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SCHOOL OF ECONOMICS AND BUSINESS

MASTER'S THESIS

A MARKET ANALYSIS: HOW ATTRACTIVE IS THE NEW 3D PRINTER ON THE EU MARKET

Ljubljana, May 2021 JAN VUJASINOVIĆ

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AM – Additive Manufacturing
CAD – Computer-aided Design
CAM – Computer-aided Manufacturing
CNC – Computer Numerical Control
DIY – Do It Yourself
EMC – Exporting Management Company
EU – European Union
EUR – Euro (currency)
FDI – Foreign Direct Investment
GE – General Electric
PLM – Product Lifecycle Management
R&D – Research and Development
SME – Small and Medium-sized Enterprise

INTRODUCTION

3D printing, or in other words, additive manufacturing, has become one of the most discussed emerging technologies in recent years, even though the real beginnings of the 3D prints go back to the late 60s of the last century (Bechthold et al., 2015; Muck, & Križanovskij, 2015, p.13). This technology provides a potentially highly disruptive solution for the market (especially health care) because of its ability to provide customised products such as individualised designs for surgical guides, implants, tissues, shoes, cars etc. Moreover, some of the areas of application are in industrial production, the well-being sector and the consumer market (Bechthold et al., 2015). It is forecast that by 2040 every household will have at least one 3D printer (Muck, & Križanovskij, 2015, p.14). Experts are following the trend closely as this emerging market is expanding swiftly. Millions of dollars are being invested into the technology and the market is growing with many new players entering. (McCue, 2019). 3D printing comes with many advantages over traditional manufacturing, such as cost, speed, quality, innovation and impact (Attaran, 2017). However, 3D printing also comes with certain obstacles such as security threats. With this technology, individuals can print out plastic guns, knives, house keys and fingerprints, which can be a significant issue when it comes to society's safety (Plant, 2013). Another problem with 3D printing is the productivity dilemma. While Attaran (2017) sees speed as one of the five key benefits of 3D printing over traditional manufacturing, because of reasons such as a shorter supply chain, reduced repair times and the ability to produce a product in shorter time; Jones (2014, p.1) believes that the machines can deliver either high speed or high quality but cannot do both, despite many advancements in the industry. 3WAY d.o.o. is finding a way to differentiate their new product by solving the productivity dilemma represented by Jones (2014). The company is providing the solution to the problem by using an hybrid approach in order to achieve high quality and speed at the same time.

This delivers us to the question whether the speed of 3D printing is an industry problem and will the product that closes the gap between speed and quality really attract more consumers than today's additive manufacturing technology. It also brings us to the main research question of the thesis; how can a company enter the European market with the new product? This applies especially to small sized company such is the case in this thesis. The main problem that the thesis analyses are the difficulties of small companies entering the international competitive market with the new product. Research has already been done regarding this problem and according to Fernández, & Nieto (2005) many family firms are not expanding due to a lack of resources. By examining family firms that did expand, we are able to see a pattern that should help with international expansion (Fernández, & Nieto, 2005). I will expand the analysis by adding methods of entry, analysing the industry in Europe and different types of usage categories and the risks inherent in different countries. What's more, I will also include GE matrix and analyses like a SWOT analysis and Porter's Five Forces. Moreover, I will use canvas for brand strategy, framework for new product

launch and Porter's generic strategies to help with gaining a competitive advantage. With this holistic approach, I will introduce solutions to the problem and the main research question from different perspectives and help the company gain competitive advantage, launch the product with the right strategy, target the right countries that have more potential for this type of product, analyse the most appropriate entry strategy, use strengths and opportunities for advantage and more.

The purpose of this thesis is to facilitate the introduction of a new product to the European market that will be produced by 3WAY d.o.o. Furthermore, it is getting the insight into the attractiveness of the 3D printer industry by taking into account a variety of relevant points such as: barriers to entry, projections, country and risk analyses. In addition, the purpose is also to describe a market entry strategy for the company by overviewing and applying divergent concepts and ideas that would potentially help the company to penetrate the European market and make profits. By looking into a study of other successful small companies in terms of internationalisation, the purpose is to understand the main factors that contribute to success. Given the advantages of the new product, the paper also displays the solutions to some of the challenges of 3D printing and sets them as competitive advantages for the firm.

The goal of the thesis is to use the knowledge from the theory and apply it to the new product to compete in the European market and gain a competitive advantage, so that sales, profits and customer value are maximised. Furthermore, other goals of the thesis are:

- To explore the European market of 3D printing
- To analyse the potential of 3D printing in the future
- To analyse the potential of the new product
- To examine internal strengths and weaknesses of the company
- To analyse the competition and different European regions for the industry
- To analyse different market entry strategies and recommend the most suitable one to the company
- To examine how the company can maximise profits with the new product

The main research question of the thesis is how can a company enter the European market with the new product?

Other research questions are:

- Will the new product solve the productivity dilemma?
- Is the speed of 3D printing an industry problem?
- Will a product that closes the gap between speed and quality really attract more consumers than today's additive manufacturing technology?
- Which European regions are more attractive for this industry?

- Which countries are less risky for entry?
- Which entry strategy should the company use?
- What barriers exist to enter the new market?

In the thesis I will use both primary and secondary sources to get all the information and data to provide solutions to the research questions.

The primary source of gaining information about 3D printing industry and the company 3WAY d.o.o. will be interviews. As Kvale describes, an interview is "a conversation, whose purpose is to gather descriptions of the [life-world] of the interviewee" (Alshenqeeti, 2014, p. 40). Furthermore, as Schostak adds, an interview is "an extendable conversation between partners that aims at having an in-depth information about certain topic or subject…" (Alshenqeeti, 2014, p. 40). For the purpose of this thesis, I will use semi-structured interviews. This type of interview falls into the non-standardised category and is often referred to as qualitative research interview. From this type of interview, there are a list of themes and questions to be covered, however, the order of questions may change based on the flow of the conversation and additional questions can be added (Saunders, Lewis, & Thornhill, 2015, p.320). The interviews will be used to gather information about the company's experience of foreign markets, their goals, the establishment of criteria, the importance of certain factors, their clients' opinions on the industry etc. The questions will be sent before the interview so that the interviewees will be able to prepare for the questions. Interviews have various benefits and disadvantages. Firstly, interviews allow interviewees to express in their own voice, with their own thoughts and feelings. They also provide high return rates, are relatively flexible, have a controlled answering order, and can accept incomplete answers. The disadvantages are that they are time-consuming, they provide only a small-scale study, they are never fully anonymous, and they have potential for subconscious bias and inconsistencies. To provide a successful qualitative interview, I will focus on two key features of the interview: natural flow and richness of details (Alshenqeeti, 2014). I will also try to minimise any subconscious bias by focusing on the objectivity of the interviews.

As additional, but not main, part of my analysis I will use models such as SWOT, PESTEL, Porter's Five Forces. For SWOT and PESTEL analyses, I will mostly rely on the theoretical background and practical knowledge that I gathered doing undergraduate and graduate projects for multiple companies. By doing market analysis I will be able to gather crucial data that will help me provide the proper market entry strategies for 3WAY d.o.o.

The structure is divided into 5 main sections, as well as introduction, recommendations and conclusion. In the first chapter I will investigate the background of 3D printing and see how the market is growing, as well as providing some of the benefits and challenges of 3D printing and what may be the solution to the productivity dilemma. In the second chapter I will introduce different entry strategies and compare them using various sources to provide

the best entry strategy according to the criteria. In the third chapter I will examine and provide ideas for brand strategy, explore a study about internationalisation strategy for small family companies, apply theory to the real life product specifications to recommend launch tactics and look into competitive advantage strategies. In the fourth chapter I will dive into the usage of 3D printers in Europe, compare countries and regions, explore the GE matrix, apply Porter's Five Forces, seek potential country entries based on criteria and compare them to economic and financial benchmarks for risk evaluation. Lastly, in the fifth chapter, I will perform a SWOT analysis, finish the practical part of the GE matrix, recommend the target market, investigate barriers to entry and provide interviews results.

1 THE BACKGROUND TO 3D PRINTING AND THE SOLUTION

As already mentioned in the introduction, 3D printing is not a new technology. It has been with us since the late 1960s. Although many have not heard of 3D printing in the past, the technology has already been in use by manufacturers. One of the reasons why many may have not heard of it before is because of the term "additive manufacturing". 3D printing can also be classified as "additive manufacturing". This is because most of the technology works on the premise of adding layers. In view of that, there are also cases of subtractive technologies, formative technologies and hybrid technologies, however, those are less common than additive manufacturing. So, additive technology works on the premises of adding layers on top of previous layers of material in a 3D space until the 3D object is made (Muck, & Križanovskij, 2015, pp.13-17).

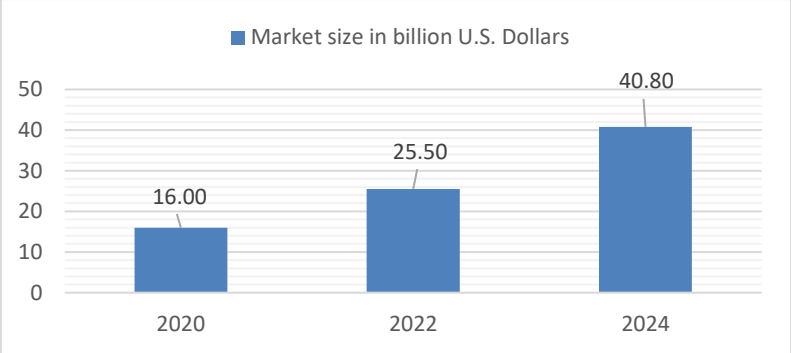
Nowadays, we can sense 3D printing technology almost everywhere. 3D printing can be viewed in industries such as: architecture for printing models, mechanical engineering for printing tools, medicine for printing organs, the automobile industry, the space industry etc. With the technology, we can create toothbrushes, clothes, and furniture, as well as (with some printers) nanostructures and microelectronic circuits. The technology also has the ability to print larger things such as buildings, bridges and cars. Moreover, there are a variety of different materials that it can use for production such as starch, cellulose, ceramics, glass, sugar and more. These can be then used as polymers that can imitate rock, wood, glass and conductive structures (Muck, & Križanovskij, 2015, p.13).

3D printing technology is evolving in many ways and this can be seen from examples like the airplane prototype called SULSA that reached speeds of 160km/h, or a 3D printed car called Urbee for which the body of the car was fully 3D printed. Moreover, examples can be also seen in the music industry with a 3D printed guitar called Olaf Diegel. The amount of 3D printers on the market is rising and the prices are falling. It is expected that by 2040, every household will own at least one 3D printer, which would result in 3D printers being for personal use, similarly to what happened with traditional 2D printers (Muck, & Križanovskij, 2015, p.14).

1.1 The growing market for 3D printing

As already mentioned, the global 3D printing industry is growing. According to Wagner (2019) the industry was expected to reach 16 billion dollars in market size in 2020, however, it can be expected that the real number is likely going to be lower because of the unexpected pandemic that shook the global economy. Companies are likely going to be challenged as consumption during an economic crisis is generally lower. To continue, as seen in Table 1, Wagner (2019) predicts that in 2022 the global market size for 3D printers will be 25.5 billion dollars and in 2024, the market size is going to rise disproportionally and reach 40.8 billion dollars. As can be identified from the numbers, the market size will grow by 24.8 billion dollars in 4 years, making it a potentially attractive industry for investors.

Table 1: Projected market size of 3D printing products and services from 2020 to 2024



Source: Wagner (2019).

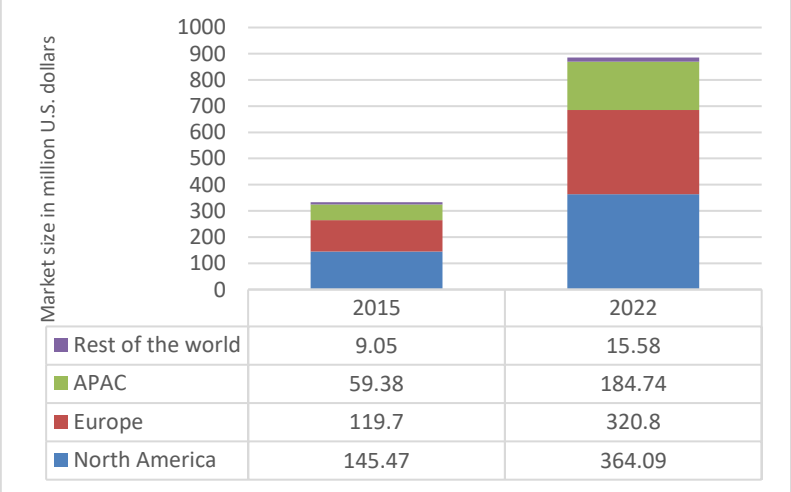
On the other hand, many 3D printing experts are eagerly following the Wohlers Report for predictions about the 3D printing industry. The Wohlers Report 2019 forecast a $15.8 billion market size for additive manufacturing products in 2020. These numbers are comparable to Wagner's predictions, which leads us to the same conclusion as the Wagner (2019) forecast. Again, a thing to keep in mind is that these numbers will likely be slightly lower as the industry is challenged by the COVID-19 situation. To continue, in 2022 the industry is predicted to climb to $23.9 billion dollars growing to $35.6 billion dollars 2 years later. In comparison with Wagner's predictions, the Wohlers Report anticipates lower growth than Wagner. Although, the gap between the two is quite small for the years 2020 and 2022, the Wohler Report predicts a more than 5 billion dollars higher market size for 2024. The predictions for the 2019 Wohlers Report are derived from 2018 data, which is the information that should be kept in mind with the forecasts. Nonetheless, both reports are united when it comes to predicting a positive growth rate for the industry (McCue, 2019).

Investigating further, the revenue from 3D metal printing grew by an estimated 41.9% in 2019. By contrast, desktop 3D printing systems that sell for under $5,000 saw a momentous drop in annual growth. Nonetheless, the overall AM market continues to trend upwards as many new players are entering the industry. Furthermore, the report also peeks at AM-related

activities in different industries. The data collected suggests that companies like Airbus and Boeing are gaining a perspective on using 3D printing with the goal of producing end-use parts. Companies like BMW, UPS and the U.S. Marine Corps share the same view. These highlights may suggest that 3D printing is becoming more and more connected to a variety of industries that were not possible or seen before (McCue, 2019).

As seen from Table 2, for the global 3D printing non-metal materials market there was a total market size of 333.6 million dollars in 2015. Most of which was coming from North America (145.47 million dollars) and Europe (119.7 million dollars), less in APAC (59.38 million dollars) and the least in RoW (9.05 million dollars). Thus, most of the market share for non-metal materials came from North America and Europe. The market size in the Asian-Pacific region was about half the size of the European market, which is interesting since this region also has some of the stronger competitors in the business. Comparing these numbers to the projected 2022 numbers, we get a total market share of 885.21 million dollars, which translates to 165.35% growth over 2015. As yearly growth, we see that the market grew by 23.62% each year. These 885.21 million dollars can also be divided into different regions. North America is predicted to reach 364.09 million dollars (21.47% yearly growth rate), Europe 320.8 million dollars (24.00% yearly growth rate), APAC 184.74 million dollars (30.16% yearly growth rate) and RoW 15.58 million dollars (10.31% yearly growth rate). In view of this data, we can see that the Asian-Pacific region is expected to grow the most (30.16% every year), followed by Europe, North America and RoW. Information regarding the number of shipments is compared in Appendix 2. (Statista Research Department, 2016a).

Table 2: Size of 3D printing non-metal materials market



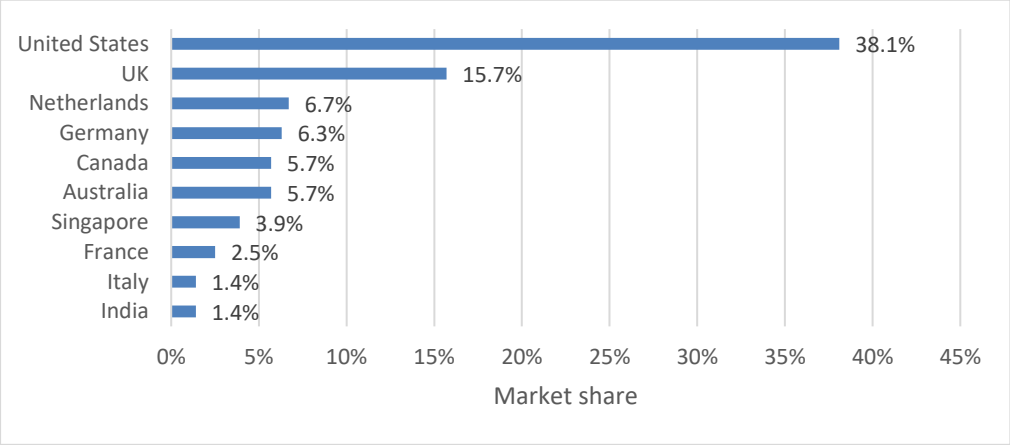
	2015	2022
Rest of the world	9.05	15.58
APAC	59.38	184.74
Europe	119.7	320.8
North America	145.47	364.09

Source: Statista Research Department (2016a).

The worldwide 3D printing market share graph suggests that the United States is the leading country with 38.1% market share, as of July 2018. As seen from Table 3, The United States seemed to be dominating the market as the second placed country reached only half of the percentage points of the U.S., which was the U.K. with a market share of 15.7%. These two

countries had quite a significant gap over other countries, as the next eight countries had a market share between 1.4% and 6.7%. For example, Netherlands had 6.7% market share while Germany had 6.3%. Interestingly, Australia reached 5.7% (6th place) despite this country not usually being close to the top when it comes to other similar lists. Another interesting fact is that China is not one of the top countries on this list even though it is usually at least mentioned on other lists (Holst, 2019a). More information regarding leading countries for 3D printing patents and global online 3D printing demand by region is seen in Appendix 3 and Appendix 4.

Table 3: Worldwide 3D printing market share



Source: Holst (2019a).

Keeping all the information in mind, we can come to the conclusion that North America has been prevailing in terms of market and demand share in the past few years. Furthermore, in Europe, the Netherlands reached a high ranking for worldwide market share while other European countries like Germany and U.K. were strong in both the total market share and patent market share categories. While China has not been at the top for the two lists, I believe that it is still a strong competitor based on other information provided in terms of patent applications and the information found in the previous paragraphs.

To conclude the section on the growing market of 3D printing, here are some of the additional key insights for 3D printing. Firstly, consumer demand for personalisation is the drive for the growth of 3D printing market. As has already been written in detail, the 3D printing industry grew and is set to grow exponentially as the market moves from the industrial sector into the consumer market. The technology has been commercially available for many years, however, the falling cost of commercially available devices and the trend for customised products is encouraging early-adopters to buy 3D printers for production of simple objects at home. As consumer demand shows no decrease and prices continue to fall, along with the increasing capabilities of 3D printers, this could have a compelling impact on brands (WARC, 2016).

Secondly, 3D printing technology could potentially disrupt a range of sectors. As more companies are entering the market, the 3D printing market is becoming more accessible to consumers. Consumers will increasingly benefit from the industry as the assembly costs, reduced waste and delivery charges will reduce. With the increased innovation of better and faster 3D printers, this could lead into manufacturers' products being available for customers to print at home, transforming the delivery and logistics (WARC, 2016).

Thirdly, according to the source, the revival of DIY rather than purchasing products is another reason for a fuelled growth of 3D printing. This is also called the "Maker Movement." These "Makers", who come from a broad educational and socio-economic background, have an impact on consumption with their passion for creation and upcycling. Furthermore, another key insight says that the accessibility of 3D printers could lead to mass production of counterfeit goods. This could give a lot of brands issues that they will have to protect themselves from. There is more information about 3D printing challenges in the next section (WARC, 2016).

The fifth key insight suggests that "Prosumers" embrace 3D printing. Prosumers are described as proactive consumers who want to participate in the design of the products and services so that they are a perfect fit for them. In other words, this means that the products would be completely customisable to their preferences (WARC, 2016).

The last key insight is that brands cannot afford to dismiss the growth of the 3D printing market. Brands that ignore innovative ideas risk becoming obsolete. Why 3D printing has a bright future is because of the fact that companies like Nike are already embracing 3D technology. The disruption to manufacturing and logistics is potentially huge. What's even more enlightening is that 4D printing technology is already under development (WARC, 2016).

1.2 The benefits and challenges of 3D printing

It has already been mentioned that 3D printing has many advantages over traditional manufacturing in terms of costs, speed, quality, innovation and impact (Appendix 5). Although, additive manufacturing is not expected to replace all existing production methods, it is expected to revolutionise many niche areas.

To start off, 3D printing provides industrial efficiency. With the technology, customers can print their own parts for fixing already purchased products. Simple spare parts can be downloaded from various websites and produced at home. This means that consumers become micro-manufacturers. Moreover, the technology also allows mass customisation at a low cost. This also means that retailers can design and personalise different goods without lengthy delivery times (Attaran, 2017).

The technology also facilitates on-demand manufacturing. In other words, the technology makes it possible to have parts produced in remote locations by local service providers and distributors. This means that delivery of goods is no longer an obstacle. To put it another way, this results in shorter supply chains, saving shipping costs and lowering or getting rid of stockpiling inventory. This way, large bulk inventories become a thing of the past. Furthermore, the AM can reduce the need for logistics as the models of the products can be transferred digitally (for example, on the Internet) providing decentralised manufacturing. By manufacturing items closer to the final destination, we are also able to have a positive environmental impact and reduce logistics costs. This reduces time from the production of the product and the sale (Attaran, 2017).

Component manufacturing is also one of the main applications and advantages of additive manufacturing. Industries that use this technology require small numbers of parts that must be printed under certain criteria with little tolerance. More than 20% of the AM market is for component part production in the aerospace and automotive industries. The success and growth of AM in these sectors is a good indicator of the high quality level coming from AM, which is matching tough industry standards. Additive manufacturing is also able to print complete systems or subsystems. The capacity to print with more materials helps create whole products and not only components. There are also other areas being worked on, such as combining traditional methods with 3D printing to create whole products. Moreover, additive manufacturing has potential to improve quality. For example, in the prosthetics and implants industry, patients are experiencing an improved quality of care. This may be due to the customisable products that fit their specific personal needs. In the AM industry, modifications and redesigns are without penalties. This is important information since over 60% of designs submitted for tooling are modified during production. Here, engineers can try multiple iterations at the same time with low additional cost. Additive manufacturing could also enable the creation of parts at a digital factory near to the manufacturing facility, when and where they are needed. This eliminates lost time and the costs of shipping parts around the globe. It also allows real-time visibility of production and lastly, the technology also allows manufacturing parts on demand since the access to parts can be very swift (Attaran, 2017).

With today's trend of a circular economy, 3D printing has the potential to enable a circular economy for several reasons, such as, reducing road transportation by enabling local small-scale production, turning waste plastic into 3D printed products and enabling plastic waste streams to provide an adequate amount of good quality plastic feedstock. The study was made by using the London metropolitan area as an example, which means that while the first two reasons can potentially be generalised to other parts of the world, we may not be able to fully generalise the waste stream study since other countries may have lower levels of plastic in the waste stream. Nonetheless, the whole study suggests a high potential for the 3D printing industry to enable a circular economy. For more information regarding advantages

of additive manufacturing over traditional manufacturing see Appendix 6 (Garmulewicz, Holweg, Veldbhuis & Yang, 2018).

Although 3D printing has many benefits, we also must consider the drawbacks of the technology. Some of the challenges illustrate the fact that the road for 3D printing is still long and that the technology may not be disruptive as of now. First off, shape optimisation. Additive manufacturing allows interior parts to be filled in any way but the search for a filling for a design space with material that optimises the right distribution of strength, mass and volume may come with issues. These issues arise from trapped material, lack of support and poorly manufactured walls, which can happen when the distribution is acceptable but is not compatible with all 3D printing processes. Moreover, while 3D printing allows creating complex geometries that couldn't be created with traditional manufacturing, to utilize these qualities of 3D printing the design process must be rethought and new tools must be created. The CAD software that is currently in use for 3D printing was not designed with this industry in mind. *"*The systems tend to be a hybrid of boundary representation and constructive solid geometry.*"* (Oropallo & Piegl, 2015). The CAD software has no ability to represent something that is physically based, as of now. Without this representation, materials (as well as functional properties) cannot be designed or modelled. Likewise, there is a problem with design. The materials available for manufacturing are very limited, although the number has been increasing in the recent years. There is also lack of tools for creating designs that can be customised on a large scale. Another issue is the pre- and post-processing. 3D printing does not go straight from the model to the printed part. The model must be pre-processed for the 3D printer to get a series of instructions on how to construct a specific part. Afterwards the attention goes towards the removal of supports and improving the surface quality or finalising certain features (Oropallo & Piegl, 2015).

The most popular layered method of 3D printing has its flaws because of several issues that happen when this method is being used. Firstly, layers are 2.5D cross sections of an original model. In complex models, this can affect the accuracy of the parts. Moreover, the orientation of the part has a significant impact on how the part's mechanical properties turn out. What is more, the hardware performance also has a significant role on how the layering is done. Different technologies produce different properties on the layers (Oropallo & Piegl, 2015).

Additive manufacturing also comes with certain errors. There are three categories of error that happen: data preparation, process error and material error. While data preparation can be avoided, this is not the case for material error. Material error can happen because of different characteristics of the material, which can majorly affect the accuracy of a printed part. Moreover, speed variation and the positioning systems can cause anomalies as well. Most 3D printing systems produce no feedback meaning that they have no ability to tell that an error has occurred. If the part moves during the printing, the system is not able to tell the

issue. In Appendix 7 there is the example of an issue that happened when the part moved during the process of printing (Oropallo & Piegl, 2015).

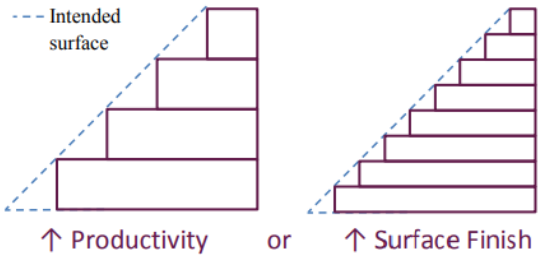
Furthermore, all layered manufacturing processes produce slices that are then put on top of each other. The height of each slice is determined by the thickness of each layer. The slicing process comes with two main problems. The first problem is the staircase effect, which makes a 3D print look like it is made from blocks rather than having a smooth surface. The second problem is the containment problem, where the slice either falls on the inside of the model or the outside of the model as shown in the figure down below. Both problems cause poor surface quality and accuracy. The slicing process is related to the build time, accuracy and roughness of the part. An example of a containment problem can be seen in Appendix 8. (Oropallo & Piegl, 2015).

Lastly, we cannot forget about the security threats that 3D printing delivers. Additive manufacturing enables home users to print out weapons, house keys and even fingerprints (Plant, 2013). Starting off with fingerprints, in 2017, the police used 3D printing technology to unlock a dead man's phone. The fingerprint (example in Appendix 9) was created by 3D-printed moulds and the combination of thinned silicone, polydimethylsiloxane and a skin-like pigment (D., 2017). This means that someone's identity can be easily stolen if the technology is used by the wrong person. Moreover, 3D printing allows users to print out a weapon. Right now, these are still feeble, but they will get stronger as the technology improves. For example, users can print out plastic knives meaning that airport security will have to be prepared for any security threats coming from this fact (Plant, 2013).

1.3 The solution to the productivity dilemma

As has already been mentioned, 3D printing has an existing problem of the productivity dilemma. This means that a 3D printer can focus either on speed or quality but not both. The technology works based on adding layers on top of another layer, which means that the surface of an object may not be smooth enough without additional post-processing part after printing out the object. A good example of how 3D printing adds layers can be seen in Figure 1 down below. Furthermore, the figure also shows how a 3D printer can focus on productivity by "building" bigger layers (meaning a less smooth surface) or quality with smaller layers (meaning a smoother surface) (Jones, 2014).

Figure 1: The productivity dilemma of Additive Manufacturing

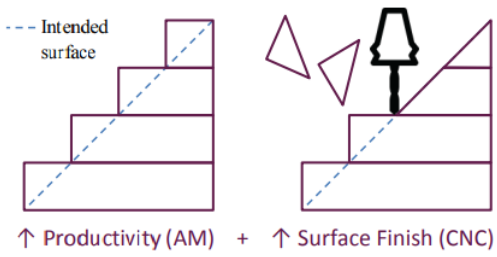


Source: Jones (2014).

This type of connection between AM and CNC is already standard practice for most metallic parts produced to have a suitable surface finish, improve cosmetics, avoid stress risers etc. (Jones, 2014, p.2). The research paper suggests that a hybrid of additive and subtractive technologies has a long history. Dr. Rado Kovacevic led research in Dallas to create a system that combined a robot welder with a CNC machine. Moreover, AeroMet Corp. was one of the early systems, which provided laser cladding on a milling machine. The system focused on production of aerospace parts, however, the system was not perfect as they encountered a technical problem with CO_2 lasers. Another example of research carried out at the University of Texas El Paso, where they used a CNC machine for the flexibility rather than productivity reasons. As seen from these researches, examples of hybrids of additive and subtractive technologies already exist (Jones, 2014).

Coming from these ideas, the way that 3WAY d.o.o. is solving the issue of productivity dilemma is by hybridising additive manufacturing with Computer Numerical Control (CNC). This means that the new product not only prints out an object but also provides a post-processing service or milling which smoothens the surface of the object. By doing this the company can solve the productivity dilemma by focusing on productivity and quality rather than productivity versus quality as seen in Figure 2.

Figure 2: The hybrid of AM and CNC



Source: Jones (2014).

In other words, the company is aiming to reach its target consumers by providing a product that is facilitating the post-processing sequence by hybridising AM and CNC technologies.

The company expects that this product will attract more consumers since, according to their experience, consumers do not like the post-processing part of 3D printing. Whenever, the 3D printer finishes its job, the person must remove the supports and smoothen the product to make it look less of a "3D printed product". Layers can often be clearly visible to the customers, which means that the 3D object does not look so good. While it is possible to make 3D prints even more precise, this is done by sacrificing a lot of time. With this hybrid, the 3D printer can provide smooth 3D printed objects without sacrificing more time on quality. In Appendix 10 there is a photo of the current state of this product. The product still needs some overhauling to make it look more attractive to consumers, however, the functionality of the product is already good.

2 ENTRY STRATEGY METHODOLOGY

Different methods of entry strategy provide different possibilities for a company that has ambitions to enter the international market. A firm can export their products to the international market and in that way, fully externalise their entry to avoid a variety of complications and risks. On the other hand, a company may also choose full control of operations but in this way have to deal with larger expenses and risks. Which strategy is the most suitable for a specific company depends on the company's goals, size, values, current state, as well as other factors. In this chapter I will introduce different types of entry strategies and evaluate them to find the most suitable strategy for 3WAY d.o.o. This will be done based on the selection criteria that will be part of the next subchapter (Lumen, n.d.; Mariadoss, 2017; Hollensen, 2014).

2.1 Selection criteria

When it comes to selecting the right entry method, for most SMEs a market entry is a critical first step, while for established firms the problem is more about how to exploit the opportunities better. There is no ideal market entry strategy and different market entry methods might be adopted by different companies (Hollensen, 2014, pp. 325-326). There are three main broad grouping when it comes to entry modes available for the firm. The company can either 100% externalise (export modes), 100% internalise (hierarchical modes) or choose something in between (intermediate modes). With the export modes the company chooses low control, low risk but high flexibility of entry. On the other hand, with the hierarchical modes the company has access to high control but high risk and low flexibility. Lastly, the intermediate modes offer shared control and risk as well as split ownership (Hollensen, 2014, pp. 326-327).

To decide what kind of strategy the company should use for its entry mode, there are three sets of rules. Firstly, with a naive rule the decision-maker uses the same entry mode for all foreign markets. Secondly, with a pragmatic rule the decision-maker uses a workable entry

mode for each foreign market. For example, starting with low-risk exporting and using other entry modes only after the initial mode was found to be not profitable or feasible. Using this rule, not all alternatives are investigated, and the workable entry may not be best entry mode. Lastly, with strategy rules, the approach requires all alternative entry modes being systematically compared and evaluated. The decision is made based on the maximisation of profit, which is subject to the company resources available, risk and non-profit objectives. (Hollensen, 2014, p. 332)

According to Hollensen (2014), the choice of entry mode has four groups of factors that influence the decision. These are the steps that a company needs to take into account when choosing the right entry mode. First off, internal factors, which are the firm's size and international experience, influence the internationalisation. The higher both are, the more hierarchical the approach should be. Secondly, external factors such as market size and growth, direct and indirect trade barriers, and a small number of relevant export intermediaries available increase internalisation. On the other hand, external factors such as sociocultural distance between home and host country, country risk / demand uncertainty, and intensity of competition decrease internationalisation and increase externalisation. Thirdly, desired mode characteristics are based on the company's preferences of risk averseness, control and flexibility. The preferences for risk averseness and flexibility decrease internalisation, while high control preference increases internalisation. Lastly, the transaction-specific factors of tacit nature of know-how and opportunistic behaviour both increase internalisation. For example, in the case of tacit (difficult to articulate) know-how the hierarchical modes are preferred as these modes are better at facilitating intra-organisational transfer of tacit expertise. Another factor to mention is the product complexity and product differentiation advantage, which both increase internalisation (Hollensen, 2014, pp. 334-339).

According to Hill (2013), on other hand, a firm must make three basic decisions when carrying out foreign expansion. First off, it must decide on which market to enter, which must be decided based on an assessment of a country's long-term profit potential. This is determined by several factors such as the economic and political factors that influence the potential of the market. The attractiveness of the nation depends on balancing the benefits, costs and risks. The second decision that a company needs to make is when to enter. Entering sooner is frequently associated with first-mover advantages because of the ability to capture demand and create a strong brand name. It also allows first entrants to build sales volume and consequently cut costs, possibly making it more difficult for latter entrants to get into the market. On other hand, the first-mover disadvantages also exist as the early entrants need to bear pioneering costs that later entrants can avoid. Lastly, a company needs to decide on scale of entry and strategic commitments. The larger the scale at which a company wants to enter, the larger the commitment of resources needed. Entering on a larger scale comes with strategic commitments that have a long-term impact and are difficult to reverse (Hill, 2013, pp. 486-489).

In the research article, the authors describe three main decisions regarding a firm's international behaviour. The three main decisions are: mode of entry (economic-rational approach, sequential approach and strategic approach), choice of markets (sequential approach and strategic approach) and timing of entry (sequential approach and international entrepreneurship approach). The research article proposes an integrative model that connects timing of entry, choice of market and entry mode, which demonstrates the logic of how the companies behave when it comes to internationalisation. Moreover, that doesn't mean that all companies behave the same, as a matter of a fact, the article proposes that when they don't, this is due to mediating and moderating variables that have a strong influence on perceived (increased or decreased) risk. So, if a company is fast getting into a nearby market, they would go for licensing. If a company is fast getting into a faraway market, they would go for exporting. In the case when the company is slow getting into a nearby market, they would go for a subsidiary. Lastly, if the company is slow getting into a faraway market, they would go for a joint venture. In the middle of the matrix is the sales office. Check Appendix 11 for the figure. (Gallego, Hidalgo, Acedo, Casillas & Moreno, 2009)

In order to find the most suitable entry strategy for the company, we need to answer a few key questions that will give us a better insight of the company's goals for the project and traits such as the amount that they are willing to invest, how much risk they are willing to take, and which strategy is the closest to their values and goals. As seen from the theory, the strategy rule may be the best approach when choosing the entry mode, however, as seen from Hollensen (2014) internal factors such as the firm's size and international experience also need to be taken into account. Moreover, Hollensen (2014) also mentions some desired model characteristics of the company such as risk averseness, desired control and flexibility. In other words, the main questions that I decided to ask the company were the size of the firm, firm's level of resources, how much commitment they were willing to make and how much risk they were willing to take. On top of that, I also asked about how much control they wanted to have over different processes, how many countries they wanted to enter and asked them to add any other information that would be important for them when entering foreign markets.

I interviewed the CEO of the company (transcripts in the Appendix 13), who gave me answers to all the main and side questions provided in the previous paragraph. This information served as the selection criteria for the market entry strategies. To summarise the findings from the interview and my own self-evaluation:

- The size of the company is small.
- The firm did not want to disclose too much information about their levels of resources; however, the company is small, and their budget cannot compete with larger companies.
- They are not extremely committed to the project. They are willing to try, however, they are not planning to continue investing into this project if there were no interest from international customers to purchase their products.

- They are not willing to take high risks. The company is risk averse, which is also one of the core values within the firm. Looking at their past projects, they most often took the less risky choice as they prefer slow growth rather than quick and risky growth.
- They want to have full or almost full control.
- They are willing to enter any country within the European Union as long as it is profitable. They do not want to limit themselves to only a few countries, however, they would not enter countries where there is no interest in this product or where it wouldn't be profitable.
- They would obviously prefer a strategy where the benefits outweigh the costs

To process the information from the interview and my self-evaluation I provided the selection criteria in the next bullet points:

- The entry strategy needs to be suitable for a small company.
- The strategy needs to enable limited commitment efforts.
- The entry strategy needs to be risk averse.
- The strategy needs to allow high or full control over the processes.
- The strategy needs to allow the company to enter more than one country.
- The strategy needs to outweigh benefits over the costs.

2.2 Exporting

Exporting is a strategy in which a company, without having overseas operations, exports goods produced from their home country (Onkvisit & Shaw, 2004, p.246). In other words, exporting is an entry mode, where a firm's products are manufactured in the domestic market or third country and then sent to the host market, either directly or indirectly. It is one of the most common modes for initial entries into international markets (Hollensen, 2014, p. 347). Many manufacturers begin with this strategy and only later switch to other entry modes (Hill, 2013, p.491). Hollensen (2014) divides exporting into three different forms; indirect, direct and cooperative. Indirect is when a firm does not take direct care of exporting activities. Direct export means that a firm takes care of the exporting activities and cooperative export involves collaborations with other firms, such as export marketing groups (Hollensen, 2014, p. 347). Furthermore, exporting is a low-risk strategy and may be attractive to businesses as mature products can find growth opportunities in foreign markets, some firms find it less risky and more profitable, it can be beneficial to export products abroad to balance out seasonal domestic demand and some firms may find there is less competition overseas. What is more, smaller firms often only export because it comes with a lower risk. Since exporting is typically the easiest way of entering the international market, most firms begin their international expansion with this type of entry. Companies export because it is the easiest way to perform global trading. It is a less costly investment than other strategies and it is much easier to stop exporting than stopping other entry modes. For definition of export related concepts and main findings check Appendix 14 (Lumen, n.d., Mariadoss, 2017).

Some of the biggest advantages for exporting are easy entry and low risk. On the other hand, exporting comes with low control. Moreover, by exporting, a company can avoid expenses of establishing operations in a new country. Nonetheless, firms must have a way to distribute and market their products, which can be typically done through contractual agreements with a local company or distributor. The company also needs to take care of labelling, packaging and pricing that is in line with the market, as well as taking care of marketing to help gain potential buyers. On the downside, exporting means transportation costs, which can be high, as well as it can have a negative impact on the environment. Moreover, firms have less control and must pay their partner a fee for their services. When it comes to direct exporting a firm has an advantage as it has access to local market experience and local support for selling. For more about advantages and disadvantages of exporting in Table 5. (Mariadoss, 2017; Hollensen, 2014, p. 362).

Comparing these findings with the selection criteria (Table 4); the strategy is suitable for small companies, it enables limited commitment efforts, it is risk averse and it allows a company to enter more than one country. On the other hand, this strategy is not suitable for full control of the processes. The benefits and costs of the strategy depend on a variety of factors so it is not possible to determine if the strategy would be successful or not, based on the limited data. It can be concluded that this strategy meets 4 criteria points out of 6, which makes it quite suitable for the company in our case.

Table 4: Criteria and export strategy

Criteria	**The strategy meets criteria** (Yes/No/Cannot be determined)	**Comments**
Suitable for small company	Yes	
Enables limited commitment efforts	Yes	
Risk averse	Yes	
Allows high or full control	No	Typically done through contractual agreements
Allows multiple country entry	Yes	
Benefits outweigh costs	Cannot be determined	The success is determined by a variety of factors that would need further research

Source: Own work.

Table 5: Advantages and Disadvantages of Exporting

Advantages	**Disadvantages**
Easiest entry, low risk, experience curve economies, realisation of location, with export marketing groups shared costs and risks of internationalisation, access to local market experience with direct exporting, no export experience required with indirect exporting	Low control, possible negative environmental impact, low local knowledge, trade barriers, problems with local marketing agents, high amount of transport costs, lack of contact with market with indirect exporting, risk of unbalanced relationships with export marketing groups

Source: Mariadoss (2017); Hollensen (2014); Hill (2013).

2.3 Joint Venture

"A joint venture or a strategic alliance is a partnership between two or more parties" (Hollensen, 2014, p. 379). It is created with a specific purpose by two or more investors who also share ownership and control. Usually, the foreign partner provides information regarding the new market, the networking and access to elements like real estate and regulatory compliance. Joint ventures require greater commitment, because of a larger risk and lower flexibility. On the downside, a company risks giving control of technology to its partner, it may be difficult to withdraw long-term investment, there may be conflicts between partners because of shared ownership and a battle for control, partners may have different objectives leading to incompatibility. On the bright side, joint ventures may benefit from tax advantages, the risk and cost is spread among all the companies, access to expertise in the local market, and they can be useful when it is the only feasible mode of entry (more about advantages and disadvantages in Table 7). Some of the reasons joint ventures are set up are the complementary technology and management skills provided by partners, an increase in speed of market entry, many developed countries restrict foreign ownerships, and global operations in production and R&D are expensive. The most typical joint ventures have 50/50 ownership share. When a firm wants to have more control, it may seek a 51 percent stake. Moreover, finding the right partner for a joint venture with compatible cultural perspectives, management practices and business focus is a challenge. As already mentioned, joint ventures are long-term investments and finding the right partners is one of the important steps. Some of the concepts and findings are shown in Appendix 15. In terms of criteria, the strategy does not meet limited commitment efforts, low risk and high/full control (Table 6) (Hollensen, 2014; Onkvisit & Shaw, 2004; Hill, 2013; Lumen, n.d.; Mariadoss, 2017).

Table 6: Criteria and joint venture/strategic alliance strategy

Criteria	**The strategy meets criteria** (Yes/No/Cannot be determined)	**Comments**
Suitable for small company	Yes	Less costly, shared resources, shared knowledge and technology
Enables limited commitment efforts	No	
Risk averse	No	Risk is spread but is still high because of other reasons such as long term commitments etc.
Allows high or full control	No	Companies has limited direct control because of other partners involved
Allows multiple country entry	Yes	Company called Hearst is an example of a multiple country joint ventures. This means it is possible, however, likely more complex to achieve than with other entry modes (Mariadoss, 2017).
Benefits outweigh costs	Cannot be determined	The success is determined by a variety of factors that would need further research

Source: Own work.

Table 7: Advantages and disadvantages of Joint venture/ Strategic alliance

Advantages	**Disadvantages**
Tax advantages, risk is spread, less costly than acquisition, seen as a local entity, shared resources, beneficial if lacking foreign market knowledge, technology sharing, marketing efforts enhanced, reduction in production and distribution costs, can be potentially advantageous for small firms	Higher risk, lower flexibility, contributions can become disproportionate, loss of control, possible conflicts between partners and battles for control, higher costs than exporting, possible locking into long-term investment

Source: Mariadoss (2017); Hollensen (2014); Hill (2013).

2.4 Licensing

Licensing is when "the licensor gives a right to the licensee against payment, e.g., a right to manufacture a certain product based on a patent against some agreed royalty." Hollensen (2014, p. 371). In other words, the licensor provides a product to the licensee by granting that company the right to use the licensor's manufacturing process, brand name, sales knowledge etc. Essentially, licensing permits the licensee to use the property of the licensor, however, the licensee pays a fee in exchange for using the intangible property and potential technical assistance. With this arrangement, the licensee attains a competitive advantage, while the licensor gains inexpensive access to a new market. Because of a scarcity of capital and import or government restrictions, this is often the only way a firm can market internationally. When a company finds exporting ineffective but wants to have direct investment abroad, licensing can be a good strategy. Although there is a general belief that FDI is more profitable, this entry strategy allows a company to spread out its R&D and investment costs, as well as enabling it to receive incremental income with minor costs. Licensing also permits entry into markets that would otherwise be closed because of high rates of duty etc. Furthermore, the licensor can take immediate advantage of the licensee's local marketing, existing customer contacts and distribution organisation. The method does involve some risks. Typically, it is the least profitable method when entering a foreign market, as well as calling for long-term commitment. Some other things to mention: lack of control over technology and licensee operations, licensee's bad image can damage parent company as well, some potential returns may be lost, plus the licensee may prove to be less competent than expected when it comes to marketing and other activities. Moreover, the licensee may become a competitor, which is another problem that may occur. How the strategy meets the criteria is in Table 8. For more about the advantages and disadvantages see Table 9. Some of the concepts and findings are in the Appendix 16. (Lumen, n.d.; Mariadoss, 2017; Onkvisit & Shaw, 2004; Hollensen, 2014; Hill, 2013).

An example of licensing can be the licensed outlets of Starbucks. In 2015, Starbucks opened 1,354 licensed outlets. AmRest Holdings SE holds the license to operate Starbucks in countries like Slovakia, Bulgaria, Hungary and more. One year later, it purchased the license to run another 144 Starbucks stores in Germany. Starbucks believed that this would help them to grow faster in the country as AmRest Holdings SE had a lot of expertise in the regions (Euromonitor International, 2016).

Table 8: Criteria and licensing strategy

Criteria	**The strategy meets criteria** (Yes/No/Cannot be determined)	**Comments**
Suitable for small company	No	Less probable or usual than with larger firms
Enables limited commitment efforts	No	The commitment efforts are long-term for this strategy
Risk averse	Yes	
Allows high or full control	No	
Allows multiple country entry	Yes	The case of Starbucks suggests that the strategy may be suitable for multiple country entry
Benefits outweigh costs	Cannot be determined	The success is determined by a variety of factors that would need further research. While, in some cases the benefits may outweigh costs, it is said that this strategy is one of the least profitable methods of entry.

Source: Own work.

Table 9: Advantages and disadvantages of licensing

Advantages	**Disadvantages**
Fast entry, low risk, low cost, requires little capital investment, the licensor is not exposed to the danger of nationalisation, licensor can take immediate advantage of local marketing, possible securing of government contracts with local manufacture	Less control, regulatory and legal environment must be in line, typically least profitable method, licensee's bad image influences parent company's image, licensee may become a competitor, danger of the licensee running out of funds, quality control difficult

Source: Mariadoss; (2017); Hollensen (2014); Lumen (n.d.)

2.5 Ownership

A wholly owned subsidiary means the firm owns 100 percent of the stock. There are different ways a company can be an owner in a foreign market. It can be either done with an acquisition or by setting up a new operation in a foreign country, often referred to as a greenfield venture where the company establishes a fully owned subsidiary from scratch (for concepts and definitions check Appendix 17). A special case of acquisition is a brownfield entry, where an investor's transmitted resources dominate those provided by an acquired company. The term "acquisition" happens when a company gets control of another company by purchasing stock, exchanging stock of its own or paying the owners a purchase price. This way, the company gains ownership of another company and control of that company. Acquisitions can be attractive due to quick access to a new market; however, they are also expensive and they can be perceived as exploitation or a blow to national pride as it replaces domestic ownership. The strength of different currencies can be beneficial when the acquiring firm is from a country with a stronger currency as the acquisition becomes comparatively cheaper. To decide whether this strategy is the one the company should pursue, the company should examine laws in the target country. For example, in China there are many restrictions on foreign ownership, which can make it a less appealing strategy for firms. Nonetheless, acquisition is a good entry strategy when scale is needed or when an industry is consolidating. Acquisitions, however, are risky and about 40 to 60 per cent of acquisitions fail. On how the ownership strategy meets the criteria see Table 10 (Mariadoss, 2017; Onkvisit & Shaw, 2004, p. 260-261; Hill, 2013, p. 498).

Another way of ownership is foreign direct investment (FDI). FDI gives a company a formal establishment of business operations in the foreign land. FDI is the most expensive commitment a firm can make when going overseas. FDI is influenced by the size and attractiveness of the market. Examples are automakers such as BMW, Honda, Mercedes etc. The most prevailing form of FDI is a foreign subsidiary, which is an independent company that is owned by the parent company (Mariadoss, 2017).

Ownership delivers high control for the company, but the costs and the risk can be large. In terms of acquisition, the company can gain fast entry, while a greenfield venture has a slow entry due to the setup time. Moreover, the fully owned subsidiary is a complex establishment that requires a lot of money and time, but the potential returns can be high. Lastly, a wholly owned subsidiary comes with a 100% share of the profits generated in the foreign market. For more about advantages and disadvantages see Table 11 (Mariadoss, 2017; Euromonitor International, 2016; Hill, 2013, p. 498).

Table 10: Criteria and ownership strategy

Criteria	**The strategy meets criteria** (Yes/No/Cannot be determined)	**Comments**
Suitable for small company	No	Acquisitions and FDIs require higher investments that can usually only be done by larger companies
Enables limited commitment efforts	No	Ownership requires extremely high commitment efforts
Risk averse	No	Ownership is a risk taking strategy that requires large investments
Allows high or full control	Yes	Ownership delivers full control
Allows multiple country entry	Yes	Potentially yes, however, this comes with great costs
Benefits outweigh costs	Cannot be determined	Fully owned subsidiaries are reported to have high potential returns but there are many other factors that affect success that are not taken into account

Source: Own work.

Table 11: Advantages and disadvantages of ownership

Advantages	**Disadvantages**
Fast entry (for acquisition), high potential returns, full control, strength of different currencies can sometimes be beneficial when acquiring a firm, retain all profits generated, realising location and experience of the economy, protecting technology	High costs, high risk, slow entry (for greenfield venture), some countries can make this strategy difficult to achieve, possible problems with communication and coordination (acquisition)

Source: Mariadoss (2017); Hollensen (2014); Hill (2013); Euromonitor International (2016).

For the conclusion of this chapter, after conducting the interview, setting the criteria and taking a deep dive into different strategies, I believe that the most suitable strategy for 3WAY d.o.o. would be the exporting strategy at first. However, they should also think about further strategies if the exporting strategy is successful. The strategy meets a significant number of the criteria that was set in collaboration with the company; it is suitable for a small company, it enables limited commitment efforts, it is risk averse and allows multiple country entry. As already mentioned, from the interview, the company is not very committed to the project. They are also not willing to take high risks and are planning to invest more into the project only if the project is successful. The strategy of exporting follows these vital parts of the criteria and that is why I believe this is the way the company should start their entry into a foreign market. On the downside, the company would miss out on full control because of the typical contractual agreements that come with exporting strategies.

Furthermore, if the company is successful with the exporting strategy, they can upgrade their entry by starting a joint venture or strategic alliance with another foreign company. This is usually suitable for a small company since investments are distributed between both partners meaning that the company does not have to cover all the expenses. This strategy would be beneficial since the marketing efforts can be enhanced with the domestic company as well as production and distribution costs being lower. The problem with this strategy, however, would be lower control, possible disagreements and lower flexibility. Nonetheless, the exporting strategy covers most of the criteria points and this is why the company should start with this strategy first and only think about changes afterwards.

3 MARKET ENTRY STRATEGY FOR 3WAY D.O.O.

In “What is Strategy” Porter found strategy is: finding one ideal competitive position in the industry, benchmarking and selecting best practices, and outsourcing aggressively. In the broader perspective this means that there are two options: do what everyone is doing but at a lower price or do something no one else can do. Porter believes that both options are not

economically equivalent. Competing with others by lowering prices (with others doing the same) will push the price to the bottom, which will decrease the profitability for the entire industry (Ovans, 2015). This shrinks the size of the pie. On the other hand, it is possible to expand the pie by getting a sustainable position based on the unique advantage created with a "preferably complicated and interdependent set of activities" (Ovans, 2015).

In this chapter, I will review brand strategy and apply it to the case of 3WAY. Moreover, I will study strategies and some of the problems that family SMEs face when it comes to internationalisation. Lastly, I will finish off with the product launch and gaining the competitive advantage in the new environment.

3.1 Brand strategy

A strategy can also be defined as an approach that is aligned with the goal that the company wants to achieve. Branding strategies are something that companies should continuously invest in and reinforce to keep consumers aware of the brand value and the advantages of the brand in relation to the competition. Companies like Oldsmobile, PanAm and Woolworth are some examples of companies that did not reinforce their brand strategy, which led to decline. When a brand falls, the large investments that created the brand turn into a sunk cost. Brand strategies can be planned based on stages of the product life cycle. For example, in the introductory stage, a company should use attractive promotional schemes. High prices can transform a brand into a premium niche, and affordable prices can be targeted at mass consumers (Rajagopal, 2019).

For 3WAY's brand strategy for entering the chosen country, I will use the brand strategy canvas as introduced in the book by Patrick Woods. The guide is similar to the models that we were using on some of the courses at the faculty and is in my opinion a good start for reaching a basic idea as to what brand strategy should the company adopt. A key thing to remember is that there are a variety of ways that brand strategies are done, some can very complex, however, I believe that for 3WAY, a simple guide would be most appropriate one since their budget is lower than large enterprises' and the commitment level for this project is also low (at least at the start) (Woods, 2020).

The canvas is divided into different boxes (as well as sections) such as customer insight, competitive environment, company/product features, rational and emotional benefits. The canvas converts the abstract strategy into clear sets of steps that a company can take. Moreover, the central part of the canvas is connected to other boxes of the canvas and is called the positioning statement. Boxes like values and personality cannot be shifted based on the business strategy, as the values of the company are true no matter the target audience or competition. Lastly, at the bottom of the canvas there are key messages, which will be communicated across all channels. These are the messages that are relevant for the target

audience and are true to the values of the company. The original/whole canvas can be accessed in Appendix 18 (Woods, 2020, pp. 1-12).

In Appendix 19 I created a brand strategy platform for the company to use when entering the new market. I believe that these ideas should be messaged through a variety of channels. For example, some of the key messages like "built for the future" or "making things reliable" can be printed on the packaging of the product to communicate some of the company's values and personality traits. This is the way that the company can communicate with a target audience that believes in the same values. When advertising the product on social media (or using other forms as well) the company should make enough space to communicate rational benefits of the product but should not forget about the emotional benefits of the product. For example, one of the rational benefits is that the product can do two things in one. The emotional benefit for that is that the work is done more easily and with less stress. The customer will be able to connect the positive emotions with the product itself, which I believe should be an overall help to the brand. Therefore, if I conclude the brand strategy, the company's values and personality traits should be communicated together to the chosen audience over many channels to get the message across. Lastly, a brand positioning statement connects quite a few of the boxes to provide one statement that helps the company communicate the benefits, the proof of the benefits, the payoff, the description and the audience. The positioning statement for this brand strategy could be phrased as: "For smaller companies looking for a better quality alternative, 3WAY offers a two in one product that can create environmentally friendly objects with smooth surfaces, because of its hybrid technology and PLA plastic material, so that you can do more, better and be more environmentally conscious". More information regarding the other parts of the canvas can be accessed in already mentioned Appendix 19 (Woods, 2020).

3.2 Internationalisation strategy for small family companies

Family companies seem to be less likely to grow and this becomes even worse when it comes to international markets. One of the main reasons for this is the limited capital available to fund both family needs and the business growth needs. Some of the other factors that may have an influence are the inflexibility and resistance to change of leadership, conflicts between sibling successors, different family goals, values and needs (Fernández, & Nieto, 2005, p. 77).

Therefore, the lack of relevant resources, psychosociological, cultural and political problems are the causes for limited growth of these family businesses. For internationalisation, it is important to have different types of resources in order to be able to expand outside the domestic market. Family firms lack these resources (especially small companies), explaining why these companies do not normally expand internationally. Reversing this trend helps reach that goal. This subchapter will analyse some of the ways that this can be achieved both internally and externally (Fernández, & Nieto, 2005, p. 78).

International expansion is based on having opportunities abroad to exploit the competitive advantages that the firm has in their domestic market. This is the reason that a lack of resources and uncertainty, as well as complexity, usually works against foreign expansion. Some theories suggest that intangibles such as technology, brand, culture and managerial capabilities are the key, while other theories suggest that the information available for both domestic and foreign markets is the key (Fernández, & Nieto, 2005, p. 78, 79).

The research article examines 4 hypotheses. The first hypothesis states that "In SMEs, international involvement is negatively related to family ownership." (Fernández, & Nieto, 2005, p. 79). This could be due to the known financial difficulties of family SMEs as well as their conservative attitude and being risk averse. Moreover, due to a lack of information about the foreign market, the company sees it as uncertain decision (Fernández, & Nieto, 2005, p. 79).

The second hypothesis states that "international involvement is encouraged by the presence of the second and subsequent generations in the family SME." (Fernández, & Nieto, 2005, p. 80). The reason for this statement is that the second generation is better prepared and has more information (Fernández, & Nieto, 2005, p. 80).

The third hypothesis states that "international involvement is encouraged when another company is a large-block share-holder in the family SME." (Fernández, & Nieto, 2005, p. 80). Family SMEs have better access to financial markets when they have large-block shareholder ties. Moreover, the shareholder company can improve internationalisation by gaining deeper knowledge about foreign market. The shareholder company can also provide human resources, technological, financial and marketing expertise (Fernández, & Nieto, 2005, p. 80).

Lastly, hypothesis 4 states that "international involvement is encouraged when the family SME has alliances with other firms" (Fernández, & Nieto, 2005, p. 81). The reason for this lays in the fact that the family SME is able to share some of the risks with another company and the effective cost of internationalisation may be reduced (Fernández, & Nieto, 2005, p. 81).

The source of empirical data was from the Survey of Business Strategies, compiled by the Spanish Ministry of Science and Technology. The dependent variables were export propensity and export intensity. The independent variables were family ownership, second generation, joint ownership and alliances. The control variables were size, indebtedness, intangibles and sector (Fernández, & Nieto, 2005, p. 81, 82).

The results suggested that first generation family firms are less involved in international markets. The involvement gets higher with newer generations or with another company investing capital. Moreover, family businesses present a lower amount of international

involvement than non-family business. The export propensity was negatively correlated with the family ownership. This means that the first hypothesis is confirmed. The second hypothesis was also supported by the fact that newer generations had a positive correlation with export propensity. Furthermore, another company investing into a family SME had a positive correlation with export propensity as well. This supports the third hypothesis. Ultimately, hypothesis 4 was also confirmed with the measurement of export propensity (Fernández, & Nieto, 2005, pp. 82 - 85).

From these research results, one of the options for family SMEs is to involve the younger generations. The second and subsequent generations may have acquired knowledge and abilities that the founders do not possess. The fact that younger generations do help with internationalisation is supported by the fact that those SMEs have a higher export propensity and intensity than first-generation SMEs. The second option is to form alliances or to have another company as a shareholder. The empirical data suggests that those companies that have another company as a shareholder are in a better position for involvement in international markets. They can also get help in terms of acquiring knowledge about foreign markets. It is similar for alliances. The study also suggests that there is a higher probability of international expansion with succeeding generations in charge. This can be a challenge for the owners and managers of the firm, but nonetheless, a successor can give a firm a new push with more ambitious strategies. Support is needed for expansion and although firms may be reluctant to involve another party, they do come with many of the already mentioned advantages, making it a good step towards international expansion (Fernández, & Nieto, 2005, p. 86, 87).

3.3 New product launch

The role of a new product launch is to maximise the chances of profitability. A launch plan can consist of strategic and tactical decisions. The strategic and tactical challenges depend mostly on the specific type of purchasing behaviour to be influenced. Based on the innovativeness of the product, the managers can establish three types of desired demand outcomes: trial and purchase, customer migration or innovation adoption and diffusion. How much the desired demand outcome will be realised depends on the buyers' perception of the product's relative advantages and compatibility. I will use the framework from the article to propose the new product launch strategy for 3WAY d.o.o. (Guiltinan, 1999, p. 509).

To start off with the innovativeness of new products and desired buying behaviours, the three kinds of buying behaviours are trial and repurchase, customer migration and innovation adoption and diffusion (Table 12). When a product is not very new to the market, the adoption is made without any real search or effort, it is then that trial and repurchase behaviour is desired. When the risk of purchase is low, buyers can trial purchase before they use the product regularly. The trial achieved will mostly depend on advertising, selling and other promotional methods that increase brand awareness (as wells as distribution

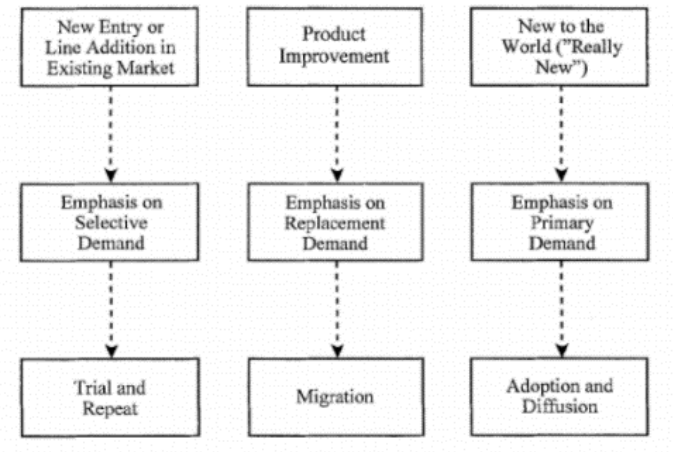
availability for products like consumer goods), as the buyers' information requirements are quite low. Here the emphasis is on selective demand (Guiltinan, 1999, p. 511, 512).

Where there is a new product that provides a significant upgrade or change to existing products, the desired behaviour is customer migration. The launch plan is to see existing customers "migrate" to the new product from the old ones. There are two types of situations when this is desirable: a new product that represents an upgrade to an existing offering, or a new price-performance offering that serves the segment where greater performance is highly desirable. The buyers' willingness to migrate depend on benefits and costs of change. Here the emphasis is on the replacement demand (Guiltinan, 1999, p. 512).

Lastly, innovation adoption and diffusion is desired when the product is completely new, and the process of adoption is usually slow. In that case, buyers will likely take more effort and time to make a decision on the purchase as the cost will increase. Typically, the strategy is to target the innovative adopters. Here the emphasis is on primary demand (Guiltinan, 1999, p. 512).

Connecting the theory to the case of 3WAY's product, the company's desired behaviour would be customer migration. 3WAY's hybrid 3D printer offers an upgrade to the existing line of classic 3D printers, but not really in a sense of completely new product. The launch strategy should emphasise on persuading customers to migrate from a classic 3D printer to a hybrid 3D printer. The success will likely depend on the assessment between benefits and costs for consumers.

Table 12: Innovativeness and desired buying behaviours



Source: Guiltinan (1999).

The characteristics that influence the adoption of the new product are relative advantage, compatibility with values and experiences, complexity in use or understanding, trialability and observability. The relative advantage presents the product's benefits against other products, while the compatibility depends on the product's fit with the individuals' needs,

values and how close the experiences and usage of the system are with the previous products they used. The complexity in user or understanding relates to how much training or skills are needed for the proper use. Trialability, on the other hand, are samples, test drives and other ways that reduce a buyer's uncertainty. Lastly, for the observability characteristic, people are more likely going to adopt a product if the benefits can be observable. Since the demand outcomes are largely influenced by relative advantage and compatibility, these are the characteristics that will be used in the core dimensions framework down below (Guiltinan, 1999, p. 513, 514).

Whether high compatibility or relative advantage is more important depends on the segment that a company wants to target (Table 13). If the company with a desired adoption/diffusion behaviour wants to target early adopters, the importance of relative advantage will be higher than for compatibility. On the other hand, if the target segment is late adopters, the compatibility will be more important. For migration-desired behaviour, for the current customer segment, compatibility is more important, while for the competitors' customer segment relative advantage is more important. Moreover, for lead users and buyers who recognise the need for improved performance, the relative advantage is also more important. For example, a customer that is less knowledgeable about personal computers will be more reluctant to update their Windows system, because of the relearning and reformatting costs that will be perceived high in relation to the benefits expected. According to 3WAY's knowledge of the market, the new hybrid 3D printer should have high relative advantage but low compatibility. This means that 3WAY should focus on the segments where relative advantage is more important. These segments are competitors' customers, lead users and buyers who need improved performance (Guiltinan, 1999, p. 517).

Table 13: Segments and importance of relative advantage versus compatibility

Desired Buying Behavior	Potential Segments	Relative Importance of	
		Relative Advantage	Compatibility
Adoption/Diffusion	Early adopters	X	
	Late adopters		X
	Users of competing category		X
	Non-users of competing category	X	
Trial/Repurchase	Current customers using our products		X
	Competitor's customers	X	
	Lead users	X	
	Buyers with special usage needs		X
	Variety seekers		X*
Migration	Current customers		X
	Competitor's customers	X	
	Lead users	X	
	Buyers who recognize need for improved performance	X	
	Buyers who do not recognize need for improved performance		X

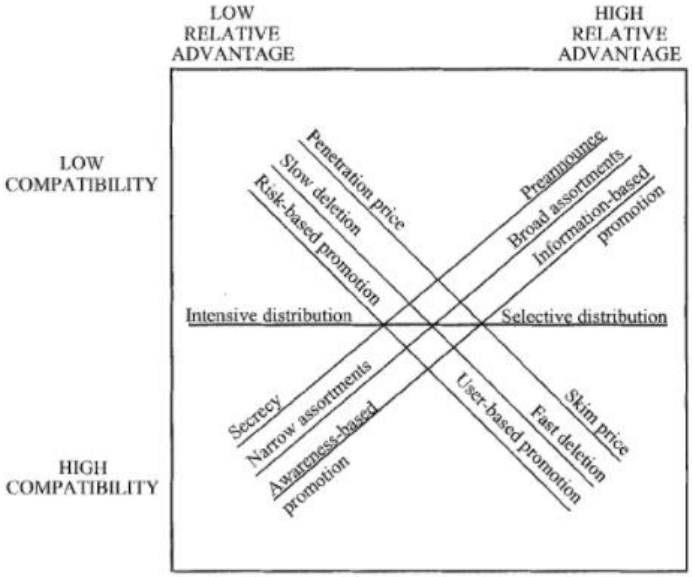
* Low compatibility may be a virtue in this segment.
X indicates the more important product characteristic.

Source: Guiltinan (1999).

A high relative advantage with a low compatibility dimension best reflects completely new products but, in this case, the product is new in terms of being a large upgrade and not that

it has technologies that have never been seen before. Why the hybrid 3D printer has a high relative advantage can be seen from all the advantages mentioned in the thesis. On the other hand, the product has low compatibility because from the perspective of 3D printer buyers, the CNC technology may not be something they have had experience of and it would require a significant effort to acquire this new knowledge. For products with high relative advantage and low compatibility, the product information must be extensive in order to underscore the relative advantages and overcome incompatibilities. The product is new, so the buyers need as much information about the product as possible. Personal selling demonstrations can be useful for this dimension as they help potential buyers see the relative advantages of the product and price incentives can be useful to stimulate distributor selling effort. Furthermore, a classic push marketing strategy can help these products, where influence agents like the press (or in our case tech influencers), as well as salespeople, provide information that shape customers' cognitive evaluations of the product. Lastly, a preannouncement can be useful so that buyers are alerted and prepared for the changes they would need to apply to their usage systems. The broader product assortments can facilitate the customisation of the new product as well. These tactics and strategies can be used by 3WAY to facilitate the launch of the new product. How launch tactics change based on different combinations of relative advantage and compatibility are shown in Figure 3 (Guiltinan, 1999, p. 520, 521).

Figure 3: Launch tactics for different combinations of relative advantage and compatibility



Source: Guiltinan (1999).

3.4 Gaining a competitive advantage

Porter's generic strategies have been widely accepted methods for gaining competitive advantage and reaching above average industry returns. Michael Porter's idea is that

strategies can be put into four generic types: differentiation, cost leadership, focus or combination. Nonetheless, while the idea may be clear to managers, the previous research does not identify tactics that can achieve the generic strategies. What's more, the prior research does not determine which tactics can bring higher levels of organisational performance. This means that managers had to interpret Porter's theory on their own and then determine the appropriate tactics for the implementation. In this subchapter, with the help of the research study, I will summarise the four main generic types of strategies, as well as look deeper into the most favourable one for 3WAY. The research study was done with the help of a survey of over 200 organisations. Moreover, with the help of factor and regression analyses, the tactics with the highest correlation to the organisational performance were identified (Akan, Allen, Helms & Spralls, 2006).

To start off with the first generic strategy, differentiation. When a company uses differentiation strategy, it focuses on providing a unique product or service, making it a different offer from those of its competitors. This strategy allows a firm to set a premium price and the strategy is implemented effectively when the company provides unique or superior value to the customer. This can be done through the high quality of the product, features, service etc. The company can charge a higher price based on the characteristics of the product, quality of service, delivery system and more. The quality does not necessarily need to be real, it can also be a perceived high value from the customer. This strategy is appropriate for the knowledgeable consumer who is interested in a unique product and is willing to pay more for a non-standardised product (Akan, Allen, Helms & Spralls, 2006).

The second strategy is the cost leadership strategy. In this strategy, the company focuses on gaining competitive advantage through the lowest costs. The company must have a low-cost leadership mindset and discontinue any activity that does not have a cost advantage. This also means, if necessary, outsourcing activities to other organisations that can achieve cost advantage. The cost leadership can be achieved through mass production, economies of scale, access to raw materials, technology etc. In summary, cost leaders provide a product with the lowest possible cost to gain a competitive advantage over the competition (Akan, Allen, Helms & Spralls, 2006).

Lastly, the focus strategy targets a specific, narrow segment of the market. This can mean that they choose a specific customer group like youths, seniors or other groups. It can also mean that they focus on geographical areas, different segments of a market, product range or service line. Focus strategy also means that it is concentrated on a narrow competitive scope in the industry that large companies overlook. The success is dependent on the size of the industry segment; it needs to be large enough for growth but small enough to not look important for other competitors. Focus strategy can also be in combination with low-cost or differentiation strategies. This means that it can enter the niche market either by lowering cost or providing a specialty product or service (Akan, Allen, Helms & Spralls, 2006).

For the 3WAY company it is difficult to pick the right strategy as the product has components of low cost focus as well as the differentiation focus strategy. The product offers a solution for smaller or medium sized companies that would allow them to invest less on a hybrid than they would have to for buying a 3D printer and CNC machine separately. On the other hand, the product differentiates itself by offering a unique quality that other 3D printers don't have, and that unique quality does not only bring two technologies together but can significantly improve the quality of the 3D printed surfaces. This means that the prices would still need to be more premium than the prices for normal 3D printers. In this case, the most appropriate strategy would be the focus strategy, which is not in combination with either low-cost or differentiation strategies. Therefore, the company should focus on a narrow segment of consumers. In the case of 3WAY that would be SMEs that want to do both 3D printing and milling for better surface quality. This is a segment that can be overlooked by larger firms and their product offers a great benefit to this type of consumer. This way the company can gain a competitive advantage by differentiating themselves with the hybrid technology as well as offer (in some cases) a lower cost product when it comes to buying a hybrid or buying two products separately. Unfortunately, the research study does not offer any special tactics for this category, but the idea is to focus on a market that other companies do not see. I believe that this product can in some ways be disruptive to traditional 3D printers since it can provide premium surface quality of prints in less time and at a lower cost compared to premium traditional plastic 3D printers. This is also why the strategy does not have to be low-cost or offer a special quality upgrade, and why the competitive advantage can be seen in the focus strategy that consists of both the right price and a significant upgrade to the consumers.

4 INDUSTRY AND COUNTRY ANALYSES

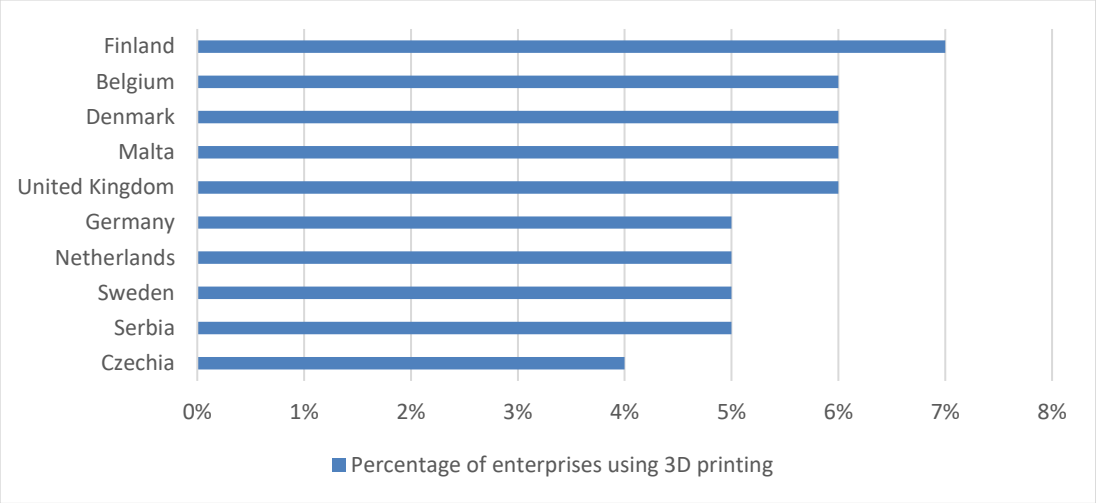
The European Union is dispersed into different member states and each of those states has a different market, which results in countries having different potential when it comes to the entry of a new firms. Additionally, even if some countries may look more attractive due to their high demand, these same member states can be more economically and financially risky, which ends up making these countries less attractive options. In this chapter I will conduct industry and country analyses to get the information about usage of 3D printers, compare different European regions and propose potential country entries. While most of the countries are in the EU, some of them are not, or are not part of the Schengen area or both, or are part of the Schengen area but not the EU, but they will still be part of the analysis in case there are attractive options (more information in Appendix 23). By knowing the usage of 3D printers in Europe we are be able to understand which countries may be more attractive, and this can be then extended into the comparison of different European regions, which does not only compare specific European countries but different regions as a whole. At the end of these subchapters, it will be possible to propose different entries and then compare them with the economic and financial benchmarks to analyse the country risk. The

data for this subchapter will be mostly derived from Eurostat for comparing regions and countries, and Statista for looking at the economic and financial risks of the chosen countries.

4.1 Usage of 3D printers in Europe

If we look at the top 10 countries when it comes to the percentage of all enterprises using 3D printing (Table 14), we find out that the countries are close in terms of their usage. The member state that stands out in this analysis is Finland with 7% of all enterprises using 3D printing technology. Afterwards, we have Belgium, Denmark, Malta and United Kingdom with 6%. Moreover, Germany, Netherlands, Sweden and Serbia have 5% of enterprises using 3D printing. By contrast, Slovenia is reaching 4% (as well as Czechia), which is also the EU average. The data also suggests that the main use for 3D printing in Europe is for prototypes and internal use. It is important to add that the data from this Eurostat spreadsheet does not come with decimal results, meaning that some countries' position may not be exactly correct because of a lack of additional information available from the source (Eurostat, 2020).

Table 14: Percentage of all enterprises using 3D printing technology



Adapted from Eurostat (2020).

Continuing the analysis with the percentage of 'small enterprises' **(**from 10 to 49 employees) using the 3D printing technology (Appendix 20), we find out that the data is similar to the 'all enterprises' analysis. Finland is again at the top with 6% of small firms using 3D printing. Belgium, Denmark, Malta, U.K. and Serbia are following Finland with 5% using 3D printing. The rest of the top 10 countries (Germany, Italy, Lithuania and Netherlands) have 4% use. In Slovenia, 3% of small enterprises use 3D printing. An interesting point is that 2% of all small enterprises in the European Union use 3D printing for prototypes or models for internal use, while in Finland the percentage is 5%. This is also the main use of 3D printing in Finland as well as in the European Union as whole. This means that most small enterprises

use 3D printing for making prototypes (or models for internal use) rather than using it to create the final product for consumers or for external use (Eurostat, 2020).

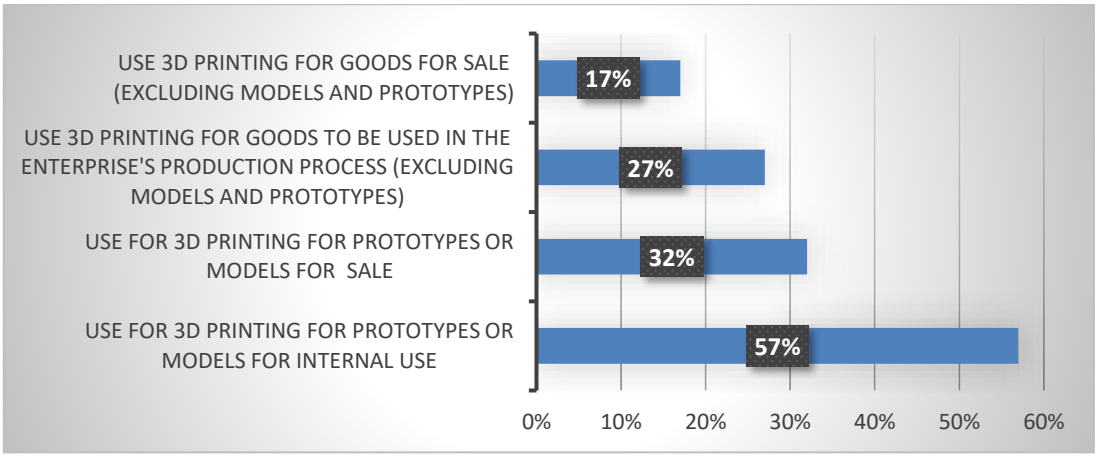
Furthermore, looking at the data for 'medium enterprises' (from 50 to 249 employees) we find out that the top countries' list changes, as well as the percentage increasing (Appendix 21). More of the medium sized companies use 3D printing than the small sized firms. The EU average of 3D printing use by small enterprises is 3% while for the medium ones it is 7%. Denmark has the highest percentage with 11% of medium sized firms using 3D printing technology. Italy and United Kingdom have 10% using 3D printing, while Germany, Austria and Finland have 9% use. The rest of the top countries are Belgium (8%), Sweden (8%), France (7%) and Netherlands (7%). In contrast, Slovenia is reaching the EU average with 7% of medium sized companies using 3D printing technology. As with the small enterprises, the main use of 3D printing technology for medium enterprises is prototypes and models for internal use (Eurostat, 2020).

In terms of 'large enterprises' (250 or more employees) the list of top countries completely changes and the percentages of 3D printing usage are significantly higher (Appendix 22). Looking at the whole Europe, 13% (still including the U.K. as a member state) of all large enterprises use 3D printing in their business. Slovenia is at the top of the list with 21% of Slovenian large firms using 3D printing. Germany is the second country with 18%. Czechia, Austria and Sweden all have 17% use rate and these countries are followed by: Denmark, France and Finland with 16% and the rest of the countries in the top 10 list are Belgium and Malta with 15% of large enterprises using this technology. As we can see, the numbers are higher when it comes to the larger enterprises in comparison to smaller enterprises. This may signify that large companies in the European Union are paying close attention to 3D printing technology. As we have already seen from the data for the other two enterprise sizes, similarly, large enterprises are using 3D printing mainly for prototypes and internal use. This means that most companies may not yet see 3D printing as a product manufacturing technology (at least in most cases), but as a technology to help companies make prototypes easier and cheaper (Eurostat, 2020).

If we look at the companies' purpose for 3D printing (Table 15), we find out that on average within the European Union (still including the U.K. as a member state) 57% of all sizes of enterprises (excluding non-3D printing technology owners) use 3D printing for prototypes or models for internal use. This number is followed by 32% of all enterprises using 3D printing for the same reason, except it is not focused on internal use, but is used for selling to external users. What's more, 27% of enterprises use 3D printing for goods to be used in the enterprises' production processes (excluding models or prototypes). Lastly, 17% of all enterprises use 3D printing to produce goods for sale (excluding models or prototypes). The data suggests, as already stated in the previous paragraphs, that the main use of 3D printing technology is to produce prototypes or models. Most of these are used internally but also external use makes up almost one third of all the ways they are used. The firms are not using

3D printing for production of goods that significantly, which may be due to a variety of reasons, from complexity of products to cost efficiency. The number of the percentage points do not add up to 100, since the company can be using printing for more than one category. For example, a firm may be using 3D printing for prototypes as well as for goods for sale (Eurostat, 2020).

Table 15: Categories of 3D printing use within EU



Adapted from Eurostat (2020).

Looking at the data for small enterprises the percentages are similar to the graph seen above; 51% of small enterprises use 3D printing for either prototypes or models (internal use), 33% for prototypes or models (for sale), 26% for goods to be used in the enterprises' production processes (excluding models or prototypes) and 19% for goods for sale (excluding models or prototypes) (Eurostat, 2020).

Furthermore, the data for medium enterprises reveals that an even higher percentage of medium sized companies are using 3D printing for either prototypes or models. 67% of medium enterprises use 3D printing for either prototypes or models (internal use), 33% for prototypes or models (for sale), 27% for goods to be used in the enterprises' production processes (excluding models or prototypes) and 13% for goods for sale (excluding models or prototypes) (Eurostat, 2020).

Lastly, in terms of large enterprises the purpose of use is shifted even more towards prototypes or models for internal use. To that end, 76% of large enterprises use 3D printing for either prototypes or models (internal use), 34% for goods to be used in the enterprises' production processes (excluding models or prototypes), 26% for the sale of prototypes or models and 10% for goods for sale (excluding models or prototypes) (Eurostat, 2020).

To summarise some of the main points of this subchapter, looking at the usage in the EU, Finland is leading with 7% of all firms using 3D printing technology. In terms of smaller sized companies, Finland is leading again but falls back in terms of medium sized

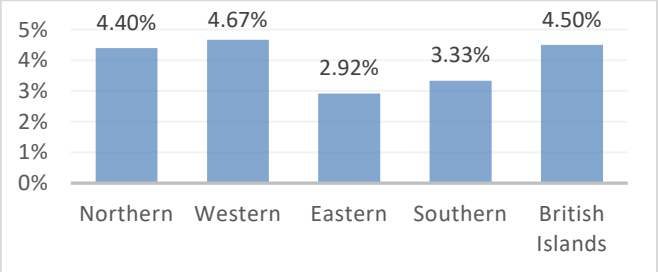
enterprises. Denmark is the leading country within the EU when it comes to the usage of 3D printing in medium enterprises. On the other hand, Slovenia leads when it comes to large enterprises, with 21% of all large companies using 3D printing technology. Another key thing to remember is that most companies in the EU use 3D printing for production of prototypes or models for internal use. This is then followed by prototypes or models for sale, goods to be used in the enterprises' processes and goods for sale.

4.2 Comparison of different European regions

For the comparison of different European regions, I will divide Europe into five regions: Northern Europe, Western Europe, Eastern Europe, Mediterranean (Southern) Europe and the British Isles. The division of countries into regions (in Appendix 23) will be adapted from the division of regions as mentioned in Finlayson (2019). I skipped countries that I could not find data for and countries that according to the sources have low reliability of information. Those countries that have low reliability in only certain categories will be removed from the calculations in those particular categories. The divisions will then be compared based on the average values of the usage of 3D printers to determine which region has a bigger market, looking from the perspective of the percentage of companies using 3D printing technology within that region. Knowing which regions reach higher levels can give the company the idea of the attractiveness of some of these regions (excluding factors such as competition, entry barriers etc.)

The data for all enterprises (in Table 16) suggests that Western Europe has the highest percentage of firms using 3D printing with 4.67% use. Next up are the British Isles with 4.5%, followed by Northern Europe (4.40%), Southern Europe (3.33%) and Eastern Europe (2.92%). In comparison with the European Union average, which is 4%, we can conclude that the Northern region, Western region and British Isles are exceeding the average, while, Southern and Eastern Europe, on the other hand, are below the average of the European Union. Some of the countries from Eastern Europe are not member states of the European Union (Eurostat, 2020).

Table 16: Comparison of European regions in terms of usage



Adapted from Eurostat (2020).

Furthermore, in terms of small enterprises (Appendix 24), the British Isles averages the highest percentage (4%) of companies using 3D printing technology. Northern Europe region is in 2nd place with 3.8% of all small companies using 3D printing. The rest of the regions are Western, Southern and Eastern Europe with 3.67%, 2.83% and 2.58% respectively. With the European Union average being 3%, the Northern, Western and British Isles' regions are all exceeding the average, while the Eastern and Southern Europe ones are below average. Once again, some countries that are not in the EU are affecting the result in comparison to the average (Eurostat, 2020).

Looking at the data for medium sized companies (Appendix 25), the Western region and British Isles both reach the same highest value of 7.5%. This is followed by the Northern region (7.4%), Southern region (5.33%) and Eastern region, which reached 3.92%. The average of the European Union is 7% while the average of the Euro area is 8%. In comparison to the European Union, the Western, Northern Europe and British Isles are exceeding the average while other regions are below average. It needs to be understood that the 7% EU average is a rounded number, so the true value may be slightly higher or lower. As in the previous paragraphs, there are also some non-EU countries that influence the average (Eurostat, 2020).

Lastly, the data for the large enterprises (Appendix 26) suggests that the highest percentage of firms using 3D printing technology is in the Western region, reaching 14.50%. The remaining Northern, British Isles, Eastern and Southern regions are reaching 13.2%, 10%, 9.42% and 8.33% respectively. The average in the European Union is 13% (Euro area 14%), meaning that the Northern and Western regions are above the average of the EU while the rest of the regions are below the average. As in the previous paragraphs, there are also some non-EU countries that impact the average (Eurostat, 2020).

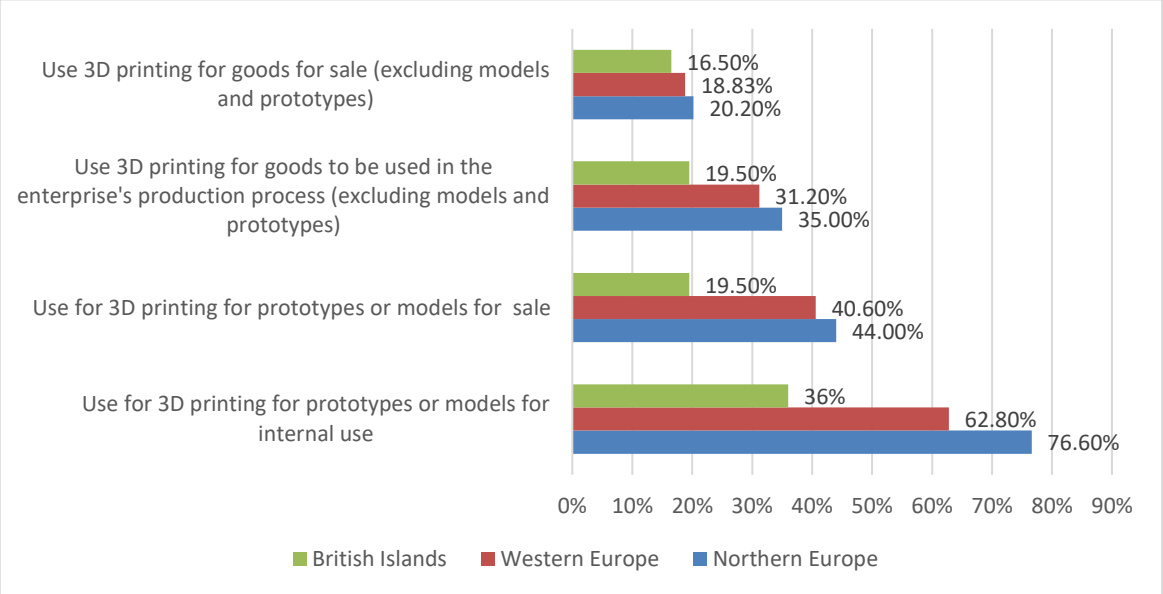
The results from the analysis suggest that the Northern region, Western region and British Isles seem to have highest percentage of firms using 3D printing. Based on the information, I can conclude that the demand in these regions may be the highest due to the number of companies using 3D printers. Nonetheless, which of these three regions are genuinely attractive for the firm, cannot be determined with this information alone, however, it is worth investigating further since companies within these three regions appear to be more prone to investing into this technology.

In terms of categories of use for all three regions (in Table 17), there are smaller differences between the Western and Northern regions for all categories except for the use of prototypes or models for internal use where the difference is almost 14%. The British Isles, on the other hand, have lower percentages. Why the U.K. has such a low number in all categories is unknown. Assuming there has been no error, I believe that the U.K. may be using 3D printers outside these categories. To continue with the analysis, in the Northern region there are 76.6% of companies using 3D printing technology for the purpose of printing prototypes or

models for internal use, while in the Western region there is 62.8%. The British Isles only reach 36%. The main use of the technology is to produce prototypes and models, more so for internal use than for the sale to other parties. The smallest percentage of companies are using 3D printing for goods for sale. Both the Northern and Western regions have quite similar percentages in this category. Entering these two regions would mean that the company should be aware of these graphs to understand where the market may be. On the other hand, the differences of categories for the British Isles are smaller, except for the bottom category on the graph. Again, most companies in the Northern and Western regions (as well as in Europe in general) use 3D printing mostly for printing out prototypes or models, so this may also be something they look for when they are searching for a new 3D printing provider, however, it still cannot be said that there wouldn't be more companies using 3D printing for goods for sale if these printers were reliable enough to produce reliable goods for sale at a cost that would be profitable for the company (Eurostat, 2020).

Important information regarding the data from Germany is that it did not seem to be very dependable according to the source, so I had to skip the country for almost the whole analysis. Only the upper category had reliable data for Germany, so that was the only category in which it was included. This may affect the reliability of this analysis.

Table 17: Categories of 3D printing use within British Isles, Western and Northern Europe



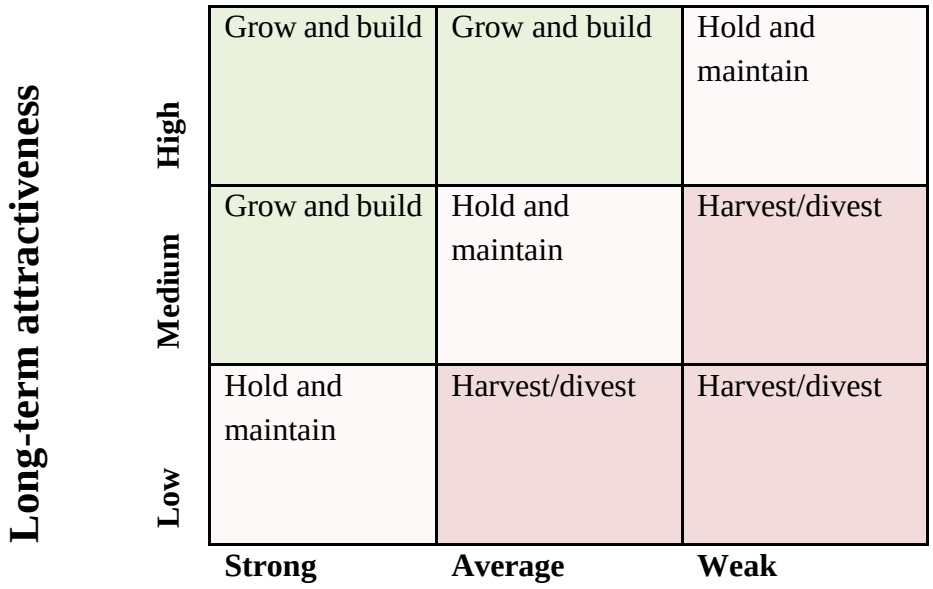
Adapted from Eurostat (2020).

4.3 GE matrix

To further inspect the attractiveness of certain markets, the business strength and the correct strategy, I will use the General Electric Matrix, which was created with the assistance of the consulting firm McKinsey (Figure 4). The nine-cell portfolio matrix was developed to avoid

the pitfalls of the BCG matrix. The matrix has two dimensions called long-term product/market attractiveness and business strength/competitiveness. The vertical axis represents the industry's long-term attractiveness, which is the composite of weighted factors such as market growth rate, market size, projected profitability, economies of scale, capital requirements and more. Each factor is weighted according to importance and the business is rated on each factor on a scale of 1 to 5. The weight and the rating then result in the weighted composite rating. The horizontal axis represents the business strength and is rated on factors such as market share, profitability, knowledge of customers, firm's skills and the rest. Both weighted composite ratings of market/product attractiveness and business strength/competitiveness are then used to plot the position in the matrix. Based on the positioning, there are three strategies indicated for each area on the matrix. One strategy is to grow and build, the second is to hold and maintain, and the last one is to harvest/divest as seen from Figure 4. The weakness of this matrix is the lack of a prescription of a specific strategy besides very general instructions (Didia & Ateke, 2017).

Figure 4: Ge Mckinsey Matrix



Adapted from Didia & Ateke (2017).

4.4 Porter's Five Forces

Porter's Five Forces is a framework that is based on the perception that a competitive strategy should depend on the understanding of industry structures and how they change (Bruijl, 2018). The competition can be divided into Five Forces: the established industry rivals, potential entrants, customers, suppliers and substitute products. These Five Forces

define the industry's structure and the competitive interaction within the industry. If the forces are great, no firm earns good returns on investment. On the other hand, if the forces are weak, the industry becomes profitable for many companies. By understanding the competitive forces and their causes, we get a sight of the roots of the industry's current profitability. The framework, on the other hand, helps in anticipating and influencing competition over time (Porter, 2008).

The theory mentioned can be beneficial for the analysis of the 3D printing market in the case of 3WAY d.o.o. and their entry strategy. Starting off with the rivalry among existing competitors. According to Holst (2018) the strongest company on the market with the largest market share is Ultimaker with 10.1%. Some of the other top competitors are Prusa Research (7.1%), Formlabs (5.2%), MakerBot (4.9%) and Flashforge (4.9%). For the last two, 3WAY d.o.o. is already collaborating with them by distributing their products in Slovenia and some other countries. Another interesting fact is that the top 11 3D printer manufacturers have about half of the total market share, while the other half is shared by other companies. The competition, despite the industry of modern additive manufacturing being quite new, is very tough. What's more, manufacturers are also becoming more and more competitive with their pricing, making it even more difficult for new firms to compete. Printer prices seem to go from $300 for the entry level to $10,000+ for business or industrial 3D printers. It can be concluded that the force of existing rivalry is very strong (Grames, 2020).

In terms of supplier power, the most important material for 3D printing is the filament. While there are a variety of filaments being used for 3D printing, the most well-known plastic ones are PLA and ABS. These two are also the ones that the new hybrid printer is going to use. The prices for these two go from about $15 to $20 per kg (Goldschmidt, 2019). Talking to the CEO of 3WAY I also gained the information that the prices have become more and more competitive over the years and that the material is not too costly. What's more, the same applies to the materials needed to produce the product. In my interview with the CEO, he told me that the materials they use for the product are so common that there is a lot of competition among the suppliers and the prices are not high. Some of these materials are wires, screws, small motors, machine control units, etc. So, based on the experience of the company as well as the information from the sources, the competition between suppliers is high, prices are low and the supplier power is weak.

For the buyer power, there has been a significant growth of the industry, meaning that there are more and more buyers of 3D printers. The evidence for this can be seen at the beginning of the thesis. With a compound annual growth rate of 26.4% expected between 2020 and 2024, the buyer power is forecast to increase (Wagner, 2019). Even though this market is getting larger every year, it is still not reaching the heights of demand for some of the other industries like the computer or TV industries. Those products can be seen in pretty much any modern house. Most modern homes have a TV and a computer. The demand for these two products is extremely high, however, comparing that to the 3D printing industry is

almost impossible. The data from Eurostat (2020) suggests that only 4% of all enterprises in the European Union use 3D printing. So, while the industry may be getting larger every year, it is still small enough that an exceedingly high majority of companies in the EU are not using it. Moreover, it is still not something that every household would have it in their home. There are few buyers, but these same buyers do have the opportunity to choose from quite a few rivals. In conclusion, I would say that the buyer power is mediocre. There is a small number of buyers, which lowers their power but on the other hand, they can switch from one rival to another quite easily, which increases their power.

In terms of threat of substitution, it could be said that additive manufacturing and traditional manufacturing are a substitution for each other, however, in many cases additive manufacturing has significant benefits over traditional manufacturing. Some of these advantages are fast prototyping, making complex pieces, producing small volume products at lower cost, less repair time etc. The technology is being used in the aerospace, automotive, medical, machine tool production industries and more (Attaran, 2017). Can consumers switch to a substitute? In many cases they can. Is the substitution cheaper? The answer to that question is tricky because it depends so much on what the buyer wants to create. Some things are cheaper and better with traditional manufacturing, but also some are not. I believe that the threat of substitution is completely based on what the consumers wants to use this technology for. From the overall perspective, I believe that the threat of substitution is mediocre. From the perspective of the future of additive manufacturing, I believe that the threat will lower as the technology progresses.

For the threat of new entry, the price of creating a 3D printer can be low. According to the source a 3D printer with 0.1mm accuracy can be made at a cost lower than 240 EUR (in India) (Kumar, Tanveer, Kumar, Javaid, & Haleem, 2016). Keeping this in mind, it can be said that the entry to this industry is tremendously easy. New companies can easily decide to start producing their own 3D printers at a cost as low as 250 EUR. Even if the product does not bring profits, the production can be stopped quickly, with costs that are likely bearable for the company. The industry also seems to not be regulated tightly, which makes new entries even easier. Overall, I believe that the threat of new entry is very high, and the trend seems to be increasing. The industry has rising revenues with many new players (McCue, 2019).

Coming to the conclusion, the rivalry seems strong in the industry, which puts strains on 3WAY trying to enter the market. What's more, the new entry threat of entering the market is high as seems to be easy for new companies to enter the market because of low costs. On the other hand, the supplier power is low, which helps in terms of the production of 3D printers. Lastly, the buyer power and threat of substitution are mediocre. Combining all this information together, the overall position of 3WAY in the industry would be slightly difficult. The company definitely would not have a strong position but also would not have

a tremendously bad position. Nonetheless, the position would certainly not be good and surviving in the industry would not be easy.

4.5 Potential country entries

For the potential country entries, I see a couple of scenarios that could potentially work for the company. I created the criteria in Table 18, which will help me decide which countries to pick for further investigation. The most important part of the criteria is that the country reaches as many factors as possible.

Table 18: Criteria for country selection

Criteria	
1. High use among small or medium size enterprises (preferring smaller size)	4. Preferring EU Schengen over other countries for easier flow of goods and potentially lower barriers
2. Above EU average for total 3D printing use	5. High usage for production of prototypes or goods for sale or combination of categories for all sized enterprises
3. High usage for production of prototypes or goods for sale or combination of categories among small or medium size enterprises	

Source: Own work.

One of the potential entry countries could be Finland. Finland has the highest percentage of all enterprises using 3D printing. Most of the enterprises are of a smaller size, which could be beneficial for our case since negotiations could be less difficult than they would be with bigger companies. An exceedingly high majority (81%) of companies use 3D printing for production of prototypes and models for internal use and nearly a quarter (23%) of companies use it for printing out goods for sale. Almost 40% of companies are using it for goods to be used in the enterprises' production processes. All the categories mentioned above are above the average of the European Union. Although there is very high percentage for the production of prototypes (or models), this may not be the market for the company in our case. These firms may not look so much for the quality and smoothness of 3D prints since those are "only" prototypes (or models) and a smooth surface may not be an important factor. Nonetheless, there is a good number of companies (39%) that are using 3D printing for goods to be used in the enterprises' production processes, which is where the product in our case could be perceived to be better. In the end, each company differs based on their goals and values. It also needs to be considered that an unknown percentage of companies are using 3D printers for both or more than one use so these companies could value the quality of the prints as well. Based on the information provided in this paragraph, Finland

does have potential with the higher use among smaller enterprises, as well as good, above average percentages for categories that are closer to the values that the product is providing (Eurostat, 2020).

Another potential entry proposal is the Netherlands. This country has a decent percentage of all enterprises using 3D printing in comparison to the European average. Nonetheless, this is not the major reason for the proposal since the usage is in all cases (in terms of enterprise size) relatively close to the European average. What's more, in terms of use for all enterprises, none of the countries in Europe is reaching a very high percentage. The point why the Netherlands is a good opportunity are the reasons why companies are using 3D technology. Netherlands is in the top 3 when it comes to the percentage of all enterprises using 3D printing for the purpose of producing goods for sale. With 37% of all 3D printing companies producing goods for sale with this technology, it makes the Netherlands significantly above the EU average (17%). Moreover, this country is also in the top 3 when it comes to the smaller sized enterprises. In fact, 41% of all small enterprises are using 3D printing for the purpose of producing goods for sale. Furthermore, the Netherlands is the top country in Europe when it comes to the percentage of medium sized enterprises producing goods for sale with 3D printing technology. In more detail, 29% of these medium enterprises are using 3D printing for goods for sale, which is significantly higher than the European Union average of 13%. This information is important because of the nature of the product that the company in case of the thesis is trying to sell. The product, as stated in the first chapter, offers solution for companies to reach higher quality of prints with the use of its hybrid. The companies that are using this technology to produce goods may benefit from hybrid more than those who are doing it to produce prototypes, where the quality of the printed surface may not be as important. Another thing to add is that in the Netherlands the sum of all categories for smaller enterprises is quite high (209%) meaning that these enterprises are likely using 3D printers for more categories at the same time (Eurostat, 2020).

The next proposal is Denmark. This country is among the top 3 when it comes to the use of 3D printing within smaller enterprises. What's more, the country has above average (in the EU) percentages in all categories, especially when it comes to 3D printing of goods to be used in the enterprises' production processes. This could mean that companies are using 3D printing for more reasons simultaneously, as shown by the fact that the sum of all categories is 200%. The 3D printer that the company is providing could potentially be attractive for this type of companies. One of the reasons is the fact that this product can increase quality by smoothening the surface of simple prototypes as well as it can print without doing the separate smoothening. Companies in Denmark may be keen to purchase this kind of product for a higher price since it allows them to use 3D printer for more reasons than one and the data suggests that companies in this country are likely to do this. Especially for smaller enterprises, which may have less budget, a hybrid (or hybrids) could be a viable option rather than having a specialised printer for each category. The country also has second highest

percentage (28%) in Europe for medium enterprises when it comes to using 3D printing for production of goods for sale (Eurostat, 2020).

One of my last proposals is to focus on the Northern region as a whole. This means that the company would enter countries like Finland, Denmark, Sweden and Norway simultaneously and review the results to determine whether to continue or discontinue the strategy in each country. As it can be seen from the data (Eurostat, 2020), the Northern region comes with strong individual countries in terms of the use of 3D printing as well as the region as a whole looks quite promising according to my regions analysis. Furthermore, Denmark and Finland are both already on the list for potential country entries, which presents us the question, why wouldn't the company try to enter both or all the Northern countries at the same time. With this theory, it could also be said that the company could have gone to more attractive countries simultaneously across the whole of Europe but this may not be as good a strategy because there could be major differences in the cultural and political positions of these countries. The Northern region is, on other hand, composed of countries that are in the same geographical region, with similar political and cultural positions. This would mean that the market entry strategy could be similar for all countries in that region, which could lower costs in general.

4.6 Economic and financial benchmarks for countries' risks

For this chapter I will include economic and financial benchmarks by Smee (1999) to evaluate chosen countries for the economic and financial risks. As seen from the tables in the Appendices 27, 28 and 29 (for the purpose of this analysis I used only the 26th and 27th), the analysis is based on key factors within different quadrants and the benchmarks associated with these factors. The analysis is then done by comparing the real data of the chosen countries to the associated benchmarks. The more benchmark "rules" that the country achieves the higher the risk. For example, as stated in Smee (1999), a few of the key factors for measuring economic risk are export growth, budget deficit, investments and inflation. To give an illustration, for export growth, the benchmark states that it should be less than import growth. If the chosen country has export growth lower than the import growth this would mean that there is a slight risk before entering the country. If this were the only bad indicator, this should still not be a significant problem when entering the country, however, if there are many negative indicators, this would mean that the country is very risky. To find indicators for my chosen countries I used sources such as Trading Economics. The indicators may not be as positive as they were before pandemic and this is also why, looking at the data from 2019 as well as 2020 may be a better strategy, as Covid-19 is affecting countries on a global scale, so the economic and financial situation may be realistic now but may not be as realistic for the future.

Starting with Finland (Appendix 30), in terms of economic risk, exports increased by 7.2 percent (in 2019) while imports dropped by 2.2 percent. Looking at the benchmark this

would be a positive indicator since the import growth rate is lower than the export growth. Furthermore, for the terms of trade, Finland has a negative indication since the country spends more money on imports than it gains through exports. Moreover, the number has decreased from 98.7 to 97.2 from January 2019 to January 2020. The current account, on the other hand, suggests a positive indication because of a low deficit (0.8% of GDP in 2019), which is not in the red area. Moreover, Finland's investment level is 23.9% of GDP in 2019, which is over the benchmark (less than 20% of GDP). Lastly, the country doesn't have volatile inflation, because of the EUR currency, which is regulated within the EU. Based on the information produced with this analysis, it can be concluded that there is very low economic risk when entering this country. The indications are not perfect but are still considerably positive (Trading Economics, 2020a; CEIC Data, 2020a; The World Bank, 2019a; Smee, 1999).

In terms of financial risk (Appendix 31), the country has a variety of negative indications. First off, the size of external debt to GDP in the fourth quarter of 2019 is more than 220%. What's more, even if we look at the previous quarters the percentage was still very high. Looking at the benchmark, this is a negative indication. Furthermore, the short-term external debt has reached 175.8 EUR billion, which is 33% of total external debt, making this factor another negative indicator. The level of international reserves reportedly covers 1.5 months of imports. Knowing that the benchmark is 3 months, it makes this factor a negative indication as well. By contrast, its international interest rates are stable because of the currency being regulated by the central bank of the EU, making this a positive indication. Lastly, there is no obvious growing mismatch between the external liabilities and the value of international reserves when comparing some of the data from 2018 and 2019. This is a positive indication. In conclusion, the benchmarks suggest that Finland has medium to high financial risk, making it a relatively risky investment from this point of view (Trading Economics, 2020a; CEIC Data, 2020a; Smee, 1999; European Central Bank, 2020; The World Bank, 2020; Knoema, 2020a).

To combine the findings of both the economic and financial sides, Finland may have a low risk when it comes to the Economic side, however, the Financial risk is, according to the benchmarks, higher. As stated before, the country may be attractive in terms of 3D printing usage among enterprises and according to other information, but there may be some long-term financial risk when entering this country. Whether the country is suitable for entry depends on the company's willingness to take this risk. Looking back, the company stated that they operate in a risk averse manner, meaning that from this perspective, they may not pick this country as ideal. In the end, the information about other countries' indicators, will help to make the overall view more evident.

Continuing the analysis with Denmark (Appendix 32), the country has export growth that is higher than the import growth, which is a positive indication for the economy. Furthermore, the terms of trade was 99.6 points in May 2019 but raised to 106.4 in May 2020. Although

at first, it was below the benchmark, an upturn in May 2020 created a positive indication because the country gained more through exports than it lost from imports. Moreover, the current account has a 7.9% surplus of the GDP in 2019, which is another positive indication for the country. On the other hand, Denmark has 3.7% budget deficit in relation to GDP (2019). This is a negative indicator; however, the percentage is close to the benchmark limit making it not a worrying situation. Furthermore, the investment part of the GDP reached 21.5% of total GDP in Dec 2019 making it a positive indication. What's more, this percentage is even higher for March 2020 when it reached 23%. Lastly, the inflation rate was 0% on 10th of August 2020 at 6 am, meaning that there was no sign of high inflation in the country, which is another positive indication. Keeping all of this in mind, the data suggests that there is very low economic risk when entering Denmark. Even the one negative indication is less than 1% above the limit of the benchmark (Trading Economics, 2020b; CEIC Data, 2020b; The World Bank, 2019b; Smee, 1999).

In terms of financial risk (Appendix 33), Denmark has a more positive indication in comparison to Finland, except for the short-term and total external debt, where the indication is negative. Having said that, the size of external debt in the fourth quarter of 2019 was 436 EUR billions. Comparing this to the GDP of the same year, we see that the external debt was more than 140% of 2019's GDP. This is quite a negative indication and provides some sort of financial risk. What's more, 39.6% of the external debt is short-term. According to the benchmark, this is another negative indicator. In contrast, the level of international reserves reach 8 months of import cover, which is a very good indicator, since the country can pay off more than 8 months of imports with their international reserves. Furthermore, the international interest rate in Denmark is 0.6% and there are no signs of a sharp upward turn in interest rate meaning that this factor does not show any potential financial risk. Denmark's currency being pegged to the EUR helps stabilise the currency and avoids potential financial risk in this matter. Lastly, there is no sign of a mismatch between short-term external liabilities and the value of international reserves. Keeping all the indications in mind the financial risk is moderate (Trading Economics, 2020b; CEIC Data, 2020b; The World Bank, 2019b; Smee, 1999; European Central Bank, 2020; Knoema, 2020b).

To conclude the economic and financial analysis of Denmark, the indicators suggest a very low economic risk and moderate financial risk meaning that the total (economic and financial) risk may be low. Other than the country's debt, there are no other indicators that would make the country a risky investment. Based on the information about 3D printing usage among the smaller enterprises and the low total risk in terms of economic and financial indicators, it can be concluded that this country is attractive for market entry (keeping in mind only the factors within this analysis). Knowing that the company is also risk averse, this may be a good opportunity for investment.

Looking into the data for the Netherlands' economic risk (Appendix 34), all the factors had a positive indication according to the benchmarks. Firstly, exports grew by 4.48% in 2019

while imports grew 0.7% in the same period. Exports growing faster than imports make this factor a positive indicator. What's more, the terms of trade was also positive (above 100) in June 2020 meaning that the country gets more capital from exports than it loses from imports. This is also true looking at older data. In terms of the current account, the Netherlands has a 10.2% surplus in relation to GDP. This is another positive indication according to the benchmarks. Furthermore, there is also a 1.7% surplus in the budget in relation to the GDP, the investment part of GDP was 22.8% in June 2020 (was also above 20% from January 2019 onwards), which are both positive indications. Lastly, inflation was 1.7% on 6th of August 2020 at 4.30, so there is no sign of high inflation, meaning that there are no signs of risk in terms of this factor. To conclude the economic risk analysis for Netherlands, all the factors suggest that there is a very low economic risk in this country (Trading Economics, 2020c; CEIC Data, 2020c; Smee, 1999).

As was the case for the other two countries, the size of external debt (Appendix 35) in relation to GDP was too high in 2019. In the case of Netherlands, the relation was even worse as the amount was more than 460% of the GDP. Moreover, the short-term external debt consisted of 47% of the total external debt, which is another negative indication. On the other hand, the level of international reserves, according to DataBank (2020), could pay off 329.9 months of imports in December 2019. This is a clear positive indication for the financial risk. Furthermore, the international interest rate was 0% from Sept 2019 to Jul 2020, making it a positive indication. What's more, it needs to be kept in mind that the interest rate is regulated by the ECB, which contributes to potential future safety as well. Lastly, there are no clear signs of a mismatch between the short-term external liabilities and the value of international reserves. This makes it a positive indication for the factor. To conclude, the data and benchmarks suggest that except from debt, the country is not financially risky. In other words, the total financial risk is moderate to low (Trading Economics, 2020c; CEIC Data, 2020c; The World Bank, 2019c; Smee, 1999; European Central Bank, 2020; The World Bank, 2020; Knoema, 2020c).

To conclude the economic and financial analysis of Netherlands, the country is relatively safe and a good option for the risk averse company. The only negative indicators were connected to the country's debt, so this is something to look at. Other than that, the country has mostly positive indications making it a low risk country. In relation to the categories that this country is using 3D printing for, this could potentially be a good entry for the company.

To put all the findings about the chosen countries into perspective, the riskiest country is Finland, while the least risky is the Netherlands. Nonetheless, we could say that Denmark and Netherlands are quite close in terms of the economic and financial risk. Netherlands may have less negative factors but has extraordinarily high external debt (460%). The external debt is also something that connects all the three countries. In fact, all the countries mentioned, have external debt higher than 100%. Even though the countries had different results regarding economic and financial risk, I believe that looking from the broader

perspective, they are quite close in terms of financial and economic risk. One country may have fewer negative indicators but has very high external debt, another country has a bad budget deficit, but the third country has a negative terms of trade that is getting worse. From the perspective of the number of positive indicators, the least risky country is Netherlands, but from the perspective of taking a deeper dive into the data, the countries may be closer in terms of risk than it may look like from the outside. Returning to the external debt, the numbers should be looked at in perspective. Some countries known to have a strong economy have high external debt. One of the examples is Germany. According to CEIC Data (2020d) the country has 144.2% of external debt in relation to its nominal GDP. This is a bad indicator, but it does not tell the whole story about the economy in Germany.

5 MARKET ANALYSIS FOR CHOSEN REGIONS

To examine the long-term attractiveness of chosen countries, business strength and the company's abilities as well as its weaknesses, this chapter will gain these insights with GE matrix and SWOT analysis. The chapter will also include the target market, unveiling the appropriate country, which was picked based on the data and knowledge gained throughout the thesis. Moreover, the chapter will include interview analysis and barriers to entry, which will be focused on the chosen country. The PESTEL analysis, however, can be accessed in Appendix 36.

5.1 SWOT analysis

The SWOT analysis (Table 19) was conducted for 3WAY based on facts connected to the company gathered from the conversation with the CEO of the company as well as my own investigation and the information provided in the thesis. Some of the most important points are made in the table.

Table 19: SWOT analysis for 3WAY

Strengths	**Weaknesses**
• Years of expertise in the field of 3D printing • Small company but on the market since 1999 • Company has certificate for AAA Platinum Creditworthiness by Bisnode (2020), which only 0.9% companies possessed in 2019 in Slovenia • Company developed a hybrid printer that helps improve the quality and productivity	• Small-sized company, making it more difficult to negotiate • Small reputation on social media • Slow growth of the company • Marketing budget cannot be competitive to bigger companies
Opportunities	**Threats**
• The "green" trend may be opportunity for 3WAY (they are providing "green" plastic used for 3D printing) • Because the technology keeps advancing and becoming more complex it can be expected that the trend will move from production of prototypes towards final goods • Completely specialised products for individuals' specific needs may be in line with the product that they are offering	• Countries seem more prone towards protecting domestic firms from foreign firms • COVID-19 situation is still making the future unknown from a variety of perspectives • 3D printers still seem to have a long way to go to be part of every household and produce complex objects • Potential threat for piracy of 3D objects in the future. Coming from the fact that there is piracy regarding movies, it could also be transferred to 3D objects as well. (will this prevent companies from investing in 3D printing?)

Source: Own work.

As can be seen from the table above, the company has years of expertise in 3D printing (as well as 3D modelling). The company also has the highest creditworthiness by Bisnode (2020), which could help them with negotiations and/or finding a business opportunity with a partner. Seeing the high creditworthiness of the company may give the impression to others

that the company is safe to work with, but on the other side, the small size of the company may have many disadvantages. While the creditworthiness may help with the negotiations, the small size of the company can also create the opposite effect. Moreover, having a smaller marketing budget makes it difficult to compete with larger firms on the market. Commercials and other types of marketing such as posters can be expensive and almost impossible to afford if the company does not have high revenues. In terms of opportunities, one could compete with specialised products. Consumers have specific needs and wants and reaching those could raise consumer value tremendously. One of the examples can be 3D printed shoes that are customised to perfectly fit the customer's feet (Allan, 2019). On the other hand, higher protection for domestic firms may also be a threat for the firm. How will countries behave in the future? Will they support globalisation or will they try to protect domestic firms? Another threat I foresee is that 3D object file sharing can also result in piracy. There are websites where people can download files of objects for 3D printing. Right now, this may not be a problem since the community users are willingly sharing their creations for free. The problem may arise if the products are not free anymore, and by file sharing among users, some people could get access to files illegally. Will this interfere with the future of 3D printing? Will this risk prevent companies from supporting 3D printing fearing lost revenues?

My strategy to maximise the company's strengths and minimise threats is to vocalise and include information regarding the company's expertise, creditworthiness and longevity through a variety of marketing channels. This way a company can prove its worth to potential customers and try to create a belief that this is a trustworthy company. What's more, I would market the hybrid 3D printer as a product that joins two "worlds" together and makes it a better option for smaller firms who cannot afford to have expensive dual options from both sides of the world (CNC and 3D printing). The company should also analyse the culture of those countries it wants to enter in order to market and get closer to consumers by adding cultural values and norms to the product. The company should also make efforts in the future to fight piracy by investing into protecting 3D objects (if it decides to sell 3D objects in the future) from being easily transported to other printers who did not pay for an object. This could maybe be done by connecting each paid object to only one specific printer with a specific serial number, this way the 3D object could not be shared. If the company does not decide to go down this path, they can also work on their printer to support similar mechanisms. The company should also invest into a newer generation of 3D printers which would be able to add more types of materials and at the same time to differentiate even more and be able to print out even more complex objects.

To maximise opportunities the company should push the use of "green" filament to follow the trend of a green future. This means that their products should support green filaments and the company should even recommend them for general use. For the next generations of the product, the company could connect their 3D printers to 3D scanners to reach high customizability and perfectly fit 3D printed objects to specific individual needs.

Furthermore, as already mentioned, another opportunity is creating a new generation of product that would allow printing more materials to increase the complexity of the 3D printed objects. By following these opportunities, I believe that they could overcome some of the weaknesses and grow the company as well as their popularity among consumers.

5.2 GE matrix for chosen countries

For the practical part of the y-axis of GE McKinsey matrix (table in Appendix 37) I compiled various factors that were derived from the analyses conducted throughout the thesis. For example, for long-term attractiveness I used the factors of economic and financial risk, which were graded based on the analysis from the fourth chapter. The same applies to the industry size, which was graded using the information from the analysis done with the help of Eurostat (2020). The focus here was mainly on the companies of smaller and medium size, which were more likely to be the potential buyers rather than larger companies based on the product specifications as already mentioned in the fourth subchapter of third chapter. The potential number of companies factor was graded and estimated based on the information from Orbis (2019). The size of attractive categories and its combination factor was done using Eurostat (2020) data revolving around the categories that could potentially be attractive in the case of the company's new product as already mentioned in the thesis. Lastly, the entry barriers were graded based on the data from OECD (2019c) and the macro environmental factors from the PESTEL analysis, focusing mainly on the political part as I believe that this may have a larger influence than other factors within the PESTEL analysis.

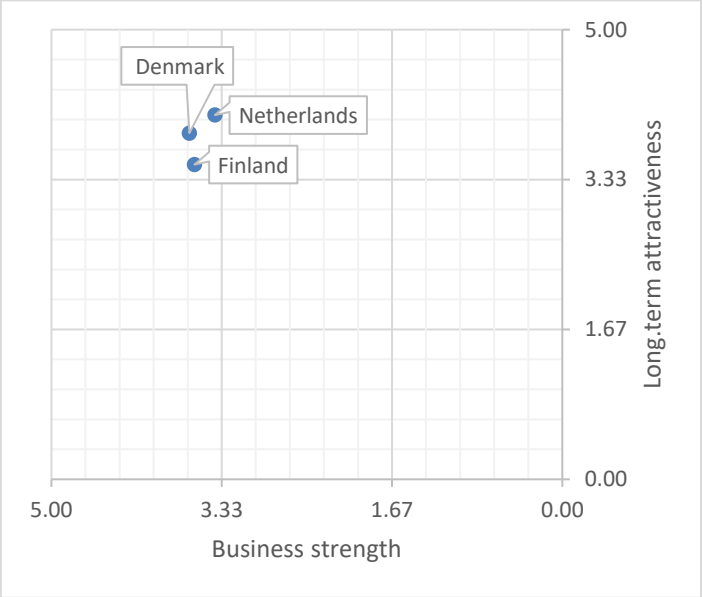
After determining the factors, the weightings were discussed with the Sales Manager (interviews in Appendix 13) from 3WAY d.o.o. The smallest weighting was the potential number of companies in the industry factor, for the reason of potentially unreliable information or errors. When searching for companies on Orbis (2019) using keywords like 3D printing, 3D printer and 3D print, I was only able to find a small number of companies doing 3D printing as a service or product for Denmark and Finland, which is likely an error. The Netherlands, on the other hand, had a lot larger number of firms doing 3D printing. Moreover, the competition does not come only from within countries in the EU, but also outside countries as per the discussion with the Sales Manager. Even if a company is not situated in a country, it can still export to that country and be competition to firms situated in the country. The highest weight was the number of attractive categories and its combination with the industry factor since this comes from more reliable information about what firms in these countries are using 3D printing for, and since certain categories are closer to hybrid than others. This is due to the specifications of the hybrid 3D printer and the categories that it could potentially be used for. By combining the weights and grades of all categories I got the result that the Netherlands has the highest long-term attractiveness, while Finland has the smallest, although, the numbers for all 3 countries showed good results.

For the business strength (table in Appendix 38) side of the matrix (x-axis) I used the information from Orbis (2019), Bloomberg (n.d.), Virk Data (n.d.) and 3WAY. From these sources I was able to gather information about some of the competitor firms' revenues, profits, profit margins, number of employees and the time the company has been operating for. In case any information was missing, I tried to assess the situation from the information that was available. I also investigated some of the competitors' websites to evaluate any other relevant information. The Netherlands has lower grades because of the limited pool of data, even more so for smaller firms. Because of the larger sized companies in the data, this led to give the impression that Netherlands' companies are reaching high revenues. In terms of factor grades, product differentiation was the only factor that reached the highest grade. I believe that the features of the new hybrid 3D printer are unique enough to differentiate itself from the products I've seen from competitors in all three countries. The weightings for all factors were similar, however, in discussion with the Sales Manager, we came to the conclusion that product differentiation was the most important information as well as being more reliable. The country with the highest weighted composite ratings was Denmark, which reached 3.65 points. On the other hand, Finland was the middle ranked country with 3.6 and Netherlands the last with 3.4.

Unfortunately, the second table of the GE matrix consisted of less reliable information than the first one as the data pool was extremely limited. This means that I had to grade factors from a limited perspective and often had to estimate the data that was unavailable. The number of companies I was able to find for some countries on Orbis (2019) was exceptionally low and had to be generalised to the whole industry, which is unrealistic. Even in combination with Bloomberg (n.d.) and Virk Data (n.d.) the issue of limited data stayed. The complication was especially evident for the Netherlands and Denmark but Finland was no exception. For the Netherlands, smaller companies do not have to disclose certain financial information (Netherlands Chamber of Commerce, KVK., n.d.b). This seemed to be similar in Denmark. In Finland there was more information about smaller firms but still limiting for the analysis purpose. This means that this side of the analysis has drawbacks. The first table, however, consisted of a larger pool of data making it more dependable.

If we sum the weighted composite ratings from the first table and the second table, we get the information that the best final value is reached in Denmark with 7.5 points (3.85 + 3.65), while Netherlands reached 7.45 and Finland reached 7.1 points. As seen from the Figure 5, all three countries meet the criteria for a grow and build strategy. All three countries are in the top left quadrant and the difference between total points is low, especially between Netherlands and Denmark. This quadrant shows an optimistic forecast for the company meaning that all three countries show great potential, however, as one of the axes has major drawbacks, I will focus my recommendations primarily on long-term attractiveness over business strength.

Figure 5: GE Matrix for chosen countries



Source: Own work.

5.3 Target market

In this subchapter I will evaluate the analysis of this and the previous chapter to recommend the most suitable market and region for entry. In the previous chapter I gained the information regarding usage of 3D printers among countries in Europe and picked the top 3 countries that I believed had the most potential for entry. What's more, I also compared regions to analyse the attractiveness of different European regions in case that the firm decides to enter the region as a whole. The 3 countries I chose were also analysed with economic and financial benchmarks to determine the risks involving the country if the firm decided to enter. I also used the Porter's Five Forces to help me understand what the expected position of the company on the market is. In this chapter, I conducted a practical part of the GE matrix to get a look into business strength and long-term attractiveness for these countries. The SWOT analysis helped me get an internal look at the company to recognise the strengths and weaknesses of the company and external opportunities and threats for the company. This helped me understand not only what the countries offered but also what the company could potentially offer.

For the target market entry, it may look obvious to pick the country with the highest usage rate because a higher percentage of all companies in that country may be looking for the product the company is offering. The solution may also be picking the country with the best GE matrix scores but the lack of information from one axis made this a less reliable option. I believed that I needed to take a deeper look and combine more analyses together to find the country that had the best market for the product. In my opinion, this evaluation has to be

done with information that was reliable and focused on market attractiveness rather than business strength.

Going back to the SWOT analysis, 3WAY is a small-sized company, which makes it more difficult for them to reach bigger companies. What's more, bigger companies will likely purchase more expensive, more sophisticated 3D printers than the product that 3WAY is trying to sell. From this perspective, the enterprises that the company should aim for should be small-sized or perhaps medium-sized. Furthermore, I believe that the company should emphasise its "green" trend in its long-term strategy as well as keeping in mind that more companies will likely use 3D printers for final goods in the future. The printer that 3WAY offers has the ability to rather reach both categories, the prototyping and the final goods. The hybrid offers a solution for companies that would like to do both, and these are the companies that 3WAY should, in my opinion, target. Since, according to my analysis of the Porter's Five Forces, the company may not have a perfect position in the market, and since the company is risk averse, I believe that they should not tackle a complete European region but try with one country first before entering others. Lastly, 3WAY should monitor the political stability and corruption index in the country of entry to make sure that sudden changes in legislation, do not stop the company from selling products in that country or that the company does not risk having a disadvantaged position because of high levels of corruption. The country should also not be too risky in terms of the economic and financial perspective. One of the examples can be high inflation rates, which can really hurt a company.

The initial target market that I chose is the Netherlands. In this country, the enterprises seem to be using 3D printing for more than just one category. This seems to be even more significant when it comes to smaller sized enterprises. The sum of categories for all enterprises was 202% while for smaller enterprises it was 209%, which gives us clues that companies are truly using 3D printers for more categories than one. The country is above average in all categories in comparison to the European Union (including the U.K.). Based on the fact that the country has relatively high percentages when it comes to production of prototypes (among top 3 in Europe) as well as production of goods for sale (top 3 as well) among smaller enterprises, this makes it a good target market for what the new product is offering (Eurostat, 2020). The hybrid 3D printer is a good solution, especially for smaller companies that would like to use 3D printing for prototyping and the production of final goods. The "two in one" product may not work as well for larger enterprises, which would presumably rather buy separate machines with higher prices for their separate goals. On the other hand, the "two in one" package may be perfect for small companies who have a limited budget but would like to reach both categories. This does not mean that the hybrid would be at an very low price, but it would nonetheless be a better offer in terms of a cost instead of two standalone products. Furthermore, the country is ranked 8th in the world for the lowest corruption level. According to the index, the country has been consistently reaching a score of over 80 for the last 5 years (Transparency International, 2019c). This is a good indication, because 3WAY in that case should not be having major problems in terms of unfair

competition because of corruption. According to the source, the country is also politically stable, which is another good signal for foreign companies trying to enter the market (The World Bank, 2019c). According to my benchmark analysis, the country is relatively safe in terms of economic and financial risks. One of the main problems, as already stated in the analysis, is the country debt, which is very high. Lastly, the country is in the European Union, which greatly facilitates doing business for companies within the EU.

5.4 Barriers to entry

The Netherlands is part of the European Union, meaning that according to the "Article 26 and Articles 28-37 of the Treaty on the Functioning of the European Union", the free movement of goods is granted with the elimination of quantitative restrictions and custom duties, as well as the "prohibition of measures having an equivalent effect" (Maciejewski & Næss 2020). In 2008, the free movement of goods, market surveillance system and the CE mark has been strengthened even more with the adoption of the New Legislative Framework. Member states are prohibited to make any charge that would have the same effect on the free movement of goods as a customs duty would have. Furthermore, it has a similar effect equivalent on quantitative restrictions. Any product legally manufactured and marketed in a member state with fair and traditional rules and manufacturing processes of that country, must be allowed in the market of any member state. Member states are, however, allowed to take measures when these are justified by general, non-economic considerations. Some of these examples are public security, public policy and public morality. These measures must have direct effect on public interest to be protected and must not go beyond necessary levels (Maciejewski & Næss 2020).

Translating this to the case of the new product and market entry to the Netherlands, the product can be exported to that country without any quantitative and custom duties' barriers. The exception to that rule would be if the hybrid 3D printer was considered as a threat to public security, morality or similar considerations as stated above. The product does not fall into those categories, meaning that any prohibitions in that matter would not be applicable.

While this is the case if the company decides to export to the country, which was also my suggestion in the Entry strategy methodology chapter, the case of a foreign business operating in Netherlands does not come with additional extensive barriers. "Dutch company law recognizes all foreign business structures except for sole proprietorships" (Netherlands Chamber of Commerce, KVK, n.d.a). Sole proprietorship can be transferred with the help of KVK. Moreover, a foreign company that operates in the Netherlands is not obliged to register as a separate legal entity. It has to be listed on their commercial register called the Handelregister. Being on the list means that you are also viewed as running a Dutch business, which means that you do not have to live or work in the Netherlands yourself. You do need to comply with the Immigration and Naturalisation Services if you are planning to reside there as well. A branch office in the Netherlands is possible too. This does not have to be

another independent legal form if it is part of a foreign business. A branch can be registered at the Chamber of Commerce (Netherlands Chamber of Commerce, KVK, n.d.a).

The Netherlands seems to be open about foreign businesses and facilitates their entry. The businesses do not have to convert their legal entities into a domestic legal form (Netherlands Chamber of Commerce, KVK, n.d.a). This may attract some foreign companies to invest in this country. Overall, the barriers to entry seem to be very low from both an exporting strategy and operating on the country's ground.

5.5 Interviews

In order to get the information regarding hybrid printer, facilitate the creation of the selection criteria for entry, understand the strength and weaknesses of the business, and understand the advantages as well as compatibility of the new product, I conducted 3 interviews with the CEO of 3WAY d.o.o. Another interview with 3WAY was conducted with the Sales Manager in order to discuss the appropriate weighting when it came to the GE matrix. Lastly, I added another interview with a Technical Associate from 3WAY to discuss the advantages and disadvantages of 3D printing from his perspective, as well as considerations from the customers he is in contact with. Similar questions were then asked in another two interviews with two customer companies from two industries. The interviews lasted up to 30min (Appendix 13). In terms of demographics, the interviewees were aged from 27 to 56 with a mean of 45.6. All of the interviewees were males due to a lower number of females working in these industries. The table for the structure of interviewees is in Appendix 12.

5.6 Interview results analysis

Some of the initial interviews were mostly tied to information regarding the new product, the creation of the entry strategy criteria and strengths as well as the weaknesses of the company, the results of which have already been described in the connected chapters. In additional interviews with customers and employees I gathered information regarding what employees believe the advantages and disadvantages of 3D printing are, whether speed of 3D printing is really the problem for the industry, what improvements customers desire, will the product that closes the gap between speed and quality attract more consumers and does the new product solve the productivity dilemma.

Firstly, in terms of advantages of 3D printing, the Technical Associate of 3WAY d.o.o. (Person C) believed that one of the advantages is the ability to produce more complex shapes that cannot be produced with conventional methods. Person D on the other hand believed that the main advantages are the speed and having an actual product in their hands. Lastly, Person E also believed that the main advantage is the speed of production of a physical model, which cannot be created at such a low cost with any comparable technology. The main drawback of 3D printing that was described was the poor surface quality (roughness),

which was agreed on by all three of the interviewees mentioned. As mentioned by Person A they "got feedback from customers and they do not like the so-called post-processing part of 3D printing where they have to remove the supports and smoothen the surface". The interviews mainly showed that the roughness of models is something that both employees and customers recognise as a disadvantage of 3D printing. There were differences of opinion when it came to the advantages of 3D printing.

Secondly, in terms of speed of 3D printing, there has been important desire among customers to achieve faster print times (Person C). Person D on the other hand believed that the speed is already satisfactory. He would put more emphasis on accuracy and the smoothness of printed models. Person E believed that the speed of printing was very important (not so much for prototypes and small series) and would like to see an improvement in this sector. Based on the results, there are different opinions regarding speed. Nonetheless, Person C who works with clients has spotted an important desire for higher speeds as did Person E who would like to see improvements in this area. Person D would, however, be interested in a product that would produce smoother surfaces without the cost of printing slower. Person A was also confident that no need to decide between quality and speed would offer great benefits. To conclude, there are different opinions regarding speed, however, according to the interviewees nonetheless it seems to be important for customers and they would be interested in a product that does not sacrifice it.

Thirdly, in terms of what improvements customers desire, Person A, as already described, mentioned that customers do not like the post-processing part of 3D printing when it comes to removing supports and smoothening surfaces. Person C pointed out a few things that customers often request are the possibility of hybrid activity, faster production and production of larger batches. He also mentioned the ability of manufacturing complex products within one machine. Person D would like to see improvements in firmness and accuracy. On the other hand, Person E would like to see improvements in wider range of materials and speed.

Furthermore, in terms of attractiveness of the new product to customers, both person D and E would be interested in a 3D printer that would produce smoother surfaces without the cost of slower printing. Person E added that this would be a very promising technology for producing smaller series and that it could open a new interesting market. Person C also believed that this kind of printer would be sought after, and it is something that customers often point out that they would like to see in a 3D printer. Similar feedback was received from person A in terms of post-processing work that needed to be done as was already mentioned in previous paragraphs. In other words, all interviewees suggested interest in the new product.

Lastly, as has already been seen throughout the thesis, in the interview with Person A, I found out that the printer solves the productivity dilemma by using a hybrid of additive and

CNC technology. As person A mentioned, that way the customer does not have to make a decision between speed and a smooth surface but can have both. More regarding interviews in Appendix 13.

6 RECOMMENDATIONS

My recommendation for the firm (map in Appendix 39) is to choose the Netherlands for their entry but plan to expand to other two candidates if successful in the Netherlands. The reason for not putting Denmark in front of the Netherlands as seen from the GE matrix comes from the fact, as mentioned before, that there was a limited pool of data when it came to the business strength axis, plus the results were close enough that the reality could have been on the either side. Nonetheless, all three candidates suited the "Grow" strategy and all seemed to be good options to be picked from the GE matrix. For my recommendation, I took an overview of all the findings from the thesis but put a larger emphasis on findings where the potential error seemed to be lower.

The Netherlands is, in my opinion, the best first option for the company since the enterprises in this country seem to be using 3D printing for more than one option. This is a good indicator because of the nature of the new hybrid printer and its advantages, which allow the product to be used for more than one category. With the hybrid 3D printer, users do not only use the product for producing prototypes but can also use the CNC technology to smoothen the surface for the production of final goods. What's more, the country is above average in all categories in comparison to the European Union and is among the top 3 countries in the EU when it comes to production of prototypes among smaller enterprises (not internal use) as well as in the top 3 when it comes to the production of goods for sale among smaller enterprises. Both categories fit the nature of the product, meaning that they could be important for targeting consumers. For these smaller enterprises, this product may be an especially good solution since the product offers a "two in one" solution, which would be cheaper than buying two technologies separately. Knowing that smaller enterprises likely have less budget to invest, this may be a great solution for them. On the other hand, bigger companies may not be the perfect target since they may be interested more in buying both technologies separately and would be willing to pay premium prices for very high precision and full features of both products. Furthermore, the country is ranked in the top 10 for the lowest corruption levels, which may help in terms of not having major problems because of unfair competition which could result from corruption. The country is also relatively safe in terms of economic and financial risks, as well as seemingly politically stable. The country also has very low barriers to entry and does not oblige companies to register as separate legal entities to operate in the Netherlands. There is also a free flow of goods with few exemptions, which this product does not seem to be part of, if the company decides to export.

For the entry strategy, I suggest that the company starts with exports as this meets a significant portion of the criteria, which were set in collaboration with the firm. The strategy

requires limited commitment efforts and is risk averse, which is, according to the interviews, very important to the company as they are not willing to take high risks and would be more committed to a project only if the project were initially successful. Continuing with the research results, if the entry is successful, I would advise the company to form alliances or to have another company as a shareholder as the empirical data suggests that family SMEs that have another company as a shareholder (or similarly alliances), are in a better position for involvement in international markets. Firms may be reluctant to have such involvements, but they come with many advantages, assisting greatly with international expansion.

When the company enters the foreign market, I suggest forming a brand strategy for the product. I have built my recommended example of a brand strategy platform that the company can use for the market. First off, I believe that the ideas from Appendix 19 should be communicated through a variety of channels. Some of the key messages could be "build for the future" or "making things reliable". By printing these texts on the packaging of the product, the company is able to communicate its values and personality traits. With this strategy the company can get closer to the target audience that believes in the same values. The company should also use advertising to communicate both the rational and emotional benefits of the new product such as doing two things in one and getting work done more easily and with less stress. More about brand strategy in the chapter Brand strategy and Appendix 19.

Moreover, in order to maximise the company's strengths I would vocalise information regarding the company's expertise, creditworthiness and longevity through marketing channels. The hybrid 3D printer could be marketed as a product that joins two worlds and is a great option for smaller firms who don't want to invest in both worlds separately. The company should also try to get closer to the cultural values and norms of the Netherlands and the other two potential countries in order to make the product look less foreign. In order to maximise the opportunities I would also suggest the company to push forward the eco-friendly filament in order to support sustainability and create a good brand image in the eyes of customers.

Since the product seems to offer high relative advantage but low compatibility, I recommend that, according to the theory, the company focuses on segments such as competitors' customers, lead users and buyers who need improved performance. Moreover, the desired behaviour for 3WAY would be customer migration; persuading customers to migrate from basic 3D printers to hybrid 3D printer. For the product that has high relative advantage and low compatibility it is advised that the product information is extensive to emphasise the relative advantages and overcome incompatibilities. Personal selling demonstrations and classic push marketing can also be beneficial. Lastly, the company could also preannounce their product so that the buyers are prepared and can adapt to the new product if they see potential in it. For more information see the New product launch chapter.

In order to gain a competitive advantage, the firm should, in my opinion, do the focus strategy. The company should focus on a narrow segment of consumers, which would in this situation be SMEs that do both 3D printing and milling for better surface quality. This segment may be overlooked by larger firms as they may target either the milling or the 3D printing segment but not both at the same time. This way the company may be able to achieve both differentiation with hybrid technology as well as (in most cases) lower cost than buying both technologies at the same time.

The thesis also has some limitations. One of the limitations of the thesis is the business strength part of the GE matrix. As already mentioned, the GE matrix was done using grades that came from the weightings. Since the grading can be, to some extent, subjective, there may be systematic errors of bias. Furthermore, the data I used for business strength in the GE matrix was very limiting, so there had to be a lot of estimations done that were only based on the data available. The number of companies with 3D printing keywords in all sources for all three countries were low, which may be due to missing data or errors. Another limitation is that I have had involvement with the firm, meaning that I might be, in some cases unknowingly biased. The interviews that I used may also have resulted in other types of biases such as acquiescence bias and more interviews with more employees would be preferred in the future. Moreover, the differences in total usages of 3D printing among countries were in reality quite low, especially when looking at all sizes of enterprises. The data from Eurostat (2020) also came without decimal points, which means that the numbers were rounded up, meaning that the real difference may be slightly bigger or smaller. Lastly, certain chapters needed some degree of personal judgement as already seen from the grading process. Opportunities for new research could be investigating more the true competition in target countries, getting more information when it comes to the business strength of different players in the market, replacing some data from percentages with absolute numbers to predict the true size of certain markets, and to investigate further the alliance as well as joint venture market entry strategies as they seem to be important for international expansion of family SMEs.

CONCLUSION

For small family firms it may be difficult to internationalise across the Europe because of issues such as low resources, experiences and technology, however, investing only into a domestic market can lead to high opportunity costs, which can turn a firm away from a desired expansion of the firm and high revenues. When a firm is situated in a even smaller domestic market, the opportunity costs may rise even higher, giving up on even higher potential. In addition, introducing a new product leads to the desire to maximise the return on the investment and attain maximum profitability from the product, which can potentially be limiting if it is only in the domestic market. Nonetheless, even though there are many hurdles for such companies, as seen from this thesis, there are paths a small family firm can take in order to give itself the opportunity to be successful in the international market.

In the thesis I investigated the growing market for 3D printing, which shows an upwards trend and gave reasons why this industry holds potential for long-term investments. I explored the various benefits as well as challenges of 3D printing, which showed that 3D printing benefits from things such as mass customisation and faster prototyping but is also challenged by things such as shape optimisation, errors, containment problem and the staircase effect. The last mentioned effect is connected to the productivity dilemma, which is the idea of choosing between productivity or better surface. The company 3WAY d.o.o. uses the theory of hybridising AM and CNC in order to solve the productivity dilemma and differentiate their product from other competitors.

With the desires of the company to sell their product in the international market, I investigated an entry strategy methodology, by forming selection criteria with the help of interviews. During these interviews, I found out that the company was not extremely committed to the project unless the initial entry happens to be successful enough for them to increase the investments into this project. By evaluating different entry strategies from a variety of points as well as combining the theory with the criteria, I determined that exporting is the best strategy but can be upgraded to a strategic alliance or joint venture in the future.

After exploring the most appropriate entry strategy, I designed a brand strategy for the firm and gave recommendations to the firm on how to present and market their products. With the help of the research article, which was conducted with the help of empirical data from the Survey of Business Strategies, I found out that those companies that have another company as a shareholder, have a better position when it comes to international markets. This supported the idea of going for a joint venture or strategic alliance if the initial entry happens to be successful. I also investigated three types of desired buying behaviours: the characteristics that influence the adoption (especially relative advantage and compatibility), potential segments for targeting and the launch tactics. After the evaluation, I concluded that 3WAY's desired behaviour would be customer migration, the target segments should be competitors' customers, lead users and buyers who need for improved performance, and the tactics used for launch should align with the framework launch tactics suitable for a combination of high relative advantage and low compatibility. By reviewing Porter's generic strategies, I evaluated that the focus strategy would be the best fit for 3WAY.

Furthermore, when it comes to the usage of 3D printing, I investigated the usage from a variety of points of view, such as usage of 3D printers in small firms, medium sized firms, large firms, as well as, for the categories that firms use 3D printing for. Moreover, I also compared different regions when it came to the usage of different sized firms as well as the categories used in the top 3 regions. Among the small firms the highest ranking country was Finland, while among the large firms the highest ranking country was Slovenia. On the other hand, among the medium sized firms, Denmark had the highest usage rate. Within the EU most companies used 3D printing for prototypes or models for internal use but the percentages among specific countries and firm sizes differed, which was important for

further analysis and potential country entries. Potential country entries (Netherlands, Denmark and Finland) were then picked based on the criteria, which suited best with the product that the company is offering. Afterwards I used economic and financial benchmarks in order to facilitate the evaluation of the riskiness of these potential entries. Furthermore, I used the GE matrix to evaluate the picked countries and compared them for the most appropriate entry. Porter's Five Forces showed that the rivalry seems to be very strong in the industry, entry seems to be easy, the supplier power is low, and the buyer power and threat of substitution are mediocre.

Lastly, I used SWOT analysis to understand the company's strength and weaknesses as well as to understand how the company can use strength to reduce threats and how it could use opportunities to reduce weaknesses. I finished off, by picking the Netherlands as the initial target market and evaluated its barriers to entry. I believe that the company has a great opportunity to market this product as it has great advantages over traditional 3D printers. One of those advantages is solving the productivity dilemma as seen from the first chapter and being a great deal for SMEs who want to reach more categories and would rather have a "2 in 1" product than buying both technologies separately. The interviews showed there was an interest in the new hybrid printer, as well as all the interviewees seeming to see the same disadvantages of 3D printing, which could be solved with the hybrid. Additionally, the market, according to all information gathered and analyses made, seems to have potential from the risk point of view as well as from the categories used for 3D printing of the target segments. By taking the necessary steps to market the product correctly, as well as picking the correct entry strategy, targeting the right segments, using a good brand strategy, using advantages and opportunities wisely, introducing the roadmap for future expansions and new features of the product, I believe that expansion into the international market can be successful for the company.

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APPENDICES

Appendix 1: Povzetek (Summary in Slovene language)

Besedni zvezi *3D-tiskanje* in *aditivna proizvodnja* sta postali dve med najpogosteje obravnavanimi novimi tehnologijami v zadnjih letih , čeprav pravi začetki 3D-tiskanja segajo v začetek 60. let prejšnjega stoletja (Bechthold in ostali, 2015; Muck & Križanovskij, 2015, str. 13). Tehnologija predstavlja visok potencial, saj omogoča ustvarjanje produktov po meri, kot so individualizirani modeli za vsadke, čevlje, avtomobile, prav tako se lahko uporablja na različnih področjih, kot so industrijska proizvodnja, velnes in potrošniški trg (Bechthold in ostali, 2015). Zaradi hitrega širjenja trga strokovnjaki pozorno spremljajo trend, medtem pa številni novi ponudniki v tehnologijo vlagajo milijone dolarjev z številnimi novimi ponudniki (McCue, 2019).

Namen pričujočega magistrskega dela je bil olajšanje uvedbe novega izdelka (hibridnega 3D-tiskalnika) na evropski trg in ugotoviti privlačnost industrije s pomočjo analiz tveganja, analiz držav, napovedi in vstopnih ovir. Opisana je tudi strategija vstopa podjetja na evropski trg in pridobitev dobička.

Cilj magistrske naloge je bil uporabiti teoretično znanje in ga aplicirati na novi produkt tako, da bi produkt lahko konkuriral na evropskem trgu in pridobil konkurenčno prednost, s katero bi se prodaja, dobiček in vrednost za kupca maksimirali. Glavno raziskovalno vprašanje je bilo, kako lahko podjetje vstopi na evropski trg z novim produktom.

Kot je ugotovil Wagner (2019), naj bi industrija v letu 2020 dosegla 16 milijard dolarjev, vendar pa bodo realne številke verjetno nižje po trenutni pandemiji, ki je zajela svet. Vseeno pa projekcije kažejo, da naj bi v letu 2022 industrija dosegla 25,6 milijard, v letu 2024 pa 40,8 milijard (Wagner, 2019). Podobne številke je predstavil tudi Wohlers Report, ki je napovedal 15,8 milijard za leto 2020, 23,9 milijard za leto 2022 in 35,6 milijard za leto 2024 (McCue, 2019). Velikost trga nekovinskega materiala za 3D-tiskanje naj bi se v zadnjih letih ves čas povečevala (Statista Research Department, 2016a). Pri tržnem deležu 3D-tiskarske industrije so ZDA na prvem, VB na drugem in Nizozemska na tretjem mestu (Holst, 2019a). Torej podatki v tem delu poglavja predstavljajo trend 3D-tiskanja, ki ves čas narašča in dobiva nove ponudnike (Wagner, 2019; McCue, 2019).

Po drugi strani pa ima tudi 3D-tiskanje svoje prednosti in slabosti. Nekatere izmed glavnih prednosti so hitrost, kvaliteta, inovacija in vpliv. V primerjavi s tradicionalno proizvodnjo ima aditivna proizvodnja na nekaterih področjih uporabe več prednosti – skrajšan čas do prodaje zaradi pospeševanja izdelave prototipov, skrajšan čas popravil, zmanjšanje stroškov dela, zmanjšanje stroškov za razvoj izdelkov, omogočanje masovnega prilagajanja izdelkov, skrajšanje dobavne verige in podobno. (Attaran, 2017). Aditivna proizvodnja pa se srečuje tudi z nekaterimi slabostmi, kot so optimizacija oblik, predobdelava in poobdelava, nepopolnost večplastne metode, stopnični učinek, varnostne grožnje in podobno (Oropallo & Piegl, 2015; Plan, 2013).

Podjetje 3WAY rešuje problem dileme produktivnosti, pri katerem se mora odločati med višjo kvaliteto oblike modela ali višjo produktivnostjo aditivne proizvodnje (Jones, 2014). Podjetje ta problem rešuje s pomočjo hibridnega 3D-tiskalnika, ki povezuje aditivno in CNC-tehnologijo. Jones (2014) meni, da se s takšnim povezovanjem dilema reši, zato lahko izdelujemo oblike z visoko produktivnostjo in visoko kvaliteto hkrati.

Da bi podjetje lahko izbralo pravilno vstopno strategijo, sem skupaj s podatki iz opravljenega intervjuja ustvaril kriterijo, ki mi je pomagala pri vrednotenju različnih vstopnih strategij. Nekatera glavna merila so: (1) da je strategija primerna za manjše podjetje, (2) da je strategija nenaklonjena tveganju, (3) da strategija predstavlja visok ali popoln nadzor nad procesi, (4) da strategija podjetju omogoča omejeno predanost projektu, razen če se izkaže za uspešnega in (5) da omogoča vstop v več države.

Z analizami strategij izvoza, skupnega podjetja, licenciranja in lastništva sem ugotovil, da je najprimernejša začetna strategija izvoz. Ob uspešnosti začetne strategije, pa vzpostavljanje skupnega podjetja ali pa strateškega zavezništva. Izvoz po eni strani predstavlja nizko tveganje in najlažjo vstopno strategijo, po drugi pa manjši nadzor, nizko lokalno znanje, visoke trgovinske ovire in visoke stroške transporta (Mariadoss, 2017; Hollensen, 2014; Hill, 2013). Ta strategija sovpada z večino izoblikovanih meril, kar pomeni, da je primerna za majhno podjetje, omogoča omejeno predanost, je nenaklonjena tveganju in omogoča vstop v več držav. Medtem pa strategiji skupnega podjetja ali strateškega zavezništva po eni strani omogočata številne davčne ugodnosti, razširitev tveganja med podjetji, ugled lokalnega subjekta, sredstva in tehnologije v skupni rabi, po drugi pa predstavljata višje tveganje, nižjo fleksibilnost, izgubo nadzora in potencialno nesorazmerne prispevke podjetij (Mariadoss, 2017; Hollensen, 2014; Hill, 2013). V naslednjem poglavju je bilo ugotovljeno, da strategija zavezništva ali imetje deleža drugega podjetja izboljša položaj srednje do majhnega podjetja pri internacionalizaciji (Fernández & Nieto, 2005, str. 86).

Strategija bi bila lahko definirana kot pristop, skladen s ciljem, ki ga želi podjetje doseči. Strategija blagovne znamke pa je nekaj, v kar bi morala podjetja vzdržema investirati, saj doprinesejo k temu, da se potrošniki zavedajo vrednosti blagovne znamke in njene prednosti v primerjavi z konkurenco (Rajagopal, 2019). S tem namenom sem ustvaril platformo strategije blagovne znamke, ki jo lahko podjetje uporabi pri vstopu na nov trg. Obširnejši del je dostopen v prilogi 19. Ena izmed idej je bila, da bi podjetje preko več različnih kanalov širilo ključna sporočila, kot so »izdelan za prihodnost« ali »izdelajmo stvari zanesljive«. Smisel takšnega širjenja bi bila komunikacija vrednot in osebnostnih lastnosti podjetja s potrošniki, ki verjamejo v enake vrednote. Preko socialnih omrežij bi lahko podjetje predstavljajo stvarne in čustvene koristi produkta. Na ta način bi potrošniki lahko navezali pozitivna čustva s produktom (Woods, 2020).

Kot je bilo že omenjeno, sem raziskal tudi strategijo internacionalizacije za majhna podjetja. Raziskava je pokazala nekaj zanimivih ugotovitev: (1) da so firme družin prve generacije

manj vpletene v mednarodne trge, kasnejše generacije pa spodbujajo vpletenost, (2) da vpletenost drugih podjetij z visokim delniškim deležem spodbujajo mednarodno vpletenost in (3) da zavezništvo z drugim podjetjem spodbuja mednarodno vpletenost (Fernández, & Nieto, 2005).

V podpoglavju lansiranja novega produkta pa sem dognal, da obstajajo tri želena vedenja kupcev pri nakupu novih produktov: (1) preizkušanje in odkup, (2) migracija strank in (3) sprejetje in razširjanje inovacij. Menim, da je najustreznejše vedenje kupcev za izbrano podjetje migracija strank. To pomeni, da gre za migracijo strank od starih produktov k novim (Guiltinan, 1999, str. 511–512). Ker naj bi po pridobljenih informacijah ta produkt nudil visoko relativno prednost in nizko kompatibilnost, verjamem, da bi se moralo podjetje osredotočati na segmente pri katerih je pomembna visoka relativna prednost: konkurenčne stranke, vodilni uporabniki in kupci, ki potrebujejo boljšo zmogljivost (Guiltinan, 1999, str. 517). Nekatere taktike in strategije, ki jih podjetje lahko uporabi za dimenzijo visoke relativne prednosti in nizke kompatibilnosti, so: napoved produkta vnaprej, osebne prodajne demonstracije, obsežne informacije o produktu in strategija potiska (angl. "push" marketing strategy) (Guiltinan, 1999, str. 520–521). V okviru Porterjevih generičnih strategij pa priporočam, da podjetje izbere strategijo fokus, ki se osredotoča na ozek segment potrošnikov. Tisti segment, ki ga večja podjetja spregledajo (Akan, Allen, Helms & Spralls, 2006). V primeru obravnavanega podjetja bi se lahko fokusirali na segment srednje do majhnih podjetij, ki želijo pri enem produktu opraviti tako 3D-tiskanje kot rezkanje.

Analiza uporabe 3D-tiskalnikov v Evropi je pokazala, da se ta produkt v podjetjih med vsemi državami največ uporablja na Finskem, na drugem mestu pa so države z enakimi odstotki – Belgija, Danska, Malta in Velika Britanija. Glede na uporabo med manjšimi podjetji (med 10 in 49 zaposlenimi) je na prvem mestu ponovno Finska, sledijo pa Belgija, Danska, Malta, Velika Britanija in tokrat tudi Srbija z enakim odstotkom. Pri srednje velikih podjetjih (med 50 in 249 zaposlenih) je na prvem mestu Danska. Pri velikih podjetjih (več kot 250 zaposlenih) pa je odstotek najvišji v Sloveniji. Kategorično podjetja največkrat uporabljajo 3D-tiskanje za izdelavo prototipov in modelov za notranjo uporabo, sledijo izdelava prototipov in modelov za prodajo, izdelava blaga za uporabo v podjetjinem procesu produkcije in izdelava blaga za prodajo. Taka kategorična razvrstitev velja tako za majhna kot srednje velika podjetja, kategorije pa so pri velikih podjetjih malce drugače razvrščene. Podatki kažejo, da večje je podjetje, bolj se uporablja 3D-tiskanje za izdelavo prototipov ali modelov za notranjo uporabo. Primerjava različnih evropskih regij prikazuje, da so imele najboljši odstotek Severna Evropa, Zahodna Evropa in Britansko otočje. Tudi tukaj so kategorične razvrstitve podobne, največje razlike so vidne pri uporabi 3D-tiskalnikov za prototipe in modele za notranjo uporabo, kjer Severna Evropa dosega 76,6 %, Zahodna Evropa 62,8 %, Britansko otočje pa 36 % (Eurostat, 2020).

Za določitev morebitnih najboljših držav sem ustvaril lestvico meril, ki je dajala prednost državam, kjer 3D-tiskanje uporabljajo: (1) v večji meri predvsem v majhnih in srednje

velikih podjetjih, (2) imajo nadpovprečno uporabo glede na Evropsko unijo, (3) imajo višjo uporabo kategorij ali kombinacijo kategorij, za katere menim, da so pomembne za dani produkt, in (4) so znotraj šengenskega območja. S to lestvico meril sem ocenil, da so najprimernejše tri države za to 3D-tehnologijo Finska, Nizozemska in Danska. Finska ima višjo uporabo pri majhnih podjetjih in nadpovprečno visok odstotek pri uporabi primernih kategorij za dani produkt. Nizozemska ima višji odstotek pri uporabi 3D-tiskalnikov vseh podjetjij za izdelavo prodajnega blaga. Majhnih podjetjij, pa 41 %, 3D-tiskalnike uporablja za izdelavo prodajnega blaga. Tudi srednje velika podjetja so nadpovprečna v tej kategoriji. Vsota kombinacij teh kategorij je visoka, kar lahko pomeni, da podjetja uporabljajo takšno tehnologijo za več različnih namenov. Na Danskem je relativno visok odstotek majhnih podjetij, ki uporablja to tehnologijo v primerjavi z drugimi evroposkimi državami. Nadpovprečno visoko ima tudi kategorijo izdelave blaga za uporabo v podjetjinih produkcijskih procesih. Tudi Danska ima vsoto kombinacij kategorij visoko (Eurostat, 2020).

Dodatno sem predlagal tudi celotno Severno Evropo. Analiza finančnih in ekonomskih meril tveganja je pokazala, da med izbranimi državami predstavlja največje tveganja Finska, najmanjše pa Nizozemska. Vseeno pa sem mnenja, da so si države po tveganju v resnici blizu. Neka država ima lahko več negativnih faktorjev, druga pa manj, vendar ima zato toliko višji zunanji dolg in podobno. S pomočjo GE matrice, ki sta jo omenila Didia & Ateke (2017), sem ustvaril merila za potencialne države, ki sporočajo, kako bi se moralo neko podjetje v potencialnih državah razvijati: (1) rasti in graditi, (2) držati in vzdrževati ali (3) ukiniti poslovanje. Ta analiza je bila narejena s pomočjo dolgoročne privlačnosti trgov in poslovne moči firme (Didia & Ateke, 2017). Analiza Porterjevih (2008) petih sil pa je prikazala, da je rivalstvo v industriji močno, grožnja vstopa novih podjetij visoka, moč dobaviteljev nizka, moč kupcev in nevarnost substitutov pa srednja. Splošen vidik analize prikazuje, da bi imelo izbrano podjetje lahko nekoliko težaven položaj v industriji.

S pomočjo SWOT analize sem ugotovil nekaj pomembnih prednosti in slabosti izbranega podjetja. Glavne prednosti so leta izkušenj s 3D-tiskarsko industrijo, hibridni tiskalnik, ki povečuje kvaliteto in produktivnost, in Bisnode certifikat odličnosti. Po drugi strani pa so slabosti, da je podjetje majhno, kar je lahko ovira pri pogajanjih, imajo pa tudi manj močan ugled na socialnih omrežjih. Obstajajo pa tudi zunanje priložnosti in grožnje. Dve izmed priložnosti sta zeleni trend ali specializacija produktov za specifične potrebe potrošnikov. Po drugi strani pa sta lahko veliki grožnji piratstvo in zaščita domačega blaga v nekaterih državah. Da bi podjetje maksimiralo prednosti in minimiziralo grožnje, bi bila rešitev lahko to, da bi tržili produkt kot nekaj, kar združuje dva svetova. To je boljša opcija za manjša podjetja, ki ne želijo kupiti obeh tehnologij posebej. Za maksimiranje priložnosti pa bi lahko podjetje promoviralo »zelene« filamente in jih priporočalo za splošno uporabo. Praktični del GE matrice je pokazal, da ima izmed treh potencialnih držav najboljšo ponderirano kompozitno oceno Danska, najslabšo pa Finska. Del analize, ko gre za poslovno moč, je lahko zavajajoč z vidika pomanjkanja informacij, vrste podatkov, ki jih je bilo mogoče

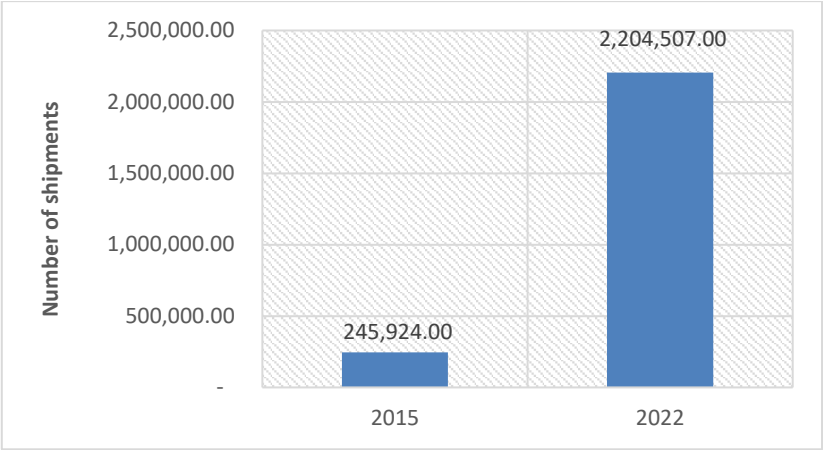
dobiti, in kasnejše ocene na podlagi omejenega števila podatkov. Vseeno pa vse tri države spadajo v strategijo rasti in gradnje, zato so vse primerne za vstop. Za primarni ciljni trg sem tako na koncu izbral Nizozemsko, upoštevajoč predvsem verodostojnih podatkov, na katere sem se z zagotovostjo lahko zanesel. Tukaj se je upoštevalo faktorje, kot je uporaba 3D-tiskalnikov, velikost podjetij, kategorije, ki se uporabljajo, ekonomsko in finančno tveganje, nivo korupcije v državi in drugo. Ovire za vstop na Nizozemsko so nizke. Že pri načelu prostega pretoka blaga ne bi smelo biti težav, saj je Nizozemska del Evropske unije (Maciejewski & Næss 2020). Še več, Nizozemska prizna skoraj vse tuje družbe – razen samostojnih podjetnikov. Tuje podjetje, ki deluje na Nizozemskem, se ne potrebuje registrirati kot ločena pravna oseba (Netherlands Chamber of Commerce, KVK, n.d.a).

Opravljeni intervjuji so pokazali, da so si bili intervjuvanci zelo enotni pri določanju pomanjkljivosti 3D-tiskanja – slednje naj bi bilo groba površina natisnjenih modelov. Prav tako je bila enotnost glede zanimanja za novi hibridni tiskalnik. Prostor za izboljšave so videli na področjih kot so hibridno delovanje, hitrost in večji spekter materialov, ki bi jih lahko uporabili.

Ob koncu sem priporočil, da bi izbrano podjetje vstopilo na nizozemski trg, če bi bilo uspešno, pa bi se razširilo še na Dansko in Finsko. Priporočam, da podjetje začne z izvozno strategijo, če pa postane uspešno, poskusi z zavezništvom z drugim podjetjem ali pridobi drugo podjetje kot delničarja. Pri strategiji blagovne znamke priporočam, da podjetje svoja ključna sporočila, ki so odraz vrednot in osebnostnih lastnosti podjetja, komunicira na več kanalih in se tako približa ciljni publiki. Izpostavlja naj tudi svoje prednosti podjetja in pa tudi racionalne in čustvene prednosti produkta. Promovira naj se tudi EKO filament, saj se tako podpira okoljsko trajnost. Da bi podjetje pridobilo konkurenčno prednost, naj se skoncentrira na fokus strategijo ožjega segmenta potrošnikov. Verjamem, da je lahko s pravimi odločitvami in strategijami širjenje izbranega podjetja na evropski trg uspešno.

Appendix 2: Non-metal 3D printer shipments

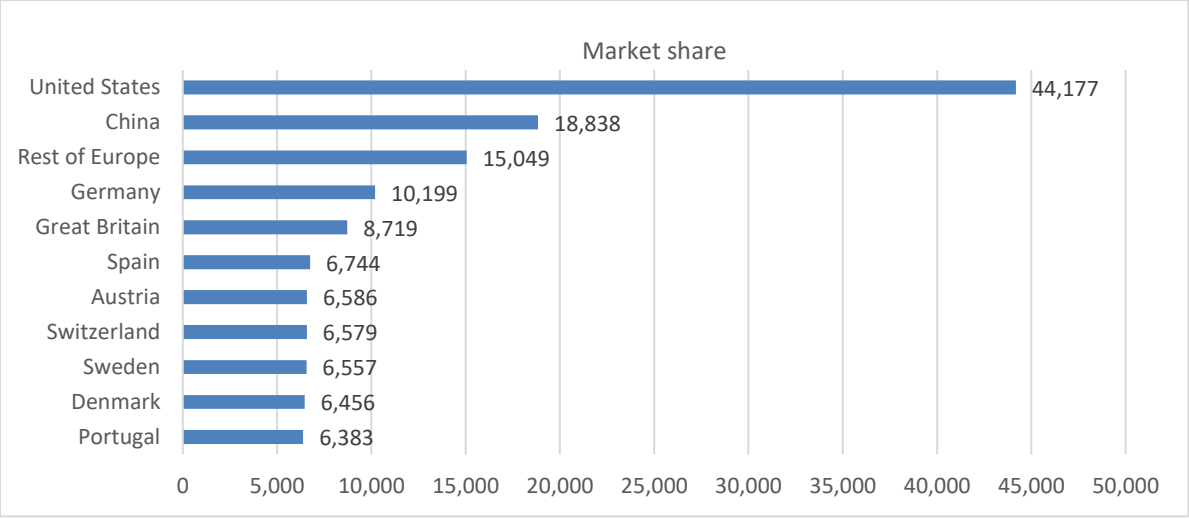
In 2015, non-metal 3D printer shipments amounted to 245,924, while in 2022 the number is expected to reach 2,204,507, which results in an annual growth rate of 32.8%. These numbers represent the whole industry, and are not limited to particular regions (Statista Research Department, 2016b).



Source: Statista Research Department (2016b).

Appendix 3: Leading countries for 3D printing patents

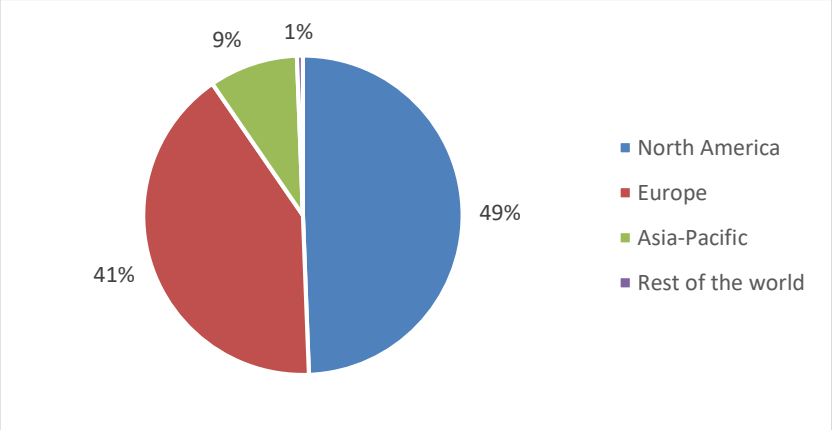
Looking at the data the United States is ahead of other countries with 44,177 applications filed. China is in second place with 18,838 applications. In third place are the "Rest of Europe". In the source, it is called "Europe", but it is assumed that it is the "The Rest of Europe" category since the numbers of other European countries exceed the number of this category. On that note, Germany is behind the Rest of Europe with 10,199 patents, followed by Great Britain (8,719), Spain (6,744) and Austria (6,586). The rest of the countries such as Switzerland, Sweden, Denmark and Portugal are close to the Austrian numbers (Duffin, 2019).



Source: Duffin (2019).

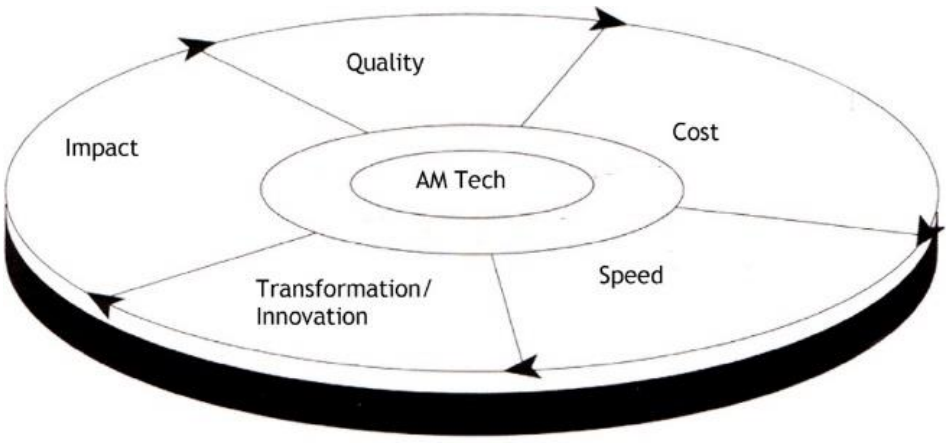
Appendix 4: Online 3D printing demand by region

By investigating the share of the global online 3D printing demand in 2018, we are able to get the information that 49.4% was from North America, followed by Europe (41%), Asia-Pacific (9%) and Rest of the world with 0.6% demand share (Holst, 2019b).



Source: Holst (2019b).

Appendix 5: Key benefits of AM technology



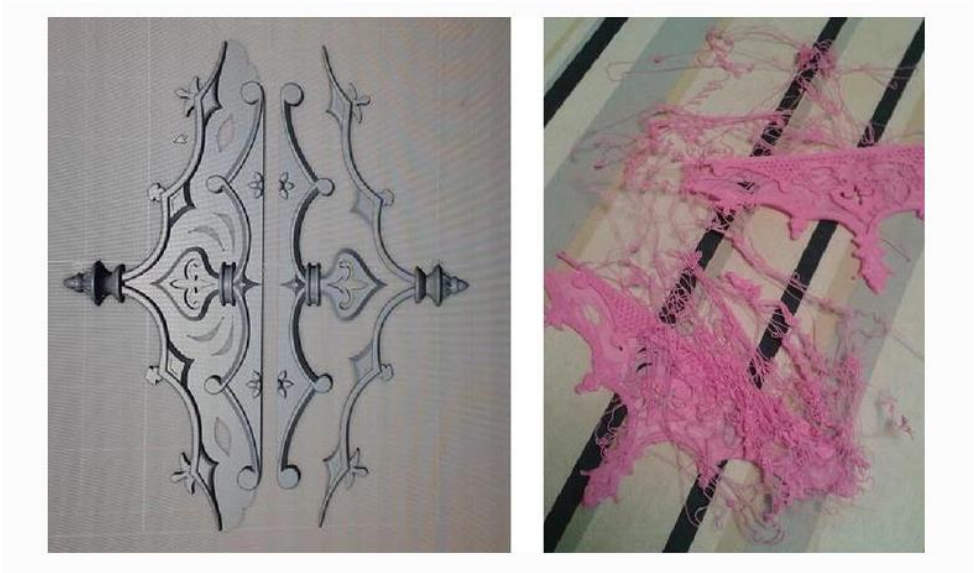
Source: Attaran (2017).

Appendix 6: Advantages of AM over traditional manufacturing

Areas of Application	Advantages
Rapid Prototyping	Reduce time to market by accelerating prototyping Reduce the cost involved in product development Making companies more efficient and competitive at innovation
Production of Spare Parts	Reduce repair times Reduce labor cost Avoid costly warehousing
Small Volume Manufacturing	Small batches can be produced cost-efficiently Eliminate the investment in tooling
Customized Unique Items	Enable mass customization at low cost Quick production of exact and customized replacement parts on site Eliminate penalty for redesign
Very Complex Work Pieces	Produce very complex work pieces at low cost
Machine Tool Manufacturing	Reduce labor cost Avoid costly warehousing Enables mass customization at low cost
Rapid Manufacturing	Directly manufacturing finished components Relatively inexpensive production of small numbers of parts
Component Manufacturing	Enable mass customization at low cost Improve quality Shorten supply chain Reduce the cost involved in development Help eliminate excess parts
On Site and On-Demand Manufacturing of Customized Replacement Parts	Eliminate storage and transportation costs Save money by preventing downtimes Reduces repair costs considerably Shorten supply chain The need for large inventory is reduced Allow product lifecycle leverage
Rapid Repair	Significant reduction in repair time Opportunity to modify repaired components to the latest design

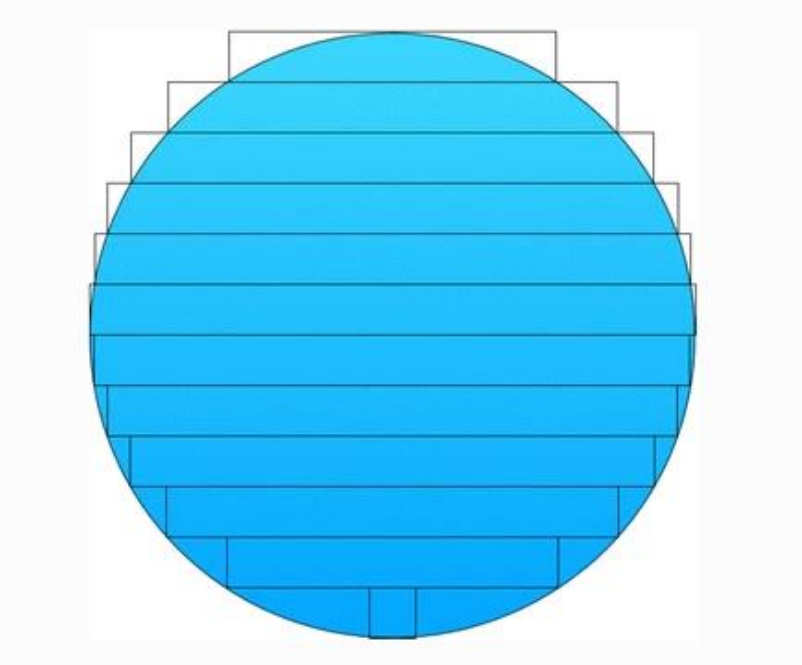
Source: Attaran (2017).

Appendix 7: Original model and hardware error



Source: Oropallo & Piegl (2015).

Appendix 8: Containment problem example

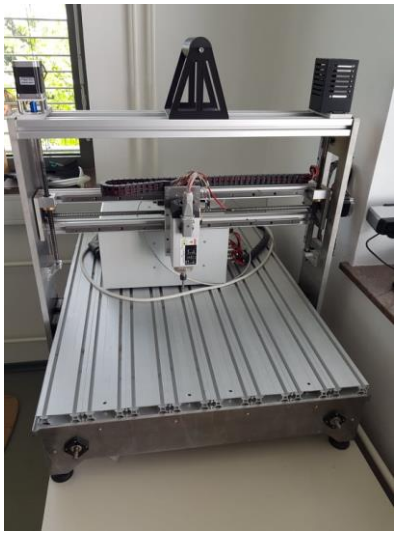


Source: Oropallo & Piegl (2015).

Appendix 9: 3D printed fingerprint example

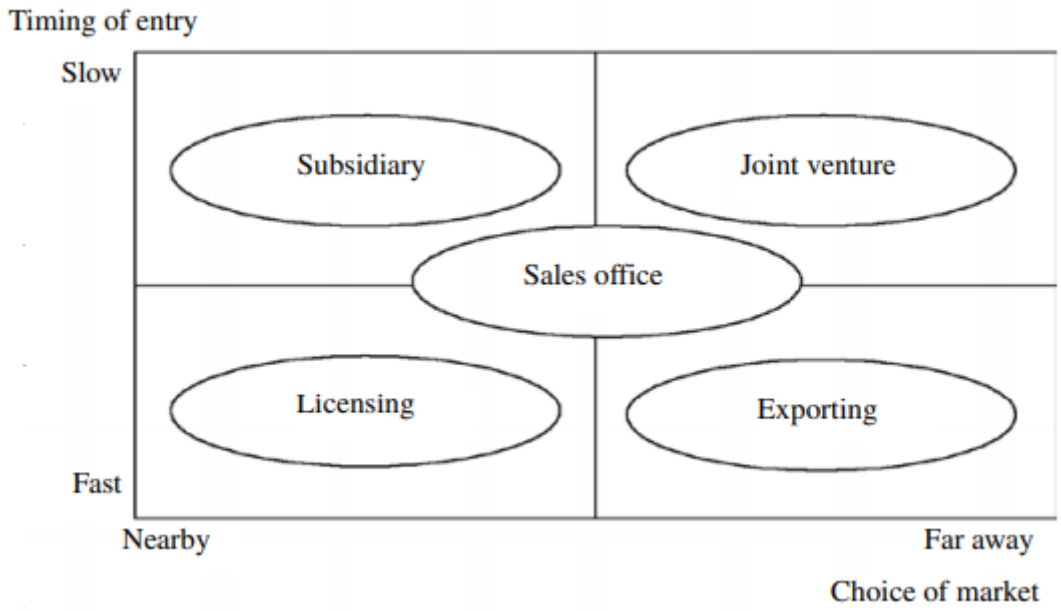
Source: D. (2017).

Appendix 10: A photo of 3WAY's hybrid



Source: Own work.

Appendix 11: Relationship between timing of entry, choice of market and entry mode



Source: Gallego, Hidalgo, Acedo, Casillas & Moreno (2009, p.322).

Appendix 12: Structure of the interviewees

Person	Gender	Age	Position	Company	Industry
A	Male	56	CEO	3WAY d.o.o.	Sales of CAD, CAM, PLM software, 3D printers and 3D scanners
B	Male	58	Sales Manager	3WAY d.o.o.	
C	Male	27	Technical Associate	3WAY d.o.o.	
D	Male	42	CEO & Production Manager	ORO S d.o.o.	Manufacturing of components for thermoplastic processing, foundry and cutting tools
E	Male	45	CEO	Modelarstvo Miketič d.o.o.	Manufacturing of tools for foundry, vacuuming and infusion

Source: Own work.

Appendix 13: Interviews

Transcriptions:

Date: 21 January 2020
Time: 10min

Key:

C = CEO of 3WAY d.o.o.
I = Interviewer

I: Hello. First, I would like to ask you regarding the new hybrid product that you have been working on. So, first… How does the product work? I know that traditional 3D printers work by adding layers on top of layers… but why hybrid? Why do you believe this is going to work on the market?

C: Well… this is a hybrid because it uses two technologies at the same time… Basically, we combined additive and CNC technologies and put into one product. Like you said… at the beginning this printer works by putting one layer on top of another to create an object like this… But the difference is that this hybrid 3D printer can also do the process of milling after it finishes with the first part… So, you asked me as to why this would work, right? Well… the problem in the 3D industry is that if you want a smoother surface, you have to create smaller layers… But this takes more time… This means that you have to make a decision between speed and how smooth the surface you want it to be… We got feedback from customers and they do not like the so-called post-processing part of 3D printing where they have to remove the supports and smoothen the surface… Basically, after you print out the product, we usually also make it smoother… manually… to make it look less of a "3D printed product" if you know what I mean… All these layers can often be clearly visible to the customer, which can ruin the looks of the model… So, to finally get to your question… We believe a hybrid would work because it solves all these problems. You do not have to decide between speed and quality. You can have both... It makes things easier and the surface is just smoother… As you can see here [shows two 3D objects]… This is before the milling and this is after… We could get closer to the smooth surface, but this would take time… With the hybrid printer, time is not a such sacrifice.

I: So… thank you for a very long answer.

C: Not a problem.

I: So… In my thesis… I am also going to work on methods of entry for your product… Basically, different types of strategies on how you could enter the foreign market. For example… exporting or… joint venture… and other strategies…In order to pick the right strategy I am making criteria so it would fit your company. So, if that's all right I am going to ask you few questions, so I can create these criteria…

C: Yes, that's all right.

I: So, I do know the size of the company is small. In terms of a budget… How much would you willing to invest…?

C: Well, I would not want to disclose that information, but yes… We are small… So, competing with larger firms is definitely incomparable to our budget.

I: Okay, what about commitment. How committed are you to this project?... Basically, trying to put the product in the European market?

C: Well, we are not extremely committed. The thing is… we are willing to try. If it works… That's great and we would keep investing into this project… But we are not

planning to keep investing into this project if the customers abroad are not willing to buy our products…

I: What about risks?... Do you find yourself as a risk taking company?

C: No, definitely not… We believe in the opposite… It is one of our core values in the firm… We almost always go for a safer route when that's possible… If I try to remember older projects…We think long term. We like slow and safe growth rather than quick growth and risking bankruptcy in a few months by taking very risky route.

I: What kind of control do you want? What I mean by that... If you go for a joint venture… The control of this project would not only be in your hands.

C: We would like full or almost full control.

I: What countries would you enter… Any special limits? For example, would you enter more countries at the same time?

C: We would enter in any country in the EU… As long as it is profitable. And no… we wouldn't limit ourselves only to a few countries… But still… we wouldn't enter the countries where there is clearly no interest for our product or where it wouldn't be profitable.

I: Would you add anything? Anything that could be added to the criteria?

C: The most important part for us is… Benefits versus costs… If the benefits are higher than costs… then we would like that strategy. But yes… I believe that is obvious.

I: Okay that's it for today! Thank you for all the answers.

C: Thank you!

Date: 24 August 2020

Key:
Time: 4min

C = CEO of 3WAY d.o.o.
I = Interviewer

I: Hello once again.

C: Hello.

I: I would like to ask you… What do you believe are some of the strengths of your company…? For example, when it comes to 3D printing. As well as in general… Something that you can objectively state about your company…

C: Well, I would say… If we get into the 3D printing industry… We have years of expertise with that industry… I can't recall the exact year we went into this industry, but we definitely have an advantage here because we've been in here for some time… Also, in general… our company has existed since 1999, which is another strength of our company… We have plenty of experience… We also have Bisnode AAA certificate Platinum, of which we are really proud.

I: What about weaknesses?

C: We are small. I think this is our biggest weakness. It is difficult to compete with bigger companies and their budgets.

I: Are the materials you use… I know that the plastic filament is being used for the printer. Is this material difficult to get? For example, PLA plastic… Are the prices very competitive? Is it a type of resource that a supplier could have the power to raise prices because of their special position?

C: No… Well, at first the prices were a bit higher… But now it really isn't the problem. The market is quite saturated, and suppliers are quite competitive, so the prices are quite low.

I: What about materials being used to produce your 3D printer? Any materials that would be very costly or something that a supplier could easily raise prices?

C: No… Definitely not… The materials we need to produce a product are quite common. We are talking about wires, screws… small motors and… machine control units… And things like that.

I: Okay, thank you once again.

C: Thank you.

Date: 9 September 2020

Key:
Time: 2min

C = CEO of 3WAY d.o.o.
I = Interviewer

I: Hello. How high would you say the advantages of the new products are...? How great are the benefits? Realistically?

C: The advantages of the product are very high. It combines two technologies at the same time, which helps with the quality and speed when printing out the products… You can basically use only 3D printing, or you can use 3D printing with CNC… We believe it offers great benefits.

I: What about compatibility? If I… For example if I have used 3D printers before… Will I be able to use this hybrid? What about… How does this product fit with previous experiences of the customers with 3D printing…? Is it something completely new…? Can they just jump into the hybrid right away?

C: No. Actually… If you used 3D printers before, this doesn't mean that you will be able to use this hybrid. If you do not have any knowledge about CNC this will be quite difficult to work with… It does not fit quite well with previous experiences… New knowledge would be needed to operate with this product for those who are only familiar with classic 3D printers.

I: Thank you!

C: Not a problem.

Summary of an interview with the Sales Manager of 3WAY d.o.o.

Date: 1 December 2020
Time: 30min

Main points:

- Weightings for different factors were discussed with Sales Manager. We also discussed where the sources are from, reliability, explanation of the factors etc.
- Regarding long-term attractiveness the potential number of companies in the industry was decided as the smallest weighting as the information was potentially unreliable. The other reason was that the competition does not only come from within the country but also outside the country
- The largest weighting was put on the size of attractive categories and its combinations in the industry. Certain categories like use of 3D printing for goods for sale may be closer categories to the hybrid printer than others. Mainly because of the need for smoother surfaces.

- Similarly goes for the industry size, where there is a need for high numbers of potential buyers if the company wants to maximise revenues
- The economic and financial risks were given more weight than entry barriers and macro environmental factors. Entry barriers in the EU are low so the factor should not have a significant impact.
- In terms of business strength, product differentiation was decided to have the highest weighting, because of reliability but also because it may be the most important factor when a customer is deciding between products
- Other factors have about the same weight, relative market share and knowledge of the industry a bit more than the other two

Summary of an interview with the Technical Associate of 3WAY d.o.o.

Date: 9 December 2020
Time: 15min

Main points:

- The main drawbacks of 3D printing are poor surface quality (roughness), to some extent poor mechanical properties and uneconomical manufacturing of larger batches of products.
- The main advantages of 3D printing are the ability of producing more complex shapes, which cannot be produced with conventional methods, the ability to make products that are uniquely customised in terms of shape and functionality, and very good material efficiency.
- The improvements and desires that customers often point out are the possibility of hybrid activity (combination of 3D printing with other manufacturing technologies), possibility of faster production, production of larger batches of products and the ability of manufacturing complex products within one machine.
- The speed and smoothness or quality of the surface are interconnected. Faster printing produces worse or less smooth surfaces. The important desire among customers is achieving faster print times (the ability to produce larger batches of products) without proportional worsening of surface quality.
- The Technical Associate believes that a 3D printer, which could produce smoother surfaces in the same time period as current printers would be highly sought after in the market. Same applies to a 3D printer, which could reach faster printing times without the worsening of surface quality.

Summary of an interview with the CEO and production manager of ORO S d.o.o.

Date: 11 December 2020
Time: 15min

Main points:

- The interviewee believes that the major shortcomings in 3D printing are surface roughness, inaccuracy, insufficient choice of materials and poorer firmness in comparison to injection moulded plastic product.
- In the interviewee's opinion the main advantages are in speed of production and having "actual" product in your hands, which can be easily tested in terms of looks and functionality in comparison to having only a CAD model.
- The improvements of the product that the interviewee would like to see the most in the industry are firmness and accuracy.
- The speed of 3D printing is already satisfactory in interviewee's opinion. The interviewee would put more emphasis on accuracy and smoothness of the printed products.
- The interviewee would be interested in a 3D printer that would produce smoother surfaces without the cost of slower printing.

Summary of an interview with the CEO of Modelarstvo Miketič d.o.o.

Date: 5 March 2021
Time: 15min

Main points:

- The main disadvantage of 3D printing is the quite rough surfaces of a printed product.
- The main advantage is the speed of production of a physical model, which cannot be created at such a low cost with any comparable technology.
- The improvements of the product that interviewee would like to see most in the industry are a wider range of materials and better speed of 3D printing.
- Believes that the speed of printing is very important, not so much for prototype-sample models as it is for a small series, which could possibly be interesting for printing because of the high cost of tools per unit when injecting plastic. The smoothness of the surface of the final products is also particularly important.
- Would be interested in a 3D printer that would create smooth surfaces. With the speeds high enough, this would be a positive step towards a way where he would see 3D printing as a very promising technology for producing smaller series. The interviewee added that with that kind of 3D printer there could be a new and interesting market open up.

Appendix 14: Concepts and main findings for export

Author & Year	Definition of concept(s)	Main findings
Hollensen (2014)	**Indirect export modes**: "A manufacturer uses independent export organizations located in its own country (or third country)." (Hollensen, 2014, p. 349) **Direct export modes: "**The manufacturer sells directly to an importer, agent or distributor located in the foreign target market." (Hollensen, 2014, p. 353)	Divides exporting into three different modes, sets partner mindshare as a measurement of the strength of a relationship when it comes to trust, commitment and cooperation. The higher the mindshare, the higher the willingness to export one brand in front of another. (Hollensen, 2014, p. 347)
Hill (2013)	**EMC**: Exporting management company helps avoid pitfalls and identify opportunities. (Hill, 2013, p. 535)	One of the most successful exporting firms 3M has built success in exporting with three main principles: entering on small scale to reduce risk, add more product lines once exporting operation starts to become successful and hire locals to promote firm's products. (Hill, 2013, p. 535) **Strategic steps for successful exporting:** 1. Hire an EMC or at least experienced export consultant 2. Start with one market or a handful of markets 3. Enter foreign market on a small scale 4. Hire additional personnel to oversee activity 5. Create strong relationship with local distributors and/or customers 6. Hire local personnel 7. Be proactive about seeking export opportunities 8. Keep option for local production (Hill, 2013, pp. 535-536)
Onkvisit & Shaw (2004)	**Exporting definition:** "Exporting is a strategy in which a company, without any marketing or production organization overseas,	The exporting strategy is poor when the company's home currency is strong (Onkvisit & Shaw, 2004, p. 247)

	exports a product from its home base." (Onkvisit & Shaw, 2004, p. 246)	The most promising predictor of export performance are use of differentiation strategy, firm size and management's motives to internationalise (Onkvisit & Shaw, 2004, p. 248)

Source: Hollensen (2014); Hill (2013); Onkvisit & Shaw (2004).

Appendix 15: Concepts and main findings for joint ventures

Author & Year	Definition of concept(s)	Main findings
Hollensen (2014)	**Joint venture:** "An equity partnership typically between two partners. It involves two 'parents' creating the 'child' (the joint venture acting in the market)." (Hollensen, 2014, p. 379)	**Y and X coalitions:** Y coalition means that "partners share actual performance of one or more value chain activities." (Hollensen, 2014, p. 380) X coalition means that partners "divide the value chain activities between themselves." (Hollensen, 2014, p. 380)
Hill (2013)	"A joint venture entails establishing a firm that is jointly owned by two or more otherwise independent firms." (Hill, 2013, p. 497)	According to research, joint ventures with local partners are at lower risk of adverse government interference when it comes to nationalization (Hill, 2013, p. 497).
Onkvisit & Shaw (2004)	Joint venture is a partnership at a corporate level, which may be either domestic or international (Onkvisit & Shaw, 2004, p. 252).	Study suggests that firms use joint ventures when entering markets with high legal restrictions or high levels of investment risks (Onkvisit & Shaw, 2004, p. 253). **Natural nonpolitical investment process**: Companies may start with a venture with a local partner because of local knowledge. Later on, they may buy more or all equity or leave venture entirely when they get familiar with the market (Onkvisit & Shaw, 2004, p. 253). **Second political investment process:** local firm uses political leverage to gradually take over ownership of the foreign partner (Onkvisit & Shaw, 2004, p. 253).

Source: Hollensen (2014); Hill (2013); Onkvisit & Shaw (2004).

Appendix 16: Concepts and main findings for licensing

Author & Year	Definition of concept(s)	Main findings
Hollensen (2014)	Licensing is a way a firm establishes local production in foreign markets without capital investment. (Hollensen, 2014, p. 371)	Two main approaches to licensing: Stand-alone licensing agreement – the agreement to transfer right and enable licensor to earn royalties (Hollensen, 2014, p.371) Licensing plus licensing agreement – not only extract royalties but also support longer-term relationship (Hollensen, 2014, p.371)
Hill (2013)	Licensing is "an arrangement where a licensor grants the rights to intangible property to another entity for a specified period…" (Hill, 2013, p. 494)	Licensing very attractive for firms, which lack capital. Also, very attractive option when a company is unwilling to commit substantial financial resources to foreign market (Hill, 2013, p. 494)
Onkvisit & Shaw (2004)	Licensing is an agreement that gives permission to a foreign company to use industrial property, technical know-how and skills and more, as well as combination of these in a foreign market (Onkvisit & Shaw, 2004, pp. 248-249)	A company can avoid high risk and other difficulties with licensing. Majority of French designers use it to avoid investing into business. Disney collects all royalties from practically risk-free Tokyo Disneyland theme park (Onkvisit & Shaw, 2004, p. 249).

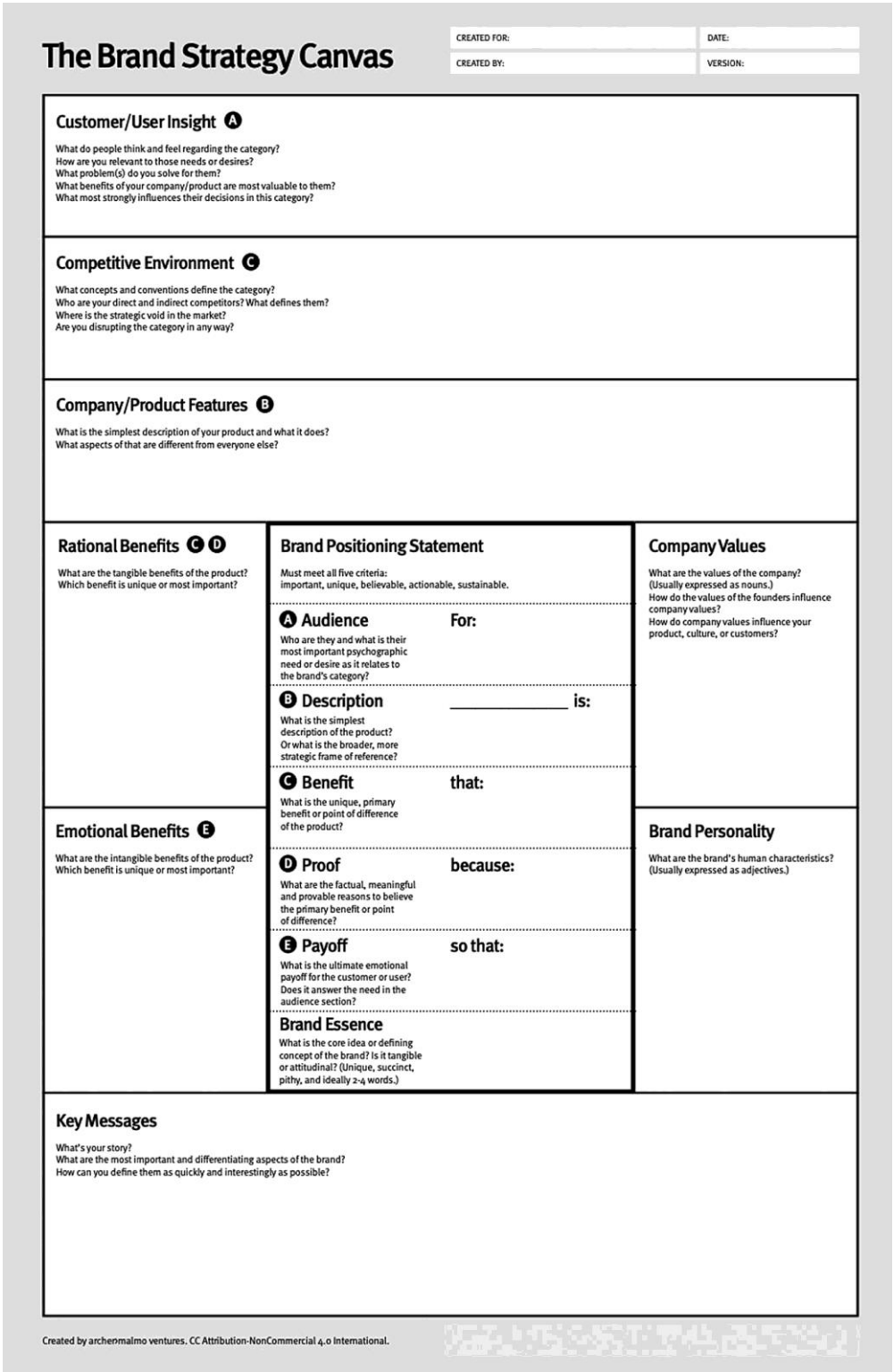
Source: Hollensen (2014); Hill (2013); Onkvisit & Shaw (2004).

Appendix 17: Concepts and main findings for ownership

Author & Year	Definition of concept(s)	Main findings
Hollensen (2014)	/	Acquisitions can be **horizontal** (markets of acquired and acquiring are similar), **vertical** (the acquired becomes supplier or customer of acquiring), **concentric** (the acquired has the same market but different technology or the other way around) or conglomerate (acquired is in a different industry) (Hollensen, 2014, p. 407)
Hill (2013)	In a wholly owned subsidiary, the company owns whole stock (Hill, 2013, 498)	Many high-tech firms prefer this entry for overseas expansion. (Hill, 2013, 498) National subsidiary may specialize in production of only one part of product line to maximize value added in each stage (Hill, 2013, 498)
Onkvisit & Shaw (2004)	/	Due to sensitive nature of acquisitions, there are some legal hurdles. In Germany, for example, Federal Cartel Office may prohibit or divestiture of the mergers and acquisitions that could create market domination or strengthen it (Onkvisit & Shaw, 2004, p. 261)

Source: Hollensen (2014); Hill (2013); Onkvisit & Shaw (2004).

Appendix 18: The Brand Strategy Canvas



The Brand Strategy Canvas

CREATED FOR: | DATE:
CREATED BY: | VERSION:

Customer/User Insight (A)

What do people think and feel regarding the category?
How are you relevant to those needs or desires?
What problem(s) do you solve for them?
What benefits of your company/product are most valuable to them?
What most strongly influences their decisions in this category?

Competitive Environment (C)

What concepts and conventions define the category?
Who are your direct and indirect competitors? What defines them?
Where is the strategic void in the market?
Are you disrupting the category in any way?

Company/Product Features (B)

What is the simplest description of your product and what it does?
What aspects of that are different from everyone else?

Rational Benefits (C) (D)

What are the tangible benefits of the product?
Which benefit is unique or most important?

Brand Positioning Statement

Must meet all five criteria:
important, unique, believable, actionable, sustainable.

(A) Audience — For:
Who are they and what is their most important psychographic need or desire as it relates to the brand's category?

(B) Description — _____ is:
What is the simplest description of the product? Or what is the broader, more strategic frame of reference?

(C) Benefit — that:
What is the unique, primary benefit or point of difference of the product?

(D) Proof — because:
What are the factual, meaningful and provable reasons to believe the primary benefit or point of difference?

(E) Payoff — so that:
What is the ultimate emotional payoff for the customer or user? Does it answer the need in the audience section?

Brand Essence
What is the core idea or defining concept of the brand? Is it tangible or attitudinal? (Unique, succinct, pithy, and ideally 2-4 words.)

Company Values

What are the values of the company? (Usually expressed as nouns.)
How do the values of the founders influence company values?
How do company values influence your product, culture, or customers?

Emotional Benefits (E)

What are the intangible benefits of the product?
Which benefit is unique or most important?

Brand Personality

What are the brand's human characteristics? (Usually expressed as adjectives.)

Key Messages

What's your story?
What are the most important and differentiating aspects of the brand?
How can you define them as quickly and interestingly as possible?

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Source: Woods (2020).

Appendix 19: The Brand Strategy Canvas for 3WAY

<table>
<tr><td colspan="3">Customer/User insight (a)
Mostly enthusiasts for personal use and companies that use it for prototyping or even final goods.
The product solves the problem of the productivity dilemma when the customer needs to decide between speed and quality of the print.
The benefit of the product is that it can increase speed, increase quality and has 2 technologies in one product.
The customers seem to be mostly influenced by price, quality and speed.</td></tr>
<tr><td colspan="3">Competitive Environment (c)
Alternative way of creating objects, tools, goods and prototypes etc.
The direct competitors are well established companies like MakerBot with generations of printers and innovation throughout the years. Many smaller companies pushing the prices down.
The indirect competitors are traditional manufacturers.
The 3WAY d.o.o. product can be disrupting to some degree since it solves the productivity dilemma problem.</td></tr>
<tr><td colspan="3">Company/Product Features (b)
The product creates an object and smoothens the surface for higher quality.
This product is different from others because of its ability to smoothen the surface at the end without extending the time by making smaller layers or smoothening it manually.</td></tr>
<tr><td>Rational Benefits (c) (d)
2 in 1 product (printing and milling).
Better surface quality of the objects.
Polylactide (PLA) plastic that can be used is an environmentally friendly material.</td><td>Brand Positioning Statement
For smaller companies looking for a better quality alternative, 3WAY offers a two in one product that can create environmentally friendly objects with smooth surfaces, because of its hybrid technology and PLA plastic material, so that you can do more, better and be more environmentally conscious.</td><td>Company Values

Innovativeness, development, advanced, risk aversion, social responsibility

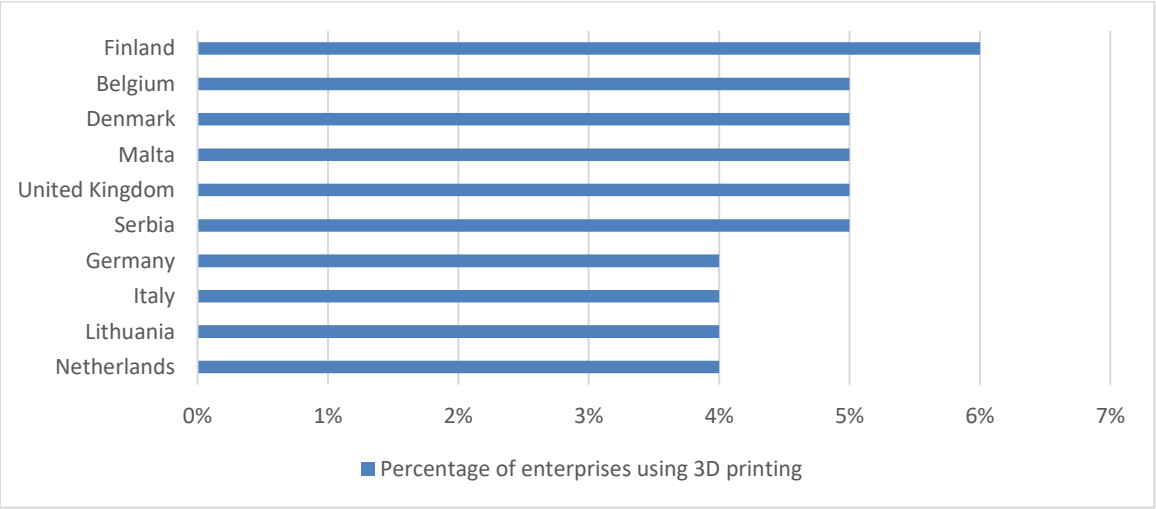
The company values the influence of the products they offer. Products are innovative, high-tech, and to some extent “green.” The investments made by the company are low risk.</td></tr>
</table>

	(a) Audience for: Small or medium-sized companies that are looking for an alternative to traditional manufacturing of certain objects but would also want a solution giving a better quality surface to objects but not investing in extreme high-end printers or waiting for extended periods of time for the printer to produce a product with such quality of surface. Mostly small or medium-sized companies that want to combine 3D printing and milling in the same product. Some enthusiasts that would like to invest more for a better quality of their objects.	
	(b) Description is: Better quality, two in one product.	
	(c) Benefit that: Creates eco-friendly products with a smoother surface.	
Emotional Benefits (e) • Making things easier (and less stressful). • Potentially less waiting time. • This product can also be used with ECO plastic as a	(d) Proof because: It uses PLA plastic with a hybrid of both printing and milling.	**Brand Personality** Professional, reliable, future oriented, sincere.
	(e) Payoff so that: Can do more things with the same product, produce better quality and be conscious about the environment.	

material, which helps people being more conscious about the environment and making them feel better about doing so.	Brand Essence Be environmentally conscious, do things better and do more.	
Key Messages Built for the future. Making things reliable. Sincere to the customers. Constantly learning, growing and improving.		

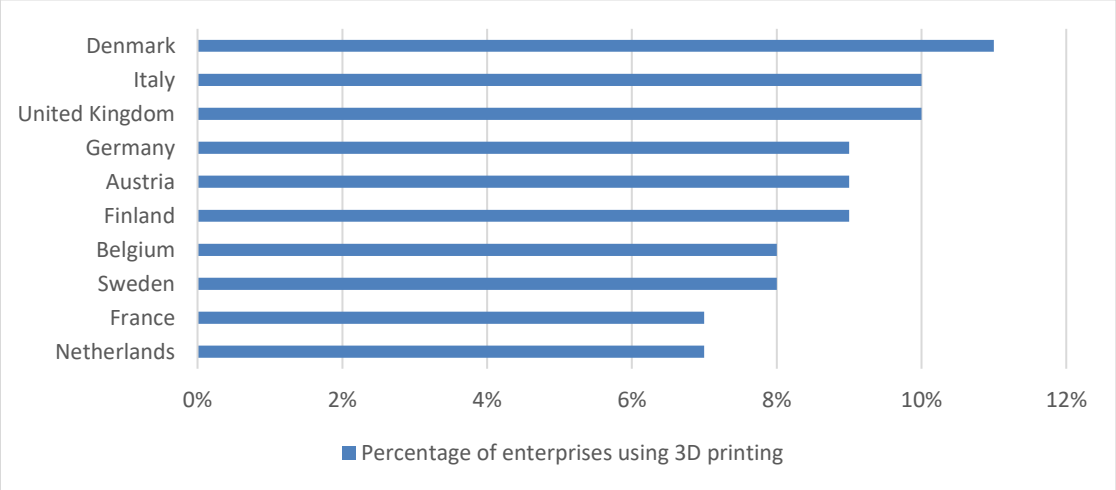
Adapted from Woods (2020).

Appendix 20: Percentage of small enterprises using 3D printing technology



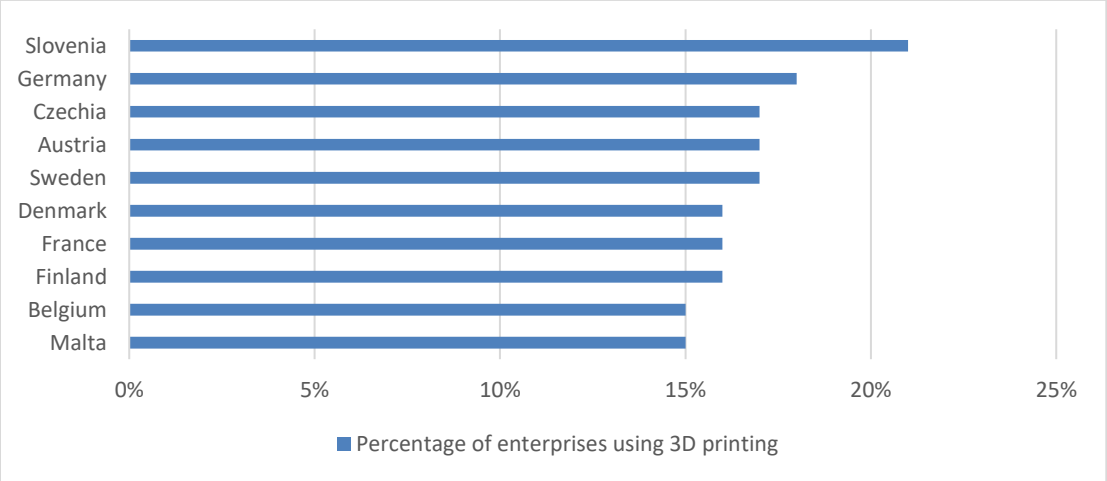
Adapted from Eurostat (2020).

Appendix 21: Percentage of medium enterprises using 3D printing technology



Adapted from Eurostat (2020).

Appendix 22: Percentage of large enterprises using 3D printing technology



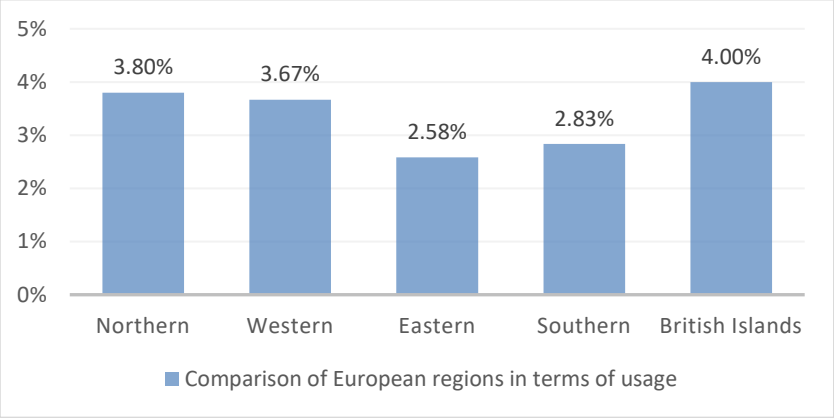
Adapted from Eurostat (2020).

Appendix 23: The division of countries into regions

Northern Europe	**Western Europe**	**Eastern Europe**	**Southern Europe**	**British Isles**
Norway (not EU, Schengen)	Germany	Lithuania	Portugal	Ireland (no Schengen)
Sweden	France	Latvia	Spain	U.K. (leaving EU, no Schengen)
Finland	Netherlands	Poland	Italy	
Denmark	Belgium	Czechia	Greece	
Estonia	Austria	Slovakia	Malta	
	Luxembourg	Slovenia	Cyprus (no Schengen)	
		Croatia (no Schengen)		
		Romania (no Schengen)		
		Serbia (not part of EU, no Schengen)		
		Bosnia and Herzegovina (not part of EU, no Schengen)		
		Bulgaria (no Schengen)		
		Hungary		

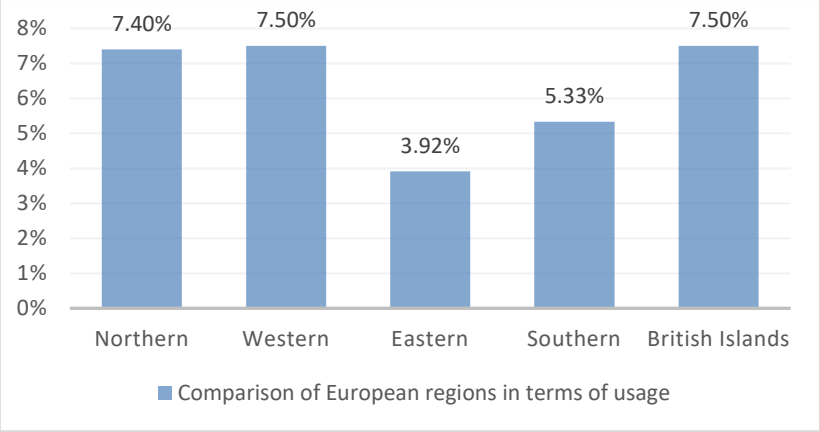
Division adapted from Finlayson (2019), other information from European Union (2020).

Appendix 24: Comparison of European regions in terms of usage of small enterprises



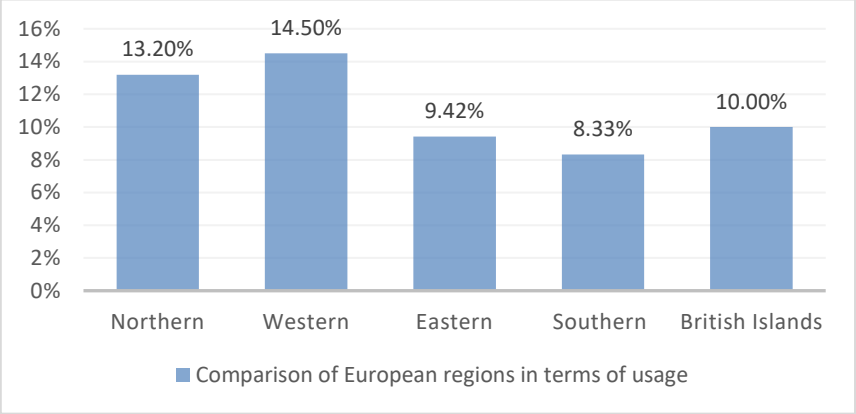
Adapted from Eurostat (2020).

Appendix 25: Comparison of European regions in terms of usage of medium enterprises



Adapted from Eurostat (2020).

Appendix 26: Comparison of European regions in terms of usage of large enterprises



Adapted from Eurostat (2020).

Appendix 27: Economic benchmarks

Quadrants	*Key Factors*	*Benchmarks*
Foreign Real	Export growth	Less than import growth
Foreign Real	Terms of trade	Loss
Foreign Real	Size of current account deficit	More than 2% of GDP
Foreign Real	Exchange rate competitiveness	Real exchange rate over-valuation
Domestic Real	Budget deficit	More than 3% of GDP
Domestic Real	Savings	Less than 20% of GDP
Domestic Real	Investments	Less than 20% of GDP
Domestic Real	Inflation	Double-digit

Source: Smee (1999).

Appendix 28: Financial benchmarks

Quadrants	*Key Factors*	*Benchmarks*
Foreign Financial	Size of external debt	More than 50% of GDP
Foreign Financial	Short-term external debt	More than 25% of total external debt
Foreign Financial	Level of international reserves	Less than 3 months' import coverage
Foreign Financial	International interest rates	Sharp upward turn
Foreign Financial	External financial management	Growing mismatch between short-term external liabilities and level of international reservers
Domestic Financial	Bank domestic lending	Growth in net domestic assets higher than nominal growth in the economy

Source: Smee (1999).

Appendix 29: Economic and financial benchmarks

Quadrants	*Key Factors*	*Benchmarks*
Foreign Real and Financial	Debt servicing requirements	More than 20% of export revenues
Domestic Real and Financial	Financial fragility	Weak banking system, poor supervision, large budget deficit, and uncertain politics
Domestic Real and Financial	Asset prices	Boom/Bust (particularly equity markets and real estate)
Foreign Real and Financial	Susceptibility to contagion	Small country size, regional effects, weak fundamentals

Source: Smee (1999).

Appendix 30: Economic risk indicators for Finland

Factors	Data	Indication based on data and benchmark	Explanation
Export growth	Exports: 7.2% Imports: 2.2% In 2019	Positive indication	Exports are growing faster than imports
Terms of Trade	January 2019: 98.7 January 2020: 97.2	Negative indication	The terms of trade was below 100 in both cases and has even decreased
Current account	-0.8% deficit of GDP in 2019	Positive indication	The deficit was less than 2% of GDP
Budget deficit	-1.1% deficit of GDP in 2019	Positive indication	The budget deficit was less than 3% of GDP
Investment	22.2% of GDP in December 2019	Positive indication	Investment was more than 20% of GDP
Inflation	0% on 14th of June 2020 5 am	Positive indication	Inflation is not an important factor in this case because of EUR currency, which is regulated within the European Union and outside their country

Adapted from Trading Economics (2020a); CEIC Data (2020a); The World Bank (2019a); Smee (1999).

Appendix 31: Financial risk indicators for Finland

Factors	Data	Indication based on data and benchmark	Explanation
Size of external debt	External debt in fourth quarter of 2019: 528 EUR Billion GDP in 2019: 239.25 EUR Billion Conversion done with ECB exchange rates	Negative indication	The external debt in the last quarter of 2019 was more than 220% of the 2019's GDP. Even if we look at other quarters the percentage is about the same
Short-term external debt	Short-term external debt fourth quarter of 2019: 175.8 EUR Billion External debt in fourth quarter of 2019: 528 EUR Billion	Negative indication	The short-term external debt was 33% of total external debt
Level of international reserves	The Finland foreign reserves reported 1.6 months of import cover in Dec 2019	Negative indication	The reserves can pay off only 1.6 months of imports
International interest rate	The current interest rate in Finland is 0%	Positive indication	The interest rate is regulated by central bank of EU, so the rate is set by the bank
External financial management	The mismatch between short-term external liabilities and value of international reserves have not grown comparing	Positive indication	

	data from 2018 and 2019		

Adapted from Trading Economics (2020); CEIC Data (2020); Smee (1999); European Central Bank (2020); DataBank (2020); Knoema (2020).

Appendix 32: Economic risk indicators for Denmark

Factors	**Data**	**Indication based on data and benchmark**	**Explanation**
Export growth	Exports: 1.6% Imports: 0.1% In 2019	Positive indication	Exports are growing faster than imports
Terms of Trade	May 2019: 99.6 May 2020: 106.4	Positive indication	The terms of trade was slightly below 100 in May 2019, however, it increased to 106.4 in May 2020, which is a good indicator
Current account	7.9% surplus of GDP in 2019	Positive indication	There was a surplus in current account of the GDP
Budget deficit	3.7% of the GDP in 2019	Negative indication	The budget deficit was more than 3% of GDP
Investment	21.5% of GDP in December 2019 23.0% of GDP in Mar 2020	Positive indication	Investment is more than 20% of GDP
Inflation	0% on 10th of August 2020 6 am	Positive indication	There are no signs of high inflation

Adapted from Trading Economics (2020b); CEIC Data (2020b); The World Bank (2019b); Smee (1999).

Appendix 33: Financial risk indicators for Denmark

Factors	Data	Indication based on data and benchmark	Explanation
Size of external debt	External debt in fourth quarter of 2019: 436 EUR Billion GDP in 2019: 310 EUR Billion Conversions done with ECB exchange rates	Negative indication	The external debt in the last quarter of 2019 was more than 140% of the 2019's GDP. This is a clear negative indication
Short-term external debt	Short-term external debt fourth quarter of 2019: 172.6 EUR Billion External debt in fourth quarter of 2019: 436 USD Billion Conversions done with ECB exchange rates	Negative indication	The short-term external debt has 39.6% of total external debt
Level of international reserves	The Denmark Foreign reserves reported 8 months of import cover in Dec 2019	Positive indication	The reserves can pay off 8 months of imports
International interest rate	The current interest rate in Denmark is -0.6%	Positive indication	The interest rate is pegged to the euro, which helps make it a less volatile currency
External financial management	There is no sign of a growing mismatch	Positive indication	

	between short-term external liabilities and value of international reserves		

Adapted from Trading Economics (2020b); CEIC Data (2020b); The World Bank (2019b); Smee (1999); European Central Bank (2020); DataBank (2020); Knoema (2020b).

Appendix 34: Economic risk indicators for Netherlands

Factors	Data	Indication based on data and benchmark	Explanation
Export growth	Exports: 4.48% Imports: 0.7% From January 2019 to January 2020	Positive indication	Exports are growing faster than imports
Terms of Trade	June 2020: 102.6	Positive indication	The terms of trade is above 100 in June 2020, and it was also positive in all months of the past year
Current account	10.2% surplus of GDP in 2019	Positive indication	There was a surplus in current account of the GDP
Budget deficit	Surplus of 1.7% of GDP in 2019	Positive indication	There was a budget surplus of GDP
Investment	22.8% of GDP in June 2020 Above 20% from January 2019 onwards	Positive indication	Investment was more than 20% of GDP
Inflation	1.7% on 6th of August 2020 4.30 am	Positive indication	There are no signs of high inflation

Adapted from Trading Economics (2020c); CEIC Data (2020c); Smee (1999).

Appendix 35: Financial risk indicators for Netherlands

Factors	Data	Indication based on data and benchmark	Explanation
Size of external debt	External debt in fourth quarter of 2019: 3,726 EUR Billion GDP in 2019: 809 EUR Billion Conversions done with ECB exchange rates	Negative indication	The external debt in the last quarter of 2019 was more than 460% of the 2019's GDP. This is a negative indication according to the benchmark
Short-term external debt	Short-term external debt fourth quarter of 2019: 1,753.2 EUR Billion External debt in fourth quarter of 2019: 3,726 USD Billion Conversions done with ECB exchange rates	Negative indication	The short-term external debt was 47% of total external debt
Level of international reserves	The Netherlands' foreign reserves reported 329.9 months of import cover in Dec 2019	Positive indication	The reserves can pay off more than 329 months of imports
International interest rate	The interest rate from Sept 2019 to Jul 2020 was 0% in Netherlands	Positive indication	The interest rate is controlled by ECB
External financial management	There is no sign of a growing mismatch between short-term	Positive indication	

	external liabilities and value of international reserves		

Adapted from Trading Economics (2020c); CEIC Data (2020c); The World Bank (2019c); Smee (1999); European Central Bank (2020); DataBank (2020); Knoema (2020c).

Appendix 36: PESTEL analysis

Starting the political part of PESTEL analysis for Finland, according to The World Bank (2019c), the country had an estimate of political stability and absence of violence/terrorism of 0.9 in 2018. This is a good result knowing that the range goes from about -2.5 (worst) to about 2.5 (best situation). The numbers were even slightly higher in the past, but the political stability is still good. Looking at the last elections that were held in 2019 in Finland, the Social Democrats won the elections with 17.7% closely followed by the Finns Party with 15.5% (Borg, 2019). The Finns Party are known as a far-right, anti-immigrant party and have gained tremendous strength in Finland, meaning that the political situation slightly changed from previous years when this party had a lower support (Borg, 2019; The Economist, 2019). In terms of the Corruption Perception Index the country scores 86 (Transparency International, 2019a). According to this information, the country is in the top 3 for the lowest corruption index.

For the economic part, most of the important things to be considered were already mentioned in the previous chapter. Nonetheless, it can be added that the unemployment rate was 6% in December 2019, this is quite a low rate of unemployment and can be seen as close to a natural rate. The rate got worse in 2020 but this is understandable because of the current COVID-19 situation. The household disposable income was 36,649 USD per capita in 2019, with an annual growth rate of 1.8%. In terms of the gross adjusted household disposable income the country is closer to the best OECD countries, but with the annual growth rate it is more towards the bottom (Trading Economics, 2020d; OECD, 2020a).

The largest age groups in Finland are 20 to 39 year olds and 40 to 59, which make up more than half of the population. The amount of obese population (age of 15+) is quite high at 67.6%. Moreover, the culture in Finland is characterised by low power distance and short-term orientation, meaning that power is decentralised and is oriented towards quick results rather than long-term achievements (Statista Research Department, 2020; OECD, 2020b; Hofstede, n.d.).

In terms of technology, Finland was ranked 7th in the world for the most innovative economy of 2020. What's more, they were ranked third in 2019. Some of the best performing metrics were productivity and research concentration (Ghosh, 2020).

Finland has chosen climate change mitigation and green growth as one of their priorities. The share of renewable energy is about third, which is one of the highest in the OECD. For 2020 the country was ambitious to reach the target of 38% renewable energy. In terms of pollution the country is ranked 6th and is 5th for water quality in the OECD. The energy taxes for CO_2 and particle emissions are very high and are getting even stricter (OECD Better Life Index, n.d.).

In terms of strictness of employment protection (temporary contracts), Finland is mediocre among OECD countries with the index rating of 1.56 (in 2019). The average among OECD countries is 1.69. An example of a very high index is Turkey, while the United States is very low. In terms of strictness of employment protection (dismissal on regular contracts), the index for Finland is 2.0. The average for OECD countries is 2.11. Therefore, in both cases the country is about average when it comes to employment protection (OECD, 2019a; OECD, 2019b).

In Denmark, the index for political stability and absence of violence/terrorism was estimated at 1.0, which is comparable to the Finland's index mentioned before (The World Bank, 2019c). The elections in 2019 resulted in the Social Democratic Party gaining the most votes, followed by Left, Liberal Party of Denmark and Danish People's Party (ElectionGuide, 2019). In comparison to the 2015 votes, the results were similar. The top 3 parties stayed the same with the exception of the Danish People's Party gaining a lot more votes in 2015 (ElectionGuide, 2015). From the political point of view, it can be said that the government is likely going to operate similarly as it has in the past years, meaning, that there may not be extreme changes in terms of legislation for foreign companies. Furthermore, with a score of 87 on the corruption perceptions index, Denmark ranks first for being the most anti-corrupt country in the world (Transparency International, 2019b).

The unemployment rate in Denmark was 3.7% throughout 2019, however, it surged to 5.6% in May 2020. The increase is obviously the reaction to the COVID-19 situation. The situation before the pandemic was, however, particularly good. The household disposable income is slightly below the Euro area average (35,616 USD) at 34,771 USD. Furthermore, the annual growth is similar to Finland's at 1.7%. This is also slightly below the Euro area average. Denmark does not use the Euro, but the comparison still gives some sort of perspective (Trading Economics, 2020e; OECD, 2020a).

In Denmark, the largest age groups are from 40 to 59 and 20 to 39. The youngest group (0-19) has been slowly decreasing over the last 10 years; however, it is still large enough relative to the other groups. Moreover, about half of the population (51% in 2017) is obese, which can give some basic indication of the population's health awareness. One of the cultural values that stands out in Denmark is individualism. This relates to the belief that individuals are expected to take care of themselves. Moreover, in Denmark small talk is

avoided, and communications are very direct (Jürgensen, 2020; OECD, 2020b; Hofstede, n.d.).

Denmark is ranked 8th in terms of the most innovative economies in the world. From 2019 to 2020 the country managed to gain 3 places. What's more, the country is ranked first in terms of researcher concentration (professionals active in R&D across the population) (Ghosh, 2020).

In terms of environment, the air pollution levels in Denmark were 9.3 micrograms per cubic meter, which is lower than the OECD average of 13.9 micrograms. This also ranks them in the top 10 countries when it comes to low air pollution. Furthermore, about 95% of people were satisfied with the water quality. Denmark is also known for its cycling policies, according to the source, one of their innovative policies is to build cycle highways, which would help cyclist commute to Copenhagen. The traffic lights would favour cyclists' speed and not cars (OECD Better Life Index, n.d.).

For the strictness of employment protection (temporary contracts) in Denmark, they are in front of Finland but slightly below the average of OECD countries. Their score is 1.63 while the average is 1.69. Furthermore, for the strictness of employment protection in terms of collective and individual dismissals of the regular contracts, Denmark scores a lower score of 1.53. This is quite below the OECD average (2.11). All the data mentioned comes from the year of 2019 (OECD, 2019a; OECD, 2019b).

In the Netherlands, the political stability and the absence of violence or terrorism is estimated to be comparable to the estimations of Finland and Denmark. In 2018 the country scored 0.9, which may be perceived as a good indication. The last general elections were held in March 2017, and we cannot know how things will unfold in 2021 and whether the new elected parties will be pro EU or not, which may also significantly influence foreign companies. For the corruption index, the country is ranked 8th for the lowest corruption level. In the past 5 years the country was consistently scoring above 80, which is a good indication. Like Finland and Denmark, Netherlands also has an extremely low corruption index and is among the best countries when it comes to low perceived levels of corruption (The World Bank, 2019c; ElectionGuide, 2017; Transparency International, 2019c).

For the economic part, the Netherlands' unemployment rate is similarly low as in the case of both previous countries, especially Denmark. Towards the end of the year of 2019 the unemployment rate was 3.5%, while in February and March of 2020 it plummeted to 2.9%. In terms of household disposable income, the Netherlands reached 37,810 USD per capita in 2019. This is higher than both Finland and Denmark. The annual growth rate of disposable income was 1.4% in 2019 (the lowest among these countries and among the lowest among OECD countries) (Trading Economics, 2020f; OECD, 2020).

The largest age group in the Netherlands is 40-65 years (5.8 million). Furthermore, 3.8 million people were younger than 20 years (3rd largest group). The second largest group is between 20 and 40 years (4.3 million). Because of this situation, there are ongoing debates for increasing the retirement age. In 2018 there were 48.5% of population aged 15+ self-reported as overweight or obese. This is a better score than most of the OECD countries. Moreover, the country is highly individualistic with a score of 80 on the Hofstede dimensions. In relation to that, the relationships between employee and employer are based on mutual advantage and hiring/promotion is based on merit only (Kamer, 2020; OECD, 2020b; Hofstede, n.d.).

In terms of innovative economies, the country is ranked 13th for the top innovative economies in the world. The best performing metric was high-tech density, which relates to the volume of domestic high-tech companies that are public, as a share of world's total companies. Such example of those companies can be biotech, Internet services, aerospace etc. (Ghosh, 2020).

For the environment in Netherlands, the PM 2.5 levels were 14.0 micrograms per m^3. This is slightly above the OECD average of 13.9. The country is ranked 7th for the water quality with 93% of people saying that they are satisfied with the water quality. One of the climate challenges in Netherlands is flooding in river deltas. This is resolved with the Delta programme to identify and manage risks. The Delta Fund is supposed to finance this programme with 1 billion EUR per year from 2020 on. The second problem are the Dutch greenhouses that are major users of gas and electricity. They are trying to reduce emissions by half compared to 1990 (OECD Better Life Index, n.d.).

The strictness of employment protection for temporary contracts is lower than for Finland, Denmark or OECD average. The Netherlands scores 1.19 in 2019, which is lower than the average of 1.69. On the other hand, when it comes to regular contracts and individual and collective dismissal, the strictness of employment protection is the highest among OECD countries. The score of 3.61 in 2019 indicates that there is very strict employment protection against dismissals. This score has become higher in the last 10 years (OECD, 2019a; OECD, 2019b).

Appendix 37: Long-term attractiveness for selected countries

Factor	**Weight**	**Grade** (1-5) (Netherlands)	Total Value (Netherlands)	**Grade** (1-5) (Finland)	Total Value (Finland)	**Grade** (1-5) (Denmark)	Total Value (Denmark)
Economic risk	0.15	5	0.75	4	0.6	4	0.6
Financial risk	0.15	3	0.45	2	0.3	3	0.45
Industry size (focus on potential buyers)	0.20	3	0.6	4	0.8	4	0.8
Potential number of companies in the industry	0.05	2	0.1	5	0.25	4	0.2
Macro environment factors (PESTEL)	0.10	4	0.4	4	0.4	5	0.5
Entry barriers	0.10	5	0.5	4	0.4	3	0.3
Size of attractive categories and its combinations in the industry	0.25	5	1.25	3	0.75	4	1
Total	1		4.05		3.5		3.85

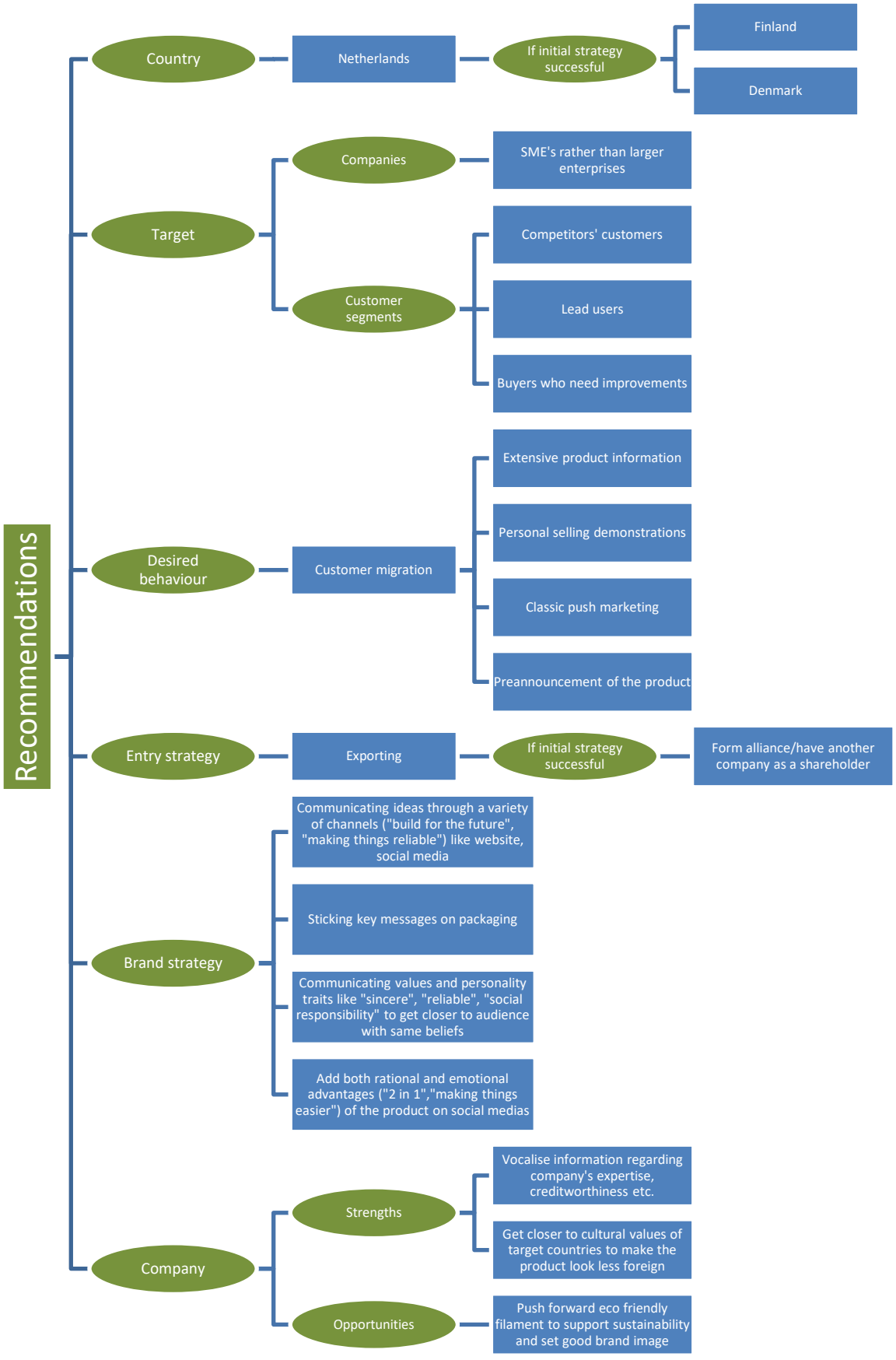
Source: Own work.

Appendix 38: Business strength for selected countries

Factor	**Weight**	**Grade** (1-5) (Netherlands)	Total Value (Netherlands)	**Grade** (1-5) (Finland)	Total Value (Finland)	**Grade** (1-5) (Denmark)	Total Value (Denmark)
Relative market share (in comparison with competitors in domestic market)	0.2	2	0.4	3	0.6	3	0.6
Profit margins	0.15	3	0.45	3	0.45	2	0.3
Knowledge of industry	0.2	3	0.6	3	0.6	4	0.8
Skills/Technology	0.15	3	0.45	3	0.45	3	0.45
Product differentiation	0.3	5	1.5	5	1.5	5	1.5
Total	1		3.4		3.6		3.65

Source: Own work.

Appendix 39: Recommendation map



Source: Own work.