones (Cambridge Dictionary 2019). However, the R&D is not limited to products but can include acquiring new knowledge without any particular goods in mind. In addition, R&D may rely on existing knowledge, which is directed to producing new goods, services, processes, systems or to substantially improve already existing ones. Companies, organisations, and governments participate often to these R&D activities, which is a systematic method to increase knowledge that could be turned to new discoveries or inventions. (OECD 2019.)

R&D is part of investment activities and significant factor and a method to come up with new discoveries or inventions (European Commission 2018a, 8). However, in this study, the focus was in already introduced innovations, and therefore R&D or other investment activities were not included in this study. For the same reason, financial activities and regulations were not considered relevant to this study.

Despite these limitations, this study will provide understanding whether the first-generation foreigners, which represents probably the least culturally adapted group of people, have a linear relationship to innovation performance.

1.5 Research methodology and data collection

There are two ways to approach reasoning in a study, deductive and inductive method. In the deduction approach, the reasoning is based on the previous theories or studies, which are then tested in order to verify the findings or new insights. The inductive method is the opposite of the deductive, where a theory is drawn from collected data. (Adams, Raeside & Khan 2014, 9-11.) This study uses a deductive analysing approach.

When the numerical terms represent the outcome of the study it is then called a quantitative method (Krishnaswami & Satyaprasad 2010, 5). Quantitative statistics can be powerful to come up with a greater understanding of different aspects of society. It is more than just summarising the numerical facts, it can be a strong tool for persuasion. Especially the

population statistics can provide important information or significant insights for society. (Walter & Andersen 2016, 7.) This paper approached the study through the quantitative research methods since it is more relevant when measuring the differences and relationships between cultural diversity and the innovation factors.

The correlation coefficient is a statistical analysis that provides an understanding of the relationship and the strength of the relationship between two or more variables. It does not indicate whether the possible correlation is caused by each other, so it is different from causation. (Chikkodi & Satyaprasad 2009, 12.1-12.2.) In this study, when the chosen innovation indicator scores are based on the individuals and businesses of part of the society, it would be irrelevant to study whether the changes in cultural diversity causes the changes in innovation scores with only two variables. Therefore, the correlation analysis is the most relevant method to understand if there is a linear relationship between the variables. The author performed the analyses with the IBM SPSS version 25.

The data used in this study was comprehensively from secondary sources. Data was collected from the reliable sources of the databases of Eurostat and Statistics Finland. The author used four datasets in the study. The first dataset represented the countries' innovation performance. The second and third dataset concerned the demographics in Europe. The fourth dataset provided more in-depth information about foreigners' occupational groups in Finland. The data is introduced in the empirical part of the study.

1.6 Thesis structure

The study consists of two main sections: theoretical and empirical. First, in the theoretical part innovation and cultural diversity will be discussed. Innovation is introduced, and its different aspects and related terms defined. In addition, the current situation of innovation performance in the European Union is demonstrated. Secondly, cultural diversity and its related terms are explained. Then previews of advantages and disadvantages of cultural diversity and current level of migration concerning the European Union countries are shown. The theoretical part ends with a discussion of previous studies concerning cultural diversity and innovation performance. In the empirical part of the study, the introduction of the data, descriptive statistics and correlation analyses will be covered. The empirical part ends to the discussion of the results. Lastly, in the conclusion part, the research questions are restated and briefly summarised. See the thesis structure in Figure 1.

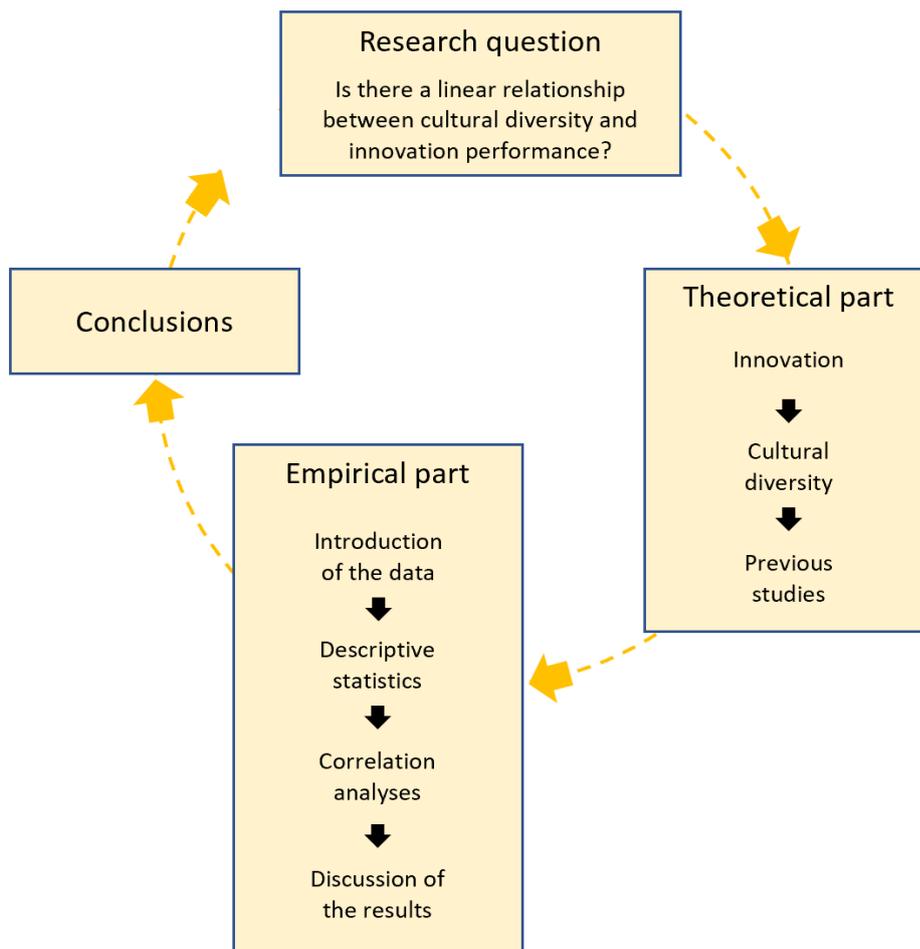


Figure 1 Thesis structure

2 INNOVATION

2.1 Discovery, invention and innovation

In the literature, there are many definitions for the word innovation. Many of these definitions share the same essence and agree on core terms, but the scope and the boundaries of the definitions vary. In the book, *Ten Types of Innovation: The Discipline of Building Breakthroughs*, is an argument that the word innovation has essentially lost its meaning, because of its overuse and the recurring use in the wrong contexts. The authors of the book argue that people often tend to confuse the outcome and the process, and “describe everything in breathless terms”. (Keeley, Nagji, Walters, Pikkell & Quinn 2013, 4.) While this is quite a generalised statement, OECD & Eurostat (2018, 20) agrees that the concept of innovation is quite subjective. Therefore, in this chapter innovation will be introduced and explained, but first, the terms discovery and invention need to be defined and distinguished.

Discoveries can be described to be findings of new novel material or processes that have not been known before. Discoveries can happen accidentally or intentionally. Accidental discoveries may arise through a mistake in a manufacturing process or through a random observation of an event. Intentional discoveries are more a result of some actions, such as material- or method-led testing, which can be described to be a systematic way to approach discoveries. Modern drug research can be an example of this kind of phenomenon, where new compounds are produced by modifying existing drugs and then testing against pathological problems. Another way to come up with intentional discoveries is to approach problems themselves and seek suitable solutions for them. (Bourriau, Phillips & Phillips 2012, 2-3.)

Bourriau et al. (2012, 2) define that inventions are unique creations of the goods that are often derived from the discoveries and it is a novel product. Lane and Flagg (2010) state that invention is more than the product. It is unique and not previously demonstrated knowledge or an idea that is doable and possible if taken into the practice. To distinguish inventions from discoveries, inventions can be described to be more tangible than discoveries. As listed in the European Patent Convention (2016, 108), Part 2, Chapter 1, Article 52;

discoveries, scientific theories, mathematical methods, aesthetic creations, schemes, rules and methods for performing mental acts, playing games or doing business, programs for computers or presentations of information shall not be regarded as inventions.

Discoveries and inventions play a critical role when coming up with innovations. Keeley et al. (2013, 5) define that “innovation is the creation of a viable new offering”. More specifically, innovations go beyond products and can encompass new systems of products and services, new interactions and engagements between organisation and customer, but also guide towards a new way of doing business. Most of the innovations are based on previous advances that are new to markets or industries rather than completely new to the world. Moreover, the innovation must sustain itself and return value to an organisation.

Talukder (2014, 9) supports Keeley’s et al. (2013) definition and states that an abstract idea that cannot be compounded into the daily activities of organisation should not be considered as an innovation. He continues that innovation is a new or significantly improved idea, system or technology that can be adopted by individuals or organisations to improve performance, efficiencies of activities or to create added value in an organisation. Organisation of Economic Co-operation and Development (OECD) defines that innovations are improved goods, services or processes, where an idea is turned into value (OECD 2010a, 12).

Below Figure 2 illustrates the stages of innovation. Discovery, a new finding that may lead to an invention, which can be described to be the application. Then this application may lead to a diffusion, which is then called innovation.

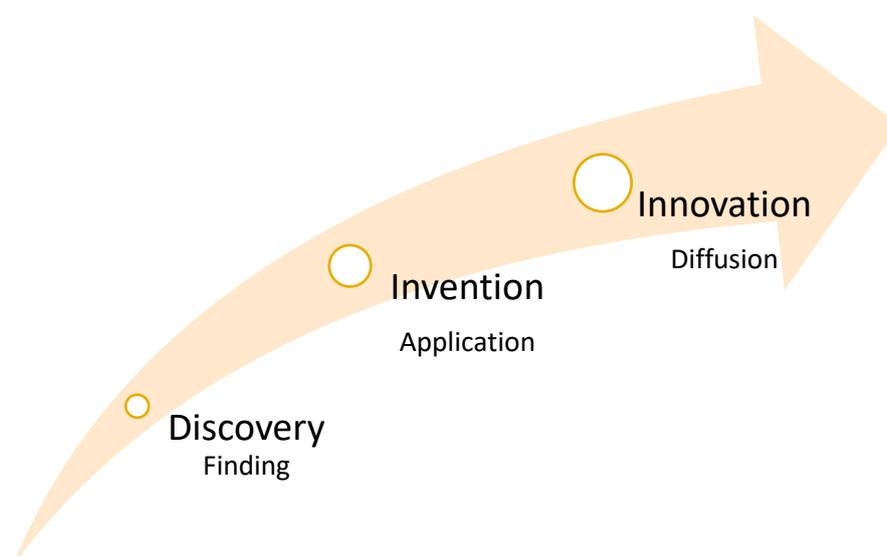


Figure 2 The process of technological change (Bourriau et al. 2012, 2)

Coming up with good discovery or invention does not guarantee that it leads to innovation. Lorem Graham (2013, 99, 161), a scientific historian, wrote about Russia’s inability to commercialise its products, despite great scientific history and technical inventions. He states that Russia’s problems are not technical, but societal problems. He adds that in

technology, often coming up with the invention itself is not the difficult part, but to find and understand the market to gain commercial success from it.

To shortly sum up the terms. Discoveries are new findings that can happen intentionally or accidentally. From commercial perspective, discoveries do not fail or succeed, discoveries are just found. Inventions are new, unique and doable knowledge or creation that have not existed before. Lastly, innovations are doable and significant improvements that generate added value, which are not necessarily new inventions.

2.2 Types of innovations

Since there are many explanations and definitions for the term innovation, it can be classified and categorised in multiple ways. Classification can be based on the drivers of innovation that can be markets, technologies, design or users for example. In addition, classification can be based on the products, services, processes, organisations, business models, systems or intensity of innovation. (Norman & Verganti 2014, 82.)

In the Oslo Manual 2018, OECD and Eurostat categorise different types of innovations as; product-, process-, organisational- and marketing innovations. Product innovations stand for goods and services, which includes knowledge-capturing products that are products that disseminate, communicate or store information. (OECD & Eurostat 2018, 75; European Customs Portal 2019.) Process innovations stand for production, logistics, and distribution, but also information and communication systems. Organisational innovations concern the administration and management when marketing innovations are related to sales and marketing. (OECD & Eurostat 2018, 75.)

Another common way of categorisation is vertical and horizontal innovations. This indicates which industry or market the successful outcomes are affecting. Concerning product development, vertical innovations mean when the quality of the good(s) is significantly improved. This is a common form of innovation and it aims to maximise the quality of the product often in a certain industry. On the other hand, horizontal innovations expand the variety of goods often across markets. (Grossmann & Helpman 1993, 43-44.)

Horizontal innovations are born from the cross-industrial transfer of knowledge or technology that creates new innovations in another industry (Phipps 2017). Phipps (2017) gives an example of the horizontal innovation between Formula 1 and neonatal care industry, where the Greater Manchester Neonatal Transport Team at St Mary's Hospital Manchester participated in a project to study how the ambulance transportations' G-forces, speed, and vibrations affect critically ill babies' heart rates and blood pressure by using "race-bred" data logger in a transport incubator. This highly important information is then used to

create technological improvements in the design of ambulances and incubators to better protect babies' lives. (Phipps 2017.) This is a great example of possible horizontal innovation, but Phipps (2017) does not provide information, whether the results of the study led to innovation and significantly enhanced the transportation of critically ill babies. However, it is a great example to gain an understanding of horizontal innovation.

The third example of categorisation demonstrates the impact of the innovation. It is often divided into incremental and radical innovations. Incremental innovation is a more common form of innovation and achieved by many companies. It increases value to the customer in the existing markets and utilises already existing technology. For example, it can include new or even removed features to existing products or services to enhance customers experience, improve efficiency or performance. (Lopez 2015.) Norman and Verganti (2014, 82) define that incremental innovations are "improvements within a given frame of solutions", basically meaning doing better than already done.

Radical innovation is a greater form of innovation and affects the whole industry. It can create, transform or end current industries and involves generating revolutionary technology. (Lopez 2015.) Most of the attempts towards radical innovations fail and successful implementations occur rarely. The difference between incremental- and radical- innovation is whether innovation is achieved by continuous modification of previous practices or by totally new and unique discontinuous practice. (Norman & Verganti 2014, 82.)

Below, Figure 3, depicts the incremental and radical innovation in the field of product development. A to B illustrates the incremental innovation, where development occurred to an existing product. Then, B to C illustrates the transformation of the product to the potential transition to radical innovation. Lastly, C to D illustrates the radical innovation. (Norman & Verganti 2014, 79.)

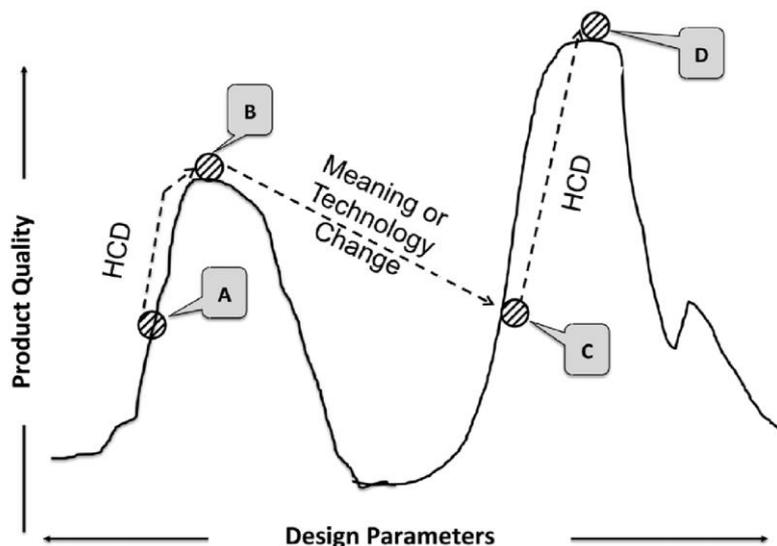


Figure 3 The hill climbing paradigm (Norman & Verganti 2014, 79)

By all means, innovation is a broad concept that can be categorised in multiple different ways. These previously mentioned examples of categorisations of innovations were most relevant for this study, and they should not be considered a comprehensive list of categorisations of innovation. In the next subchapter, the matter of innovation will be discussed.

2.3 Matter of innovation

Innovations can significantly change or transform the living environment. When innovations do occur, they tend to expand from unknown to widespread in a short period of time. In history, time periods such as bronze and iron age are named to refer to the innovations regarding the use of these materials that changed the societies at that time. (Bourriau et al. 2012, 1.)

In today's world, societal problems such as climate change, poverty or food security are dependent on new innovations and international co-operation (OECD 2010b, 17). Innovations may significantly increase the well-being of people, improve inequality or provide treats or cures for major diseases or injuries for example (Fong & Harris 2015; Garden, Bowman, Haesler & Winickoff 2016). Basically, innovations can change or improve any aspect of life. However, it is not always evenly distributed to everyone. A study that was conducted in Canada between 1996 and 2006 found that innovations increase wage inequality, which means the profits of the innovations are not distributed evenly. (Breau, Kogler & Bolton 2014, 359.) This means that when innovation may be an improvement for some, it may be disadvantageous for others, especially in the business world.

Since innovations tend to lead to change and greater financial success, they are greatly desired targets for entrepreneurs, corporations, countries and policy makers. Corporations are investing significant sums of money and resources to achieve new innovations. Policy-makers in the European Union try their best to implement supportive programs, enhance policies and reduce unnecessary regulations for better innovation environment (European Commission 2019a.)

Innovations are a significant factor for companies and countries competitiveness. In fact, it is one of the key factors of European Union's competitiveness in the global economy. Industry accounts over 80% of Europe's exports and new growth opportunities come from technological breakthroughs, new processes, and business models, but also from non-technological and service related innovations. (European Commission 2019a.) Wijnberg (2004) states that innovative products and services are essential for companies, especially when they compete in an environment where change is continuous and unpredictable (Wijnberg 2004, as cited in Varoglu & Köker 2009, 46).

Antonio Minniti re-examined the Schumpeterian paradigm (1942) that stated that higher competition induces fewer incentives to research activities which harm technological process and economic growth. Minniti examined the relation between product market competition and leading-edge growth when horizontal and vertical innovations can simultaneously occur. He found a positive effect between the variables and therefore stated that the Schumpeterian paradigm does not hold. (Minniti 2007, 131-141.) From this, it can be concluded that product market competition can accelerate innovation activities that can lead to economic growth.

2.4 Intellectual property rights

When companies and governments are pursuing new innovations by investing significant sums of money and resources, there needs to be some regulations that cover the investors for the risks they have taken. Intellectual property rights (IPR) can be explained to be an agreement between an inventor and government. It aims to cover inventors by providing protection that prevents others to copy the goods or services that are being invented or created. The invention does not hold any marketable value unless the inventor alone can use the idea. Therefore, IPRs provide a monopoly position for inventors to gain value against their effort for a certain period of time. (Shippey 2008, 1-2.) In addition, IPRs guarantee that the inventions or concepts are available for society's use after the coverage time (May & Sell 2005, 7).

Three most known IPRs are patents, copyrights, and trademarks (Shippey 2008, 2). Patents are agreements between the inventor and government to allow the inventor to have an advantage from an invented product or commercial services for a specific time. Usually, the more important the invention is for the society the shorter the coverage time will be. (May & Sell 2005, 7-8.) It prevents inventors' competitors, or anyone else, to make, distribute, import or sell the concept without the patent owner's permission (WIPO 2019a). Therefore, the patent provides value for the inventor for the effort, investments and risks it has taken during the research or implementation process (May & Sell 2005, 8). The main concept for the copyrights and trademarks is the same. Copyrights protect artistic work, such as architecture, movies, music or paintings. It protects tangible and original ideas typically 50 to 70 years after the creator's life. Trademarks are signs, symbols or phrases that are distinctive identifiers for businesses and their products and services. (Shippey 2008, 3.)

Counterfeiting is a problem that breaks the IPRs. It means that someone manufactures or distributes goods without the permission of the owner of the goods. (International Anti-Counterfeiting Coalition 2019.) Counterfeiting is not limited to smaller goods and can concern more expensive products such as medicines or motorcycles for example. It does not occur only in local industries and markets but has evolved to affect global business, when counterfeiters are exploiting free trade zones. Trade in fake and pirated materials and the growth of IPR thefts threatens innovative economies worldwide. While it hurts the companies and the economies that have invested in inventions that are counterfeited or copied, it also hurts the economy of the country where these occurrences happen by decreasing tax revenues and foreign investments. In addition, customers that use their money to such products might be under safety or product quality risks. (Osling 2010, 5.)

There are many organisations that are involved in IPR activities: World Trade Organization (WTO), World Intellectual Property Organization (WIPO), European Patent Office (EPO), United States Patent and Trademark Office (USPTO) etc. One of the activities of these organisations is to protect IPRs within different countries and in global markets. Globalising IPRs is an important task for the global economy to prevent counterfeiting and other IPR thefts. However, some countries are more involved than others, and therefore IPRs are not covered worldwide. (World Trade Organization 2019; WIPO 2019b; European Patent Office 2019; The United States Patent and Trademark Office 2019; Office of the United States Trade Representative 2018, 38.) Even though the IPRs may cover the value of inventions, there are still some disadvantages that IPRs causes.

IPRs may hinder the societal wellbeing or its development. For example, accessing important medicines that cure or relieve the symptoms of major diseases may be very difficult for people living in rural and poor areas, because of the pharmaceutical companies and their patents, which aims to secure their profits. (Glaser & Murphy 2010, 215.) In addition, there are some views that IPRs hinder the industrial development of developing countries. Therefore, some countries aim to keep IPR systems weak to stimulate the growth of technological firms. However, this argument is controversial. There are many economists that have published empirical evidence that stronger IPRs accelerate industrial development. (Wakasugi, Lakhwinder & Sukhpal 2017.)

2.5 Innovations in the European Union

Measuring innovation is possible and recommended, but the results are very dependent on which indicators are chosen. Global innovation index measures 80 different indicators when European innovation framework consists of 27 indicators (WIPO 2019c; European Commission 2018a, 8). Therefore, results vary significantly between different methods. Global Innovation Index ranks non-European countries in the following order: Switzerland, Singapore, United States, Israel, and Korea when European Innovation Scoreboard 2018 ranks South-Korea as first, then Canada, Australia, Japan and the United States. (Cornell University, INSEAD & WIPO 2018, xx; European Commission 2018a, 3-6.)

EU is a strong performer in incremental innovation and has a leading position in many major industries such as fashion, mechanical engineering, and pharmaceuticals. EU is sixth-best performer in global innovation and is catching up with other major countries such as the United States, Canada, and Japan. Policy makers are implementing supportive programs and investing heavily in innovation activities. (European Commission 2018a, 3-6.) EUR 100 billion is included in the European Union's budget to support the Horizon Europe program for the years 2021 – 2027 that is a continuation to the successful Horizon 2020 program, which aims to ensure the effectiveness of funding of R&D and innovation activities (European Commission 2019b).

European Union provides yearly an innovation performance analysis from its members and its regional neighbours. As mentioned, there are 27 indicators that are measured, with the purpose to assess national innovation systems and its relative strengths and weaknesses. (European Commission 2018a, 7; European Commission 2019c.) When inspecting innovation performance within the EU, there were 11 countries that were strong or leader innovators and 17 countries with modest or moderate innovators. See Figure 4 below.

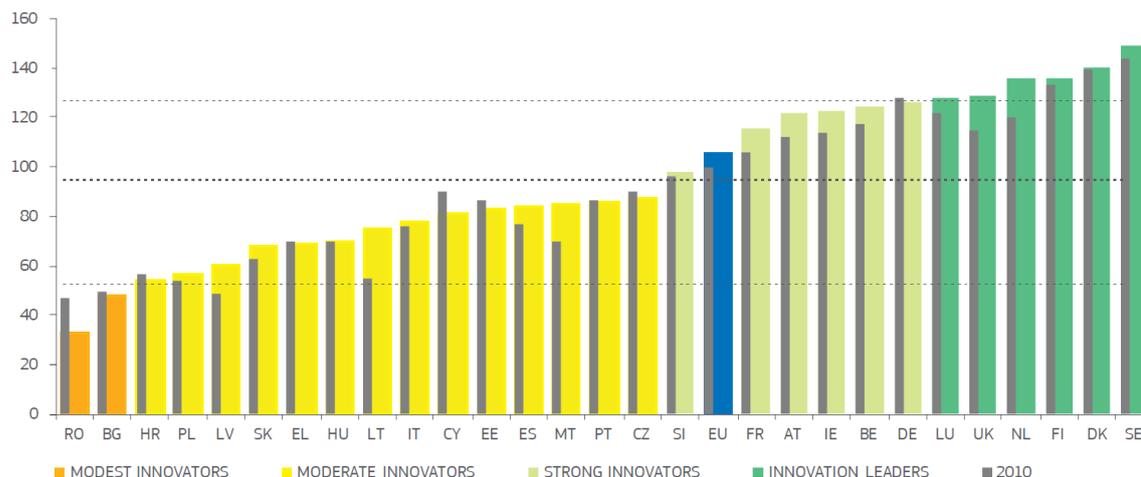


Figure 4 Innovative systems performance of EU member states (European Commission 2018a, 7)

Nordic countries (SE, DK, FI) were best performing innovators in EU, followed by Netherlands (NL), United-Kingdom (UK), Luxemburg (LU), Germany (DE) and Belgium (BE). The greatest growth from 2010 has Lithuania (20.1%), Netherlands (15.9%), Malta (15.2%) and United-Kingdom (14.0%). Most declined Romania (RO, -14.0%), Cyprus (CY, -9.2%) and Estonia (EE, -3.2%). (European Commission 2018b.) Geographically, North and West Europe performed better in the field of innovation compared to South and East Europe (European Commission 2018a, 1).

2.5.1 SME innovators

SME innovation performance consists of the SMEs introducing product or process innovations (3.1.1), percentage of SMEs introducing marketing or organisational innovations (3.1.2) and SMEs innovation in house, which represents the co-operation with other organisations or initial product or process innovations (3.1.3) (European Commission 2018a, 95).

Figure 5 below demonstrates SMEs that introduced product-, process-, marketing-, organisational- innovations or came up with initial innovations. It has decreased by 14% since 2010 in the EU. (European Commission 2018a, 23.)

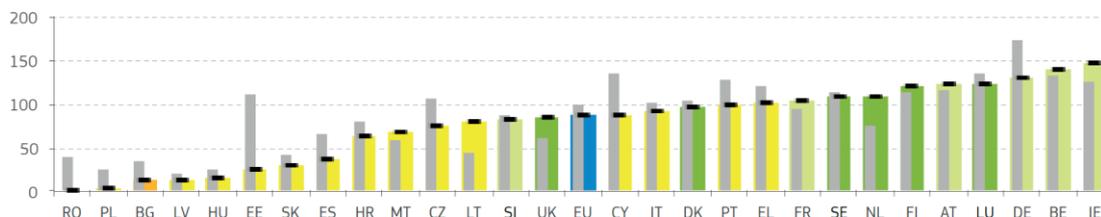


Figure 5 SME innovators (European Commission 2018a, 23)

SMEs in Ireland, Belgium and Germany introduced most of the innovations when Romania, Poland and Bulgaria were the weakest performers in this field. Lithuania, Netherlands, and the United Kingdom were best improvers. Cyprus and Germany decreased by over 40% when Estonia decreased by almost 90% since 2010. Product, process or initial innovations came from Belgium and Ireland and most of the marketing or organisational innovations came from Luxembourg and Ireland. Ireland was a strong performer in SMEs innovation activities and has improved in each field since 2010. (European Commission 2018b.)

2.5.2 Intellectual property

Intellectual property indicators consist of new design, patent and trademark applications per billion gross domestic product (GDP) (European Commission 2018a, 96). Intellectual assets have increased in 21 out of 28 countries since 2010 (European Commission 2018a, 24). See Figure 6 below that indicates the performance and the development of the intellectual assets by each member country.

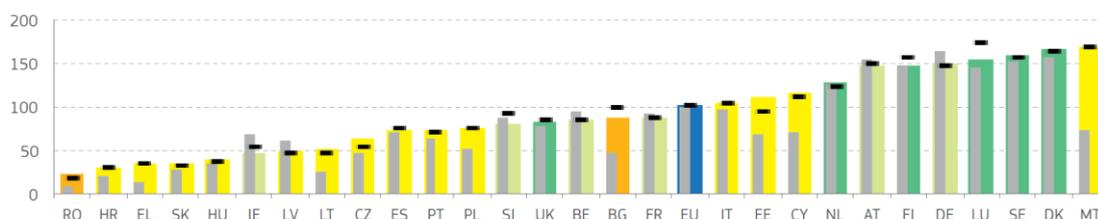


Figure 6 Intellectual assets (European Commission 2018a, 24)

Denmark and Sweden were in the top three, but a moderate innovator, Malta, has performed greatest in intellectual assets and had the highest growth since 2010. Malta performed especially well in design (1st) and trademarks (2nd). Romania and Croatia were keeping the tail in intellectual assets. Most of the patent applications were introduced by

Sweden and Finland when the least patents were introduced by Romania and Greece. (European Commission 2018b.)

2.6 Innovation performance in Finland

Finland is a strong performing innovation country. Globally, it is the seventh most innovative country based on the global innovation index 2017 (Cornell University, INSEAD & WIPO 2018, xx). European innovation scoreboard 2017 ranked Finland in the top three in Europe's innovation performance among Denmark and the innovation leader Sweden. In fact, these three countries have kept the top three positions since 2010. (European Commission 2018a, 7; European Commission 2018b.) Finland's innovation performance has grown yearly since 2010. Its strengths are in human resources, innovation-friendly environment, intellectual assets, and innovative SMEs. Weaknesses rely on innovation sales and exports, employment in fast-growing enterprises and non-R&D innovation expenditures. (European Commission 2018a, 75.)

Finland's population was about one percent of the population of the EU in 2017. Still, it was one of the greatest performing innovators globally. Table 2 shows a compact comparison of economy-, governance- and demographic- factors between Finland and the EU average in 2017.

Table 2 Structural difference between Finland and the EU in 2017 (European Commission 2018a, 75)

| | FI | EU |
|--|--------|--------|
| Performance and structure of the economy | | |
| GDP per capita (PPS) | 31,400 | 28,600 |
| Average annual GDP growth (%) | 2.4 | 2.2 |
| Employment share Manufacturing (NACE C) (%) | 13.5 | 15.5 |
| of which High and Medium high-tech (%) | 36.0 | 37.2 |
| Employment share Services (NACE G-N) (%) | 39.9 | 41.6 |
| of which Knowledge-intensive services (%) | 38.8 | 35.0 |
| Turnover share SMEs (%) | 39.8 | 38.0 |
| Turnover share large enterprises (%) | 44.9 | 44.4 |
| Foreign-controlled enterprises – share of value added (%) | 10.5 | 12.5 |
| Business and entrepreneurship | | |
| Enterprise births (10+ employees) (%) | 0.3 | 1.5 |
| Total Entrepreneurial Activity (TEA) (%) | 6.7 | 6.6 |
| FDI net inflows (% GDP) | 3.2 | 3.6 |
| Top R&D spending enterprises per 10 mln population | 71.9 | 19.7 |
| Buyer sophistication (1 to 7 best) | 4.6 | 3.7 |
| Governance and policy framework | | |
| Ease of starting a business (0 to 100 best) | 80.8 | 76.9 |
| Basic-school entrepren. education and training (1 to 5 best) | 2.3 | 1.9 |
| Govt. procurement of advanced tech products (1 to 7 best) | 3.9 | 3.5 |
| Rule of law (-2.5 to 2.5 best) | 2.1 | 1.2 |
| Demography | | |
| Population size (millions) | 5.4 | 510.1 |
| Average annual population growth (%) | 0.1 | 0.3 |
| Population density (inhabitants/km ²) | 110.9 | 117.1 |

Finland's overall performance was better compared to the EU average. Especially, the governance and policy frameworks were in favour of Finland. The ease of starting a business was higher compared to the EU average, but still, the enterprise births with more than 10 employees were significantly lower. In addition, the average annual population growth was three times lower for Finland than the EU. (European Commission 2018a, 75.)

2.6.1 SME innovators

SME innovation performance has decreased in the EU since 2010. However, Finland's SME innovation performance has increased by 9.4% since 2010. Figure 7 represents the development of SME innovation performance in Finland compared to EU averages.

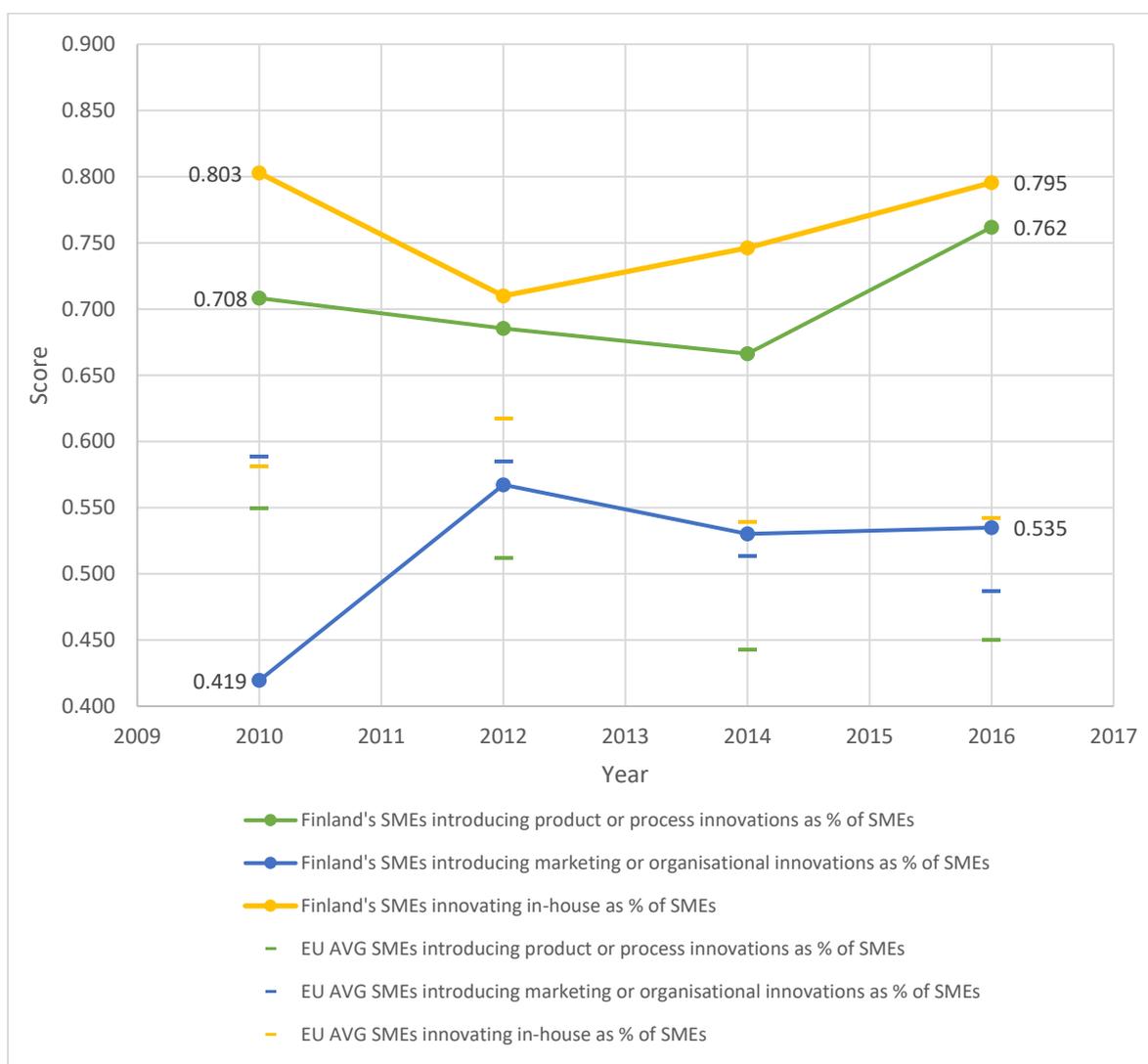


Figure 7 Innovators in Finland between 2011 and 2017 (European Commission 2018b)

Finnish SMEs have introduced more marketing and organisational innovations compared to 2010. Product and process innovations has decreased slightly from 2010 to 2014 but

then increased again in 2016, which led to 69.4% higher score compared to the EU average. In-house innovations dropped between 2010 and 2012 but then increased steadily, and the score is 46.7% higher compared to EU average in 2016. (European Commission 2018b.)

2.6.2 Intellectual property

In intellectual assets, Finland has 46.7% more intellectual property applications compared to the EU in 2017. Figure 8 depicts the development of Finnish intellectual asset applications compared to EU averages between 2010 and 2017.

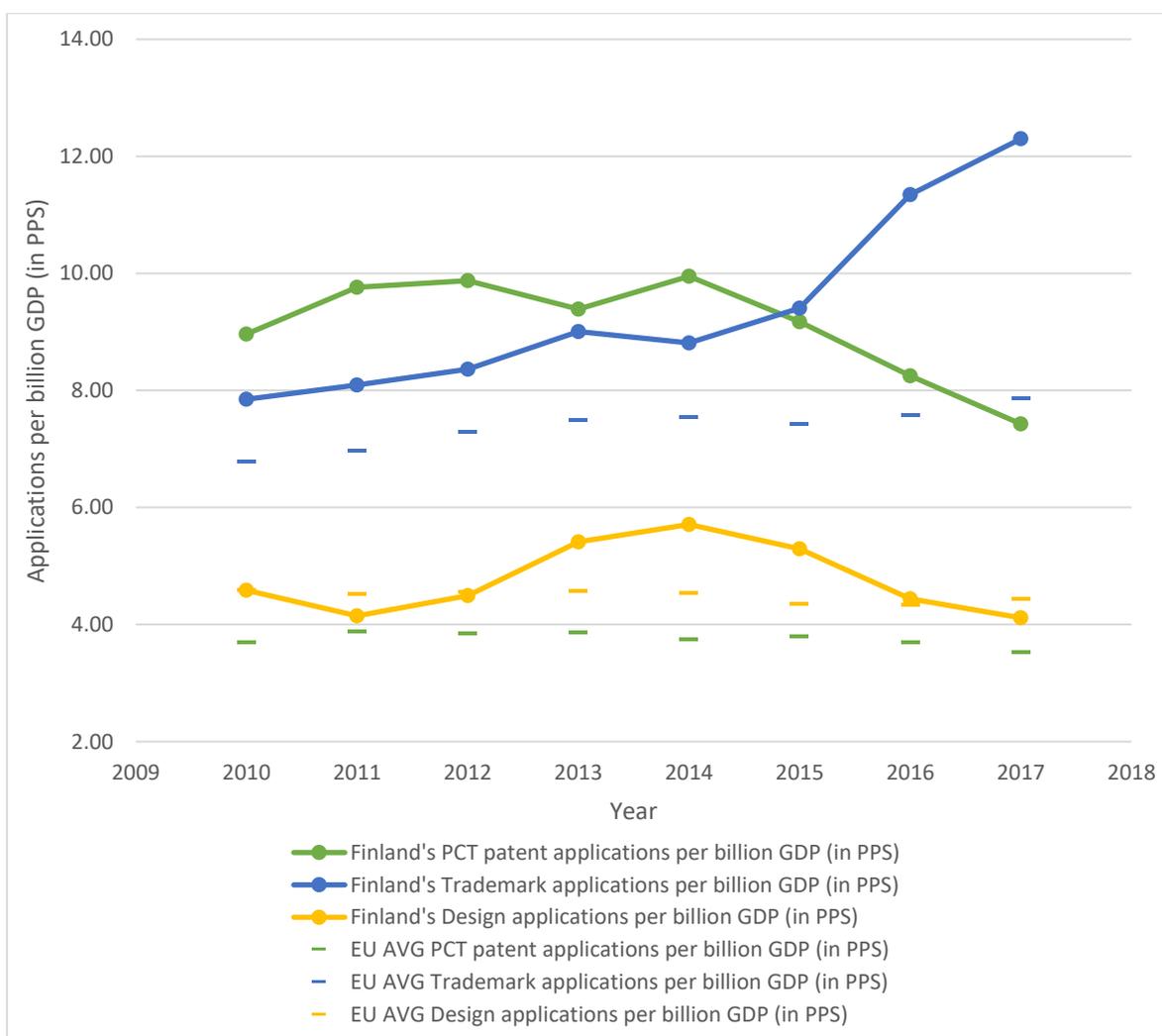


Figure 8 Applications of intellectual assets in Finland compared to EU averages between 2010 and 2017 (European Commission 2018b)

In Finland, trademark applications had the greatest growth, which increased by 57% from 2010. Patent and design applications have decreased since 2014. Patent applications were still greatly above EU averages when design applications were slightly below.

3 CULTURAL DIVERSITY

3.1 Defining diversity

Diversity as a word represents differences and similarities of any mixture of things. It is often compounded to emphasise the differences, but the critical distinction is that it applies just as strongly to similarities. Its' compounds are not limited to items and people but can concern concepts or abstractions. The given dimension is part of the diversity, which takes into account the collective mixture. Term "diversity" can be visualised to be a bowl of different colour gummy bears, where colour indicates the difference, candy the similarity and the bowl represents the given dimension. (Roosevelt 1996, 5-8.)

When moving the discussion from candies to people, there are identified six primary dimensions of diversity: age, gender, sexual orientation, physical ability, ethnicity, and race. Secondary dimensions include factors such as marital status, income, religion, personal habits, appearance, work or education experience. (Loden & Rosner 1991, as cited in Gardenswartz & Rowe 2003, 33.) Kapoor (2011) conducted a research review for The Hospitality Industry Diversity Institute (HIDI) to define the term "diversity". As a result, Kapoor (2011) affirmed The Diversity Task Force's (2001) definition "all characteristics and experiences that define each of us as individuals" (The Diversity Task Force, as cited in Kapoor 2011). Kapoor (2011) emphasised the importance of recognising both primary and secondary dimensions to avoid discrimination since secondary dimensions can be significantly different even if the primary dimensions are similar between individuals. The author of this study reminds that since the ethnicity and the race are both identified as a primary dimension of diversity, it is important to provide more clarity on the terms and distinguish them from each other. To start with the term race.

In the past, when Europeans explored the world and "discovered" the people that they considered as less advanced at that time, they interpreted the bible to point that they themselves were God's chosen ones. This led to categorisation of the people, "chosen ones" and the ones that are "not chosen". People were mainly categorised by different beliefs, customs, and attributes such as skin colour. Therefore, it could be concluded that the term race was born in history to promote capitalism and religion of the Europeans and Americans. Nowadays, the term race is controversial. Its' sociological meaning is existing, but the biological definition is unclear. There are nine geographical races that are classified by most of the scientists: African, American Indians, Asians, Australian Aborigines, East Indian, European, Melanesians, Micronesians, and Polynesians. (Williams 2012, 5-8.) Even though there are over seven billion humans living on the earth, there is not much

variety of genetical differences among the people. Skin colour is a poor indicator of the race since the same colour skin can occur between Australian Aboriginals, Africans and with East Indians for example. In addition, in some cases, the genotype can be more similar between European and Korean than among two Europeans. Therefore, making biological racial categorisation is very challenging. (Barbujani & Pigliucci 2013.)

Ethnicity as a concept categorises people based on their traditional and cultural origins and its characteristics like language, nationality, genealogy, tribal affiliation or religious faith and traditions (Williams 2012, 9). Ethnicity has developed through the historical process and is a social entity that relates to belonging or not belonging to a certain ethnic group. This affects the behaviour of people and how they socialise, co-operate or turn the beliefs into action. (Rongxing 2009, 2; McAll 1990, 5.) Ethnic groups are not a new phenomenon but have existed a long time in history. When people with the same ethnical background are forced or voluntarily integrated to live in a society with other ethnicities, they are then called an ethnic group. Historically, causes for the mobility of people could be conquests, desires of rulers, political, economic or religious reasons. Still today, there are both forced and voluntary reasons for the movement of people, and the mobility is focused especially on the developed countries (Encyclopedia Britannica 2019; Keeley 2009, 21-31.)

This high-volume movement of people has a significant impact on the countries that attract newcomers. Changes are taking place at a rapid pace and the absorption capacity of societies and people is limited. (Lewis 2006, 7.) Ethnicity and the race as its sociological meaning are key topics when talking about multiculturalism or multiculturalism. Gould (1995, 199) states that in its simplest definition multiculturalism means the culturally pluralistic society. However, Aggestam and Hill (2008, 98) argue that term multiculturalism has become a root term for culturalism and people cannot distinguish multiculturalism and multiculturalism from each other. They emphasise the definition of multiculturalism and multiculturalism by Brian Barry (2001), who stated that the multiculturalism is the ideology when the multiculturalism represents the fact of cultural diversity.

Even though the ethnic groups have existed for a long time, multiculturalism as a term has emerged mainly in Australia, Canada, Britain and in the United States in the 1960s and 1970s. From a political perspective, the term multiculturalism was representing an application of liberal values, which extended the individuals' freedoms and aimed to promise of equal citizenship. Nowadays, the term in politics relates to the adjustment of minority cultures that are living in one society. It is referenced by a race, ethnicity or religion, but in some cases, by nationality or aboriginality. (Meer, Modood & Zapata-Barrero 2016, 31-

34.) From a societal perspective, multiculturalism is the name for an approach that demonstrates the use of knowledge in a different or alternative way to understand ideas and occurrences. The driving themes for this approach are the concepts of ethnicity, race, class, gender, and culture, which also endorses the respect of the dignity of people that are forgotten. (Trotman 2002, ix.) Cultural pluralism has its advantages and disadvantages that will be discussed in the next subchapter.

3.2 Advantages and disadvantages

Diversity in modern societies is setting challenges and opportunities for society and individuals. It is a widely studied topic and results are controversial. Especially, early researches have indicated that societies and individuals may be negatively affected by diversity when more recent studies emphasise that this is not always the case. (Ramos, Hewstone, Barreto & Branscombe 2016, 793; VanAlstine, Cox & Roden 2013, 9.)

There are many different studies that point out the negative aspects of cultural diversity. Results show that increased cultural diversity may, for example, affect negatively on people's mood, hinder human development, increase ambiguity, complexity, and confusion, decrease societal trust, participation, togetherness or team performance. (Burrow & Hill 2013; VanAlstine et al. 2013, 9; Kautish 2012; Bergrom, Vartia-Vaananen & Kinnunen 2015; Dinesen & Sønderskov 2015; Alberto & La Ferrara 2000, 847; Maderer, Holtbrügge & Schuster 2014, 232.)

On the other hand, some studies point out the benefits of cultural diversity. It can increase entrepreneurship, creativity, satisfaction, reputation, and innovations to mention few. (Russell, Nabamita & Sanjukta 2010; Stahl et al. 2010; Hudea 2014; Mir-Babayev, Gulililyev, Shikhaliyeva, Azizova & Nuri 2017.) Pieterse, Van Knippenberg and Van Dierendonck (2013) argue that cultural diversity affects positively on the performance of the team when the members' performance avoidance is low and the learning approach orientation is high.

Coming up with competitive advantages or other positive aspects of cultural diversity, diversity management has been recognised as an effective tool (Romanenko 2012, 96). Scientists argue that people tend to think in terms of patterns. Cultural differences can create frustration to these patterns, since they can trigger unpredictable and confusing occurrences. Therefore, cultural education and cultural management can mitigate these confusions, which may lead to better results. In the society, the ideology of multiculturalism aims to adjust policies to make the living environment suitable for everyone when in business environment cross-cultural management aims to allay the disadvantages and bring

out its strengths that lead to positive and better outcomes. (Gesteland 2002, 9; Contini & Maturo 2010; Malehia 2010, 11-14.)

3.3 Migration

The world's wealth is distributed and concentrated unevenly among its 195 countries. In fact, there are roughly twenty countries that have the greatest wealth, which then correlates to a better standard of living for the citizens. It is common for governments to practice migration policies and strategies, which aims to control and achieve the optimal level of migration. (Meer et al. 2016, 1.)

Keeley (2009, 26) states that migrants represent a very diverse group of people and there can be many different reasons behind migrations. Keeley categorises migrants in nine groups: temporary labour, long term and low skilled, highly skilled and business, irregular, refugees, asylum seekers, forced migrants, family members and return migrants.

The growing number of migrants, which movement is focused in the developed countries and the populated cities, has a significant impact on the local society. It is affecting housing, services, work-life, transportation, environment and many other aspects of society. (United Nations 2017a; Ramos et al. 2016, 793.)

3.3.1 Migrants in the EU

According to the United Nations (2017a; 2017b), migration has increased steadily since the 1990s. In 2017, there was an estimate of over 257 million migrants across the world, which is about 3.4% out of 7.6 billion people in the world. Data is based on the estimate on the official statistics that indicate the foreign- or foreign-born population.

There was a great difference between countries income levels and migration. In high-income countries, there were almost 165 million migrants in 2017, which represented 14.1% of the population of the high-income countries. In the same year, there were 81 million migrants in the middle-income countries, and because of the greater number of populations, the migrants represented 1.4% of the total "middle-income" population. In the low-income countries, there were living approximately five million migrants, which was 1.6% of the total population. (United Nations 2017a; United Nations 2017b.)

In 2017 there were on estimate over 55 million migrants living in European member countries, which was a 12% increase from 2010. Most migrants were in Germany (~12.1 million), United Kingdom (~8.8 million) and France (7.9 million). Western Europe was the most popular destination for migrants in Europe. (United Nations 2017a.) Figure 9

demonstrates the distribution of the migrants in 27 countries in the EU in 2010 and 2017. There was no data available for Cyprus.

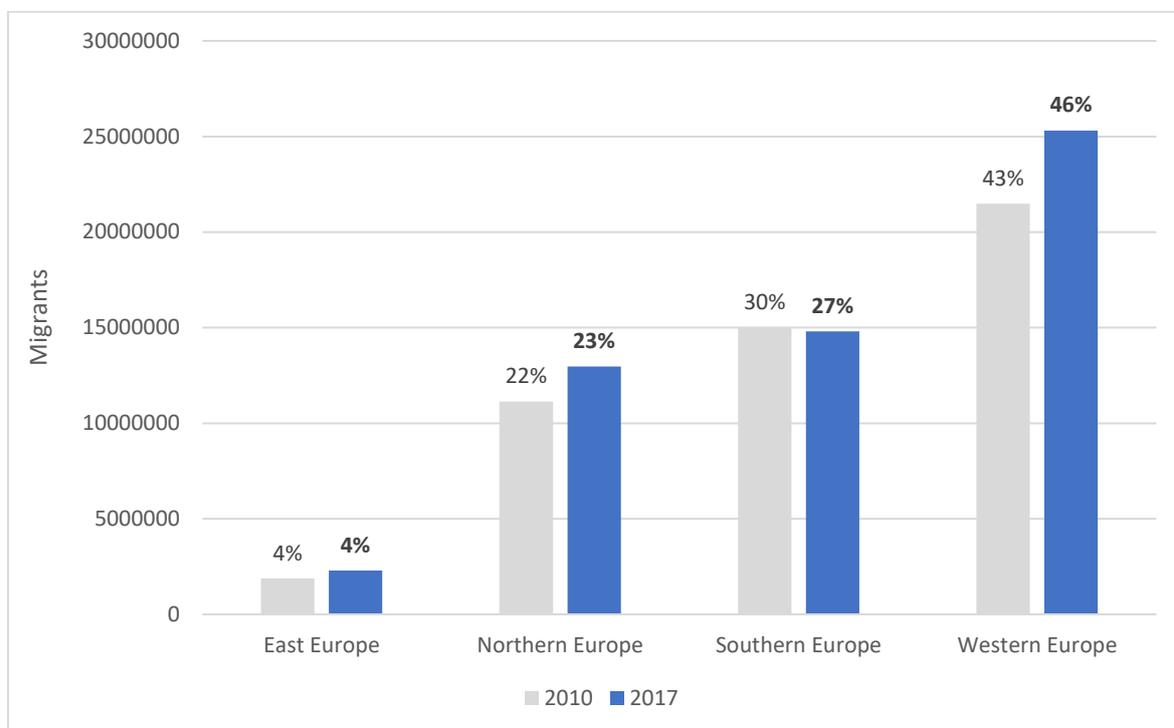


Figure 9 Migrants in EU member countries in 2010 and 2017 (United Nations 2017a)

When inspecting the migrants relative to the population of the country, it shows that the highest percentages were in Luxembourg (45.3%), Austria (19%) and Sweden (17.6%). The lowest percentages were in Poland (1.7%), Romania (1.9%) and Bulgaria (2.2%). (United Nations 2017a.) Figure 10 represents the number of migrants relative to the population of the country.

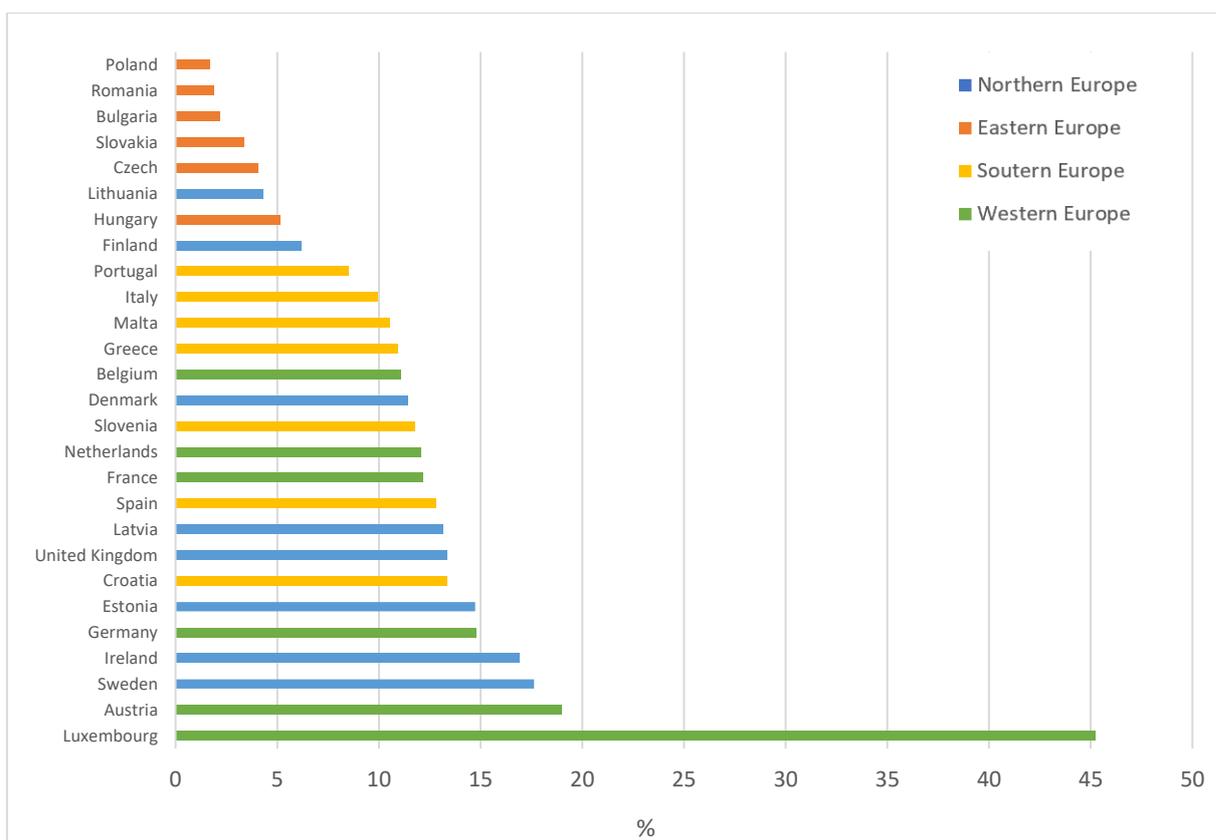


Figure 10 Migrants relative to the population of the country (United Nations 2017a)

3.3.2 Foreign workforce

It can be challenging for migrants to find a job in a country where there are different cultural norms, language, lack of social contacts or other requirements regarding employment. Quite often migrant workers can be “overqualified” for the jobs they are working in since it is more difficult to compete with native people on high skilled occupations. From an employers’ perspective, it may be a risk to hire foreign workers, especially if their education and work experience are comprehensively achieved abroad. It may be difficult to know, whether education or work experience is equivalent to the local standards. However, governments pursue greater employment integration of immigrants for economic and social reasons. Economical reasons may be concerning some sectors or industries where there is a lack of employees for example. Sociological reasons may rely on preventing poverty that could lead to social communities. (Keeley 2009, 86-87.)

In EU28, the share of the foreign workers has grown steadily since 2010. Foreign workers represented 10.8% of all people employed in EU28 when the same number in 2016 was 12.4%. EU28 born workers in other EU countries account for about a quarter of all foreign workers between 2010 and 2016. (Eurostat 2019a.) Figure 11 depicts the foreign workforce compared to natives.

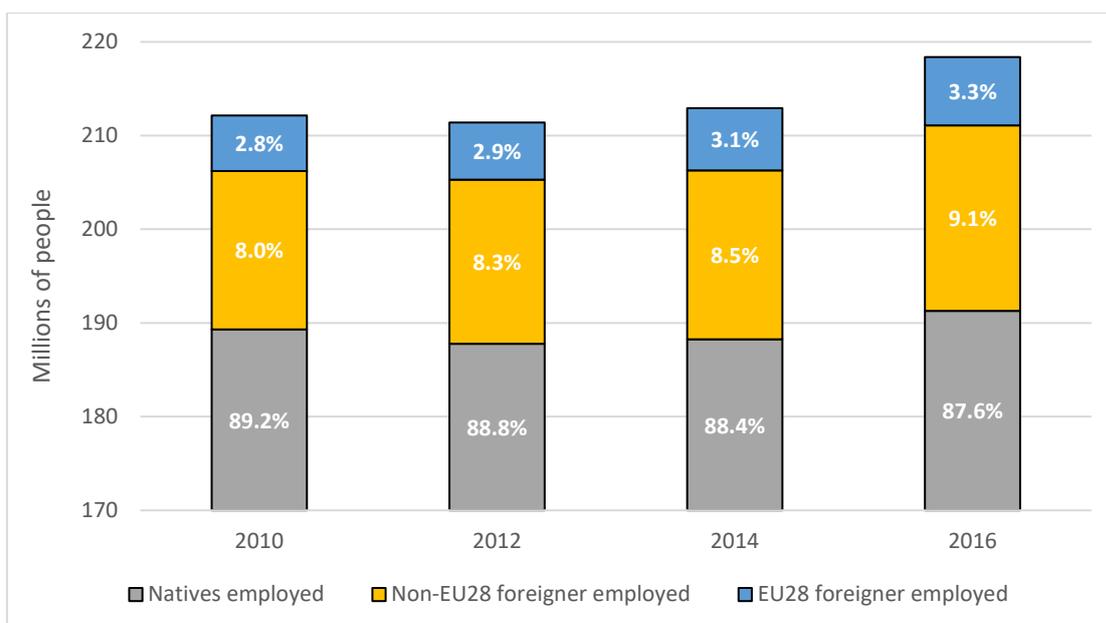


Figure 11 Employed 15 to 64 years old in EU28 between 2010 and 2016 (Eurostat 2019a; Eurostat 2019b)

In 2017, there were approximately 43.2 million 15 to 64 years old foreign-born people living in the EU28. Almost 28 million of them were employed, which made the employment rate roughly 65%. The foreign workforce continued the growth and represented 13% of the total workforce. Around 37% of the total foreign workforce was born in another EU28 country. (Eurostat 2019a.)

In Finland, there were 223 thousand workforce aged foreigners living in 2017. Foreigners employment rate was 60.3%, slightly lower compared to the EU28 average. Finland tended to have relatively more foreigner workers that were born in EU28 countries. Gender diversity of foreigners in EU28 and in Finland were 54:46, so there were slightly more foreign men employed compared to women. (Eurostat 2019a.) See Table 3 below.

Table 3 Foreign population aged 15 to 64 in EU28 and in Finland in 2017 (Eurostat 2019a)

| | EU28 | Finland |
|--|----------|---------|
| Total | 43245500 | 223300 |
| Employed | 27943500 | 134700 |
| Employment | 64.6% | 60.3% |
| Born in another EU28 | | |
| Born in another EU28 | 14262600 | 79700 |
| Born in another EU28 employed | 10386400 | 57000 |
| Born in another EU28 of all foreign employed | 37.2% | 42.3% |
| Employed men | | |
| Employed men | 15155400 | 73200 |

| | | |
|-----------------------------------|-------------|-------------|
| Employed women | 12788000 | 61500 |
| Gender distribution (men : women) | 54.2 : 45.8 | 54.3 : 45.7 |

3.3.3 The foreign workforce in Finland

Between 2010 and 2016, the three biggest occupational groups for foreign workers in Finland were service and sales workers, elementary occupations and professionals. All occupational groups grew from 2010, but greatest growth had managers (+79.9), craft and related trade workers (+61.1), elementary occupations (+53.8%) and professionals (42.4%). (Statistics Finland 2019.) See Figure 12 below.

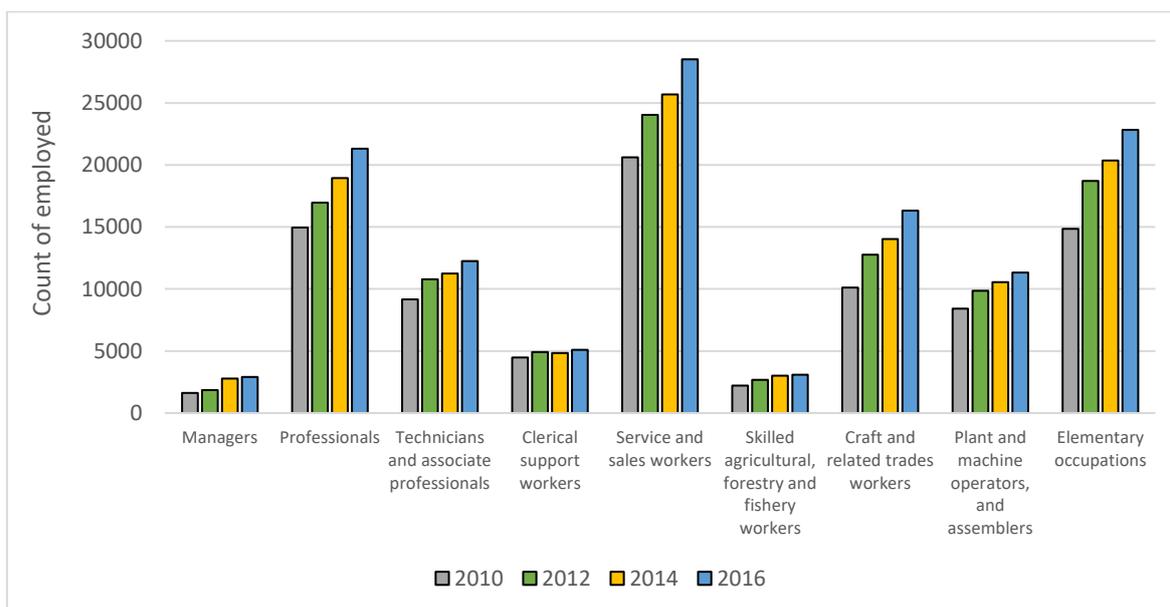


Figure 12 Foreign employees in Finland by the occupational group between 2010 and 2016 (Statistics Finland 2019)

When inspecting gender distribution, men represented the majority in the employment of the foreign workforce in Finland in 2016. The overall distribution was divided 56:44 in favour of men. Craft and trade work, plant and machine operator, manager and professional occupation groups employed more men. The majority of women were in service and sales work, clerical support work, elementary- and technicians and associate professional occupation groups. (Statistics Finland 2019.) See Figure 13.

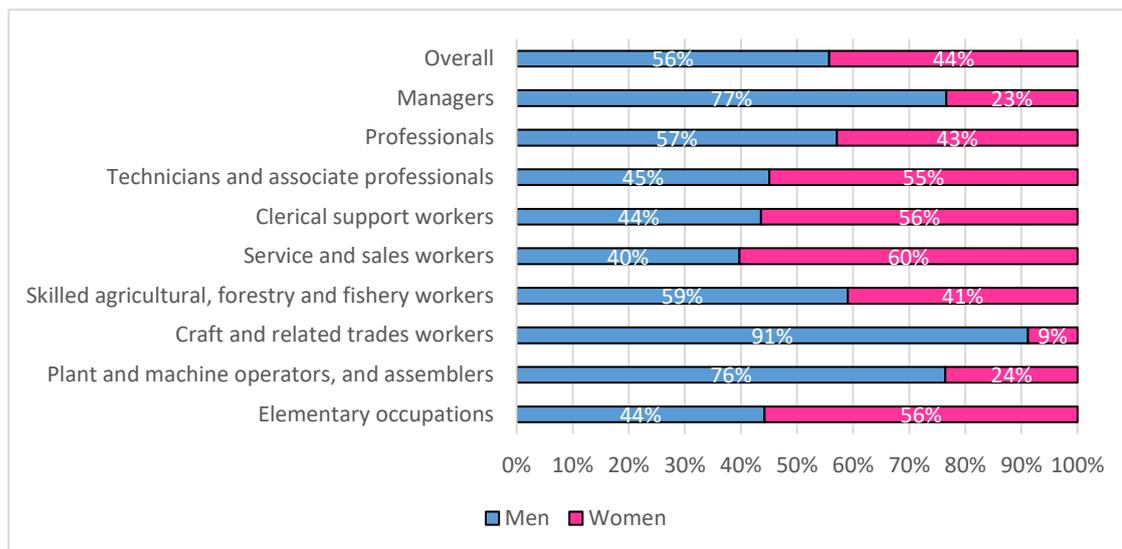


Figure 13 Foreign workers gender distribution between occupations in 2016 (Statistics Finland 2019)

In 2016 there were foreign people from 81 different countries employed in Finland. Most of the employed foreigners came from Estonia, China, Viet Nam, Thailand, and Turkey. In addition, many of the foreigners' background is in the former Soviet Union and Yugoslavia. (Statistics Finland 2019.)

3.4 Previous studies concerning cultural diversity and innovation

There are theories and studies concerning innovation performance and different aspects of cultural diversity. In general, results are controversial. As stated in the subchapter 2.4 the results of innovation measurement are dependent on the indicators that are chosen. In addition, as introduced the multidimensional nature of the cultural diversity in the chapter three, it is not surprising that the results vary among the studies.

Lambert (2006, 73-75) reviewed previous studies concerning cultural diversity and its link to innovation performance. He stated that the link between creativity and diversity may be existing, but it is not a guarantee for new innovations. However, he argues that culturally diverse firms perform better compared to homogeneous groups when the innovation strategy is implemented, and groups are linked to creativity during research processes.

Nathan and Lee (2013, 373-374, 379) studied cultural diversity, innovation, entrepreneurship and strategies of 7,500 companies based in London between 2005 and 2007. They concluded that companies that have more culturally diverse management tend to introduce 1.24 times more product innovations compared to homogeneous management teams. However, the results vanish for the companies that are comprehensively run by migrants.

Mir-Babayev et al. (2017, 82-83, 86) studied how cultural diversity influences innovation performance on the construction industry of Azerbaijan. They conducted a survey with support of trade unions and received replies from 76 firms in the country. They ran correlation and regression analyses and concluded that moderate level cultural diversity may accelerate innovation performance, but results vanish when the level of cultural diversity increases over this optimal level.

Bratti and Conti (2013, 19) studied migrant workforce and its effect on innovation performance in Italy. The results indicate a negative relationship between migrant workforce and innovation performance. Bratti and Conti continue that this could be explained by the type of migrants that are relatively low skilled in Italy.

Ramasamy and Yeung (2016) state that even though the culture and its influence on innovation level are well studied on a national level, they point out that the value is another significant part of the innovation performance that is distinct from cultural diversity. They studied innovation performance compared to cultural diversity and diversity of the values. Their results show a negative relationship between cultural diversity and innovation performance when the values contribute positively. Ramasamy and Yeung argue that the best innovators are countries that are ethnically homogeneous but are diverse in values.

Hunt and Gauthier-Loiselle (2010, 33-37) studied patenting behaviour between skilled natives and foreigners in the United States. The results indicated that immigrants with post-college education have two times more owned patents compared to the native populations per capita. However, they argue that results may rely on the fact that immigrants tend to have more science and engineer degrees that might increase the patenting activities.

Ozgen, Nijkamp and Poot (2012, 11-13) argue that there can be multiple ways how migration may affect innovation performance such as increased population, change in population density, increased foreigner diversity and potential skills of the migrants. They studied how migration affects European countries regions' innovation levels between 1991-1995 and 2001-2005. Innovations were measured as by means of a number of patent applications per million inhabitants. There was no statistically significant linear relationship found between the share of the foreigners and innovation performance. However, a positive relationship was found between the share of foreigners born in other European countries to innovation performance. The authors argue that this group of foreigners is more likely to have higher education and might be more adaptive to economic and social integration in the European Union.

4 EMPIRICAL RESEARCH

4.1 Empirical research and data analyses

Empirical research and data analyses are covered in this part of the study. It consists of four main parts: introduction of the databases, descriptive statistics, correlation analyses, and discussion of the results. First, the introduction of the databases discusses the source of the data, how they were originally gathered and how data were extracted from the databases. Second, descriptive statistics explores the innovation performance, demographic factors and the changes of these variables. Third, the introduction and the results of the correlation analyses are presented, which aim to answer the five introduced sub-questions. Last, the empirical part ends into the discussion of the results.

In each of the following subchapters are discussed a more detailed explanation concerning the topic and methods that were used. As mentioned in the introduction this study approached the research via deductive reasoning. Therefore, some of the created variables are based on the author's understanding of previous researches and theories in the theoretical part of the study. The variables will be introduced later in the descriptive statistics of the empirical part.

The sample size consisted of 28 European member countries. Analyses were based on the years between 2010 and 2016. Statistical procedures were conducted with IBM SPSS version 25.

4.2 Introduction of the data

This study relied comprehensively on secondary sources since the subject is broad and concerns many different countries. Data was gathered from reliable sources of the databases of Eurostat and Statistics Finland. There were four datasets used in this study which are listed in Table 4 below.

Table 4 Source, ID, name, version, and the date of the export of the databases

| Source | ID | Name of the database | Version | Date of export |
|----------|-------------|--|----------|----------------|
| Eurostat | EIS2018 | Database of European innovation scoreboard 2018 | 26062018 | 21 April 2019 |
| Eurostat | lfsa_pgacws | Population by sex, age, country of birth and labour status | 24042019 | 21 April 2019 |

| | | | | |
|--------------------|---------------|---|----------|---------------|
| Eurostat | migr_pop3ctb | Population on 1 January by age group, sex and country of birth | 17042019 | 21 April 2019 |
| Statistics Finland | 022_115t_2016 | Employed persons by occupational group (Classification of Occupations 2010, levels 1 to 2), background country, sex and year, 2010-2016 | 05042019 | 21 April 2019 |

Database of European Innovation Scoreboard 2018 (EIS2018) provided the innovation data between 2010 and 2016, which consisted of 21 indicators. The indicator performance was demonstrated as a score between (0.000) and (1.000). Six indicators were chosen in this study since they represented the already introduced innovations. Three out of six indicators represented innovations introduced by small and medium-sized enterprises (3.1.1, 3.1.2 and 3.1.3). The other three indicators represented applications of intellectual properties (3.3.1, 3.3.2 and 3.3.3). These indicators were introduced more in detail in the subchapter 1.3. The SME innovation indicators were based on the community innovation survey, which has been gathered every second year by the European member countries. The SME indicators were available on four years: 2010, 2012, 2014 and 2016. The intellectual property indicators were based on intellectual property databases, which were available on every year between 2010 and 2016. (European Commission 2018c, 7-9; Eurostat 2019c; European Commission 2018b.)

The second and third datasets concerned the population statistics in the European countries. Data was gathered from the databases of the Eurostat. The first dataset (lfsa_pgacws) was based on the Labour Force Survey, which provided information of the EU citizens employment. It was gathered by the European Union via a large household sample survey. The second dataset (migr_pop3ctb) provided information about the employment status of the migrants. It was based on the migrant indicators statistics that were originally gathered by sample surveys and by relying on governmental registers. (Eurostat 2019d, Eurostat 2019e.) The author exported the population data aged between 15 and 64 years old, which represented the most productive age group. In addition, foreigners born in the European Union were separated from the total foreigner group, which allowed the comparison between EU-born and non-EU-born foreigners.

The fourth dataset (022_115t_2016) concerned the foreigners living in Finland. It provided information about the occupational groups, genders and background countries of the foreigners. The data was based on the administrative registers and statistical data files.

(Statistics Finland 2019; Official Statistics of Finland 2019.) The author exported the data of foreign and native population aged between 15 and 64 years old. Concerning the foreigners' occupations, the author chose nine out of ten occupational groups that were available. Only "Armed Forces" occupational group was not included in the study since there were not too many foreigners working in this occupation in Finland. See Table 5 below.

Table 5 Occupational groups (Statistics Finland 2019)

| Occupational Group | Examples of Occupations |
|---|--|
| 1. Managers | Chief Executives, Commercial and Administrative Managers, Production and Specialised Managers etc. |
| 2. Professionals | Science-, Engineering-, Health-, Business-, Legal-, ICT-, (etc.) Professionals |
| 3. Technicians and associate professionals | Science-, Engineering-, Health-, Business-, Legal-, ICT-, (etc.) Associate Professionals |
| 4. Clerical support workers | Keyboard clerks, Customer service, Clerical support workers |
| 5. Service and sales workers | Sales workers, Personal care workers, Protective services |
| 6. Skilled agricultural, forestry and fishery workers | Market oriented skilled agricultural, fishery, forestry and hunting workers |
| 7. Craft and related trades workers | Building-, metal-, machinery-, handicraft-, electrical-, food processing- workers |
| 8. Plant and machine operators, and assemblers | Stationary plant and machine operators |
| 9. Elementary occupations | Cleaners and helpers, mining, transport, manufacturing labourers |

In addition, data regarding different occupational groups were separated among genders to allow further analyses to be conducted between males and females.

4.3 Descriptive statistics

Descriptive statistics help to understand the data. It can be presented in tables or figures to demonstrate the key points. (Adams et al. 2014, 139.) In the study, descriptive statistics will be shown in four parts. First, the countries' overall innovation performance among the six innovation indicators and the average scores were described. Secondly, the overall view of 15 to 64 years old population and foreigners that were living in EU28 countries. Thirdly, the descriptive statistics of changes in the innovation performance and changes in the foreign diversity groups between 2010 and 2016 were demonstrated. Lastly, the changes of foreigners by the occupational groups and genders in Finland were inspected.

4.3.1 EU28 and the six innovation indicators in 2016

Concerning the innovation data, the author introduced a seventh innovation factor "score of six indicators". The purpose of this was to better compare countries performance among the six indicators. The seventh innovation factor was calculated as average from six innovation indicator scores, see below.

$$(3.1.1 + 3.1.2 + 3.1.3 + 3.3.1 + 3.3.2 + 3.3.3) \div 6 = \textit{Score of six innovation indicators}$$

If there was a case, where one or more of the innovation indicators were not available, then the average score was not calculated for that country on that year.

Appendix 1 demonstrates the countries' innovation performance in 2016. Luxembourg, Germany, and Finland performed greatest among the six innovation indicators when the weakest performers were Hungary, Slovakia and Croatia. Concerning the SME indicators (3.1.1, 3.1.2, 3.1.3) the best performers were Ireland, Belgium and Germany when the greatest performers in the intellectual properties (3.3.1, 3.3.2, 3.3.3) were Luxembourg, Malta, and Denmark. There were no comprehensive data available for the average score of the six indicators for Latvia, Poland, and Romania. Scores of the six innovation indicators is represented in the map in Figure 14 below. East European countries performed weaker compared to West and North Europe in 2016. (European Commission 2018b.)

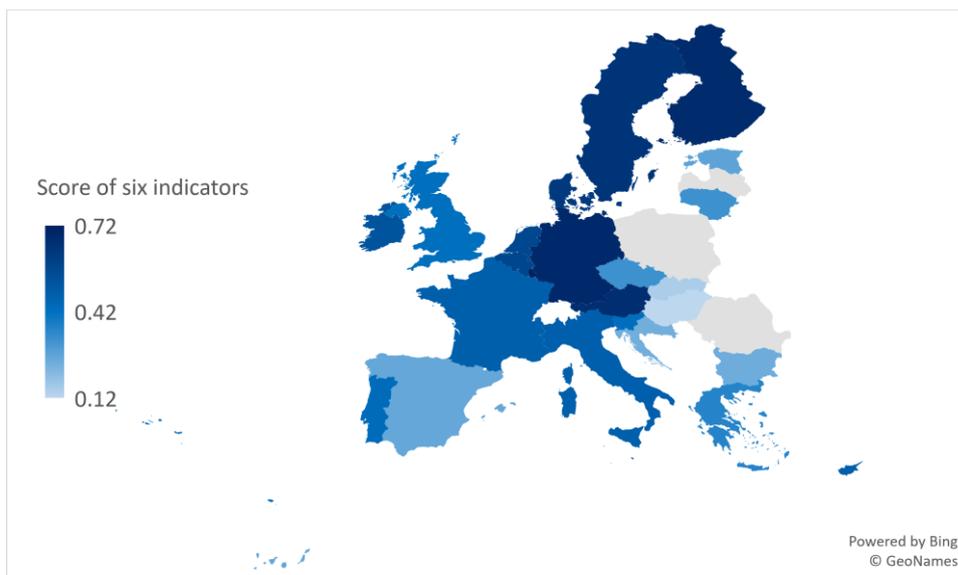


Figure 14 Score of the six innovation indicators by countries in 2016 (European Commission 2018b)

4.3.2 EU28 natives and foreigners in 2016

There were 42.6 million foreigners in EU28, which represented approximately 13% of the population in this age group. The highest percent of foreign-born was in Luxembourg 51.3 with the lowest being in Romania, only 0.06. Foreigners' employment percent was 63.6, which was slightly lower compared to natives' average 66.4 percent. Table 6 demonstrates the demographics of 15 to 64 years old among the member countries in 2016. (Eurostat 2019a; Eurostat 2019b.) Concerning the employment of foreigners, there was no data available for Romania. In addition, there was no data available for Bulgaria, Germany and Romania regarding the EU born foreigners that worked in the reporting country.

Table 6 Population aged between 15 and 64 in EU28 in 2016 (Eurostat 2019a; Eurostat 2019b)

| | N | Minimum | Maximum | Sum | Mean | Std. Deviation |
|------------------------------|----|---------|----------|-----------|-------------|----------------|
| Total population | 28 | 304300 | 53802300 | 328848000 | 11744571.43 | 15106736.228 |
| Total foreign population | 28 | 8600 | 10117900 | 42632100 | 1522575.00 | 2597571.170 |
| Total employed | 28 | 205000 | 40165000 | 218398000 | 7799928.57 | 10330598.046 |
| Foreigners employed | 27 | 10800 | 6857200 | 27104400 | 1003866.67 | 1735018.039 |
| Foreign men employed | 27 | 5900 | 3853800 | 14716700 | 545062.96 | 959491.089 |
| Foreign women employed | 27 | 4900 | 3003400 | 12388100 | 458818.52 | 776377.267 |
| EU28 born foreigner employed | 25 | 5200 | 2289600 | 7289400 | 291576.00 | 502835.542 |
| Valid N (listwise) | 25 | | | | | |

As expected, there was a great deviation between foreigners among the countries. In Germany, there were over 10 million foreigners living among this age group, which was more than the native populations of 15 to 64 years old in Finland and Sweden combined. However, Sweden (21%) had relatively more foreigners living in the country compared to Germany (19%). (Eurostat 2019a; Eurostat 2019b.) Figure 15 depicts the share of the foreign population in the countries on the map.

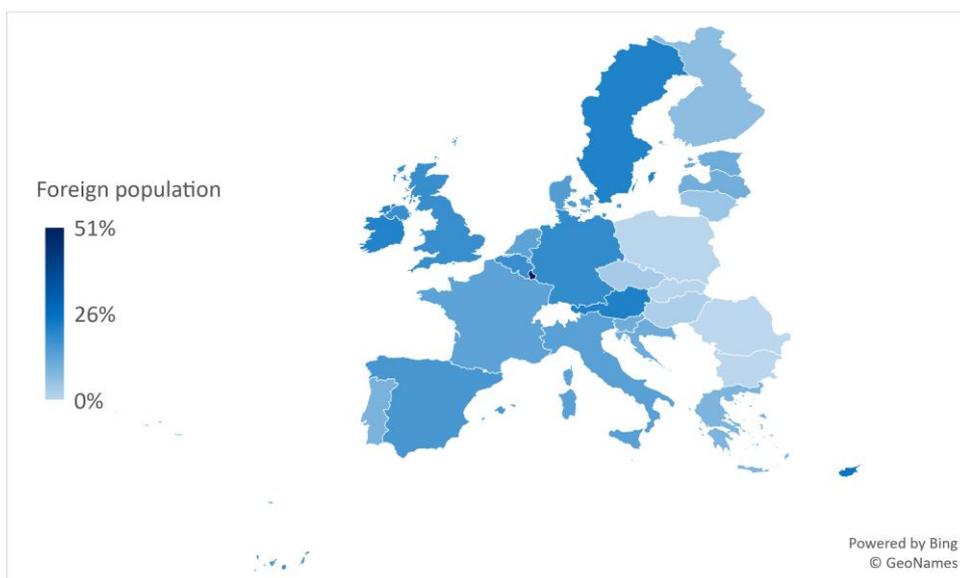


Figure 15 The share of the foreign population in the countries in 2016 (Eurostat 2019a; Eurostat 2019b)

4.3.3 Foreign diversity and innovation indicators between 2010 and 2016

This subchapter demonstrates the changes in countries' foreign diversity and the changes in the innovation indicators between 2010 and 2016. The author introduced three diversity variables, which allows comparison between foreign groups. See the foreign groups and calculation formulas for each country below.

1. The share of the foreigners of total population

$$\text{foreign population} \div \text{total population} = \text{share of the foreign population}$$

2. The share of the foreigners of total workforce

$$\text{foreign workforce} \div \text{total workforce} = \text{share of the foreign workforce}$$

3. The share of the EU28 born foreigners of total workforce

$$\begin{aligned} & \text{EU28 born foreign workforce} \div \text{total workforce} \\ & = \text{share of EU28 born foreign workforce} \end{aligned}$$

The changes of the three diversity variables and changes in the seven innovation indicators were calculated between 2010 - 2012, 2012 - 2014 and 2014 - 2016. See the calculation formula below.

$$(N_{2012} - N_{2010}) \div N_{2010} = \text{Change between 2010 and 2012}$$

$$(N_{2014} - N_{2012}) \div N_{2012} = \text{Change between 2012 and 2014}$$

$$(N_{2016} - N_{2014}) \div N_{2014} = \text{Change between 2014 and 2016}$$

This provided a sample size of 84 for each variable if data was available for every country, every second year.

The percentual changes of the diversity variables and changes in the innovation indicators are described in Table 7 below. There was no data available for Romania concerning the change of the foreign workforce diversity between 2014 and 2016. In addition, there was no data available for EU28 born foreigners for Bulgaria, Germany, Lithuania or Romania. Missing data regarding the innovation indicators can be examined in Appendix 1.

In general, the foreign diversity and the foreign workforce diversity has increased relatively in most of the countries over time. Growth was lower for the EU28 born foreigners. The SME product and process innovations (3.1.1) have increased slightly when the organisational and market (3.1.2) and the "in-house" (3.1.3) innovations have decreased every second year. At the same time, the intellectual properties (3.1.1, 3.1.2, 3.1.3) have grown along the years. On average, EU28 has grown (+0.80%) every second year among the six innovation indicators. (Eurostat 2019a; Eurostat 2019b; European Commission 2018b.)

Table 7 Descriptive statistics of the changes in the variables between 2010 and 2016 (Eurostat 2019a; Eurostat 2019b; European Commission 2018b)

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---|----|-----------|-----------|------------|----------------|
| % change of foreign diversity % | 84 | -36.44067 | 89.55260 | 5.8428989 | 16.84601040 |
| % change of foreign workforce diversity % | 83 | -20.36404 | 73.89322 | 5.7325752 | 15.09473817 |
| % change of EU28 born foreign workforce diversity % | 72 | -32.34552 | 81.27690 | 1.5290577 | 15.35412040 |
| % change of 3.1.1 | 81 | -87.15835 | 420.98877 | 1.9186059 | 62.90683300 |
| % change of 3.1.2 | 83 | -78.06979 | 255.03101 | -1.3996018 | 37.87615090 |
| % change of 3.1.3 | 82 | -73.16261 | 302.89804 | -2.6983941 | 43.20821816 |
| % change of 3.3.1 | 84 | -69.94965 | 111.06767 | 7.4755381 | 30.66984433 |
| % change of 3.3.2 | 84 | -25.52438 | 118.24545 | 9.2957875 | 20.51713885 |
| % change of 3.3.3 | 84 | -42.97045 | 368.35611 | 20.5420493 | 67.13061298 |
| % change of 6 innovation indicators' scores | 80 | -34.27000 | 81.80485 | .7994768 | 17.71600265 |
| Valid N (listwise) | 70 | | | | |

4.3.4 Changes of foreigners by occupational groups and genders in Finland

As demonstrated in Figure 12 in the subchapter 3.2.3 “Foreign workforce diversity in Finland” shows that the foreigner workforce diversity has grown since 2010. In this subchapter, a more specific demonstration of the relative growth of the foreigners by different occupational groups over the years is presented. In addition, the foreigners’ diversity and the occupational groups will be inspected by genders between 2010 and 2016.

The change of the foreigners’ occupational groups was calculated yearly from 2010 to 2016. It demonstrates how the share of the foreigners has increased or decreased among the occupational groups compared to previous year. See the formula below. PY stands for the previous year.

$$\frac{((\text{Foreign employed} \div \text{All employed}) - (\text{Foreign employed PY} \div \text{All employed PY}))}{(\text{Foreign employed PY} \div \text{All employed PY})}$$

= Change in the share of foreigners to previous year

As shown in Table 8, the share of the foreign managers has increased by 6.819% in 2011, which indicates that there are relatively more foreign managers among all managers compared to 2010. In fact, all the occupational groups have grown every year compared to the

previous year. Greatest growth on average between 2010 and 2016 has “skilled agricultural, forestry and fishery workers”, “craft and related trade workers” and “managers”. Weakest growth had “professionals” and “technicians and associate professionals”. (Statistics Finland 2019.)

Table 8 The relative change of foreigners by occupational groups compared to the previous year (Statistics Finland 2019)

| | Year | | | | | |
|--|--------|--------|--------|--------|-------|-------|
| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
| Managers | 6.819 | 8.861 | 19.508 | 11.360 | .874 | 5.799 |
| Professionals | 6.757 | 4.526 | 4.987 | 5.066 | 2.607 | 5.701 |
| Technicians and associate professionals | 6.397 | 9.705 | 5.146 | 2.969 | 1.431 | 7.283 |
| Clerical support workers | 9.696 | 8.749 | 5.918 | 1.946 | 7.579 | 7.937 |
| Service and sales workers | 5.425 | 8.639 | 4.285 | 4.996 | 3.250 | 8.986 |
| Skilled agricultural, forestry and fishery workers | 13.525 | 14.883 | 9.846 | 11.304 | 5.019 | 6.822 |
| Craft and related trades workers | 13.146 | 13.636 | 10.148 | 8.204 | 6.934 | 6.897 |
| Plant and machine operators, and assemblers | 10.156 | 10.219 | 7.267 | 6.537 | 4.689 | 2.559 |
| Elementary occupations | 11.156 | 10.412 | 8.460 | 6.525 | 7.392 | 6.819 |

When inspecting the growth of the foreigners in the different occupational groups by genders, it can be concluded that the foreign female managers (+91%) have grown relatively more compared to the foreign men managers (+77%). Both foreigner groups have grown since 2010, males (+46%), females +(40%). At the same time, the native workforce has decreased by 6%. (Statistics Finland 2019.) See Table 9 below.

Table 9 Foreigners' by the occupational groups in Finland (Statistics Finland 2019)

| | 2010 | | | 2016 | | |
|---|--------------|-------------|---------------|--------------|-------------|---------------|
| | Native total | Foreign men | Foreign women | Native total | Foreign men | Foreign women |
| Managers | 82449 | 1263 | 357 | 88645 | 2233 | 681 |
| Professionals | 408332 | 8623 | 6337 | 430312 | 12171 | 9137 |
| Technicians and associate professionals | 411775 | 4420 | 4730 | 397284 | 5520 | 6722 |
| Clerical support workers | 166078 | 1745 | 2727 | 125033 | 2224 | 2880 |
| Service and sales workers | 449760 | 8377 | 12249 | 432267 | 11327 | 17186 |

| | | | | | | |
|--|--------|------|------|--------|-------|-------|
| Skilled agricultural, forestry and fishery workers | 72160 | 1155 | 1071 | 54492 | 1821 | 1261 |
| Craft and related trades workers | 241256 | 9049 | 1076 | 214928 | 14876 | 1439 |
| Plant and machine operators, and assemblers | 204912 | 6069 | 2343 | 181460 | 8660 | 2665 |
| Elementary occupations | 142797 | 6583 | 8254 | 126253 | 10094 | 12730 |

a. Limited to first 100 cases.

4.4 Correlations

As earlier introduced, the correlation coefficient is a statistical analysis that provides an understanding of a relationship and the strength of the relationship between two or more variables. It does not indicate whether the possible correlation is caused by each other, so it is different from causation. (Chikkodi & Satyaprasad 2009, 12.1-12.2.)

The result of the correlation analysis can be positive, neutral or negative. The positive relationship indicates that when one variable increases it corresponds to another variable, which increases along with the variable at some strength. The negative relationship indicates the opposite when variable decreases it corresponds to the other variable that decreases along with the first variable. The neutral result indicates that there is no correlation between variables. (Chikkodi & Satyaprasad 2009, 12.1-12.3.) The result of the analysis is represented by the letter r , which stands for the correlation coefficient. The results range between -1 and $+1$, where negative indicates the negative relationship and positive indicates the positive relationship. When r is 0 , it represents that there is no correlation between the variables. The further from the zero the stronger the correlation is. (Corder & Foreman 2014, 139-140.) Table 10 below demonstrates the degrees of correlation.

Table 10 Degrees of correlation (Chikkodi & Satyaprasad 2009, 12.4)

| Degree of Correlation | Positive | | Negative | |
|--|----------|-------|----------|-------|
| Correlation lies between +1 and -1 (Approximation) | Range | | Range | |
| | From | To | From | To |
| | +1 | 0.00 | 0.00 | -1.00 |
| 1. Perfect | | +1 | | -1 |
| 2. Very High Degree | +1.00 | +0.90 | -0.90 | -1.00 |
| 3. High Degree | +0.90 | +0.75 | -0.75 | -0.90 |
| 4. Moderate Degree | +0.75 | +0.60 | -0.60 | -0.75 |
| 5. Low Degree | +0.60 | +0.30 | -0.30 | -0.60 |
| 6. Very Low Degree | +0.30 | +0.00 | -0.00 | -0.30 |
| 7. No Correlation | | 0 | | 0 |

There are different methods to perform correlation analyses, which have different assumptions concerning the calculation. In this study, Spearman's rank order correlation will be used, since it is the most suitable method for the innovation data, which is based on a score between 0 and 1. (Corder & Foreman 2014, 139-140.) In the study, the level of significance is commonly accepted 0.05, which represents that the results are not caused by a change 95 times out of 100. (Corder & Foreman 2014, 5.)

4.4.1 Foreign population, foreign workforce and innovation indicators

The three diversity variables, countries' share of the foreign population, share of the foreign workforce and share of the EU28 born foreigners were analysed against innovation indicators. Spearman's correlations were calculated for two different years, first 2010 and then 2016. These analyses aim to answer the sub-questions one and two, whether there is a linear relationship between cultural diversity and innovation indicators in 2010 and in 2016.

Share of foreigners and innovation performance in 2010

In 2010, the results indicate that there was a moderate positive relationship between the share of the foreign population (.704) and the share of the foreign workforce (.650) and average of the six innovation indicators. Both highly significant with P-values (.000). This means that when a certain country has a higher share of foreigners or a higher share of foreign workforce, it tends to have a higher score concerning the average of six innovation indicators. Concerning the EU28 born foreign workforce, the strength of correlation was very weak (.215) and the result was insignificant with P-value (.314). (Eurostat 2019a; Eurostat 2019b; European Commission 2018b.) This indicates that the probability of having such a result by chance is 31.4 times out of 100, which is not considered reliable to

identify a correlation between variables. See Appendix 2 for comprehensive correlation results. Figure 16 indicates the positive and moderate relationship between the average of the innovation indicators and the share of the foreigners of total population and the share of the foreign workforce of the total workforce.

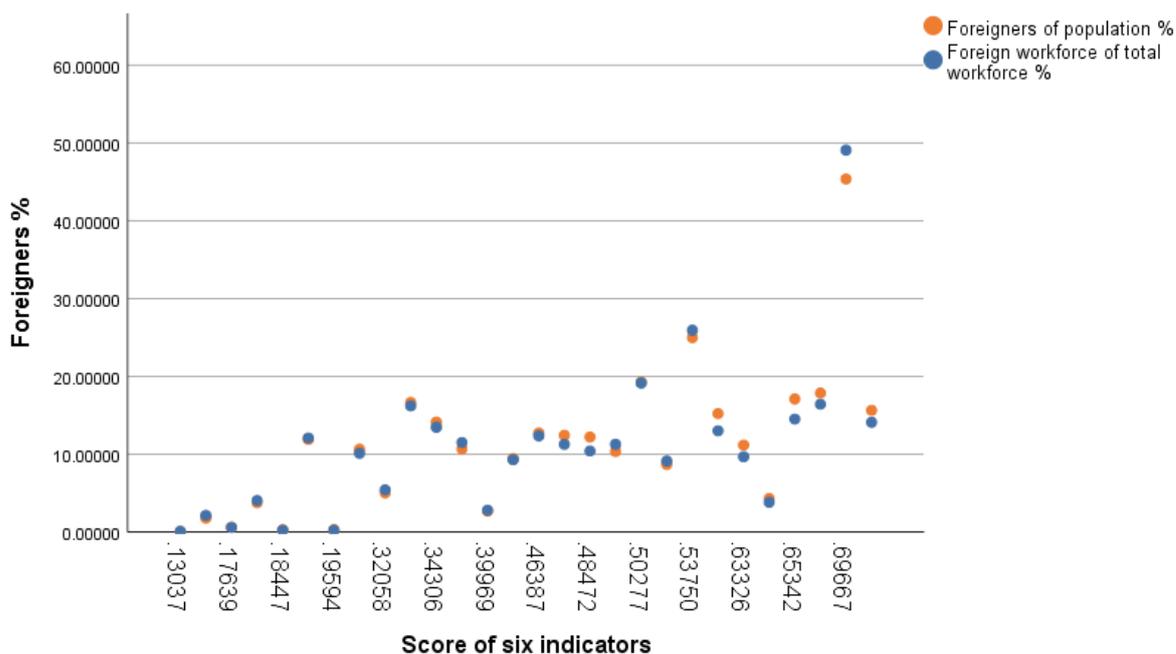


Figure 16 Scatter diagram of the significant foreign groups and the scores of the six innovation indicators in 2010 (Eurostat 2019a; Eurostat 2019b; European Commission 2018b)

When inspecting the innovation indicators separately, all the SME indicators (3.1.1, 3.1.2, 3.1.3) had either a moderate or a low positive correlation with the share of the foreigners and the share of the foreign workforce. Two intellectual property indicators (3.3.1, 3.3.2) correlated positively with both previously mentioned diversity groups. In addition, intellectual property indicator 3.3.3 correlated significantly with the share of the foreigners, but not with the share of the foreign workforce. The correlation coefficient scores concerning the EU28 born diversity group were weaker and statistically insignificant. (Eurostat 2019a; Eurostat 2019b; European Commission 2018b.) See Figure 17 below, which demonstrates the degree of the correlation among the innovation indicators. Colour indicates significant results and grey pattern insignificant results among the variables.

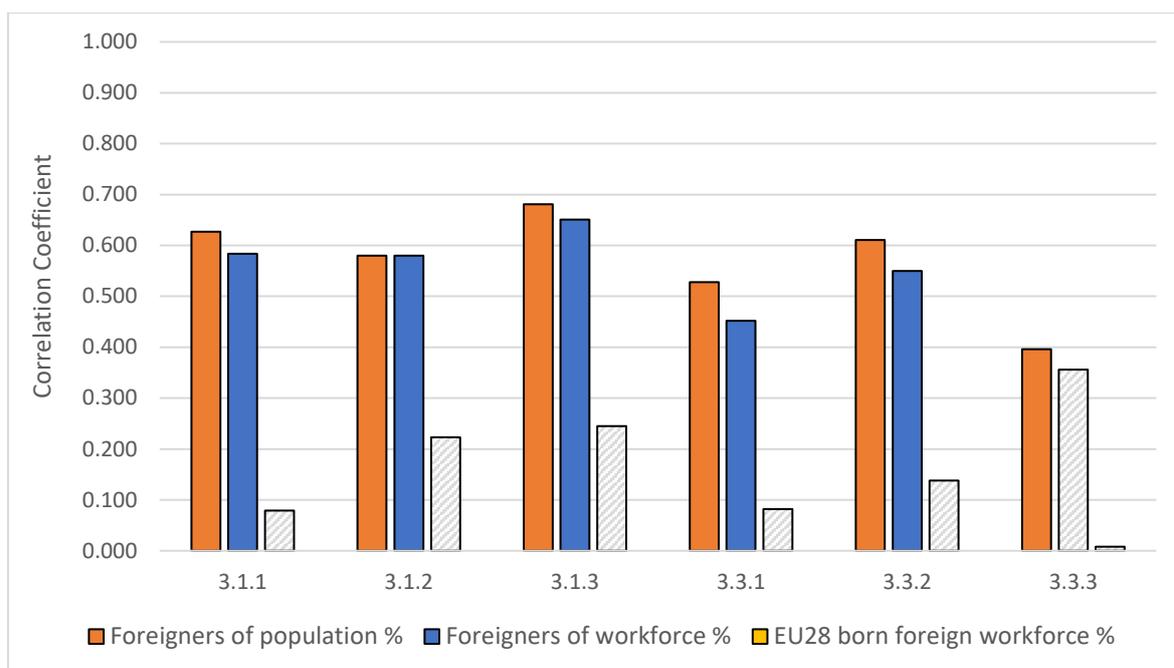


Figure 17 The correlation coefficients between the innovation indicators and the diversity groups in 2010 (Eurostat 2019a; Eurostat 2019b; European Commission 2018b)

The strongest correlation had the SME “in-house” (3.1.3) innovations to the share of the foreigners of population (.681) when the weakest significant correlation had the design patent applications (3.3.3) to the share of the foreigners of population (.396). As Figure 17 depicts that the share of foreigners’ diversity group had a stronger correlation coefficient concerning all indicators compared to the share of the foreign workforce. (Eurostat 2019a; Eurostat 2019b; European Commission 2018b.) The results indicate that the higher share of foreigners in total population tends to have a stronger relationship to better innovation performance score compared to the higher share of the foreign workforce.

Spearman’s correlation 2016

Another correlation test with the same diversity variables and innovation indicators was performed for the results in 2016. Again, there was a moderate positive relationship between the share of the foreigners of population (.687) and the share of the foreign workforce diversity (.642) with significance levels of (.000) and (.001). The results for the share of EU28 foreign-born indicated a very weak correlation (.258) with insignificant results (.235). See Appendix 3 for the Spearman’s correlation results concerning the year 2016. (Eurostat 2019a; Eurostat 2019b; European Commission 2018b.) Figure 18 demonstrates the moderate correlation between the innovation indicators and the two significant diversity groups: the share of foreigners of population and the share of foreign workforce.

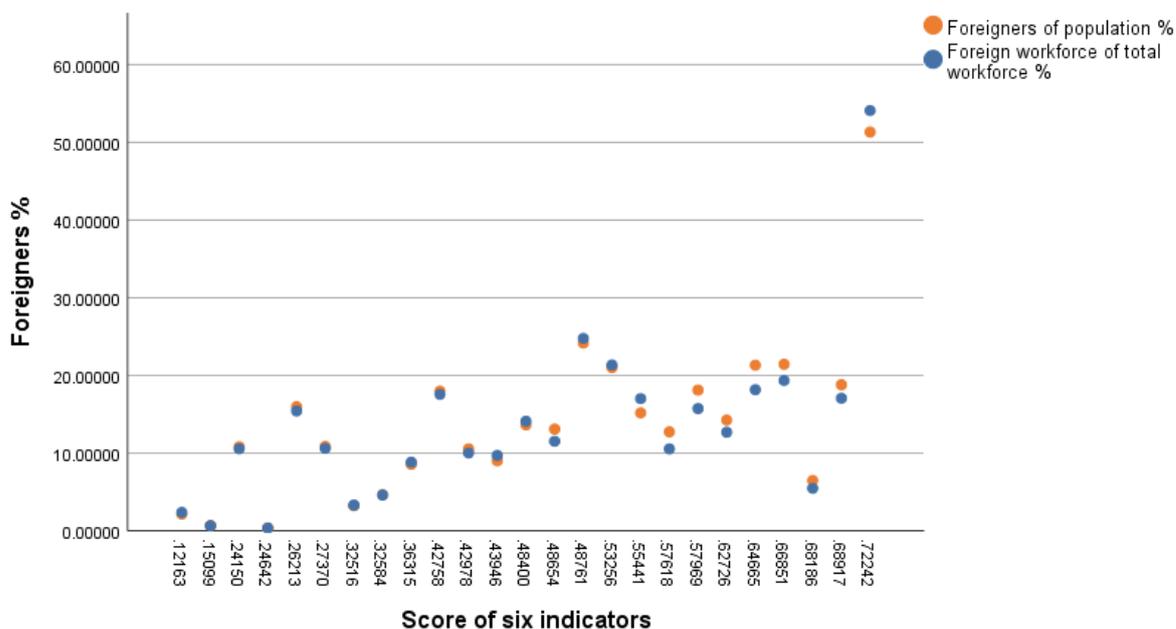


Figure 18 Scatter diagram between the significant foreign groups and the scores of the six innovation indicators in 2016 (Eurostat 2019a; Eurostat 2019b; European Commission 2018b)

In 2016 the same innovation indicators correlated positively and significantly as in 2010. The strongest correlation among the innovation indicators was between the SME organisational or market innovations and the two foreigner groups: the foreigners of population (.694) and the foreigners of workforce (.692), with the significance levels of (.000). Among the statistically significant results, the weakest correlation was again between the share of the foreign population (.407) and the design patent applications with the P-value of (.032). (Eurostat 2019a; Eurostat 2019b; European Commission 2018b.) See Figure 19 to compare the strengths of the correlation coefficients between the indicators and the diversity groups to results in 2010. Again, grey indicates insignificant results.

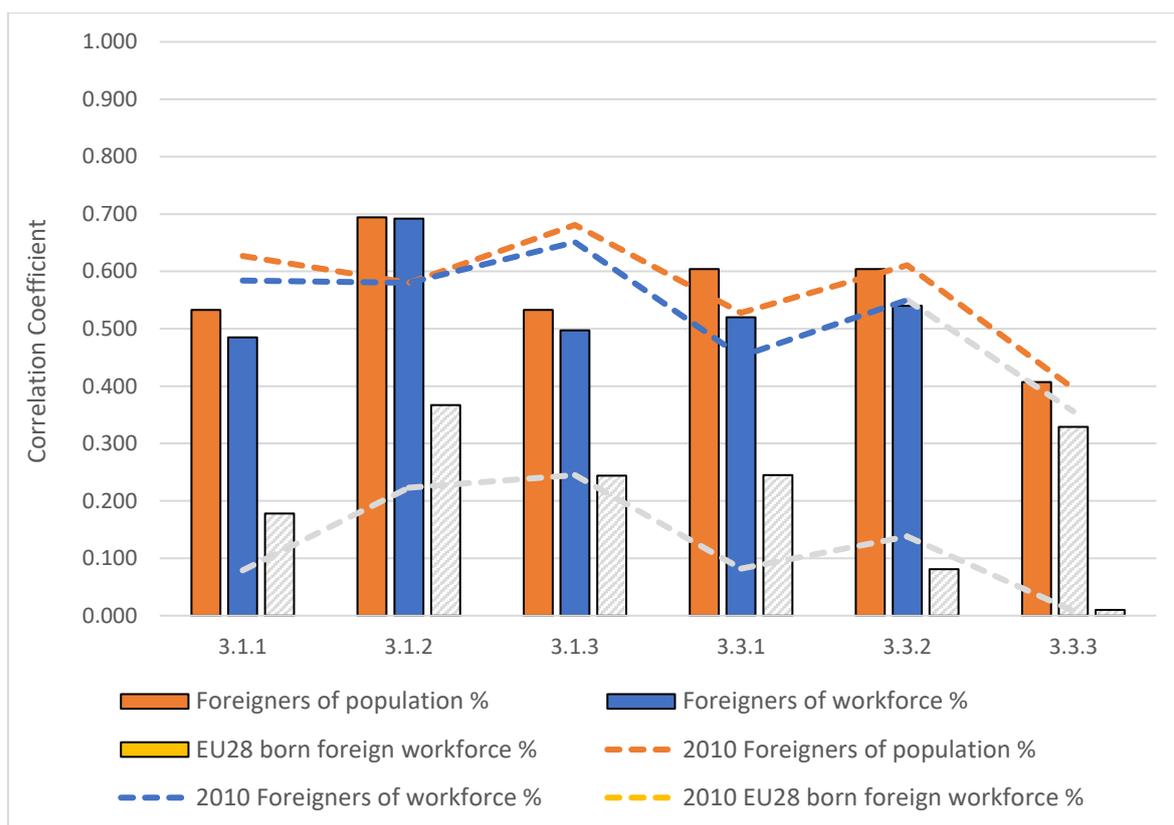


Figure 19 Correlation coefficients of the innovation indicators and the diversity variables in 2016 compared to the results in 2010 (Eurostat 2019a; Eurostat 2019b; European Commission 2018b)

When comparing the results between 2010 and 2016. The strength of the correlation declined from moderate to low concerning the two SME indicators (3.1.1, 3.1.3). On the other hand, the SME innovation indicator concerning the organisational and market innovations (3.1.2) strengthened. The correlation regarding the intellectual property patent applications (3.3.1) has strengthened slightly when the other two intellectual property indicators (3.3.2, 3.3.3) correlation coefficients remained on the same degree.

4.4.2 EU28 change of foreign population, foreign workforce and innovation indicators between 2010 and 2016

Third correlation analysis aims to provide the answer to the sub-question three, whether there is a linear relationship between the change in foreign diversity and the change in the innovation indicators. The countries' changes concerning the variables were calculated between the years 2010 - 2012, 2012 - 2014 and 2014 - 2016. The calculation formula was introduced in the descriptive statistics 4.2.3.

The results indicated a very weak positive correlation (.243) between the change in the indicator 3.1.3 and the change in the foreign population. The P-value was (.028), which makes the result statistically significant. The change of the six innovation indicators indicated a very weak positive correlation to the foreigners of population (.196) and the foreigners of workforce (.195). However, the P-values were (.081) and (.083), so these results were considered statistically insignificant. The EU28 born foreigners' correlation coefficient was (-.018) with the highly insignificant P-value (.881). See Appendix 4 for Spearman's correlation results. (Eurostat 2019a; Eurostat 2019b; European Commission 2018b.) Figure 20 demonstrates the very weak correlation between the change of the foreign population and the change of the SME "in-house" innovation indicator score.

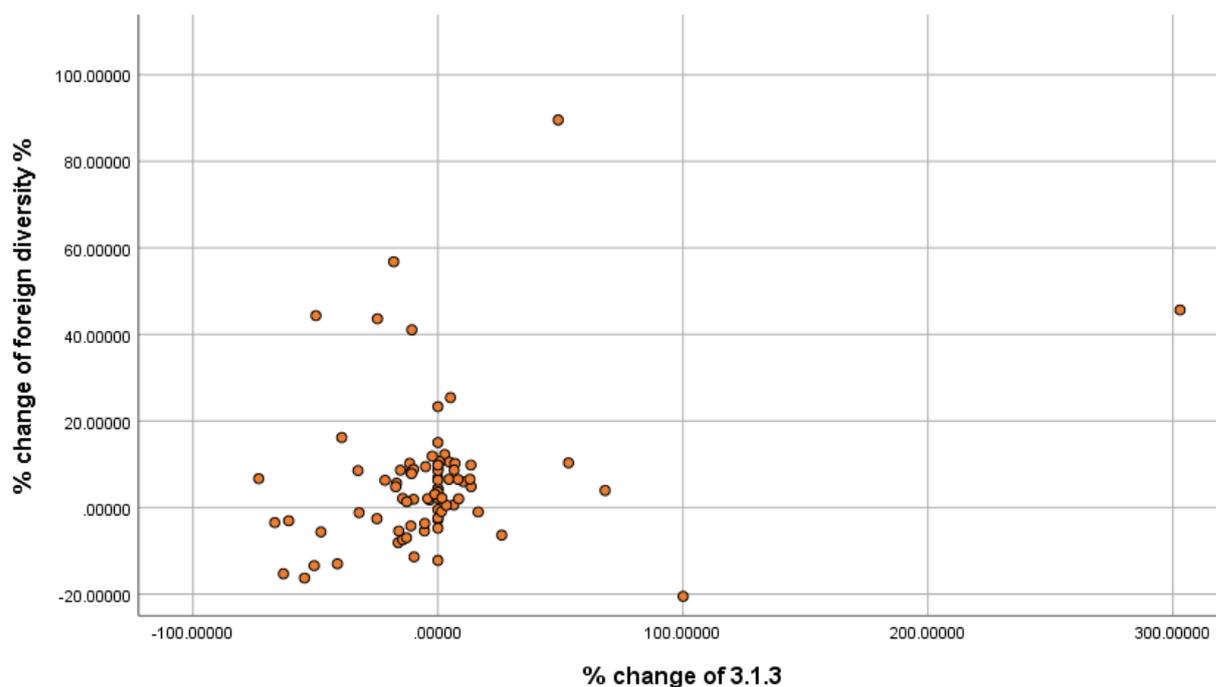


Figure 20 Change of foreign population and change of indicator 3.1.3 between 2010 and 2016 (Eurostat 2019a; Eurostat 2019b; European Commission 2018b)

As it is shown in Figure 20 that there are few outliers in the scatter diagram. The author reminds that Spearman's correlation as a non-parametric test makes it less sensitive to the outliers in the sample.

The results indicate that when the share of the foreigners has grown compared to the native population, there tend to be more SMEs introducing innovations, that have been developed by the company itself or in collaboration with other companies.

4.4.3 Foreigners' occupational groups, genders and innovation performance in Finland

This subchapter demonstrates the results concerning the changes of the foreigners' occupational groups and the changes of the innovation performance in Finland. This subchapter consists of three parts. First, the SMEs' innovation performance will be demonstrated between the foreigners' occupational skill groups. Secondly, the intellectual property performance among the foreigners' occupational groups will be presented. Lastly, based on the previous findings the correlation of foreigners' occupational groups among genders will be investigated. This subchapter aims to answer the sub-questions four and five.

SME innovation performance

There was no data available to perform the correlation tests for the SME innovation performance. The SME innovation data is provided only every second year, which would leave the sample size as small as three between 2010 and 2016. Therefore, the changes of the SME indicators' averages and the changes of the foreigners' occupational groups will be demonstrated in a scatter matrix.

The author modified the data and transformed the occupational groups into three groups: High skilled, skilled and elementary. See below.

High skilled = Managers + Professionals + Technicians and associate professionals

*Skilled = Clerical support workers + Service and sales workers
+ Skilled agricultural, forestry and fishery workers
+ Craft and trade workers + Plant and machine operators*

Elementary = Elementary occupations

The percentual changes of the variables were calculated from the data between 2010 and 2016. The changes were calculated every second year, which provided a sample size of three. See below.

$$(N_{2012} - N_{2010}) \div N_{2010} = \text{Change between 2010 and 2012}$$

$$(N_{2014} - N_{2012}) \div N_{2012} = \text{Change between 2012 and 2014}$$

$$(N_{2016} - N_{2014}) \div N_{2014} = \text{Change between 2014 and 2016}$$

Figure 21 demonstrates a scatter matrix of the three introduced occupational skill groups and the three SME innovation indicators (3.1.1, 3.1.2, 3.1.3). The innovation indicator (3.1.1) which represents the product and process innovations indicated dispersion between the different skill-based occupations. The indicator (3.1.2) which indicates organisational or marketing innovations demonstrated possibly strong linear positive relationship between the elementary and the skilled occupational groups. The third innovation indicator (3.1.3) concerning the “in-house” innovations presented a possible negative linear relationship to the high skilled occupational group. (Statistics Finland 2019; European Commission 2019b.)

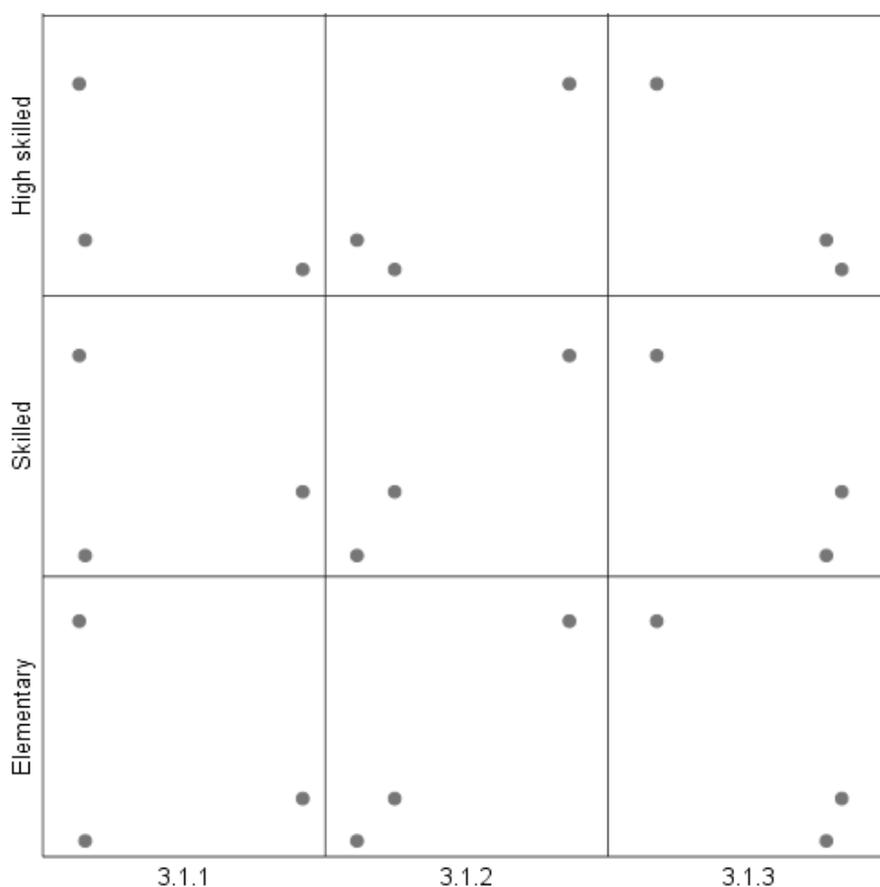


Figure 21 Scatter matrix foreign workers' skill groups and SME innovation indicators (Statistics Finland 2019; European Commission 2019b.)

The author reminds that the sample size is very small and therefore conclusions should not be drawn. However, it demonstrates the potential trend between the occupational groups and the SME innovation performance for further studies.

Intellectual property performance

Unlike the SME indicators, the intellectual property indicators (3.3.1, 3.3.2, 3.3.3) have been gathered yearly between 2010 and 2016. This allowed to perform the correlation analysis between the intellectual property indicators and the three occupational skill groups. The difference was calculated yearly, which provided a sample size of six for each variable.

$$(N1 - N2) \div N1 = \text{Change between } N1 \text{ and } N2$$

The Spearman's correlation coefficient indicated either no correlation, a very weak negative correlation, or a very weak positive correlation between the different variables. The results were highly insignificant. The correlation was not calculated for the intellectual property indicator 3.3.1 since the score has been highest possible since 2010. (Statistics Finland 2019; European Commission 2019b.) See Table 11 for Spearman's correlation results.

Table 11 The correlation results between the occupational skill groups and the intellectual property performance (Statistics Finland 2019; European Commission 2019b.)

| | | | 3.3.1 | 3.3.2 | 3.3.3 |
|----------------|--------------|-------------------------|-------|-------|-------|
| Spearman's rho | High skilled | Correlation Coefficient | . | .371 | -.314 |
| | | Sig. (2-tailed) | . | .468 | .544 |
| | | N | 6 | 6 | 6 |
| | Skilled | Correlation Coefficient | . | .200 | -.086 |
| | | Sig. (2-tailed) | . | .704 | .872 |
| | | N | 6 | 6 | 6 |
| | Elementary | Correlation Coefficient | . | .086 | -.257 |
| | | Sig. (2-tailed) | . | .872 | .623 |
| | | N | 6 | 6 | 6 |

Next, the author studied occupational groups separately. The second correlation analysis measured the nine foreigners' occupational groups and intellectual property performance averages. The author introduced the average of the intellectual property indicators, which consist of the average of the three intellectual property indicators.

$$(3.3.1 + 3.3.2 + 3.3.3) \div 3 = \text{average of 3 IPR indicators}$$

Appendix 5 demonstrates the results of the Spearman's correlation between the yearly change in the share of foreigners' occupational groups and the change in the average of

the three IPR indicators (3.3.1, 3.3.2 and 3.3.3). There was a positive high degree correlation (.771) between the relative increase of the foreign managers and average of the IPR indicators. However, the P-value was (.072), which means that the result is not considered statistically significant. No statistically significant correlation was found between the foreigners' occupational groups and the intellectual property performance. (Statistics Finland 2019; European Commission 2019b.)

IPR performance among the foreign' managers by genders

Based on the correlation results concerning the foreigners' occupational groups, the author aims to identify whether there is a statistically significant correlation between foreign managers by genders and the intellectual property performance. This time only the foreign manager occupational group is analysed.

Figure 22 demonstrates the change of the foreign manager diversity by gender and the change in the average of intellectual property indicators. It indicates that there could be a moderate or strong positive relationship between the increase in foreign males among all male managers to the intellectual property performance. In addition, there could be a weak or moderate positive relationship between the increase of foreign female among all female managers to the intellectual property performance. (Statistics Finland 2019; European Commission 2019b.)

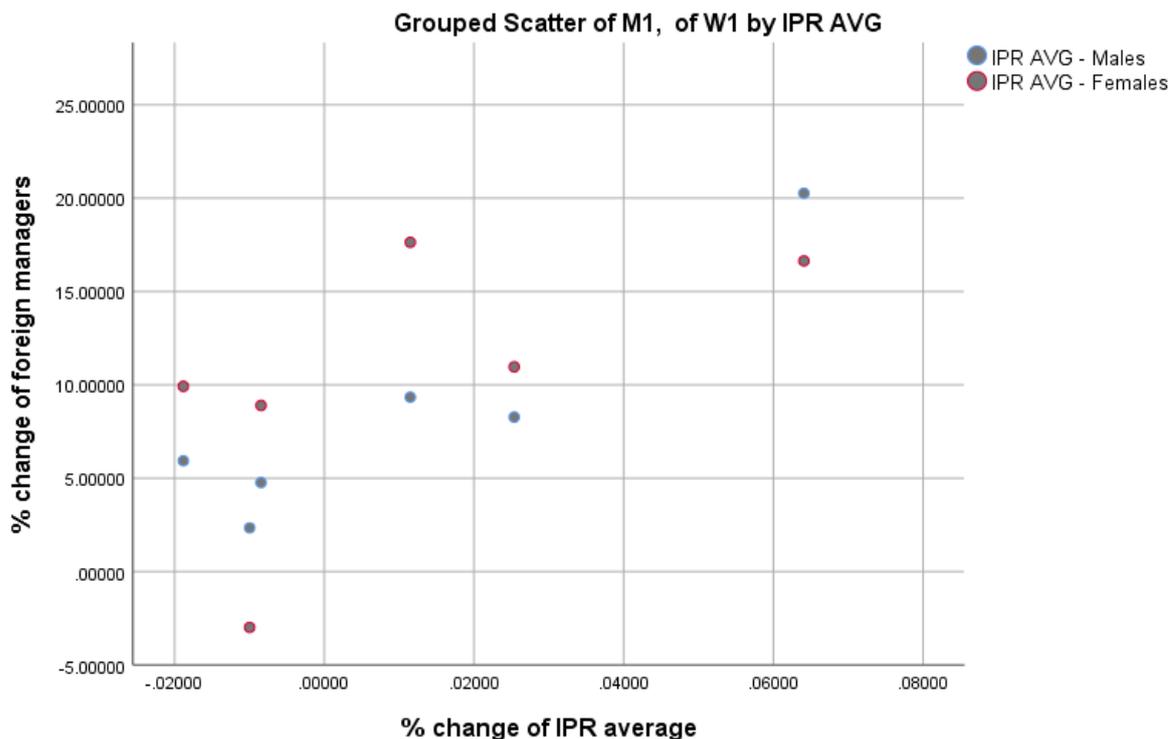


Figure 22 Change of foreign managers by gender and change of IPR average (Statistics Finland 2019; European Commission 2019b)

The results indicated a strong positive correlation (.771) between the share of foreign males and the indicator that represents design patent applications (3.3.3). In addition, the correlation coefficient concerning the foreign female managers indicated a positive moderate linear relationship to indicator 3.3.3. However, both results were statistically insignificant with P-values of (.072) and (.156). The indicator 3.3.2 concerning trademark applications indicated a negative relationship to both manager groups, males (-.257) and females (-.486) with highly insignificant results (.623) and (.329). Again, the correlation was not calculated for the IPR indicator 3.3.1, since the results have not changed since 2010. (Statistics Finland 2019; European Commission 2019b.) See Table 12 for Spearman's correlation results.

Table 12 The correlation results between the relative change of the foreign managers by genders and the intellectual property indicators between 2010 and 2016 (Statistics Finland 2019; European Commission 2019b)

| | | | 3.3.1 | 3.3.2 | 3.3.3 |
|----------------|-------|-------------------------|-------|-------|-------|
| Spearman's rho | Men | Correlation Coefficient | . | -.257 | .771 |
| | | Sig. (2-tailed) | . | .623 | .072 |
| | | N | 6 | 6 | 6 |
| | Women | Correlation Coefficient | . | -.486 | .657 |
| | | Sig. (2-tailed) | . | .329 | .156 |
| | | N | 6 | 6 | 6 |

4.5 Discussion of the results

The results of the study indicated that there is a moderate positive relationship between the average of the six innovation indicators and the share of the foreign population and the share of the foreign workforce. In other words, when the cultural diversity is higher, there tend to be more innovations introduced by small and medium-sized enterprises and applications of intellectual properties in the country. However, the results are not surprising. First, as it was concluded in the subchapter 2.2 based on the Minniti's (2007, 131-141) calculations, the product market competition can accelerate innovation activities that can then lead to economic growth. Second, as referred to the statement by the United Nations (2017a) in the subchapter 3.2, the migration is especially focused to the developed countries. In addition, it was demonstrated how migration and innovation performance was the lowest in the East Europe. Based on these statements and findings, the positive relationship can be argued to be expected. The author reminds that the results indicate a positive relationship but does not tell whether the cultural diversity itself led for a greater amount of inventions or innovations in the countries. In fact, the author suspects that the most innovative countries are more attractive destinations for international migrants, but do not rule out the potential impact of cultural pluralism on better innovation performance. As previously argued by Ozgen et al. (2012, 10), there can be multiple ways on how foreigners could affect the innovation performance in a country, which are not limited to companies' operations.

Ozgen et al. (2012, 14-15) have studied immigration and innovation performance regionally in the European Union between 1991-1995 and 2001-2005. They did not find a statistically significant causal relationship between the share of the foreigners and the intellectual property performance. On the other hand, they found a positive causal

relationship between European born foreigners and regional innovation performance regarding the intellectual property applications. Even though this study did not analyse causation, the results of the relationships were the opposite. In the study was found a positive correlation between the share of the foreigners of total population and all the intellectual property indicators, but all analyses concerning employed EU-born foreigners were weaker and insignificant towards all six innovation indicators in 2010 and in 2016.

The second part of the correlation analyses concerned the changes of the three diversity variables and the six innovation indicators every second year between 2010 and 2016. The analysis identified a very weak positive correlation between the growth of the relative foreign population and the increase in the small and medium-sized enterprises “in-house” innovations. However, such relationship was not found between the changes in the foreign workforce or the changes in the foreign EU28 born workforce. The finding is interesting and raises a further question that could there be a possibility for a causal relationship between increasing foreigner population and SME innovation performance. As Ozgen et al. (2012, 1-2) have stated that the cultural demographic changes can boost the creation of new ideas. The author reminds that culturally diverse customer base could be a source of inspiration for the companies.

The third part of the analyses focused on Finland. Foreigners’ occupational groups, genders, and innovation performance were studied. Based on the previous theories by Bratti & Conti (2013, 19) and Hunt & Gauthier-Loiselle (2010, 33-37) it was expected that the correlation could be positive and stronger between high-skill occupational groups and innovation performance compared to low-skill occupational groups. It was not possible to run a correlation analysis between the foreign occupational groups and the SME indicators because of the too small sample size. The correlation analysis concerning the foreign occupational skill groups and the intellectual property indicators did not identify a significant association between the variables.

When occupational groups were studied separately, results indicated a strong positive correlation between foreign managers and intellectual property performance. However, the result was slightly insignificant. Even when the occupational groups were examined separately and among different genders, the significant results were not identified. Generally, the results varied between the different occupational groups and no linear trend was found among the higher-level occupational groups and the intellectual property performance in this study. The author reminds that even though the foreign workforce has grown yearly, it still represents a very small share of the aggregate workforce in Finland, especially among the high skill occupational groups. As Keeley (2009, 86-87) stated, it

can be challenging for foreigners to find a suitable job in a foreign environment because of linguistic or cultural differences. Quite often foreign workers can be “overqualified” for their jobs. The author is not familiar with how successfully the foreigners are integrated in Finland but points out that Finland is likely to rely on a foreign workforce in the future. As it was demonstrated in Table 2 in the subchapter 2.6, population growth in Finland was three times lower compared to the European average. At the same time, the relative GDP growth was higher. In addition, the relative birth of the enterprises with 10 or more employees was five times slower compared to the European average. Even though cultural diversity may set some challenges for society, it is still a proven factor to increase creativity and entrepreneurship (Russell, Nabamita & Sanjukta 2010; Stahl et al. 2010).

In overall, the author finds it interesting that there is a stronger relationship found between the share of the foreigners in population and the innovation performance, rather than between the share of the foreign workforce and the innovation performance. The author points out that the findings of the study could be potential for further research concerning the foreign customer base. It would be interesting to see if the higher foreign population has a positive relationship to wider product categories or offered services of the companies for example.

5 CONCLUSION

5.1 Answers to the research questions

The study aimed to identify a relationship between cultural diversity and innovation performance. The main research question and the five sub-questions are listed and answered below.

1. Is there a linear relationship between cultural diversity and innovation performance?

Yes, there is. It was identified in the correlation analyses that the countries with greater cultural diversity tended to have greater innovation performance scores. Two out of three diversity groups correlated positively on most of the innovation indicators. It was identified that the share of the foreign population had stronger relationship to innovation performance compared to the share of the foreign workforce.

a) Is there a linear relationship between countries' cultural diversity and innovation indicators in EU28 in 2010?

Yes, there is. The share of foreign population had either positive, moderate, or weak correlation with all the six innovation indicators. The share of foreign workforce had either moderate or weak positive correlation with the five out of six innovation indicators.

b) Is there a linear relationship between countries' cultural diversity and innovation indicators in EU28 in 2016?

Yes, there is. Again, the share of the foreign population had either positive, moderate, or weak correlation with all the six innovation indicators. The share of the foreign workforce had either moderate or weak positive correlation with the five out of six innovation indicators.

c) Is there a linear relationship in changes of countries' cultural diversity and innovation indicators between 2010 and 2016?

Yes, the association was identified to one of the innovation indicators. The share of the foreign population had a very weak positive correlation with the small and medium-sized enterprises' own or in collaboration developed introduced innovations. However, overall "average" innovation performance indicated a positive relationship but remained statistically insignificant.

d) Is there a linear relationship between changes in foreigners' occupational groups and innovation indicators in Finland?

No, linear relationship between the foreigners' occupational groups and the innovations indicators were not identified in the study.

e) Is there a linear relationship between changes in foreigners' occupational groups among genders and innovation indicators in Finland?

No, linear relationship between foreign' workers occupational groups and the innovation indicators among the genders were not identified in the study. See Table 13 for the results concerning the five sub-questions.

Table 13 The study results

| Sub-question | Objective | Method | Variable | Result | Significance |
|--------------|---|------------------------|---------------------|---------------------------------|---------------|
| 1 | Is there a linear relationship between cultural diversity and innovation indicators in EU28 in 2010 | Spearman's correlation | Foreigners total | r = 0.704 (AVG 6) Sig. 0.000 | Significant |
| | | | Foreign workforce | r = 0.650 (AVG 6) Sig. 0.000 | Significant |
| | | | EU born foreigners | r = 0.215 (AVG 6) Sig. 0.314 | Insignificant |
| 2 | Is there a linear relationship between cultural diversity and innovation indicators in EU28 in 2016 | Spearman's correlation | Foreigners total | r = 0.687 (AVG 6) Sig. 0.000 | Significant |
| | | | Foreign workforce | r = 0.642 (AVG 6) Sig. 0.001 | Significant |
| | | | EU born foreigners | r = 0.258 (AVG 6) Sig. 0.235 | Insignificant |
| 3 | Is there a linear relationship between changes of countries' cultural diversity and innovation indicators between 2010 and 2016 | Spearman's correlation | Foreigners total | r = 0.243 (3.1.3) Sig. 0.028 | Significant |
| | | | Foreign workforce | All insignificant | Insignificant |
| | | | EU born foreigners | All insignificant | Insignificant |
| 4 | Is there a linear relationship between changes in foreigners' occupational groups and innovation indicators in Finland | Spearman's correlation | Occupational Groups | All insignificant | Insignificant |
| 5 | Is there a linear relationship between changes in foreigners' occupational groups between genders and innovation indicators in Finland? | Spearman's correlation | Managers men | r = 0.771 (3.3.3) Sig. 0.072 | Insignificant |
| | | | Managers women | r = 0.657 (3.3.3) Sig. 0.156 | Insignificant |

5.2 Validity and reliability

This study has several limitations and results should be used with caution.

As introduced in the study limitations that measuring both cultural diversity and innovation performance can be challenging. Therefore, this study relied on reliable secondary sources. However, neither of the variables, innovation nor cultural diversity, should be considered as comprehensive. Firstly, all the innovation indicators in this study were based on the data only from Eurostat. As mentioned in the subchapter 2.4 results of innovation performance are very dependent on the indicators that are chosen. Therefore, results could have been different if some other sources like the Global Innovation Index were used. Secondly, the cultural diversity in this study was represented only by the foreign-born people. As stated by Williams (2012, 9) language, nationality, genealogy, tribal affiliation or religious faith and traditions can represent cultural diversity. The author reminds that most of these aspects were not taken into account in this study.

Another fact is that foreigners account for only 13% on average of the total population among the studied age group. If it is imagined that foreigners would have a strong causal relationship to innovation performance, it could be possible that even the correlation could not be identified in this study. It could happen if the native population was performing differently compared to foreigners, which would be relatively stronger factor to influence the overall innovation scores of the countries. However, the author reminds that the purpose of this study was not to identify a causal relationship, but to study countries as a whole.

In addition, an integration time of the foreign people to local society is not considered in the study. Concerning the third correlation analysis that measured the changes between foreign diversity and innovation performance, results could have been different, if the adaptation time of the foreigners would have been included. The same applies for the fourth and fifth correlation analyses that measured the relationship between occupational groups and intellectual property performance. However, the author argues that the optimal integration time would be challenging to identify since adaptation times could consist of many different aspects in the societies.

Lastly, the fourth and fifth analyses concerning foreigners' occupational groups and genders in Finland, the author reminds that the sample sizes were very small, which decreases the reliability of the results.

5.3 Suggestions on further research

This study identified a moderate correlation between foreign diversity and foreign workforce diversity to innovation indicators. In addition, the correlation analysis concerning the changes in foreign diversity and changes in SMEs' "in-house" innovations identified a very

weak positive relationship between the variables. However, it is not known whether cultural diversity had an impact on these variables. It would be interesting to study the causal relationship between foreign diversity and SMEs' innovation performance more in-depth. Not just from the workforce perspective, but especially whether foreign' customers are inspirational for SME companies.

In addition, this study used very basic variables concerning cultural diversity. It would be interesting to add multiple factors such as linguistic-, religious-, and educational diversity among the foreigners, and aim to identify linear relationship towards innovation performance. Another interesting topic would be to study the relationship between second-generation foreigners and innovation performance.

Lastly, in the study occupational groups were analysed with small sample sizes. Further and more in-depth studies concerning foreign workforce diversity, cross-cultural management and innovation performance concerning Finnish SMEs could be an interesting topic for further research.

6 SUMMARY

The study aims to identify a linear relationship between cultural diversity and innovation performance among the European Union member countries. The study focuses on the foreign-born population aged between 15 and 64. In addition, the innovation performance is reflected on already introduced innovations. The geographical focus is on the European area, but more in-depth analyses are conducted concerning foreigners' occupational groups in Finland. The author approaches the study with quantitative research methods.

The study consists of two main parts: a theoretical and an empirical part. In the theoretical part the main themes of the innovation and the cultural diversity are introduced and explained. The innovation part begins with a definition of the term and it is then distinguished from related terms. Then follows types of innovation, intellectual properties, the matter of innovation and the current innovation performance in the European Union. The cultural diversity part discusses terms related to diversity, and its advantages and disadvantages. In addition, migration statistics are previewed concerning Europe and Finland. At the end of the theoretical part, previous studies concerning innovation performance and cultural diversity are explored.

The empirical part consists of the introduction of the data, descriptive statistics, correlation analyses, and discussion of the results. The author has gathered and modified secondary data from Eurostat and Statistics Finland that are explained at the beginning of the empirical part. Three diversity variables and six innovation indicators are used in the study concerning Europe. Nine foreigners' occupational groups, genders, and the innovation performance variables are used concerning Finland. Descriptive statistics provide an overview of the innovation performance and the cultural diversity in Europe and in Finland between 2010 and 2016. Spearman's correlation analyses are performed for the variables to answer the research questions. The empirical part ends in the discussion of the results.

The results indicate a moderate positive association between the innovation performance and the share of the foreign population and the share of the foreign workforce. In addition, a very weak positive relationship is identified between the changes of the share of foreigners and the changes of the small and medium-sized enterprises product or process innovations that have been introduced by the companies' themselves or in collaboration with other companies. The relationship between the foreigners' occupational groups and the innovation performance is not identified in this study.

In general, the results indicate that there is a linear relationship between cultural diversity and the innovation performance among the European Union countries.

REFERENCES

Written References

Minniti, A. 2007. *Economic Perspectives on Innovation and Invention*. Barnes, P.W. New York: Nova Science Publishers.

Varoglu, A. & Köker, A. 2009. *Innovation Policies, Business Creation and Economic Development*. Aydogan, N. New York: Springer.

Electronic References

Adams, J., Raeside, R. & Khan, H. 2014. *Research Methods for Business and Social Science Students*. Sage Publications [accessed 06 May 2019]. Available at: <http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/ebookviewer/ebook/bmx-IYmtfXzc4NDg4MI9fQU41?sid=963764e6-73a2-44ea-a29b-f00c1d2bfa44@pdc-v-sessmgr03&vid=0&format=EB&rid=1>

Aggestam, L. & Hill, C. 2008. The challenge of multiculturalism in European foreign policy. *International Affairs*. Vol. 84. p. 97-114 [accessed 13 April 2019]. Available at: <http://web.a.ebscohost.com.aineistot.lamk.fi/ehost/pdfviewer/pdfviewer?vid=1&sid=caa7c3b0-1402-43bf-b97c-cee888096a35%40sessionmgr4009>

Alberto, A. & La Ferrara, E. 2000. Participation in heterogeneous communities. *Quarterly Journal of Economics*. Vol.115. ISS 3, p. 847-904 [accessed 13 April 2019]. Available at: <http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=505cb8de-bf69-4516-bc09-a9df9e442112%40pdc-v-sessmgr01&bdata=JnNpdGU9ZWZWhvc3QtbGl2ZQ%3d%3d#db=bsh&AN=3474895>

Barbujani, G. & Pigliucci, M. 2013. Human races. *Current Biology*. Vol. 23, ISS. 5, p. 185-187 [accessed 11 April 2019]. Available at: <https://www.sciencedirect.com/science/article/pii/S0960982213000274>

Bergbom, B., Vartia-Vaananen, M. & Kinnunen, U. 2015. Immigrants and natives at work: exposure to workplace bullying. *Employee Relations*. Vol. 37. ISS. 2, p. 158-175 [accessed 14 April 2019]. Available at: <https://search-proquest-com.aineistot.lamk.fi/docview/1705063507>

Bourriau, J., Phillips, J. & Phillips, J. 2012. *Invention and Innovation*. Oxbow Books [accessed 12 March 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=4697915>

- Bratti, M. & Conti, C. 2013. Immigration, Population Diversity and Innovation of Italian region. Associazione Italiana Economisti Del Lavoro [accessed 17 April 2019]. Available at: http://www.aiel.it/Old/bacheca/LUISS/papers/Bratti_Conti.pdf
- Breau, S., Kogler, D. & Bolton, K. 2014. On the Relationship between Innovation and Wage Inequality: New Evidence from Canadian Cities. *Economic Geography*. Vol. 90. ISS, 4, p. 351-373 [accessed 18 April 2019]. Available at: <http://web.a.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=e1a88816-2395-46ed-a2ba-b6b7d2cbd0f6%40sdc-v-sessmgr01&bdata=JnNpdGU9ZWwhvc3QtbGl2ZQ%3d%3d#db=afh&AN=98404077>
- Burrow, A. & Hill, P. 2013. Derailed by Diversity? Purpose Buffers the Relationship Between Ethnic Composition on Trains and Passenger Negative Mood. *Personality & Social Psychology Bulletin*. Vol. 39. p. 1610 [accessed 14 April 2019]. Available at: https://masto.finna.fi/PrimoRecord/pci.gale_ofa355421817
- Cambridge Dictionary. 2019. Research and Development [accessed 22 March 2019]. Available at: <https://dictionary.cambridge.org/dictionary/english/research-and-development>
- Chikkodi, C. & Satyaprasad, B. 2009. Business Statistics. Global Media [accessed 26 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=3011296&ppg=317>
- Contini, R. & Maturo, A. 2010. Cross-Cultural Education. *Procedia - Social and Behavioral Sciences*. Vol. 2. p. 1794-1805 [accessed 14 April 2019]. Available at: <https://www.sciencedirect.com/science/article/pii/S187704281001027X>
- Corder, G. & Foreman, D. 2014. *Nonparametric Statistics: A Step-By-Step Approach*. John Wiley & Sons [accessed 26 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=1676115&ppg=164>
- Cornell University, INSEAD & WIPO. 2018. Global Innovation Index 2018 Rankings [accessed 31 March 2019]. Available at: <https://www.globalinnovationindex.org/gii-2018-report#>
- Dinesen, P. & Sønderskov, K. 2015. Ethnic Diversity and Social Trust: Evidence from the Micro-Context. *American Sociological Review*. Vol. 80. p. 550-573 [accessed 14 April 2019]. Available at: <https://journals-sagepub-com.aineistot.lamk.fi/doi/full/10.1177/0003122415577989>
- Encyclopedia Britannica. 2019. Ethnic Group [accessed 12 April 2019]. Available at: <https://www.britannica.com/topic/ethnic-group>

European Commission. 2011. Innovation Union Scoreboard 2011 [accessed 06 May 2019]. Available at: https://ec.europa.eu/eip/ageing/library/innovation-union-scoreboard-2011_en

European Commission. 2018a. European Innovation Scoreboard [accessed 25 March 2019]. Available at: <https://ec.europa.eu/docsroom/documents/33147>

European Commission. 2018b. EIS 2018 Database [accessed 26 March 2019]. Available at: <https://ec.europa.eu/docsroom/documents/30282>

European Commission. 2018c. European Innovation Scoreboard 2018 Methodology Report [accessed 23 April 2019]. Available at: https://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en

European Commission. 2019a. Innovation [accessed 13 March 2019]. Available at: https://ec.europa.eu/growth/industry/innovation_is

European Commission. 2019b. The Commission's proposal for Horizon Europe [accessed 25 March 2019]. Available at: https://ec.europa.eu/info/designing-next-research-and-innovation-framework-programme/what-shapes-next-framework-programme_en

European Commission. 2019c. European Innovation Scoreboard [accessed 25 March 2019]. Available at: https://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_en

European Customs Portal. 2019. Definition: Knowledge-capturing product [accessed 27 March 2019]. Available at: <https://www.tariffnumber.com/info/abbreviations/12126>

European Patent Office. 2016. European Patent Convention. 16th Edition [accessed 14 May 2019]. Available at: [http://documents.epo.org/projects/babylon/eponet.nsf/0/029F2DA107DD667FC125825F005311DA/\\$File/EPC_16th_edition_2016_en.pdf](http://documents.epo.org/projects/babylon/eponet.nsf/0/029F2DA107DD667FC125825F005311DA/$File/EPC_16th_edition_2016_en.pdf)

European Patent Office. 2019. About Us [accessed 8 April 2019]. Available at: <https://www.epo.org/about-us.html>

Eurostat. 2019a. Population by sex, age, country of birth and labour status [accessed 19 April 2019]. Available at: <https://ec.europa.eu/eurostat/web/migrant-integration/data/database>

Eurostat. 2019b. Employment and unemployment: LFS Series: Employment: Employment by sex, age and citizenship (1 000) [accessed 19 April 2019]. Available at: <https://ec.europa.eu/eurostat/web/lfs/data/database>

Eurostat. 2019c. Community Innovation Survey (CIS). European Commission [accessed 10 May 2019]. Available at: <https://ec.europa.eu/eurostat/web/microdata/community-innovation-survey>

Eurostat. 2019d. European Union Labour Force Survey (EU LFS). European Commission [accessed 10 May 2019]. Available at: <https://ec.europa.eu/eurostat/web/microdata/european-union-labour-force-survey>

Eurostat. 2019e. Migrant Integration Methodology. European Commission [accessed 10 May 2019]. Available at: <https://ec.europa.eu/eurostat/web/migrant-integration/methodology>

Farkas, L. 2017. Data collection in the field of ethnicity. European Commission [accessed 23 April 2019]. Available at: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=2ahUKEwiMhYb-m-bhAhXEFsSKHRYfBgEQFjAAegQIBhAC&url=https%3A%2F%2Fec.europa.eu%2Fnewsroom%2Fjust%2Fdocument.cfm%3Faction%3Ddisplay%26doc_id%3D45791&usg=AOvVaw1miR_XV5fKoBBRJokOn6Mx

Fong, H. & Harris, E. 2015. Technology, innovation and health equity. Bulletin of the World Health Organization. Vol. 93. p.438 [accessed 17 April 2019]. Available at: <http://web.a.ebscohost.com.aineis-tot.lamk.fi/ehost/pdfviewer/pdfviewer?vid=1&sid=d4ef889a-fc8d-46fa-b1bb-d9f597a1d8ff%40sessionmgr4007>

Garden, H., Bowman, D., Haesler, S. & Winickoff, D. 2016. Neurotechnology and Society: Strengthening Responsible Innovation in Brain Science. Neuron. Vol. 92. ISS, 3, p. 642-646 [accessed 17 April 2019]. Available at: <https://www.sciencedirect.com/science/article/pii/S0896627316308030>

Gardenswartz, L. & Rowe, A. 2003. Diverse Teams at Work : Capitalizing on the Power of Diversity [accessed 10 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/detail.action?docID=839197>

Gesteland, R. 2002. Cross-Cultural Business Behaviour. Copenhagen Business School Press [accessed 14 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=3400738&ppg=9>

Glaser, M. & Murphy, A. 2010. Patients Versus Patents: Thailand and the Politics of Access to Pharmaceutical Products. Journal of Third World Studies. VOL 27. ISS 1

[accessed 24 March 2019]. Available at:

<http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/pdfviewer/pdfviewer?vid=1&sid=1dca2c32-b91e-490e-9c7e-3baebc0e9d60%40pdc-v-sessmgr02>

Gould, K. 1995. The misconstruing of multiculturalism: the Stanford debate and social work. *Social Work*. Vol. 40. p. 198-205 [accessed 12 April 2019]. Available at:

<http://web.a.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=62332613-5ca8-4dfb-87b9-67e8eb315864%40sdc-v-sessmgr01&bdata=JnNpdGU9ZWwhvc3QtbGl2ZQ%3d%3d#db=c8h&AN=107417815>

Graham, L. 2013. *Lonely Ideas: Can Russia Compete?* MIT Press [accessed 10 March 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=3339671>

Grossman, G. & Helpman, E. 1993. *Innovation and Growth in the Global Economy*. Mit Press [accessed 19 March 2019]. Available at:

<http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/ebookviewer/ebook/bmxIYmtfXzExNDA4X19BTg2?sid=a0fbf44e-cc6c-48b7-986a-141b76b0ba13@sessionmgr102&vid=0&format=EB&rid=1>

Hamel, G. 2010. *The Future of Innovation*. Ashgate Publishing Ltd [accessed 05 May 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=564096&ppg=20>

Hudea, O. 2014. Cross-cultural Leadership. *Manager*. Vol. 19. ISS, 19, p. 45-52 [accessed 14 April 2019]. Available at: <https://search-proquest-com.aineistot.lamk.fi/docview/1619354089?accountid=16407>

Hunt, J. & Gauthier-Loiselle, M. 2010. How much does immigration boost innovation? *American Economic Journal*. Vol. 2. ISS, 2, p.31-56 [accessed 04 May 2019]. Available at: <https://search-proquest-com.aineistot.lamk.fi/docview/871998109?accountid=16407>

International Anti-Counterfeiting Coalition. 2019. What is counterfeiting? [accessed 18 April 2019]. Available at: <https://www.iacc.org/resources/about/what-is-counterfeiting>

Kapoor, C. 2011. Defining diversity: the evolution of diversity. *Worldwide Hospitality and Tourism Themes*. Vol. 3, ISS. 4, p. 284-293 [accessed 10 April 2019]. Available at: <https://search-proquest-com.aineistot.lamk.fi/docview/888257399>

Kautish, P. 2012. Paradigm of Workforce Cultural Diversity and Human Resource Management. *Vidwat*. Vol 5. ISS 1, p. 37-41 [accessed 14 April 2019]. Available at: <https://search-proquest-com.aineistot.lamk.fi/docview/1287585581>

- Keeley, B. 2009. International Migration. OECD Publishing [accessed 12 April 2019]. Available at: https://read.oecd-ilibrary.org/social-issues-migration-health/international-migration_9789264055780-en#page1
- Keeley, L., Nagji, B., Walters, H., Pikkell, R. & Quinn, B. 2013. Ten Types of Innovation: The Discipline of Building Breakthroughs. John Wiley & Sons [accessed 11 March 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=1180146>
- Krishnaswami, O. & Satyaprasad, B. 2010. Business Research Methods. Himalaya Publishing House [accessed 30 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=588025&ppg=6>
- Lambert, J. 2016. Cultural Diversity as a Mechanism For Innovation: Workplace Diversity And The Absorptive Capacity Framework. Journal of Organizational Culture, Communications and Conflict. Vol. 20. ISS, 1, p. 68-77 [accessed 16 April 2019]. Available at: <https://search-proquest-com.aineistot.lamk.fi/docview/1804899646>
- Lane, J. & Flagg, J. 2010. Translating three states of knowledge--discovery, invention, and innovation. Implementation Science, VOL 5 [accessed 24 March 2019]. Available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2827367/>
- Lewis, R. 2006. Multiculturalism Observed : Exploring Identity. ASP [accessed 12 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/detail.action?docID=3115865>
- Lopez, J. 2015. Types of Innovation. Constant Contact [accessed 13 March 2019]. Available at: <https://techblog.constantcontact.com/software-development/types-of-innovation/>
- Maderer, D., Holtbrügge, D. & Schuster, T. 2014. Professional football squads as multicultural teams: Cultural diversity, intercultural experience, and team performance. Vol. 14. p. 215-238 [accessed 14 April 2019]. Available at: <https://journals-sagepub-com.aineistot.lamk.fi/doi/full/10.1177/1470595813510710>
- Malehia, M. 2010. European Multiculturalism Revisited. Silj, A. Zed Books [accessed 14 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=619256&ppg=18>
- May, C. & Sell, S. 2005. Intellectual Property Rights : A Critical History. Lynne Rienner Publishers [accessed 21 March 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=3328971>

McAll, C. 1992. *Class, Ethnicity, and Social Inequality*. MQUP [accessed 11 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/detail.action?docID=3331355>

Meer, N. & Modood, T., & Zapata-Barrero, R. 2016. *Multiculturalism and Interculturalism : Debating the Dividing Lines*. Edinburgh: Edinburgh University Press [accessed 05 April 2019]. Available at: <http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=836f2641-5006-4976-8a41-5a5c45e0f38c%40sessionmgr120&bdata=JnNpdGU9ZWZWhvc3QtbGl2ZQ%3d%3d#AN=1424250&db=nlebk>

Microsoft. 2019. *Diversity and Inclusion* [accessed 06 May 2019]. Available at: <https://careers.microsoft.com/us/en/diversityandinclusion>

Mir-Babayev, R., Gulaliyev, M. Shikhaliyeva, S. Azizova, R. & Nuri, O. 2017. *The Impact of Cultural Diversity on Innovation Performance: Evidence from Construction Industry of Azerbaijan*. *Economics & Sociology*. Vol 10. ISS, 1, p. 78-93 [accessed 14 April 2019]. Available at: <https://search-proquest-com.aineistot.lamk.fi/docview/1888701018?accountid=16407>

Nathan, M. & Lee, N. 2013. *Cultural Diversity, Innovation, and Entrepreneurship: Firm-level Evidence from London*. *Economic Geography*. Vol. 89. ISS, 4, p. 367-394 [accessed 16 April 2019]. Available at: <http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=6a907de6-501e-40e9-9e8b-0b0659e0502b%40sessionmgr103&bdata=JnNpdGU9ZWZWhvc3QtbGl2ZQ%3d%3d#AN=90633668&db=afh>

Nike. 2019. *Standing up for equality* [accessed 06 May 2019]. Available at: <https://purpose.nike.com/standing-up-for-equality>

Norman, D. & Verganti, R. 2013. *Incremental and Radical Innovation: Design Research vs. Technology and Meaning Change*. *Design Issues*. Vol 30, ISS 1, p. 82 [accessed 17 March 2019]. Available at: <http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/pdfviewer/pdfviewer?vid=1&sid=ca6babdf-ba70-4514-80a0-7959df9e46ec%40pdc-v-sessmgr05>

OECD. 2010a. *Measuring Innovation* [accessed 9 March 2019]. Available at: https://read.oecd-ilibrary.org/science-and-technology/measuring-innovation_9789264059474-en#page4

OECD. 2010b. Innovation Strategy [accessed 9 March 2019]. Available at: https://read.oecd-ilibrary.org/science-and-technology/the-oecd-innovation-strategy_9789264083479-en#page1

OECD. 2019. Research and development (R&D). OECD iLibrary [accessed 22 March 2019]. Available at: https://www.oecd-ilibrary.org/industry-and-services/research-and-development-r-d/indicator-group/english_09614029-en

OECD & Eurostat. 2018. OSLO Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation. OECD Publishing [accessed 27 March 2019]. Available at: https://read.oecd-ilibrary.org/science-and-technology/oslo-manual-2018_9789264304604-en#page4

Office of the United States Trade Representative. 2018. 2018 Special 301 Report [accessed 8 April 2019]. Available at: <https://ustr.gov/sites/default/files/files/Press/Reports/2018%20Special%20301.pdf>

Official Statistics of Finland. 2019. Employment. Statistics Finland [accessed 10 May 2019]. Available at: http://www.stat.fi/til/tyokay/meta_en.htm

Osling, A. 2010. Intellectual Property Rights and International Trade. Nova Science Publishers [accessed 21 March 2019]. Available at: <http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/ebookviewer/ebook/bmxlYmtfXzM5MzlyNF9fQU41?sid=bb1593c3-0bb5-41e1-bf97-8d45a45741d7@sessionmgr120&vid=0&format=EB&rid=1>

Ozgen, C., Nijkamp, P. & Poot, J. 2012. Migration Impact Assessment. Edward Elgar Publishing [accessed 03 May 2019]. Available at: https://ideas.repec.org/h/elg/eechap/14476_8.html

Phipps, M. 2017. Horizontal innovation: Solving our greatest challenges with existing technologies. Engineering and Technology [accessed 18 March 2019]. Available at: <https://eandt.theiet.org/content/articles/2017/01/horizontal-innovation-solving-our-greatest-challenges-with-existing-technologies/>

Pieterse, A., Van Knippenberg, D. & Van Dierendonck, D. 2013. Cultural diversity and team performance: the role of team member goal orientation. Academy of Management Journal. Vol. 56. ISS 3, p. 782-804 [accessed 14 April 2019]. Available at: <http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=3f44a408-50a9-40fb-a240->

d602d136549a%40sessionmgr103&bdata=JnNpdGU9ZWZWhvc3QtbGI2ZQ%3d%3d#AN=88416158&db=bsh

Ramasamy, B. & Yeung, M. 2016. Diversity and innovation. *Applied Economics Letters* [accessed 16 April 2019]. Available at:

[http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=3&sid=236c94d9-2567-4b93-838c-](http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=3&sid=236c94d9-2567-4b93-838c-077109854e74%40sessionmgr101&bdata=JnNpdGU9ZWZWhvc3QtbGI2ZQ%3d%3d#db=bsh&AN=116237693)

[077109854e74%40sessionmgr101&bdata=JnNpdGU9ZWZWhvc3QtbGI2ZQ%3d%3d#db=bsh&AN=116237693](http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=3&sid=236c94d9-2567-4b93-838c-077109854e74%40sessionmgr101&bdata=JnNpdGU9ZWZWhvc3QtbGI2ZQ%3d%3d#db=bsh&AN=116237693)

Ramos, M., Hewstone, M., Barreto, M. & Branscombe, N. 2016. The opportunities and challenges of diversity: Explaining its impact on individuals and groups. *European Journal of Social Psychology*. Vol. 46. ISS 7, p. 793-806 [accessed 13 May 2019]. Available at:

[http://web.a.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=4c8bde63-1ab4-48e5-ab4a-](http://web.a.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=4c8bde63-1ab4-48e5-ab4a-545656b995dd%40sessionmgr4007&bdata=JnNpdGU9ZWZWhvc3QtbGI2ZQ%3d%3d#AN=122685937&db=afh)

[545656b995dd%40sessionmgr4007&bdata=JnNpdGU9ZWZWhvc3QtbGI2ZQ%3d%3d#AN=122685937&db=afh](http://web.a.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=4c8bde63-1ab4-48e5-ab4a-545656b995dd%40sessionmgr4007&bdata=JnNpdGU9ZWZWhvc3QtbGI2ZQ%3d%3d#AN=122685937&db=afh)

Romanenko, A. 2012. *Cultural Diversity Management in Organizations: The Role of Psychological Variables in Diversity Initiatives*. Diplomatica Verlag [accessed 15 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=1035434&ppg=96>

Rongxing, G. 2009. *Cross-Cultural Economic Management*. Nova Science Publishers [accessed 11 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=3019367&ppg=17>

Roosevelt, T. 1996. *Redefining Diversity*. AMACOM [accessed 10 April 2019]. Available at: <http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=f4454cc1-fc8f-423c-8e69-8009457710bf%40pdc-v-sessmgr06&bdata=JnNpdGU9ZWZWhvc3QtbGI2ZQ%3d%3d#AN=2038&db=nlebk>

Russell, S., Nabamita, D. & Sanjukta, R. 2010. Does cultural diversity increase the rate of entrepreneurship? *Review of Austrian Economics*. Vol. 23. ISS, 3, p. 269-286 [accessed 14 April 2019]. Available at: <https://search-proquest-com.aineistot.lamk.fi/docview/755586295?accountid=16407>

Shippey, K. 2008. *Short Course in International Intellectual Property Rights : Protecting Your Brands, Marks, Copyrights, Patents, Designs and Related Rights Worldwide*. World Trade Press [accessed 21 March 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=439436#>

Stahl, G., Maznevski, M., Voigt, A. & Jonsen, K. 2010. Unraveling the effects of cultural diversity in teams: A meta-analysis of research on multicultural work groups. *Journal of International Business Studies*. Vol. 41. ISS, 4, p. 690-709 [accessed 14 April 2019]. Available at: <https://search-proquest-com.aineistot.lamk.fi/docview/197135006>

Statistics Finland. 2019. Employed persons by occupational group (Classification of Occupations 2010, levels 1 to 2), background country, sex and year, 2010-2016 [accessed 19 April 2019]. Available at: http://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__vrm__tyokay/?tablelist=true

Talukder, M. 2014. *Managing Innovation Adoption: From Innovation to Implementation*. Ashgate Publishing [accessed 10 March 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=1643843>

The United States Patent and Trademark Office. 2019. About Us [accessed 8 April 2019]. Available at: <https://www.uspto.gov/about-us>

Trotman, C. 2002. *Multiculturalism: Roots and Realities*. Indiana University Press [accessed 04 March 2019]. Available at: <http://web.a.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=894fbfc7-9ae5-4f77-aace-bd6530dbbe31%40sessionmgr4009&bdata=JnNpdGU9ZWZWhvc3QtbGl2ZQ%3d%3d#AN=66828&db=nlebk>

United Nations. 2007. *Principles and Recommendations for Population and Housing Censuses*. United Nations Publications [accessed 11 April 2019]. Available at: <http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/detail/detail?vid=0&sid=335ac958-ec6b-4e0c-a41d-b8ccfeef37a7%40pdc-v-sessmgr02&bdata=JnNpdGU9ZWZWhvc3QtbGl2ZQ%3d%3d#db=nlebk&AN=235007>

United Nations. 2017a. Total international migrant stock [accessed 4 April 2019]. Available at: <https://www.un.org/en/development/desa/population/migration/data/estimates2/estimates17.asp>

United Nations. 2017b. *World Population Prospects: The 2017 Revision* [accessed 4 April 2019]. Available at: <https://www.un.org/development/desa/publications/world-population-prospects-the-2017-revision.html>

VanAlstine, J., Cox, S. & Roden, D. 2013. The Costs and Benefits of Diversity: Are Religious Differences Most Important? *Journal of Global Business Issues*. Vol. 7. ISS 2, p.

9-20 [accessed 14 April 2019]. Available at: <https://search-proquest-com.aineistot.lamk.fi/docview/1461381812?accountid=16407>

Wakasugi, R., Lakhwinder, S. & Sukhpal, S. 2017. Innovations and Intellectual Property Rights in Asia: An Introduction. *Millennial Asia*. VOL 8. ISS 1 [accessed 24 March 2019]. Available at: <https://journals-sagepub-com.aineistot.lamk.fi/doi/full/10.1177/0976399616686859>

Walter, M. & Andersen, C. 2016. *Indigenous Statistics : A Quantitative Research Methodology*. Routledge [accessed 30 April 2019]. Available at: <https://ebookcentral-proquest-com.aineistot.lamk.fi/lib/lamk-ebooks/reader.action?docID=1418425&ppg=8>

Williams, D. 2012. *Race, Ethnicity, and Crime : Alternate Perspectives*. New York: Algora Publishing [accessed 11 April 2019]. Available at: http://web.b.ebscohost.com.aineistot.lamk.fi/ehost/ebookviewer/ebook/bmxlYmtfXzUyMTY1NV9fQU41?sid=47d230d3-ff2e-4151-ae3e-7f323ec42d91@sessionmgr101&vid=0&format=EB&lpid=lp_6&rid=0

WIPO. 2019a. *Frequently Asked Questions: Patents* [accessed 21 March 2019]. Available at: https://www.wipo.int/patents/en/faq_patents.html

WIPO. 2019b. *What is WIPO?* [accessed 8 April 2019]. Available at: <https://www.wipo.int/about-wipo/en/>

WIPO. 2019c. *Global Innovation Index 2018* [accessed 30 March 2019]. Available at: <https://www.wipo.int/publications/en/details.jsp?id=4330>

World Trade Organization. 2019. *Agreement on Trade Related Aspects of Intellectual Property Rights, Including Trade in Counterfeit Goods* [accessed 8 April 2019]. Available at: https://www.wto.org/english/docs_e/legal_e/ursum_e.htm#nAgreement

APPENDICES

APPENDIX 1 Descriptive statistics of countries' innovation indicator scores in 2016 (European Commission 2018b)

| Country | 3.1.1. | 3.1.2. | 3.1.3. | 3.3.1. | 3.3.2 | 3.3.3. | Score of six indicators |
|----------------|--------|--------|--------|---------|---------|---------|-------------------------|
| Austria | .68170 | .71046 | .70649 | .59317 | .58726 | .73198 | .66851 |
| Belgium | .86026 | .69225 | .83344 | .40392 | .40191 | .28635 | .57969 |
| Bulgaria | .05095 | .08493 | .07561 | .07814 | .46635 | .72258 | .24642 |
| Croatia | .32018 | .40640 | .33947 | .07366 | .22190 | .08740 | .24150 |
| Cyprus | .49551 | .41182 | .58750 | .09986 | 1.00000 | .33099 | .48761 |
| Czechia | .44804 | .30446 | .52112 | .12698 | .27897 | .27140 | .32516 |
| Denmark | .53835 | .58914 | .52754 | .72511 | .55145 | .83200 | .62726 |
| Estonia | .12925 | .09060 | .19800 | .16878 | .66126 | .39433 | .27370 |
| Finland | .76174 | .53479 | .79548 | 1.00000 | .53898 | .46016 | .68186 |
| France | .55778 | .62184 | .61576 | .50517 | .31702 | .30166 | .48654 |
| Germany | .70171 | .77110 | .78424 | .76879 | .46473 | .64441 | .68917 |
| Greece | .53734 | .59231 | .61172 | .07009 | .23713 | .13035 | .36315 |
| Hungary | .07530 | .09438 | .09020 | .16150 | .21225 | .09618 | .12164 |
| Ireland | .80021 | .83961 | .87523 | .29480 | .28381 | .10173 | .53256 |
| Italy | .49149 | .48147 | .58840 | .26291 | .41562 | .66409 | .48400 |
| Latvia | . | .16919 | .04885 | .04389 | .37168 | .18361 | . |
| Lithuania | .51569 | .26983 | .58478 | .09763 | .33596 | .15118 | .32585 |
| Luxembourg | .59274 | .87618 | .63403 | .23158 | 1.00000 | 1.00000 | .72242 |
| Malta | .35057 | .40519 | .41197 | .15874 | 1.00000 | 1.00000 | .55441 |
| Netherlands | .73410 | .43980 | .70860 | .72424 | .47206 | .37828 | .57618 |
| Poland | .03270 | .01770 | . | .07049 | .28887 | .62113 | . |
| Portugal | .71411 | .54564 | .45761 | .08632 | .37386 | .45920 | .43946 |
| Romania | . | . | . | .03193 | .10779 | .08430 | . |
| Slovakia | .11416 | .23852 | .14866 | .05415 | .23678 | .11365 | .15099 |
| Slovenia | .48993 | .45341 | .47044 | .36273 | .49266 | .30953 | .42978 |
| Spain | .15870 | .30019 | .16283 | .19292 | .44620 | .31192 | .26213 |
| Sweden | .67442 | .49158 | .70954 | 1.00000 | .51600 | .48833 | .64665 |
| United Kingdom | .48930 | .69831 | .28360 | .39663 | .38140 | .31625 | .42758 |

a. Limited to first 100 cases.

APPENDIX 2 Correlation between percent of foreigners in population and percent of foreign workforce of total workforce against innovation indicators in 2010 (Eurostat 2019a; Eurostat 2019b; European Commission 2018b)

| | | | Foreigners of population % | Foreign workforce of total workforce % | EU28 born foreign workforce % |
|-------------------------|--|-------------------------|----------------------------|--|-------------------------------|
| Spearman's rho | Foreigners of population % | Correlation Coefficient | 1.000 | .986** | .073 |
| | | Sig. (2-tailed) | . | .000 | .734 |
| | | N | 28 | 28 | 24 |
| | Foreign workforce of total workforce % | Correlation Coefficient | .986** | 1.000 | .051 |
| | | Sig. (2-tailed) | .000 | . | .812 |
| | | N | 28 | 28 | 24 |
| | EU28 born foreign workforce % | Correlation Coefficient | .073 | .051 | 1.000 |
| | | Sig. (2-tailed) | .734 | .812 | . |
| | | N | 24 | 24 | 24 |
| 3.1.1. | Correlation Coefficient | .627** | .584** | .079 | |
| | Sig. (2-tailed) | .000 | .001 | .715 | |
| | N | 28 | 28 | 24 | |
| 3.1.2. | Correlation Coefficient | .580** | .580** | .223 | |
| | Sig. (2-tailed) | .001 | .001 | .296 | |
| | N | 28 | 28 | 24 | |
| 3.1.3. | Correlation Coefficient | .681** | .651** | .245 | |
| | Sig. (2-tailed) | .000 | .000 | .248 | |
| | N | 28 | 28 | 24 | |
| 3.3.1. | Correlation Coefficient | .528** | .452* | .082 | |
| | Sig. (2-tailed) | .004 | .016 | .704 | |
| | N | 28 | 28 | 24 | |
| 3.3.2 | Correlation Coefficient | .611** | .550** | .138 | |
| | Sig. (2-tailed) | .001 | .002 | .519 | |
| | N | 28 | 28 | 24 | |
| 3.3.3. | Correlation Coefficient | .396* | .356 | .008 | |
| | Sig. (2-tailed) | .037 | .063 | .971 | |
| | N | 28 | 28 | 24 | |
| Score of six indicators | Correlation Coefficient | .704** | .650** | .215 | |
| | Sig. (2-tailed) | .000 | .000 | .314 | |
| | N | 28 | 28 | 24 | |

APPENDIX 3 Correlation between percent of foreigners in population and percent of foreign workforce of total workforce against innovation indicators in 2016 (Eurostat 2019a; Eurostat 2019b; European Commission 2018b)

| | | | Foreigners of population % | Foreign workforce of total workforce % | EU28 born foreign workforce % |
|-------------------------|--|-------------------------|----------------------------|--|-------------------------------|
| Spearman's rho | Foreigners of population % | Correlation Coefficient | 1.000 | .991** | .325 |
| | | Sig. (2-tailed) | . | .000 | .113 |
| | | N | 28 | 27 | 25 |
| | Foreign workforce of total workforce % | Correlation Coefficient | .991** | 1.000 | .328 |
| | | Sig. (2-tailed) | .000 | . | .109 |
| | | N | 27 | 27 | 25 |
| | EU28 born foreign workforce % | Correlation Coefficient | .325 | .328 | 1.000 |
| | | Sig. (2-tailed) | .113 | .109 | . |
| | | N | 25 | 25 | 25 |
| 3.1.1. | | Correlation Coefficient | .533** | .485* | .178 |
| | | Sig. (2-tailed) | .005 | .012 | .405 |
| | | N | 26 | 26 | 24 |
| 3.1.2. | | Correlation Coefficient | .694** | .692** | .367 |
| | | Sig. (2-tailed) | .000 | .000 | .071 |
| | | N | 27 | 27 | 25 |
| 3.1.3. | | Correlation Coefficient | .533** | .497** | .244 |
| | | Sig. (2-tailed) | .005 | .010 | .250 |
| | | N | 26 | 26 | 24 |
| 3.3.1. | | Correlation Coefficient | .604** | .520** | .245 |
| | | Sig. (2-tailed) | .001 | .005 | .237 |
| | | N | 28 | 27 | 25 |
| 3.3.2 | | Correlation Coefficient | .604** | .540** | .081 |
| | | Sig. (2-tailed) | .001 | .004 | .701 |
| | | N | 28 | 27 | 25 |
| 3.3.3. | | Correlation Coefficient | .407* | .329 | .081 |
| | | Sig. (2-tailed) | .032 | .093 | .701 |
| | | N | 28 | 27 | 25 |
| Score of six indicators | | Correlation Coefficient | .687** | .642** | .258 |
| | | Sig. (2-tailed) | .000 | .001 | .235 |
| | | N | 25 | 25 | 23 |

APPENDIX 4 Correlations between two-year changes on: percent of foreigners in population, percent of foreign workforce of total workforce, EU born foreign workforce and innovation indicators (Eurostat 2019a; Eurostat 2019b; European Commission 2018b)

| | | | % change of foreign diversity % | % change of foreign workforce diversity % | % change of EU28 born foreign workforce % |
|----------------|---|-------------------------|---------------------------------|---|---|
| Spearman's rho | % change of foreign diversity % | Correlation Coefficient | 1.000 | .877** | -.149 |
| | | Sig. (2-tailed) | . | .000 | .213 |
| | | N | 84 | 83 | 72 |
| | % change of foreign workforce diversity % | Correlation Coefficient | .877** | 1.000 | -.179 |
| | | Sig. (2-tailed) | .000 | . | .132 |
| | | N | 83 | 83 | 72 |
| | % change of EU28 born foreign workforce % | Correlation Coefficient | -.149 | -.179 | 1.000 |
| | | Sig. (2-tailed) | .213 | .132 | . |
| | | N | 72 | 72 | 72 |
| | % change of 3.1.1 | Correlation Coefficient | .167 | .121 | -.044 |
| | | Sig. (2-tailed) | .135 | .283 | .713 |
| | | N | 81 | 81 | 71 |
| | % change of 3.1.2 | Correlation Coefficient | .091 | .180 | .064 |
| | | Sig. (2-tailed) | .412 | .104 | .596 |
| | | N | 83 | 83 | 72 |
| | % change of 3.1.3 | Correlation Coefficient | .243* | .182 | -.085 |
| | | Sig. (2-tailed) | .028 | .103 | .479 |
| | | N | 82 | 82 | 71 |
| | % change of 3.3.1 | Correlation Coefficient | -.153 | -.156 | -.055 |
| | | Sig. (2-tailed) | .164 | .158 | .648 |
| | | N | 84 | 83 | 72 |
| | % change of 3.3.2 | Correlation Coefficient | -.085 | -.027 | -.041 |
| | | Sig. (2-tailed) | .439 | .811 | .733 |
| | | N | 84 | 83 | 72 |
| | % change of 3.3.3 | Correlation Coefficient | .079 | .131 | -.086 |
| | | Sig. (2-tailed) | .478 | .239 | .472 |
| | | N | 84 | 83 | 72 |
| | % change of 6 innovation indicators' scores | Correlation Coefficient | .196 | .195 | -.018 |
| | | Sig. (2-tailed) | .081 | .083 | .881 |
| | | N | 80 | 80 | 70 |

APPENDIX 5 Correlation between yearly change in IPR average and foreigners' occupational groups between 2010 and 2016 in Finland (Statistics Finland 2019; European Commission 2018b)

| | | IPR AVG | |
|--|---------|-------------------------|-------|
| Spearman's rho | IPR AVG | Correlation Coefficient | 1.000 |
| | | Sig. (2-tailed) | . |
| | | N | 6 |
| Managers | | Correlation Coefficient | .771 |
| | | Sig. (2-tailed) | .072 |
| | | N | 6 |
| Professionals | | Correlation Coefficient | -.371 |
| | | Sig. (2-tailed) | .468 |
| | | N | 6 |
| Technicians and associate professionals | | Correlation Coefficient | .200 |
| | | Sig. (2-tailed) | .704 |
| | | N | 6 |
| Clerical support workers | | Correlation Coefficient | -.486 |
| | | Sig. (2-tailed) | .329 |
| | | N | 6 |
| Service and sales workers | | Correlation Coefficient | -.029 |
| | | Sig. (2-tailed) | .957 |
| | | N | 6 |
| Skilled agricultural, forestry and fishery workers | | Correlation Coefficient | .200 |
| | | Sig. (2-tailed) | .704 |
| | | N | 6 |
| Craft and related trades workers | | Correlation Coefficient | .257 |
| | | Sig. (2-tailed) | .623 |
| | | N | 6 |
| Plant and machine operators, and assemblers | | Correlation Coefficient | .257 |
| | | Sig. (2-tailed) | .623 |
| | | N | 6 |
| Elementary occupations | | Correlation Coefficient | -.143 |
| | | Sig. (2-tailed) | .787 |
| | | N | 6 |

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).