Market and Segment Analysis

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Abstract

“The health impacts of environmental noise are a growing concern among both the general public and policy-makers in Europe” (World Health Organization, 2011). Environmental noise or noise pollution have immense consequences on people’s health, and most people do not realise this. My study is a market and segment analysis for the Norwegian market, where I have looked at the residential market, kindergartens, restaurants and China, with main focus on the residential market. I have researched different segments within the Norwegian market and the needs and consumer behaviour of these, then further analysed both qualitative and quantitative data, and at the end I have given recommendations to the company. The findings suggested that the 1st target segment are the nearly 8% of the population that are affected by noise pollution and when this segment is captured, several segments are worth expanding into. With effort, time and capital, Norsk Akustikksenter can educate the population of their need of sound regulating solutions and can from there expand into new and additional segments.

摘要

“环境噪音的影响对于欧洲的政府和大众已经开始越来越令人担心了”（世界卫生组织，2011）。环境噪音或噪音污染对人们的身体造成了非常大的影响，但是人们并没有意识到。这次的考察是对于挪威市场的分析。我观察了住宅市场、幼儿园、餐厅和中国，并且主要观察住宅市场。我研究了挪威市场的需求以及消费人员的表现，之后深入分析了定性和量性数据，然后在最后也给公司提供了推荐方案。调查结果显示，第一个目标群体是受噪音污染影响的人口中的近8%，当这个群体被捕获时，有几个群体值得投入，在足够的精力、人力和时间投入下，Norsk Akustikksenter可以教育人们需要合理的调节音量的方案，并从那里扩展到新的和更多的细分市场。
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1.0 Introduction
This thesis is the final work of my bachelor’s degree in International Marketing at the Norwegian Business School BI. The thesis is written in cooperation with Norsk Akustikksenter and my supervisor at my exchange university; Xi’an Jiatong-Liverpool University.

1.1 Motivation
My motivation and the reason I wanted to contact Norsk Akustikksenter, or Norwegian Acoustics Center from here on, and enter into an agreement with them, was because I have a passion for music. As a hobby musician who plays piano, I know the importance of high quality acoustics and how noise can ruin concentration and how the tones can be disrupted. Professional artists use recording booths, soundproof rooms and studios where the acoustic is perfect and unwanted noise is closed out. I do not have the capital or space to use or own a recording booth, so when I play in my apartment, unwanted noise is often a problem. This is also relatable to me as a student. To sit in a group room or classroom with terrible sound regulation, takes the focus away from the task at hand. “International studies indicate that noise pollution in school has a negative effect on student’s learning and academic achievement.” (Bulunuz et al., 2017). With the products Norwegian Acoustics Center offer, students will have more beneficial learning outcome. Since I had a contact in the company, it was easy to choose a company. I had been explained to the main points and vision for the company, and it sounded interesting. Acoustic and/or sound regulation is something a majority of the population take for granted until the moment the acoustics are terrible, or the sound is damaging to their health.

1.2 Background
In this day and age, noise is all around. Norwegian Acoustics Center offer sound-regulating solutions that creates a good and efficient acoustic environment, in accordance with the Norwegian Standard (Standard Norway). The foundation for optimum results of sound regulation is to measure and calculate acoustics in the building. Norwegian Acoustics Center is one of the only specialist center for sound regulation. Their vision is to be market leader in acoustic solutions for the Norwegian market, both on the private and professional market. This is achieved by ensuring exceptional quality by further developing their product range.
Norwegian Acoustics Center have extensive expertise in product developing, quality assurance and research on the importance of acoustics for a good environment in homes, offices, schools, kindergartens and restaurants (Norsk Akustikksenter, 2017).

Their products are among the best on the market and is developed and fitted to the Nordic market. The products have been developed over many years through improvement and testing, both in laboratory and in the “field”. Norwegian Acoustics Center have products for types of buildings and sound related challenges and can also deliver specialized products. The objective is to have the highest possible quality on their products and services. To achieve this, Norwegian Acoustics Center does not only offer products, but solutions. If you as a customer want, they will come to your house to measure and inspect the acoustic, come up with a report and recommended solution, estimated cost, deliver the product to your house and then mount the product. All in the spirit of giving the customers a better everyday life (Norsk Akustikksenter, 2018).

Furthermore, Norwegian Acoustics Center offers another category of products, décor and print; sound dampening pictures on the wall with the use of acoustic plates. They use the same type of plates for this as the rest of the solutions, only with either with foil or textile. Today, more people are interested in art and to brighten up their surroundings with something not everyone have. Norwegian Acoustics Center offers that solution, together with improving the acoustic of the area where the art is displayed.

In Addition to their own competence and experience, is Norwegian Acoustics Center’s knowledge-, quality- and production platform consisting of a close cooperation with a number of highly skilled and internationally acknowledged businesses and people in the acoustic industry, production of sound regulating products, quality control and certification (Norsk Akustikksenter, 2018). This cooperation has been operating together for many years and is working because of their own office in Norway, and employees in Shanghai. Norwegian Acoustics Center has been operating in China since the fall of 2005 and have had experience with quality control of production in China since the mid 1990’s. In Figure 1 can we see the cooperation platform for their sound regulating products.
This dissertation is a market and segment analysis for Norwegian Acoustics Center targeting the Norwegian market and the products offered towards private housing, kindergarten and restaurants, with the main focus on the private market. I will also give suggestion towards the Chinese market and how Norwegian Acoustics Center can enter in the future. I will look at different segments, and which one they should focus on. They already have an employee in their Shanghai office who oversees quality control and is supervising the production of the products (Norsk Akustikksenter, 2017). Recently they opened a showroom in Shanghai, but at this moment this is all they are doing in and towards the Chinese market. I will in this analysis give them suggestions on what can be done there and if this is a market they should expand to. With the help from my research, Norwegian Acoustics Center will be able to expand into the segments of the market that, based on needs and customer behaviour, will be easiest to penetrate.
1.3 Research questions and objectives

A research question is the initial step in a project and is an answerable inquiry into a specific issue or concern. Research questions serve two purposes; one, it identifies specific objectives the study will address, and two, it determines what kind of information the writer will be looking for (Booth, et al., 2008). The research in this analysis will provide the information needed to answer these questions:

Main research question:
*How can the Norwegian Acoustics Center expand to new segments and markets?*

Norwegian Acoustics Center are already on the Norwegian market, but which steps can they take to expand into new markets and segments and which segments should they consider expanding into.

Secondary research questions:
*What are the needs and customer behaviour in the residential market?*
*What are the needs and customer behaviour for kindergartens in Norway?*
*What are the needs and customer behaviour for restaurants in Norway?*
*Is there a need for this product in China, and if so, how should they enter the market?*

The secondary research questions consider the needs and customer behaviour, and to completely understand these questions, we need to understand these two theories. According to the Business Dictionary’s marketing definition of need, it is “A driver of human action which marketers try to identify, emphasize and satisfy, and around which promotional efforts are organized.” What do the market and customers need, and what motivates them to make the choices they do. That is what customer behaviour does. “The study of individuals, groups, or organizations and the processes they use to select, secure, use, and dispose of products, services, experiences, or ideas to satisfy needs and the impacts that these processes have on the consumer and society.” (Perner, 2017).
2.0 Literature review

Noise is the environmental problem that affects most of the population in Norway (Norwegian Environmental Agency, 2017). Almost 2.1 million are exposed to noise over 55 dBA outside their own home. The number has increased with approximately 700 000 since 1999. dBA is a decibel scale which attaches the greatest importance to the frequencies our ears perceive best and are most used in regulations for noise (Norwegian Association Against Noise). In Norway, 1 out of 20 people have their sleep disturbed by noise, mostly from traffic. Scientist Gunn Marit Aasvang at the National Institute of Health have conducted research into how this type of noise affects our sleep.

The industry of sound regulation or soundproofing in Norway is in competition with the construction product industry (Accounting Figures, 2017). Even though they do not offer the same products, the two industries have products that are similar, the main difference is that the construction product industry does not offer solutions that improve an efficient acoustic environment. However, these types of products are more popular because of price and need. This can be seen in Norwegian Acoustics Center profits for 2016, which are 145 000 NOK, a 62% decrease from 2015, where the profit reached 390 000 NOK (Accounting Figures, 2017). A natural explanation for this would be a decrease in residences, but as shown over, the number of residences in Norway increases every year (Statistic Central Bureau, 2017).

In this literature review, I will look at the health consequences of noise and what type of consequences environmental noise has on the human body. I will explain the different types of effects noise can have and how many people, especially in Western Europe, that are affected. Furthermore, will I examine three different markets Norwegian Acoustics Center targets; the residential market, kindergartens and restaurants. I will also explain how and why these markets are affected by noise pollution. At the end I will define needs and consumer behaviour and why it is important to understand the consumers need and behaviour to maximize profit and reach out to the largest market possible.
2.1 Health consequences

Noise pollution is a worldwide problem and is harmful for people’s health, and according to studies, it could be costing lives. A report done by World Health Organization (WHO), finds that Western Europeans lose years to disability and death from excessive sound and noise (Baughman, 2011). “WHO definition of health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity. Then excessive noise is clearly a health problem” (Agarwal & Yadav, 2013). When we look at the definition of health according to the WHO, noise and noise pollution classifies as a health problem. Not only does noise disturbs peoples work, communication and sleep, but it also damages hearing capacity and evokes physiological, psychological and possible sociological and pathological reactions.

![Diagram of Effects of Noise](image)

**Figure 2: Effects of noise**

As we can see in Figure 2, noise can have damaging consequences on people’s health, and some of the most serious consequences it can have, is the development of cardiovascular problems, like high blood pressure and heart disease (Agarwal & Yadav, 2013). Kim Rokho, a researcher for WHO support research done on noise and its health consequences, and states that it is not lost sleep, but the human body’s reaction to noise that is dangerous (Baughman, 2011). He continuous by saying that even though a person is not aware or conscious, noise effects blood pressure and the heart rate.
Figure 3 shows the various effect felt by persons in percentage on industry workers (Agarwal & Yadav, 2013). Even though the numbers only consider industry workers, I believe the numbers are transferable to other parts of the population, not only on industry workers. As we can see, noise problem is encountered by almost all the workers and up to 75 percent complained about lack of concentration. The effect noise has on people’s health are considerable and not only when it comes to hearing damages, but diseases, pain and permanent damages on people’s health.

In 2011, WHO published a report on the impacts of environmental noise and the growing concern around it. “With conservative assumptions applied to the calculation methods, it is estimated that DALYs (Disability-adjusted life year) lost from environmental noise are 61 000 years for ischaemic heart disease, 45 000 years for cognitive impairment of children, 903 000 years for sleep disturbance, 22 000 years for tinnitus and 654 000 years for annoyance in the European Union Member States and other western European countries” (World Health
Organization, 2011). What these numbers indicates, is that at least one million life years are lost every year from noise pollution in Western Europe. The main burden of environmental noise is comprised of sleep disturbance and annoyance, but as we can see, noise is a huge health concern, which can be reduced with the solutions Norwegian Acoustics Center offer.

2.2 Residential market

When we look at the market in which Norwegian Acoustics Center operates and targets is growing every year, especially the private market. In total there is 2,515,589 residences in Norway, which indicates that the whole of Norway as a market is quite big (Statistic Central Bureau, 2017). New residences are built every year, and in the period 2007-2017 there was an increase of residences in Norway (Statistical Central Bureau, 2017). These figures show a steady growth in the Norwegian residential market for Norwegian Acoustics Center. Of the approximately 273,000 new residences the last ten years, are 44% of the net growth apartment buildings, which exclusively are in urban areas (Statistic Central Bureau, 2017). The development shows that more and more people live closer to each other than before. 80% of residences in Norway are in urban areas. The cities account for large parts of the housing fortification. In the ten most populated municipalities, more than 90% of the homes are in densely populated areas and of the five largest metropolitan municipalities, the proportion of dwellings is 98% and above (Statistic Central Bureau, 2017). As we can see in Figure 4, Oslo as a county have the highest number of residences. We can also see that there is a correlation between number of residences and residences per km², as we can see in the two graphs. With around 2500 residences per km² and 100% of the residences in this county is in urban areas.
Noise-induced hearing loss can occur and be caused by continuous exposure to loud sound, or exposure to an intense one-time sound. As mentioned noise or sound is measured in decibels, and sound less than 75 decibels, are unlikely to cause any hearing damage or loss, however exposure to 85 decibels or more can. Noise from heavy city traffic, have a measured decibel at 85 (National Institutes of Health, 2017). This information opens a whole new market for Norwegian Acoustics Center; After-installation and regulation for already built buildings.

2.3 Kindergartens
There are 5980 kindergartens in Norway (Statistical Central Bureau) as of 2016. The number of kindergartens has reduced in Norway over the last ten years, from 6600 in 2007. However, the number of kindergartens is more than adequate when we look at the market for after-installation. 282 649 children are in kindergarten, and many young children are not necessarily able to protect themselves against noise-induced damages. Therefore, it is essential to protect them against noise. However, not only kids are exposed to noise, and kindergartens are known as loud workplaces (Norwegian Association Against Noise, 2013), which is not good for the 94 540 kindergarten workers in Norway (Statistic Central Bureau, 2017). Studies indicates a significant proportion of hearing impairments among kindergarten workers.
and nursery workers, although other studies indicate that the noise does not reach the threshold for hearing damage. However, as mentioned, harmful noise is more than hearing damage. The amount and level of noise in kindergartens is due to the negligence of good acoustics in the rush of getting full nursery coverage. The reason is partly also due to too many children in the premises, and with so-called “bad acoustics” (reverberation time is too long), the children’s tendency to drown each other’s screaming and they enter a vicious circle that may lead to early hearing impairment. “Nurseries and pre-schools have a noisy environment both for the students and the teachers. High level of noise, which has bad effects on health, is a public health problem.” (Gokdogan & Gokdogan, 2016). However, with the products and solutions Norwegian Acoustics Center offer, the circle may be broken.

2.4 Restaurants

Restaurants are often busy and can get loud. A study towards nightclubs done by Action on Hearing Loss, UK’s biggest organisation for people with hearing impairment, in 2015, shows that 75% of the population are willing to pay more if there are good sound conditions at the venue (Martinsen and Archer, 2017). 75% also said they would go out more if that was the case. According to Anders Hegre, General Secretary in the Institution for Hearing Impaired, this are numbers that can be transferred to conditions in Norway. I believe this also can be transferred to restaurants. “A 2016 Consumer reports survey revealed that excessive noise is the top reason people complain about restaurants — ahead of service or even food issues” (Belluz, 2018).

2.5 China

According to a new report by environmental authorities in China, a quarter of all Chinese cities suffers from excess levels of noise (China Radio International, 2017). In March 2017 a ranking of the 50 most noise polluted cities were released. The list is based on information and statistics collected by the World Health Organization, together with a report done by a Norwegian-based technology research group called SINTEF. Guangzhou in the south of China is, according to the ranking, the city in the world who suffers worst from noise pollution. Shanghai, Taipei and Hong Kong follow and respective 12th, 14th and 17th place (Richards, 2017). The findings are preliminary, but Henrik Matthies, managing director of Mimi Hearing Technologies, says the result is robust, in an interview with AFP (Newsmax, 2017).
2.6 Needs

It is essential for Norwegian Acoustics Center to understand the needs of their customers if they aspire to expand their market. As we can see in the different markets described above, the consumers have certain needs they want to cover, especially when it comes to their health. Need have several definitions, one of them is “a sensation that one is lacking something one desire” (Schiffman, et al., 2012). Abraham Maslow believed that individuals are motivated to achieve certain needs, and that these needs are unrelated to unconscious desires and rewards. Maslow stated that when one of these needs are fulfilled, an individual seeks to fulfil a new need. He continued to propose a five-stage model of these motivational needs, called Maslow’s hierarchy of needs (McLeod, 2007). Maslow stated that human motivation is based on people seeking fulfilment and change through personal growth and reaching self-actualisation. The growth of self-actualisation refers to the need for personal growth and is present throughout an individual’s life (McLeod, 2007).

“One can choose to go back toward safety or forward toward growth. Growth must be chosen again and again; fear must be overcome again and again”
- Abraham Maslow

Figure 5: Maslow’s hierarchy of needs

As the model above shows, the hierarchy of need if divided into five stages; physiological, safety, social, esteem and self-actualisation. On the basis of this thesis, the two lower levels of the model will be the focus, since these two are relevant to the products Norwegian Acoustics Center delivers.

*Physiological needs* or biological needs (deficiency) consist of the basic needs an individual has and are necessary for the survival of the individual. This includes air, water, food, shelter and reproduction. For example; if a person is thirsty, he or she needs to drink, or he or she
will die. Physiological needs are generally influenced through human cravings. If the human body is deprived of a need on this stage of the hierarchy, it will react. “Throughout life, the idea of physiological needs remains consistent. The need to maintain adequate physiological balance will always be essential” (Poston, 2009). Norwegian Acoustics Center offer products that can be placed in to this stage and can help individuals fulfil these needs. Both shelter and sleep are needs that, with the noise-regulated solutions Norwegian Acoustics Center offers, certainly can be met sufficiently. The products can be used in the creation of the shelter and can benefit the individual’s sleep by reducing noise pollution. Maslow stated that when a person’s physiological needs are sufficiently met, he or she addresses more complex needs (Poston, 2009).

The next stage of the hierarchy, is safety and security needs. This platform of needs consists of personal security, employment, resources, health and property. The need to feel secure, as physiological needs, requires maintenance throughout life. However, safety needs may differentiate between each individual, depending on where the person is in his or her life (Poston, 2009). If we concentrate on the health need, or need for good health, Norwegian Acoustics Center’s product line can meet this need. Noise-induced hearing damage and loss can occur by continuous exposure to noise pollution. By implementing these noise-regulating solutions, the need for safety in the health capacity is reduced.

Maslow’s theory has had some criticism over the years. One criticism concerns the assumption that the lower levels of the hierarchy must be satisfied before one can achieve fulfilment and self-actualisation. This is not always the case and the theory has therefore been falsified in some aspects (McLeod, 2007). There has also been more criticism towards Maslow’s methodology in developing the hierarchy of needs, and from a scientific perspective there are numerous problems with his approach. However, because the theory is highly recognized and the credibility of it despite the criticism, the theory shows that Norwegian Acoustics Center can offer solutions to the most basic human needs.

2.7 Consumer behaviour

“Consumer behaviour is the study of why people buy the product they do, and how they make their decision” (Horner & Swarbrooke, 2016). This means all those activities which are directly involved in obtaining, consuming and disposing of a service or product. This also
includes the processes that precedes and follows these actions (Engel, et al., 2001). The consumer goes through a psychological process during both the pre- and post-purchase stage, and both Horner & Swarbrooke (2016) and Engel et al (2001), emphasizes the importance of this process. However, R. Solomon (1996) made an extended version of the definition earlier than the two mentioned. In his book Consumer Behaviour (1996), Solomon incorporated the concept of consumer needs into his definition of consumer behaviour: “Consumer behaviour is the process involved when individuals or groups select, purchase, use, or dispose of products, services, ideas or experiences to satisfy needs and wants”. This definition links together the need and behaviour of the customer and helps us to understand that the need of the customer influences the behaviour, and if one can understand what the customer need, one can predict the behaviour of the customer and in this case manoeuvre him or her towards the solutions Norwegian Acoustics Center offer.

Solomon’s (1996) definition also introduces the idea that some purchase decisions are made in a group of consumers, not simply as individuals. This idea is highly relevant for Norwegian Acoustics Center. If we look at the different segments we are researching in this thesis, the purchase decisions are often made by groups. On the private market, the percentage of household with multiple residents are high, and when constructing a restaurant or kindergarten, there are often multiple partners or people involved in the decisions regarding purchase and design. With this in mind, Norwegian Acoustics Center should consider appealing to the family or group and emphasize how their solutions will benefit the group as a whole.

It is important for us to consider and understand the role of consumer behaviour in the marketing process. If the marketing activity organizations carries out is to be effective, an understanding of consumer behaviour is vital. Marketing relies on the idea that organizations should have their consumers as the central focus for their activities, and the relationship between them as a seller and the buyer. Organizations must consider their consumer’s needs, but they also rely on persuading them to choose their product or service. This is referred to as consumer persuasion and is a powerful tool in marketing (Horcajo, et al., 2010). The act of persuading a consumer that your product covers the consumers need better than the competitors. However, the main priority for an organisation is to serve the final want and needs for the consumer. This means that organizations and companies rely on constantly
researching consumer needs, and the reason for these needs, both today and in the future. And by assembling correctly designed marketing mixes, companies can produce the products requested by consumers. It is essential for Norwegian Acoustics Center to research what their consumers demands and why. By understanding why the consumer wants something, they can offer solutions that satisfies the consumer’s need (Horner & Swarbrooke, 2016).

### 2.8 Summary

This literature review has looked at different health consequences caused by noise pollution and how Norwegian Acoustic Center’s products can reduce the risk of these. The effects noise can have is widespread and cardiovascular problems, hearing damage, stress and cognitive development are only a few. The different markets I have concentrated on are growing and the need for the products are there, even if the market have not realised it yet due to lack of knowledge regarding noise. The increase of residences in urban areas are noticeable considering the level of noise pollution here unlike the lower levels in more rural areas. The effects of children are evident and installing noise regulating products in kindergarten will help both the children and the employees. China could be an interesting market bearing in mind the high-ranking cities on rankings measuring environmental noise. The needs and behaviour of the consumer are important to understand if we want to expand our existing market, and by understanding them, we can offer solutions to satisfy their needs.
3.0 Research methods and methodology

In this dissertation, the use of different methods to gather and understand information is prudent to my research. To obtain the information necessary to answer the research questions and objectives, as well as give Norwegian Acoustics Center a helpful market analysis, have I used methodological triangulation. “Methodological triangulation is the use of at least two methods, usually qualitative and quantitative, to address the same research question.” (Morse, 1991).

3.1 Qualitative research

“Qualitative research is primarily explorative research. It is used to gain an understanding of underlying reasons, opinions and motivations.” (DeFranzo, 2011). This method includes individual interviews, focus groups and observation. In this dissertation I chosen to carry out individual interview as a qualitative approach. This approach is chosen because an in-depth interview has more advantages for this dissertation compared to focus groups, such as a large amount of individual information (Gripsrud et al., 2016). In an in-depth interview the likelihood that the subject is affected by the presences of others is removed and it is easier to discuss sensitive information one-to-one. I also have the chance to go more in depth with an interview and get a better understanding of the interview object’s answers. But there are a few negative aspects of this form of qualitative approach. Price is one of them, but for this dissertation and the person I have interviewed, the price will be close to, if not zero because I will use skype. The other aspects of negativity for this approach is the influence for the moderator or interviewer, which means that me as an interviewer could lead them into answering the way I want them to. This will not be the case since this will damage the information and the integrity of the thesis as a whole.

Nevertheless, for me to be able use methodological triangulation, I must have at least one interview object. With more focus on the health consequences of noise pollution and the benefits Norwegian Acoustics Center offer, I chose to approach someone from the Norwegian Association Against Noise. A representative from the organization agreed to the interview but requested that the person’s identity would be anonymous. I agreed to this because of the limited time to find and conduct another interview, and because I will use the interviewees
answers to support my secondary findings and data. The answers are not revolutionary and different, but rather a confirmation that the secondary data I have gathered are correct.

The reason I selected this person for the qualitative approach, is because of the interviewee’s knowledge when it comes to noise and noise pollution. I am certain that the information the representative will be able to provide will help me analyse the market and answer the research questions and objectives.

3.2 Quantitative research

“Quantitative research is used to quantify the problem by way of generating numerical data or data that can be transformed into usable statistics.” (DeFranzo, 2011). This type of data collection is more structured than data collection for a qualitative method. This method includes for example surveys, which I will compose and conduct for this dissertation since Norwegian Acoustics Center have not done this for this market. The survey I had in mind is targeting the private market in Norway. The survey will be a comparative study on noise and sound, where the respondents will be convenience samples. These are all selections where the items selected are determined by what can be obtained (Gripsrud et al., 2016). With limited resources, the respondents will be Norwegian people I know or can easily come in contact with over the internet and through social media, since this will be an online survey. Most of these people will be over 40 years old and own their own residence. As mentioned in the proposal; my thesis coincides with research and surveys Norwegian Acoustics Center are implementing this year. However, they have not completed their research and therefore have not been able to conduct any quantitative research. This means that I do not have any data directly from Norwegian Acoustics Center. Then again, the data I have collected are sufficient for this thesis and will help Norwegian Acoustics Center in the future, which is the objective for the thesis.

3.3 Strategic Models

For this dissertation I will also use some models to examine what effects the company external and internal. The first one is the PESTEL analysis (Political, Economic, Socio-cultural, Technological, Environmental and Legal). It has two functions for a company. The first is identification of the environment which the company operates within. The second is to provide information and data to help the company predict situations that might occur in the
future (Yüksel, 2012). However, even though PESTEL analysis provides important knowledge for an analysis of the macro environment, in terms of evaluation and measurement, it has a few limitations.

The first problem we can encounter in the dimension of measurement and evaluation, is that PESTEL does not adopt a quantitative approach to measurement. PESTEL factors normally have a qualitative structure, measurement cannot be made. “Using such an evaluation, does not allow the factors constituting the external environment of the company to be objectively or rationally analysed” (Dincer, 2004). The second issue is that even though the conceptual dimension of the analysis proposes a holistic approach, the factors analysed are normally measured and evaluated independently, and therefore not reflected in the measurement and evaluation dimension. Some factors have a critical and significant effect on companies’ operations and success, other factors have limited effect (Dincer, 2004). It is therefore important to understand that the factors and sub-factors may differ in their importance, and we need to understand which of the factors the company must pay attention to. Another issue is the interactions and relations between PESTEL factors. To measure and evaluate each macro environmental PESTEL factor independently might not reflect the real situation for the company. It is not wise or possible to consider economic conditions and legal arrangements without looking into or isolating from political conditions. A political situation could give rise to socio-cultural and economic implications (Eren, 2002). However, even though the PESTEL analysis have some limitations, I will still use it. “PESTEL analysis, as it stands, mainly provides a general idea about the macro environment and situation of a company” (Yüksel, 2012). I will use this analysis when I examine the Chinese market and look at which forces that works for or against entering this market.
4.0 Analysis and findings

In the analysis and findings part of this thesis I will analyse and discuss the results of the data and information I have gathered through primary data, in form of qualitative and quantitative research, and the secondary data I gathered in the literature review. Furthermore, I will look at themes and patterns in the analysis, or if there is inconsistencies or ambiguities. Then I will look at the findings in light of the research questions and come up with an answer and recommendation to each of the secondary research questions. First, I will analyse the interview and questionnaire and look at the results of the analysis. Then I will look at the PESTEL analysis for China and which factors that affect Norwegian Acoustics Center and the Chinese market.

4.1 Qualitative findings

As previously mentioned in the methodology section of the thesis, I have conducted an interview with a representative from the Norwegian Association Against Noise. The interviewee wanted to remain anonymous since this is regarding a bachelor thesis and I respected that, and because of the limited time left I agreed. As stated before, the answers were not different or revolutionary in the field, which I already had in mind. Nevertheless, the information gathered from the interview helps support my findings from the literature review. The interview was done via an email exchange, instead of Skype as I previously had planned. It was easier for the both of us, because of our different schedules and time zones. It also meant that the interviewee had time to think over the answers and was comfortable with them, which led to a good result.

The first half of the questions in the interview revolved around what noise is, how it is measured and the effects of noise. On question 3 in the interview (What are some decibel levels of everyday sounds?), the interviewee explained that if someone is standing a couple of meters from you and shouting, it will be measured till around 85 dB (Appendix 1, Q3). She then explained that “Any sound from 85 dB and over can cause damage to your ear and hearing over time” (Appendix 1, Q4). This is supported in the literature review by National Institutes of Health which says that exposure to 85 decibels or above can cause hearing loss or have other health effects (National Institutes of Health, 2017).
Further in the interview the conversation turned onto the effects noise have on human health and the problems it may lead to. There are no surprises here either in the answers the interviewee gave, it matches most of the information I gathered in the literature review. “Noise have some direct physiological effects, such as for example hearing damage like tinnitus, hearing loss. Noise can also cause cardiovascular problems, and effects the blood pressure and heart rate in some instances. Indirect effects are loss of sleep and concentration, mood changes, stress, aggression and social isolation” (Appendix 1, Q5). In Figure 2 in the literature review, we can see that the physiological and psychological consequences the interview stated, are all mentioned in the figure (Agarwal & Yadav, 2013). The figure mentions a couple of more effects noise have on the human health, however the most serious consequences noise can have, such as the development of cardiovascular problems, like high blood pressure and heart disease, are covered by both, which suggest the information is sustainable. Moreover, this information is supported by the World Health Organization who, in their report on the impacts of environmental noise, explained the health consequences of environmental noise and the estimated DALYs (Disability-adjusted life year) lost from it (World Health Organization, 2011).

Another part of the interview that are comparable to my findings in the literature review and I want to point out, was the effects noise has on children. The interviewee stated that since the ear canal of a child is smaller than for adults, the sound pressure experienced by a child is up to 20 dB greater than that in the ear of an adult (Appendix 1, Q6). The interviewee continuous by saying that noise is not only a threat to the children’s hearing, but can cause mental stress, and impacts learning and cognitive development significantly. This coincides with the information from Norwegian Association Against Noise’s information that many young children are not necessarily able to protect themselves against noise-induced damages (Norwegian Association Against Noise, 2013). Children in kindergartens are highly exposed to noise and nurseries are known to be environment with high level of noise (Gokdogan & Gokdogan, 2016). And since we know that the amount and level of noise in kindergartens is due to the neglection of good acoustics in the rush of getting full nursery coverage (Norwegian Association Against Noise, 2013), it is safe to say that noise can have big health consequences for children. In addition, as stated in the introduction, “International studies indicate that noise pollution in school has a negative effect on student’s learning and
academic achievement” (Bulunuz, et al., 2017). This is another example that the information from the interview concurs with the information gathered in the literature review.

On the other hand, there was some new information collected from the interview. First is the effect noise have on animals. When I asked what noise pollution is, the interviewee said, “manmade sound in the environment we live in that may be harmful to humans or also animals” (Appendix 1, Q7). The interviewee then explained the consequences noise have for animals, both wild and household. In the wild it can lead to damaged hearing but can also lead to wrongful use of the fight-or-flight response, which can be deadly. When it comes to household animals, high sounds as the noise from firework on New Year’s Eve confuse and scare animal. This is information we can use to target and assist animal owners and come up with solutions that will benefit them.

The last part of the interview that needs to be shed light on, is the information regarding Norwegian Acoustics Center. The interviewee said that she had heard about the company and she think the products and solutions they offer are useful and could help people reduce the risk of hearing damages and other health issues (Appendix 1, Q12). However, the interviewee also believes that a big part of the Norwegian population is not familiar with the health consequences of noise and noise pollution, and with that, not familiar with the company. We will get more numbers on this through the questionnaire and during the quantitative findings. Nevertheless, the findings through the qualitative research indicates that Norwegian Acoustics Center’s marketing efforts should be directed two ways. Firstly, efforts should be put into educating the consumers concerning the harmful effects noise have. Secondly, they need to increase brand recognition of the company. However, this is provided that they have the marketing capabilities, time and the financial means to do so.

4.2 Quantitative findings
When I approached Norwegian Acoustics Center and we agreed on my thesis, they wanted me to focus on the private residential market. The questionnaire I have developed is made on the background of this. As mentioned in the methodology section, the respondents are people I reached out to through social media and is therefore a convenience sample. This was effective and ended up with 111 respondents. I exported all the data into SAS JMP, a data analysis program, which I used to set up graphs and figures explaining the data. A couple of the
respondents have some *missing values*, variables or sections where the respondents have not answered the question (Gripsrud, et al., 2016). Some questions have a couple of missing values, I have however decided not to delete these as the will not affect my analysis. Two of the respondents had not answered any of the questions, so these I had no choice but to delete. One of the respondents had only answered a couple of the questions, so I decided to hide/exclude these from the analysis. I choose to focus my analysis on some of the questions from the questionnaire and I have investigated the following factors; (1) to what degree people are affected by noise pollution, (2) willingness of product installation, (3) to what degree people are affected by noise pollution in restaurant and (4) recognition of the company.

4.2.1 To what degree are people affected by noise pollution?
People are affected by noise pollution differently and as previously mentioned, the level of noise pollution in Norway is quite low. Figure 6 illustrate to what degree the respondents are affected by unwanted noise. It suggests that most are not affected by noise pollution. The reason for this could either be that the respondents live in quiet areas, have reasonably good sound regulative insolation or that they do not have competent knowledge concerning what qualifies as noise pollution.

![Figure 6: Are you affected by unwanted noise from the outside? (Noise-pollution)](image)
The figure above (Figure 7), displays the number and percentage of the respondents that agree or disagree to the question of affection (Figure 6 is based on these numbers). It suggests that 23.84% of the respondents agree that they are affected in some way by noise pollution, and of these only 7.33% either “agree” or “strongly agree”. The 7.33% would be the 1st target segment in line with the first secondary research question concerning the private market. Afterwards, they should consider targeting the rest of the almost 25% of the population to expand their growing segment. However, when we look at the willingness to install noise regulating solutions, the percentage is higher than the percentage that are affected.
4.2.2 Willingness to install the solutions

![Bar chart showing willingness to install solutions](chart.png)

*Figure 8: Noise-pollution is the propagation of noise with harmful impact on the activity of humans. Noise-pollution affects both health and behaviour. With this in mind, would you want to install solutions/products to reduce this?*

As Figure 8 illustrate and Figure 9 displays, most of the respondents are in between “definitely yes” and “definitely not”, most of the respondents no not have a, absolute certain answer to this. 29,25% answered “probably not” and together with the 13,21% that checked of at “definitely not”, 42,46% is not likely to be persuaded into installing Norwegian Acoustics Center’s products. However, this leaves us with a group of 57,54% of the respondents which either answered a form of yes or “might or might not”, these are the people we should focus at. Of these, nearly 34% are the ones they should target first considering they are in some degree willing to install our products. The figures indicate that around 9% would definitely install these types of products, and effort needs to be put into reaching out before other competitors do or they approach the competitors on their own initiative. Both the figures concerning people affected by noise and the ones concerning willingness to install, indicates that there is a segment on the private market which between 25-35% of the population is located within.
Figure 9: Noise-pollution is the propagation of noise with harmful impact on the activity of humans. Noise-pollution affects both health and behaviour. With this in mind, would you want to install solutions/products to reduce this? (numbers)

As presented in the table under (Figure 10), is the willingness to install the solutions by the county the respondents live. We can see that Akershus and Buskerud have the highest percentage of respondents saying they “probably” or “definitely” would install products as the ones Norwegian Acoustics Center offer. Although, a reason for this could be that these two counties’ is the one where most of the respondents live, this could affect the percentage, however, it also indicates that there is a market for these solutions and it gives us geographic segmentation criteria. Oslo is the third highest county with positive answers and has the same percentage as Buskerud on the option “might or might not”. The fact that these three counties are on the top of willingness to install is not that surprising, since the percentage of residences in urban areas in these counties are high. This will affect the outcome of my recommendation further along in the thesis.

Figure 10: Willingness to install by County
4.2.3 Noise pollution in restaurants

As discussed in the literature review, excessive noise is the top reason people complain about restaurants. Figure 11 illustrates that approximately 80 of the 111 respondents have noticed noise pollution or bad acoustic in some degree. This indicates a need for products that gives better acoustic and reduces the reverberation time, which is the time required for the sound to “fade way” (NTI-audio, 2018). However, the age range of the respondents needs to be taken into consideration on this question. Most of the respondents are 45 years old and over, and there might be a correlation between age and sensitivity to noise pollution. According to the NIH (National Institutes of Health), age-related hearing loss gradually occurs in most people when they grow older and is one of the most common condition that affects the older people get (National Institutes of Health, 2018). It might indicate that we should look at restaurant frequented by younger clientele, even though it often seems that young people are less sensitive to sound as their older counterpart. Nevertheless, this gives us segmentation for the types of restaurants we should target.

![Figure 11: Have you noticed noise-pollution/bad acoustic in restaurants?](image)

As indicated in Figure 12 below, around 40% of the respondents would pay more to have dinner at a place with no noise pollution or better acoustic. This means that if the restaurants invest in noise regulating products, a significant percentage of the consumers would be willing to invest more. This does not only prove that the surrounding in a restaurant is almost
as important as a service as the food, it also indicates that both restaurants and Norwegian Acoustics Center will be able to profit of this part of the population.

![Chart showing responses to the question: Would you pay more to eat at a place with better acoustic/no noise-pollution?](image)

**Figure 12: Would you pay more to eat at a place with better acoustic/no noise-pollution?**

### 4.2.4 Recognition and knowledge about the company

The last question in the questionnaire revolves around the respondent’s knowledge or recognition of the company. In my interview, the interviewee believed that a big part of the Norwegian population is not familiar with the health consequences of noise and noise pollution, and with that, not familiar with the company. Figure 13 illustrates and supports the interviewee’s theory. However, people can be aware of brands, while they choose to not use their type of products, so even though the figures support the interviewee’s theory, it does not prove it decisively. The figure indicates that only 10.19% of the respondents have heard of Norwegian Acoustics Center, which means that out of the 111 respondents, 89.81% are not familiar with the company. This indicates that the company need invest effort, time and money into brand recognition. “Brand recognition is the extent to which the general public (or an organization's target market) is able to identify a brand by its attributes” (Investopedia, 2018). If they can educate the consumers on the health consequences noise can bring and how their products can reduce the risk of these consequences, their brand recognition might increase, and they will be able to gain an enhanced part of the market.
Figure 13: Have you heard of Norsk Akustiksenter?

4.3 PESTEL

“A PESTEL analysis is a framework or tool used by marketers to analyse and monitor the macro-environmental (external marketing environment) factors that have an impact on an organisation” (Professional Academy, 2018). As mentioned above in the methodology section, PESTEL is an acronym for Political, Economic, Social, Technological, Environmental and Legal. In a marketing situation is it fundamental to conduct a situational analysis before you can implement any kind of strategy or tactical plan (Oxford College of Marketing, 2018). For an organisation to differentiate from the competition and gain competitive advantage, they need to monitor and respond to changes in the macro-environment. The PESTEL is targeting the Chinese market and looks at which forces that works for or against entering this market. The reason that I choose to look at the Chinese market, is to get more insight and information on this possible segment.

4.3.1 Political factors

Political factors “determine the extent to which government and government policy may impact on an organisation or a specific industry” (Oxford College of Marketing, 2018). This
means to what degree the government intervenes in the economy. A company or organisation needs to be capable of responding to anticipated or current legislations and adjust their policy thereafter (Professional Academy, 2018).

China has become the second largest economy in the world during the Xi Jinping era (Mulyadi, 2015) and is believed to surpass the United States in 2020. Jinping has focused on pushing China’s investment abroad and acquiring large foreign direct investment (FDI) into China, especially in industries China has not had the expertise. China have had some riots in the years before 2015 which created unstable condition for FDI, however, the government has taken measures to prevent situations such as this and to create safe environment for foreign companies and investors (UKEssays, 2015). This demonstrates the government’s power in China, and political control remains tight even though living standards have improved and room for personal choice has expanded (Mulyadi, 2015).

“Norway is one of China’s important trading partners in Northern Europe” (China FTA Network, 2017). However, the Chinese-Norwegian trade relationship took a major setback in 2010 because the Norwegian Nobel Committee awarded the peace prize to Liu Xiaobo, a Chinese human rights activist that was incarcerated (Mackinnon, 2010). The bilateral trade negotiations were postponed without further notice. Nevertheless, the Chinese-Norwegian relations were in November 2016 normalized after six years without political contact (NRK, 2018). In January 2018 imported China more than 1700-ton Norwegian salmon, that is eight times as much as the same month the previous year. Even though it is not the same market or industry, it exemplifies that the trade relations between China and Norway have enhanced the last few years and will probably stabilize and continue to grow stronger.

4.3.2 Economic factors
These factors have a significant impact on the economy and on how a company or organisation does business. Economic factors can be broken down further into macro-economical factors, which deal with the management of demand of an economy, and micro-economical factor, which are dealing with how people spend their income (Professional Academy, 2018).
The economic performance of China over the past few years, even decades, is impressive. “China is now the world’s second largest economy in terms of GDP” (Mulyadi, 2015). In the March quarter of 2018 did the Chinese economy advance 6.8 percent year-on-year in annual GDP growth rate, as illustrated under in Figure 6 (Trading Economics, 2018).

![China GDP annual growth rate](image)

This is in line with market expectations and the same pace as in the previous quarters. With a growing GDP, a relatively low inflation rate at 2.1 in March 2018 (Trading Economics, 2018) and a population growth of 0.39% (Worldometers, 2018), the GDP per capita continuous to grow.

4.3.3 Social factors

“Also known as socio-cultural factors, are the areas that involve the shared belief and attitudes of the population” (Professional Academy, 2018). This focuses on the social environment and helps marketers to gain a further understanding of their customers’ needs (Oxford College of Marketing, 2018). Social factors have direct effects on what drives the consumers and on identifying new and emerging trends.

“The social and cultural aspect of China plays an important role as the demographics constantly change” (Mulyadi, 2015). China has an increase on both income and health awareness, with this follows a steady growth in consumer demand for health and wellness products (Euromonitor International, 2017). This means that the segment and market for
Norwegian Acoustics Center might increase over the next years. China has a literacy rate of over 90%, and with emphasize on education (Mulyadi, 2015). With such a high percentage of literates and growing demands for health products, more people might see the consequences noise pollution have on health, especially annoyance and concentration in universities and schools.

4.3.4 Technological factors
Technological factors consider the rate of development and technological innovation that could affect the market or industry in which a company operates. However, there is a distinct tendency to only focus on development and innovation in digital technology. New methods of manufacturing, logistics and distribution must also be taken into consideration (Oxford College of Marketing, 2018).

The innovation and development of electric vehicles over the last years and decades, is a factor that can affect the Chinese market if the education around health consequences is extensive enough. “Electric cars almost entirely eliminate engine noise, and the relatively high-pitched noise electric motors do emit doesn’t propagate as far” (Barnard, 2016). However, according to a rapport done by Lykke Iversen from the Danish Public Road Administration, electric vehicles will reduce noise pollution in carparks and streets where vehicles travel at speed under 30 km/h (Iversen, 2015). Nevertheless, since traffic in cities in China often flows in under 30 km/h, the experienced noise with electric vehicles might be lower.

4.3.5 Environmental factors
These factors relate to the growing influence from the surrounding environment and have only recently, over the last fifteen years, come to the forefront. The have become more important due to the rise in importance of Corporate Sustainability Responsibility (CSR), scarcity of raw materials, pollution and the carbon footprint set by companies and the government (Professional Academy, 2018). The last one is an example of a factor that can be classified as both an environmental and political factor and is one of the limitation mentioned in the methodology section.
The Chinese government, as any government, are increasingly paying attention to the environmental problems China are facing. Which are shown in the signing of the Paris Agreement in 2016 (United Nations, 2018). Air pollution is an extensive problem in China, with a vast number of factories and cars (Lallanilla, 2013). Even though this is a problem and China’s carbon footprint are enormous, we look at the other type of pollution these factories and car are responsible for, the noise pollution. As mentioned under health consequences in the literature review, are the effects of noise on workers in the industry damaging (Agarwal & Yadav, 2013). This implies that the factories do not only emit pollution outside, but also on the inside. With a growing concern towards the planet and sustainability, the noise pollution might see a reduction.

4.3.6 Legal factors
It is essential for company or organisation to understand what is allowed and legal within the market they operate in. They need to be aware of changes in legislations and the impact this may have on its operation (Oxford College of Marketing, 2018). These factors may be complicate the operations of a company if they trade on a global scale, as each country has its own set of regulations and rules. These factors may cross over with political factors and again shows a limitation with this analysis. However, the difference is that a company must comply with the legal factors and political factors are led by government policies.

China has set up a law system to encourage foreign companies to invest in China. The Law of the People’s Republic of China on Chinese-Foreign Equity Joint Ventures was published in 1979, and laws and statutes concerning operation of foreign invested companies have been issued since (UKEssays, 2015). China changed its system for government control of FDI on October 1, 2016. This change was achieved by revising the status concerning foreign owned enterprises and joint ventures, both equity joint and contractual joint (Dickinson, 2016). “For the past several years, China has been ramping up efforts to expand investment access and unify laws and regulations while applying stable, transparent and predictable policies to foreign investment” (Shuiyu, 2017). This could mean easier investment processes for Norwegian companies. Even though Norwegian Acoustics Center have cooperation with companies and employees in China and also their production there, laws that makes it easier for FDI is usually beneficial in the long term, and might give them an edge, both now and in the future.
4.3.7 Summary

The most relevant findings in the PESTEL analysis regarding the Chinese market are a couple of factors. First is the government's control and power as a political factor. Even though the Chinese government has created a safer environment for foreign companies and investors, and the relationship between China and Norway has been normalized, the government's involvement can still make it difficult for the company to do business in China. Two important factors that may indicate that they might consider going into the Chinese market, is social and technological. The social factors of health awareness and education might be important for the company in the following years. The Chinese population have a high percentage of literates, and with increased focus on health, they might see the consequences noise have on their health. Lastly is the innovation and production of electric vehicles as a technological factor. If the education towards health consequences is extensive, they will realize the effects these vehicles have, and might decrease the need for the solutions Norwegian Acoustics Center offer.
5.0 Conclusion

Environmental noise or noise pollution can have a vast spectrum of health consequences and is a worldwide problem effecting millions of people every day. This thesis is a market and segment analysis for Norwegian Acoustics Center targeting the Norwegian market. In this conclusion I will answer the research questions drawn up at the beginning of the thesis concerning the residential or private market, kindergarten, restaurants and towards the Chinese market. At the end I will give some recommendations concerning which segments to focus on and the road ahead.

5.1 Residential market

The private or residential market has been the main focus in this thesis, with the secondary research question; *What are the needs and customer behaviour in the residential market?* This is the largest market in which Norwegian Acoustics Center operates and is growing every year (Statistic Central Bureau, 2017). People are affected by noise on a different scale and according to the quantitative research I have conducted, nearly 25% of the Norwegian population are affected by noise to some degree, with around 8% of these as the 1st target segment. According to the questionnaire, over 57% of all the respondents are willing to install solutions or product to reduce noise pollution. 9% of these said they definitely would install noise regulating solutions and are the ones that need to be targeted first, before expanding the segment to the remainders of the willing. Most of the respondents that had high willingness to install, lives in urban areas in Akershus, Buskerud and Oslo, and as mentioned in the literature review, residences in urban areas are growing and high percentage of the noise pollution takes place in such areas, which mean that the health consequences of this segment are dangerous and has a tremendous need for Norwegian Acoustics Center’s products.

5.2 Kindergartens

Kids are the future, and their health is therefore essential. As supported by both the literature review and the interview, is noise pollution a tremendous threat to health and especially for kids. With a smaller ear canal is sound pressure experienced up to 20 dB greater than in an adult. Noise can cause not only damage to their hearing but can also cause mental stress and impact cognitive development and learning. When we look at the second secondary research question; *What are the needs and customer behaviour for kindergartens in Norway?*, we
know that there is a great need for noise regulating solutions in kindergartens. As mentioned, the high level of noise in kindergartens is due to the neglect of good acoustics in the rush of getting full nursery coverage. This indicates that the choice of not protecting the children from noise, is so they could finish quicker. The kindergarten market is not as big as the private market, but it is important for the future of us all.

5.3 Restaurants

Noise and bad acoustic is something most people have experienced at one point in restaurants, this is also supported by my findings and the literature review. According to the quantitative findings have 72% of people noticed noise pollution to some degree. The third secondary research question are as follows; What are the needs and customer behaviour for restaurants in Norway? And according to my research, what they need is products that give better acoustic and reduces the reverberation time. However, the findings on this might be the least decisive because of the age range of the respondents. Hearing loss due to age might affect this, and the findings might indicate that we should look at restaurant frequented by younger clientele, even though it often seems that young people are less sensitive to sound as their older counterpart. Nevertheless, this gives us segmentation for the types of restaurants we should target.

5.4 China

The last secondary research question was; Is there a need for this product in China, and if so, how should they enter the market? According to the information gathered in the literature review, it might seem that there is a big market here if we look at the ranking of the cities with most noise pollution. However, there are a few factors weighing against entering China when we consider the findings from the PESTEL analysis. The social factors state that China has had an increase in health awareness and a higher demand for health products and together with the literature review, supports that there is a need for these products in China. However, the other factors, such as the government’s political control leads me to conclude that even though there is a need for such products, Norwegian Acoustics Center should not enter the market at this moment.
5.5 Recommendations

These recommendations are derived from the information gathered in the literature review, as well as the findings from the qualitative research, quantitative research and the PESTEL analysis and will answer the main research question for this thesis; *How can the Norwegian Acoustics Center expand to new segments and markets?*

Firstly, efforts should be put into educating the Norwegian population and the consumers of the health consequences of noise pollution. According to the research and findings, the knowledge surrounding this type of health problem and its effects is inadequately. The population have a need for this type of products and solutions, however, they have not realised it yet.

Secondly, I would recommend Norwegian Acoustics Center to target the residential market first and focus on 25% of the Norwegian population are affected by noise to some degree, with around 8% of these as the 1st target segment, together with the 9% that are willing to install the solutions, before expanding the segments further. They should next focus on the segment of kindergartens because of the highly documented need kids have to reduce noise pollution. The third recommendation is to research more on the restaurant segment. Even though 72% are affected by noise pollution in restaurant, most of the respondents in the questionnaire was 45 years old and over, and there could be a correlation between the two. There is also the fact that hearing loss caused by aging is affecting many. This leaves younger people, and they are not always as bothered by noise as the older generation, which means that more research on this segment is the best recommendation I can give. Lastly, I would recommend not entering the Chinese market despite the obvious need for the product. However, when the company has grown and have more capital, this market might be an opportunity. As of this moment, China would not be a profitable market and the focus should be aimed at the Norwegian market and the segments this thesis has uncovered.

Lastly, Norwegian Acoustics Center need to increase brand recognition for their company. According to the findings, the percentage of the respondents that had knowledge about the company was minimal and need to change. However, this is provided that they have the marketing capabilities, time and the financial means to do so.
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Appendices

Appendix 1 In-depth Interview

Q1: What is noise?
A1: It is defined as sound that is unwanted. Maybe because it is too loud, annoying or distracting to people.

Q2: How is noise measured?
A2: Well, in literally terms we can’t. There is no instrument to objectively detect how “unwanted” something or a noise is, so we can’t measure it directly. However, we can measure the sound level. By using something called a sound level meter, we can measure the quantification of a sound’s intensity or pressure. And the sound level is measured in something called decibels.

Q3: What are some decibel levels of everyday sounds?
A3: A conversation is normally around 60 dB, a whisper is half that and if someone is shouting at you from a couple of meters it is 85 dB. Home appliances range from 50dB to 90dB, your refrigerator to a food processor or something similar. Power tools and similar equipment have noise levels between 80-120 dB.

Q4: At what decibel level does it start effecting human ears?
A4: Nerve damage that is irreversible and immediate can be caused by sounds around 140 dB. However, we can also be affected at lower sound levels, and this harms us over time. Any sound from 85 dB and over can cause damage to your ear and hearing over time.

Q5: What effects does noise have on human health?
A5: Noise have some direct physiological effects, such as for example hearing damage like tinnitus, hearing loss. Noise can also cause cardiovascular problems, and effects the blood pressure and heart rate in some instances. Indirect effects are loss of sleep and concentration, mood changes, stress, aggression and social isolation.
Q6: How does noise affect children?
A6: The ear canal of children is smaller than for adults, therefore is sound pressure up to 20 dB greater than that in the ear of an adult. It does not only are a threat to a child’s hearing, in can cause mental stress and physiological damages, as in adults. It also impacts learning and cognitive development significantly. Background noise interferes with speech and language acquisition.

Q7: What is noise pollution?
A7: One definition is all manmade sound in the environment we live in that may be harmful to humans or also animals.

Q8: So noise pollution also cause problems for animals?
A8: Yes. Animals have good hearing, and rely on it for warning, hunting, finding mates, and so forth. High noises can damage their hearing, or mask sounds that could lead to them loosing their life at worst. Sounds like planes can lead to fight-or-flight response, which again can lead so a life-threatening situation if they do not no when to run or fight. This also affects house animals, and you may have experienced how dogs or cats are on new years eve with all the rockets. High noises confuse animals, so they do not know which sounds are actually dangerous and which are not.

Q9: What sources of noise pollution are most common?
A9: in the world, it is cars and other vehicles. Other sources are trains, planes, factories, construction equipment and so forth.

Q10: What types of problem does noise pollution cause for people?
A10: Well I have mentioned some, like hearing damage, stress, loss of sleep, cardiovascular effects and high blood pressure. These are some of the most common ones, together with annoyance.

Q11: What can people do to reduce their own noise pollution?
A11: Drive less, don’t work in a factory are two. But these might not be the most relatable, so you can honk less when you drive, not work in the garden like mowing your lawn at all times. It is difficult to give exact suggestions if I don’t know where a person live or what they are
used to doing. However, if you are bothered by noise pollution, you can install products in your house to reduce the sound level from outside.

**Q12: Norsk Akustikksenter (Norwegian Acoustic Center) offers products and solutions to reduce noise and noise pollution in your home. Have you heard of them and these solutions?**

A12: Yes, I have heard of them. I think their products are very good and useful and could help people reduce the risk of damaging their hearing or other health problem. However, I don’t think that many people in Norway know about the risk and consequences of noise, and Norway don’t have that big of a problem when compared to other countries, it is quieter here than other places. But, it is still a problem in Norway as well, people just don’t know it. I also believe that not that many have heard of the company, which is a shame, they can really do a lot of good.
Appendix 2 Questionnaire

FYP

Start of Block: Default Question Block

Q1 Gender

- Male (1)
- Female (2)

Q2 Age

- 18-24 (1)
- 25-34 (2)
- 35-44 (3)
- 45-54 (4)
- 55-64 (5)
- 65+ (6)
Q3 Which county do you live in?

- Østfold (1)
- Akershus (2)
- Oslo (3)
- Hedmark (4)
- Oppland (5)
- Buskerud (6)
- Vestfold (7)
- Telemark (8)
- Aust-Agder (9)
- Vest-Agder (10)
- Rogaland (11)
- Hordaland (12)
- Sogn og Fjordane (13)
- Møre og Romsdal (14)
- Trøndelag (15)
- Nordland (16)
- Troms (17)
- Finnmark (18)
Q4 Marital status
   ○ Single (1)
   ○ Married (2)
   ○ Cohabitation (living together, but not married) (3)
   ○ Divorced (4)
   ○ Separated (5)
   ○ Widowed (6)

Q11 Do you have children?
   ○ Yes (1)
   ○ No (2)

Q5 Do you own a residence?
   ○ Yes (1)
   ○ No (2)
Q6 If yes, what type of residence?

- Detached house (enebolig) (1)
- Semi-detached house (tomannebolig) (2)
- Apartment (3)
- Townhouse (rekkehus) (4)
- Other (5) _________________________________
- Do not own (6)

Q7 How big is the residence? (square meters)

_____________________________________________________________

Q8 Are you affected by unwanted noise from the outside? (Noise-pollution)

- Strongly agree (1)
- Agree (2)
- Somewhat agree (3)
- Neither agree nor disagree (4)
- Somewhat disagree (5)
- Disagree (6)
- Strongly disagree (7)
Q9 Noise-pollution is the propagation of noise with harmful impact on the activity of humans. Noise-pollution affects both health and behaviour. With this in mind, would you want to install solutions/products to reduce this?

- Definitely yes (1)
- Probably yes (2)
- Might or might not (3)
- Probably not (4)
- Definitely not (5)

Q12 If yes (one of them), why have you not installed this type of solution already? (Can choose more than one)

- Did not know it existed (1)
- Too costly (2)
- Have not had time (3)
- Too much work (4)
- Are not bothered by noise-pollution (5)
Q13 Have you noticed noise-pollution/bad acoustic in restaurants?

- Strongly agree (1)
- Agree (2)
- Somewhat agree (3)
- Neither agree nor disagree (4)
- Somewhat disagree (5)
- Disagree (6)
- Strongly disagree (7)

Q14 If you agree, would you pay more to eat at a place with better acoustic/no noise-pollution?

- Definitely yes (1)
- Probably yes (2)
- Might or might not (3)
- Probably not (4)
- Definitely not (5)

Q15 Have you heard of Norsk Akustikksenter?

- Yes (1)
- No (2)

End of Block: Default Question Block
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<td>Are you affected by uncontrolled noise from the outside? (Noise pollution)</td>
<td>Noise pollution is the propagation of noise with harmful impact on the activity of...</td>
<td>If you notice one of them, why have you not installed this type of windows or choose more than one?</td>
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**Note:** The table and diagram appear to be related to a study or survey regarding noise pollution and its impact on various activities. The table lists different responses to questions about the severity of noise and whether it affects people, along with reasons why certain windows or improvements were not installed. The diagram likely visualizes the data or findings from the survey.
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**Note:** The table above represents a survey with multiple questions and options. Each row corresponds to a different question or statement, and the Yes or No responses are indicated for each option.
Question 1: Gender

Question 2: Age
Question 3: Which county do you live in?
Question 4: Marital status

![Marital status chart]

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N Missing: 1

5 Levels

Question 5: Do you have children?

![Children chart]

78% Yes
22% No
Question 6: Do you own a residence?
Question 7: If yes, what type of residence?