# SOCIAL LICENSE TO OPERATE REINFORCING CONTINUITY OF BUSINESS: WILL STONES TURN INTO BREAD FOR YEARS TO COME? – A CASE STUDY OF YARA SUOMI OY, SIILINJÄRVI SITE

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JYVÄSKYLÄN YLIOPISTO

**ABSTRACT**

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Social license to operate reinforcing continuity of business: Will stones turn into bread for years to come? – A case study of Yara Suomi Oy, Siilinjärvi site

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Abstract

Obtaining and maintaining a social license to operate (SLO) has become essential for resource-extractive industries as key stakeholders are increasingly expecting the industry to contribute positively to the surrounding society and environment, communicate openly and engage the local communities in their decision-making (Moffat & Zhang, 2014). Not obtaining acceptance from relevant stakeholders is related with financial (Franks et al., 2014) and reputational backlashes (Prno & Slocombe, 2014) setting the company under unnecessary risks.

This quantitative case study is the first attempt to comprehensively portray Yara's image as perceived by the residents of Siilinjärvi, where the site of Yara Suomi Oy produces fertilizers for agriculture, feed and forest industry and soil improvements. Operating in the immediate vicinity of the municipality of Siilinjärvi, maintaining acceptance of local community is essential while exploring the prospects for future. Hence, this research aims to evaluate the level of the current SLO and examine the potential differentiation in attitudes between socio-demographic factors along with the residents' relation to Yara. To address these tasks, the perceptions of 146 members of the local community were empirically examined. A simple random sampling was applied to generate a sample with respect to the socio-demographic structure of the municipality.

The results indicate that Yara is broadly accepted by the local community. Furthermore the data suggest that socio-demographic attributes and the current relationship with Yara poorly predict the attitudes towards Yara Siilinjärvi. The outcomes of the study clearly demonstrate the development areas to be tackled while striving to build a trustworthy connection with the local community to further explore the mutual path towards a sustainable future. This research then also calls for a follow-up study to explore the evolution of the site's SLO.

Key words
Social license to operate, Sustainability, Community acceptance, Resource-extractive industry

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Sosiaalisen toimiluvan saavuttaminen ja ylläpitäminen on tullut välttämättömäksi kaivannaisteollisuudelle, sillä keskeiset sidosryhmät odottavat teollisuudelta yhä enemmän myötävaikutusta ympäröivään yhteiskuntaan ja ympäristöön, avointa kommunikaatiota sekä paikallisten päätöksentekoon osallistuminen mahdollistamista (Moffat & Zhang, 2014). Hyväksynnän puuttuminen on yhteydessä taloudellisiin (Franks et al., 2014) ja imagollisiin (Prno & Slocombe, 2014) haasteisiin asettaen yritykselle tarpeettomia riskejä.

Tämä kvantitatiivinen tapaustutkimus on ensimmäinen yritys kuvata kokonaisvaltaisesti Yaran imagoa Siilinjärven asukkaiden näkökulmasta. Yara Suomi Oy:n tuotantolaitos tuottaa lannoitteita maataloudelle, rehu- ja metsäteollisuudelle sekä maaperän parantamiseen. Siilinjärven kunnan välittömässä läheisyydessä toimivalle toimipaikalle paikallisyhteisön hyväksyntä on tärkeää samalla kun tarkastellaan toiminnan tulevaisuudennäkymiä. Näin ollen tämän tutkimuksen tavoitteena on arvioida nykyisen sosiaalisen toimiluvan tasoa sekä tutkia sosio-demografisten tekijöiden sekä asukkaiden ja Yaran suhteiden mahdollista vaikutusta asenteisiin. Tutkimuksessa tarkasteltiin yhteensä 146 paikallisyhteisön jäsenen käsitystä Yarasta. Otos muodostettiin yksinkertaisella satunnaisotannalla huomioiden kunnan sosio-demografinen rakenne.

Tulokset osoittavat, että paikallinen yhteisö on laajalti hyväksynyt Yaran. Lisäksi tulokset viittaavat siihen, että sosio-demografiset ominaisuudet ja asukkaiden suhde Yaraan ennustavat huonosti paikallisyhteisön asenteita. Tutkimus osoittaa myös selvästi kehitysalueet, joihin on puututtava, samalla kun pyritään rakentamaan luotettava yhteys paikalliseen yhteisöön ja pyritään edelleen löytämään yhteinen polku kohti kestävää tulevaisuutta. Mahdollinen jatkotutkimus tukisi toimipaikan sosiaalisen toimiluvan kehittymisen seuraamista.

Asiasanat
Sosiaalinen toimilupa, Kestävä kehitys, Yhteisön hyväksyntä, Kaivannaisteollisuus

Säilytyspaikka
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# 1 INTRODUCTION

## 1.1 Background

Over the past few years, the debate about natural resources and particularly resource-extractive industry has become a current topic both globally and locally (Fleming & Measham, 2015; Mononen & Suopajärvi, 2016). Minerals as raw material produced by the mining industry serve humankind in various ways; they are utilized e.g. in energy and food production, transportation as well as in gadgets, that have become essential for our daily lives (Vasara, 2018). Not only are they necessary contemporary but essential for accomplishing the giant sustainability leap the future generation has ahead while supplying the transformation of infrastructure and technology towards carbon-free society (Ali, 2018; Sairinen, 2018) and serving the food-production with fertilizers next to increasing plant-based nutrition-demand due to the population growth (Daily et al., 1998). On global level mines have been identified as central actors in green economy (Vasara, 2018). The situation has been illustrated "paradoxical" as the image of mines lies still very much on them having a pivotal role in constructing the world based on fossil energy (Sairinen, 2018).

The market of minerals have been favourable during the recent years, which has led to increasing interest in the expansion of resource-extractive operations along with growing investments in ore-finding and new operations (Vasara, 2018). The prevalent nature of resource-extractive industry is characterised by engaging in global markets while the impacts both positive but especially the negative ones are felt locally (Jartti, Rantala, & Litmanen, 2014, 45). The confrontation of ambitions and aims between various actors around the industry is evidential. One frequent claim rising from the local community is to construct or move the operations somewhere else: "not in my backyard" (NIMBY) (Peltonen, 2004, 43-54). NIMBY and LULU (locally unwanted land use) are frequently used concepts for encapsulating the situation, where the operation is unwanted in own neighbourhood and would rather be located to somewhere else (Jenkins-Smith, Silva, Nowlin, & DeLozier, 2011). However, the question where this would be remains unanswered. Moving the location of the resource-extractive operation won't resolve the issue of the impacts at a global level. Moreover, managing the impacts might be less developed in third countries causing even higher environmental impacts (Li, 2008). Secondly, being self-contained by producing minerals like lithium, cobalt, platinum and other conventional basic metals required for batteries, electric cars, smart electricity grids etc. while cutting down the dependence of China is comprised in the EU increasingly important (Sairinen, 2018). Similarly phosphate, which is utilized for producing fertilizers, has been classified as a critical raw material by the EU (Deloitte Sustainability, Survey, Minières, & Research, 2017). Lastly, the location of the minerals is finite and restricted to certain regions. Hence, transferring the

operations somewhere else might not be a solution at all. The danger in not finding a mutual path is in confrontation that will lead to "win-lose" situation and if the conflict continues usually both parties end up sinking and finally losing in the surrounding circumstances (Wall & Callister, 1995). The intriguing question hence remains: would it be possible to find a balance between industrial operations and settlement?

**The emergence and relevancy of social license**

Generally seen as the acceptance gained from local community (Bursey & Whiting, 2015; Demuijnck & Fasterling, 2016; Gunningham, Kagan, & Thornton, 2004; Kemp & Owen, 2013; Nelsen, 2007; Pike, 2012) a social license to operate (SLO) is a central element for finding a mutual path for constructing the future world offering a platform to build a trustworthy relationship for exploring mutual aims and to find sustainable solutions to benefit both parties (Boutilier, Black, & Thomson, 2012). As a concept SLO offers a platform for companies to better understand the expectations among stakeholders and for local communities to bring forward their viewpoint (Mercer-Mapstone, Rifkin, Louis, & Moffat, 2017). Indeed, SLO gained first footstep among industry practitioners while describing the social challenges resource-extractive operation faces (Gehman, Lefsrud, & Fast, 2017; Prno & Slocombe, 2014) but has since been adopted also by academics, politicians as well as the media (Gehman et al., 2017; Nelsen, 2007; Prno, 2013). Such approval has become increasingly significant for industry practitioners while not gaining and retaining may inhibit the company's access to important resources in the region such as land and water (Owen & Kemp, 2013). Losing the acceptance has been related also with financial (Franks et al., 2014; Henisz, Dorobantu, & Nartey, 2013; Prno, 2013) and reputational backlashes (Prno & Slocombe, 2014) whilst a high level of approval minimizes economic risks securing the continuity of the operation (Dare, Schirmer, & Vanclay, 2014; Esteves & Barclay, 2011; Pike, 2012; Vidal, Bull, & Kozak, 2010). Such repercussions can moreover cause delays in projects leading to withdrawal of investors (Franks et al., 2014; Pike, 2012; Porter & Kramer, 2006). In some cases that could even jeopardize the whole industrial project leading to shutdowns as some recent examples illustrate (Pike, 2012; Saariniemi, 2018). Hence, the time of confrontations is over, and era of communication and cooperation is here.

Companies engaged in resource-extractive projects are traditionally seen to enrich rural areas through e.g. job-creation, enhanced business opportunities for supplying industry and development of infrastructure (Zhang & Moffat, 2015). The flip side of the coin are various e.g. unfavourably perceived impacts such as shaping of landscapes and environmental impacts (Zhang & Moffat, 2015). Among others, such impacts can further negatively influence recreation activities and tourism (Jokinen as cited in Mononen & Suopajärvi, 2016). When the balance of aforementioned negative and positive impacts is equalizing to a favourable contribution on the society, the "path" towards gaining acceptance is smoother (Moffat & Zhang, 2014). However, as earlier research illustrates, acceptance does not only build on social contribution but also on the communica-

tion between industry and stakeholders together with the perceived fairness in decision making-processes (Moffat & Zhang, 2014). To build a trustworthy relationship requires a genuine two-way interaction (Mercer-Mapstone et al., 2017). The possibility of being involved in decision-making moreover increases the feeling of being heard and being appreciated (R. G. Boutilier & Thomson, 2011)(Boutilier & Thompson, 2011). While communication has changed dramatically next to globalization and social media, companies are obligated to redevelop the procedures of interaction (Argenti, 2006; Waldeck, Durante, Helmuth, & Marcia, 2012). These aforementioned determinants precede trust, which furthermore predicts acceptance and approval (Moffat & Zhang, 2014).

**Yara Siilinjärvi aims at a strong relationship**

The production site of Yara Suomi, a subsidiary of a Norwegian based multinational corporation Yara International ASA, located in Siilinjärvi Finland, has likewise acknowledged the relevance of communication with its key stakeholders and further stated as their target a strong social license to operate ("Toimipaikan kehityssuunnitelma," 2019). The site consists of a mine and chemical factories producing fertilizer raw materials and fertilizers for agriculture, feed and forest industry and soil improvements (Yara Suomi Oy a), 2019). Hence the processes of the site include a massive mining operation and extensive chemical processes formulating a unique combination (Yara Suomi Oy a), 2019). The aim of the present exploratory case study is to evaluate the current level of the complete site's SLO. Even though academics have agreed on some factors easing the path towards acceptance and gaining a license to operate (Boutilier & Thomson, 2011; Moffat & Zhang, 2014; Prno, 2013), it is argued that the borderline of obtaining a SLO is a line drawn in the water (Owen & Kemp, 2013). Measuring this complex framework has proven to be challenging and hence the limit and level of the SLO is arguable (Boutilier et al., 2012; Owen & Kemp, 2013). As the subject has been conventionally approached from qualitative aspects (Howard-Grenville, Nash, & Coglianese, 2008; Koivurova et al., 2015; Prno, 2013; Prno & Slocombe, 2014; Rytteri, 2012; Santiago & Demajorovic, 2016; Wilson, 2004), the quantitative method has been gaining footstep (Jartti et al., 2014; Zhang et al., 2015) as it has successfully been utilized while investigating the macro-scale acceptance. Even the fruitful results gained from quantitative research, statistical methods are still far less utilized in case studies. Hence this case study contributes to fill the existing gap in the literature by examining the acceptance of Yara Siilinjärvi granted by the local community with a quantitative approach. Moreover the present study contributes by providing a more extensive understanding of the sites SLO as only limited quantitative surveys on the attitudes of local community together with environmental impact assessments (EIA) and some qualitative focus group interviews (Tekir Oy a), 2016) have been conducted so far.

Also the possible differences in attitudes between the participants with diverse background such as socio-demographic attributes and the relationship with Yara Siilinjärvi are under the interest of this case study. While in previous research there is evidence that the differentiation in attitudes between socio-

demographic groups does not significantly vary (Jartti et al., 2014), the recent movements related with environmental awareness among youth (Rimaila, 2019) together with the rising awareness of environmental issues especially between the younger generation reflects another kind of story. As according to the contemporary theories the acceptance builds among other things on the perceived balance of the negative and positive impacts of the industry (Jartti, T., Litmanen, T., Lacey, T., Moffat, 2017, 31) there is a puzzling contradiction between the existing literature and practice. Understanding the possible differences in the perception between participants with diverse background such as age, gender, profession and education along with the relationship to the company is essential while planning the relevant actions in stakeholder management and while implementing those in practice as e.g. generations utilize variant platforms (Ohmori, Yamao, & Nakajima, 2000). Similarly the possible differences between genders can be addressed by acknowledging the conceivable gendered career-choices as well as developing the communication towards more open and gender neutral (Saariniemi, 2018, 23). The existing literature illustrates opposite results about the magnitude respondent's background influences his approach toward resource-extractive operations (Jartti et al., 2014; Jenkins-Smith et al., 2011; Saariniemi, 2018). While Jenkins-Smith et. al. (2011) explored certain socio-demographic factors (e.g. age, gender, education) influencing the approval of a permanent nuclear waste disposal facility in New Mexico, Jartti, Rantala and Litmanen (2014) discovered systematic differentiation in attitude towards mining industry on regional level in Finland only between genders. Moreover the research in Finland has concentrated in exploring the differentiation between socio-demographic groups on a regional level SLO (Jartti et al., 2014) and hence, there is only little knowledge if and how the socio-demographic background impacts along with the relationship with the company on the individual SLO.

**The image of resource-extractive industry**

A social license is however, more than the sum of its parts: the context and macro-scale acceptance affect the local acceptance (Jartti et al., 2014). After Finland enabled the entrance of foreign corporations to the resource-extractive operations in the 90s (Mononen & Suopajärvi, 2016; Rytteri, 2012) the profits gained through taxation and job-creation have been questioned because of their inadequacy in comparison to the value of the mined minerals (Litmanen, Jartti, & Rantala, 2016; Hernesniemi, Berg-Andersson, Rantala & Suni, 2011 Mononen & Suopajärvi, 2016). Moreover the regulation has been claimed being insufficient for securing the nature (Jartti et al., 2017). The discussion around the mining legislation has heated up during the spring 2019, while the election of the new parliament was just around the corner (Teittinen, 2019). Such unsound confidence in governance decreases the trust and onwards the acceptance of the industry on national level (Jartti et al., 2017).

On the other hand the aforementioned transformation in the political framework in EU (Sairinen, 2018) could onwards impair the image of the resource-extractive industry. This topic is clearly extremely timely: the amount of articles related to the subject has exploded (Gehman et al., 2017) influencing for

its part in the public perception of the industry (Ruiz Martín, Rodríguez Díaz, & Ruíz San Román, 2014). What is easily forgotten in generalizing public discussions are the essential differences between resource-extractive projects like location, mined minerals, relationship and cooperation as well as best practices utilized in the operation. Whilst the national acceptance is a predicting factor for local-scale acceptance (Jartti et al., 2014), each case should be carefully studied. As (Sairinen, 2018) emphasized, resource extractive projects are diverse, illustrating the whole spectrum: "the good, the bad and the ugly".

Behind the transformation of the general image of extractive industries are not only the legislative amendments made in Finland but even more the role of business in society (Kakabadse, Rozuel, & Lee-Davies, 2005). The fundamental position of business took turns during the later half of the 20th century when the evolving stakeholder theories suggested that business would have also other responsibilities than those towards its shareholders (Kakabadse et al., 2005). Freeman (1984), one of the pioneers of stakeholder theories illustrated that organizations do not operate in isolation but in an environment, where other organizations, groups and external factors may affect the organization's operations and likewise (Stieb, 2009). While stakeholder theories broaden the network of whom companies' are accountable for, corporate social responsibility (CSR) illustrates the kind of responsibilities companies have towards these identified stakeholders (Kakabadse et al., 2005, 289). Enterprises are increasingly expected to engage and contribute to the society and to legitimize their existence as public awareness about the global sustainability issues increases (Kuvaja & Koipijärvi, 2017). The trend seems to be rising while the youth is stepping on barricades on behalf of the climate (Rimaila, 2019).

Though literature has mainly researched the external reasons for practicing social responsibility, the internal reasons like personal motivation of managers lead similarly the way towards sustainability transformation (Bossle, Dutra De Barcellos, Vieira, & Sauvée, 2016; Howard-Grenville et al., 2008). The aforementioned social license to operate can be comprised as a stream of CSR (Kakabadse et al., 2005) stressing one of the three bottom lines (Elkington, 1998) and hence serving a platform for the social aspects. Originally utilized to express the challenges mining has faced in gaining the local acceptance (Bursey & Whiting, 2015; Demuijnck & Fasterling, 2016; Gunningham et al., 2004; Kemp & Owen, 2013; Nelsen, 2007; Pike, 2012), SLO has later become a framework to describe acceptance on multiple levels: individual, regional, national (Dare et al., 2014; Hall, Lacey, Carr-Cornish, & Dowd, 2014; Lacey & Lamont, 2014; Zhang et al., 2015), towards various different resource-extractive industries (Gunningham et al., 2004; Hall et al., 2014; Williams and Martin, 2011 as cited in Moffat & Zhang, 2014). Extractive industry includes in addition to mining, aggregate and natural stone industries (Mononen & Suopajärvi, 2016). Some broaden the definition to cover also operations such as pulp and paper manufacturing (Gunningham et al., 2004), alternative energy generation (Hall et al., 2014), and agriculture ( Williams and Martin, 2011 as cited in Moffat & Zhang, 2014). To avoid further confusion of the subject of the present study, in this pa-

per with extractive industry and resource-extractive projects are referred to any industry or project using natural resources in great extent and causing significant environmental impacts influencing both society and nature. Hence, the current paper comprehends here the entire site of Yara Siilinjärvi including the mine and the four factories.

## 1.2 Research task

This master thesis concentrates on an exploratory case study, examining the attitudes of the local community towards Yara Siilinjärvi and evaluating the level of SLO related to the case. The social license to operate granted by the residents of the municipality of Siilinjärvi, is examined first time in this extent from a quantitative perspective.

The aims of this case-study are therefore twofold: first to portray the image local residents obtain of Yara Siilinjärvi and secondly, provide Yara with measures, which can be utilized in the future to track the fluctuations in the company's acceptance. The purpose was to enable Yara to evaluate in the coming years, if the measures implemented for maintaining and strengthening the SLO have yield positive results. The objectives are moreover to explore what is required of Yara's site in Siilinjärvi to retain the license to operate also in the future by identifying the demands of the local community towards the site and to explore if the attitudes differ between participants with different background (socio-demographic or relationship). In the interest is to gain a comprehensive understanding of the local community's expectations towards the site. The research questions can be specified as following:

1. To which extent does the company fulfil the expectations of the local community as a key stakeholder group, when it comes to social contribution, communication, involvement in decision-making and responsibility contributing to the prevailing strength of social license to operate?
2. Does the attitude towards the company differentiate significantly between participants with diverse backgrounds?

The study will help Yara Siilinjärvi site in identifying, what is expected from them by the local community and furthermore to respond to these demands with their responsibility program in order to retain the SLO. It would be beneficial to scrutinize possible variances between socio-demographic and relationship related groups while planning the future of stakeholder management. Moreover, the study will contribute to the relationship between the company and its local community by maintaining the communication active and serving Yara's goal to increase the interaction. Especially the open-ended questions serve this aim as the possible concerns brought up by the participants can be

responded with direct actions. The goal of the company to engage the local community in earlier phases of planning future operations is beyond this study.

As one of the aims is to build a measure for the local operator to follow-up how the social license to operate develops in the future, the research methods are planned in a way that they are repeatable as such. Quantitative method fits to these objectives as its easily repeatable (Valli, 2015) allowing Yara to redo the study in few years of time. Next quantitative approach enables reaching out a broader amount of residents and their opinions (Heikkilä, 2014; Valli, 2015), allowing shedding light on the silent opinions not heard before. The residents of the whole municipality serve as the population of the study from which the sample is chosen by utilizing a simple random sampling taken from Bisnoden register ("Yaran imago," 2019). While formulating the sample the socio-demographic structure of the population was considered (Yaran imago, 2019). The data was then collected via telephone interviews, which were conducted by an external service provider, Taloustutkimus Oy. The amount of respondents for the survey was altogether 150 community members living in the municipality of Siilinjärvi from which 146 were finally approved to the analyses. The structure of the questionnaire comprised from respondents background information like general position in life, education and the relationship to Yara; eleven statements to evaluate the components of the SLO and finally two open-ended questions allowing respondents to elaborate their attitudes (Appendix 1.). The statements were asked to rate on five point Likert's scale (Heikkilä, 2014, 51-52). Furthermore the data was analysed with SPSS, software developed specifically for statistical analyses (Heikkilä, 2014, 118-119). The statistics as means, standard deviation and percentages of the answers allocated on the scale were calculated for single statements and on applicable parts for the corresponding sum variables formulated from the single statements. Next significance tests i.e. T-tests and One-Way Analysis of Variances to evaluate the possible differentiation between background (socio-demographic and relationship) groups was calculated.

**The structure of the Master's Thesis**

The master's thesis will be structured as follows; in the first chapter the background and motivation for the research and the aim of the research, research task and questions are illustrated. In the second chapter the setting of the case study is portrayed while the key concepts, theories and the literature on its relevant parts will be elaborated in chapter three. In the fourth chapter the choice of methodology and research design together with data collection and analysis will be introduced. In the fifth chapter research findings will be provided before the final discussion part in the chapter six.

# 2 SETTING OF THE CASE STUDY

## 2.1 Background and current position

Yara is a multinational corporation producing mineral fertilizers, industry chemicals and products targeted for environmental protection (Ramboll a), 2018, 7). One of their twenty factories located worldwide is based in the heart of northern Savo in Finland next to a village with above 21 000 inhabitants (Tilastokeskus, 2017) illustrated in the Picture 1. The site and the local community have been living side by side almost fifty years after the fertilizers plant and associated raw material plants started their operations in 1969 and the apatite mine a decade later in 1979 ("Yara Siilinjärvi site," 2019).


**Picture 1 Yara Siilinjärvi site operate on 3 758 hectares ("Yara Siilinjärvi site," 2019) next to the municipality of Siilinjärvi (National Land Survey of Finland, 2019)**

Back than the site was operated by Kemira Oy, a state-owned corporation (Yara Suomi Oy b), 2019). In the 90s, the operations of Kemira Oy were incorporated and simultaneously listed in the Helsinki Stock Exchange, the site in Siilinjärvi continued operating under Kemira Chemicals Oy (Yara Suomi Oy b), 2019). In the beginning of 2000s the operations were separated from Kemira Oy to Kemira GrowHow Oy. The new company became later the same decade a subsidiary of Yara International (Yara Suomi Oy b), 2019) and has since that been known as Yara Siilinjärvi, one of the three production sites of Yara Suomi Oy (Yara Suomi Oy b), 2019). Nowadays the factories and the mine form a unique combination of operations formulating a supply chain producing high-class fertilizers ("Yara Siilinjärvi site," 2019).

By employing directly around 400 employee and indirectly circa 1600 (Yara Suomi Oy a), 2019), Yara stands out as the third biggest employer in the region of Siilinjärvi and the biggest employer in private sector ("Suurimmat työnantajat 2016," 2016). Altogether above 1000 of these representatives work daily on the site (Yara Suomi Oy a), 2019). The estimated income impact is 400 man-years; the employment impact increasing altogether tills 2400 man-years (Yara Suomi Oy a), 2019). Yara has invested in Finland between 2008-2017 approximately 880 million euros, from which all together around 600 million to Siilinjärvi ("Yara Siilinjärvi site," 2019).

The site in Siilinjärvi plays a substantial role in the whole phosphorus production chain of Yara Finland by supplying raw material to the fertilizer factory located in Uusikaupunki and to the feed phosphate factory in Kokkola ("Yara Siilinjärvi site," 2019). The site consists of two open pits, concentrator and four factories producing sulphuric acid, phosphoric acid and nitric acid and NPK fertilizers ("Yara Siilinjärvi site," 2019)The production chain, side products and end products are illustrated in the Figure 1. below. The mine produces yearly around 11 million tons of apatite ore from which circa 1 million tons of apatite mineral ("Yara Siilinjärvi site," 2019) is separated in the concentrator. The main product of the mine is concentrated apatite, from which approximately 85 % is utilized in the production of phosphoric acid while the rest is used as raw material for the production of fertilizers on the site as well as in Yara's other site's producing fertilizers located in Uusikaupunki and Norway ("Yara Siilinjärvi site," 2019). The apatite is transported by trucks to the phosphoric acid factory where phosphoric acid is produced from the apatite and sulphuric acid produced in the sulphuric acid factory. From part of the produced phosphoric acid goes to fertilizer factory while the rest is transported to Yara's other sites as raw material. In the fertilizer factory the phosphoric acid is further processed with nitric acid, ammonia, potash salt, sulphuric acid and apatite to products for field- and forest fertilizers and ammonium nitrate solutions (AN - solution) for raw material for the quarry explosives ("Yara Siilinjärvi site," 2019). The factories produced in 2018 altogether around 750 thousand tons sulphuric acid, 290 thousand tons phosphoric acid, 460 thousand tons fertilizers, 147 thousand tons nitric acid and finally 42 thousand tons AN-solutions ("Yara Siilinjärvi site," 2019).The site aims to utilize the side-products generated

through the production chain sufficiently; circa ⅓ of the gangue from mining is utilized partially for land construction, tailings are utilized in production of mica (corrosion protection), calcite and biotite from apatite concentrator is used for soil improvements for agriculture, fluorosilicic acid from phosphoric acid factory for aluminium industry and gypsum for soil improvements and water preservation and finally calcite from sulphuric acid factory for cement and steel industry (Figure 1.). However not all of the side products are managed to reutilize and therefore the rest of the gangue and tailing are deposited on the corresponding areas on the site.

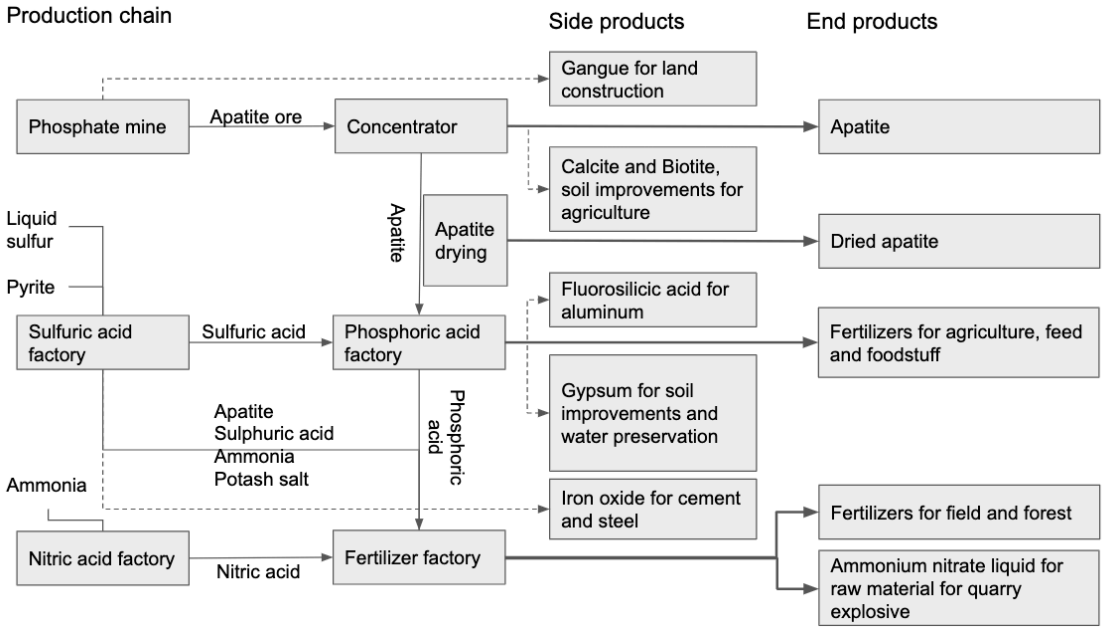



**Figure 1 Production chain of Yara Siilinjärvi site ("Yara Siilinjärvi site," 2019)**

When calculated with the global consuming of 2017, there are still phosphate reserves worldwide for the coming 267 years (Vasara, 2018, 59). However, most of the deposits are located outside Europe (Vasara, 2018, 59). Therefor, Yara Siilinjärvi site being the only producer of phosphate in the Western Europe has a substantial role in the production chain of phosphate and furthermore food production. Circular economy offers some options for the conversational mining of phosphate (Vollaro, Galioto, & Viaggi, 2016). Yara has partnered with UPM, a Finnish forest industry company (UPM, 2019), to explore the possibilities of circular economy for fertilizers (Yara Suomi Oy c), 2019). However, the results indicate so far that the availability of the nutrients from recycled fertilizers is lower than from mineral fertilizers (Yara Suomi Oy c), 2019) and hence, is not sufficient yet to cover the current continuously rising demand (Vollaro et al., 2016). In January 2019 Yara established a partnership with Veolia, an international company expertized in "optimized resource management", aiming to further "develop circular economy in the European food and agricultural chain by recycling nutrients and creating nutrient loops" (Yara Suomi Oy f), 2019). To explore this research stream more in the future could offer beneficial solutions and Yara is determined to be involved in the development of new technologies related with circular economy (Yara Suomi Oy c), 2019). Next to the research

stream of circular economy, Yara Siilinjärvi site is answering the growing demand of phosphate by exploring opportunities to expand its operations (Yara Suomi Oy d), 2019). Indeed, to preserve our societies food production while population growth, increasing both the production of phosphate as and the amount of recycling seems necessary (Vollaro et al., 2016).

Evidently such extensive production of minerals, chemicals and fertilizers cause impacts on the environment. The environmental permit has been updated several times during the history of the operation, the last updated permit for the whole site being from 2016, which eventually was set to force by Vaasa's court of appeal in 2018 ("Yaran Ympäristötarkkailu," 2019). After this, two new environmental impact assessments (EIA) aiming to ensure the operation till 2035 have been conducted (Ramboll a), 2018; Ramboll c), 2018). In February 2019 the application of amending the current environmental permit was finally established. While choosing the suitable options for the application from the ones illustrated in the EIA's processes mentioned prior, authorities, residents and other stakeholder groups were heard to explore the most suitable option for all parties (Elinkeino- liikenne- ja ympäristökeskus Pohjois-Savo, 2018) and in that the economically most suitably options for the company were excluded. By acting so the company and the site proves to acknowledge the relevancy of stakeholders' opinions to them. The monitoring of the environment is comprehensive: air emissions, impact on water, noise, tremor, the deposit of sediments and amount of waste are followed ("Yaran Ympäristötarkkailu," 2019).

As the current mining plans as such extend till the end of the year 2035 (Ramboll a), 2018, 10). The prospects to ensure the continuity of the operation beyond this are currently examined (Yara Suomi Oy d), 2019). Related to this, a specific area Laukansalo, with significant ore potential is at present explored (Yara Suomi Oy d), 2019). Laukansalo is located on the southern part of the operation i.e. closer to the local community and hence the topic of SLO including communication with locals and involving them to the decision-making processes is highly current. Another initiative derives from Yara Siilinjärvi site aiming to a higher classification of the national responsible mining system; "Kaivosvastuujärjestelmä" based on the Canadian "Towards Sustainable Mining" (Kaivosvastuu a), 2017). The system consists of eight assessment tools; stakeholder management; biodiversity, tailings management, water management, energy efficiency and GHG, health and safety, crisis management and shutting down the site (Kaivosvastuu b), 2019). Each assessment tools include criteria for classification levels from C to AAA (Kaivosvastuu b), 2019). For stakeholder management four performance criteria have been defined (Kaivosvastuu b), 2019). These are identifying the stakeholders, active communication and dialogue with the stakeholders, a system to collect and react to stakeholder feedback and reporting (Kaivosvastuu b), 2019).

Yara Siilinjärvi has stated as their mission to feed the world - "Bread from stones" ("Yara Siilinjärvi site," 2019). Responsibility is in the core of the strategy and has been implemented in Siilinjärvi site to the operations by e.g.

utilizing the relevant standards (ISO 9001, ISO 14001 and ISO 45001) (Yara Suomi Oy a), 2019). The site is also highly aware of the importance of the SLO and hence keen to find a state where their operations are in a balance with the requirements and demands of the local community (Yara Suomi Oy a), 2019). Yet, the site is not a rookie with the stakeholder management as the relevance of the local community and other stakeholders have been acknowledged and taken into consideration throughout the history by e.g. by reacting to the received resident feedback and by conducting resident surveys as a part of each environmental impact assessment concluded for the environmental permits required for the new operations of the site (Jaakko Pöyry Infra, 2004; Ramboll e), 2013). In 2016 Yara Siilinjärvi site formulated a communication plan based on focus group interviews executed by an external operator (Tekir Oy a), 2016). After this the operations on the site has been expanding and two more environmental impact assessments have been executed as prior mentioned (Ramboll a), 2018; Ramboll c), 2018). The amount of spontaneous resident feedback has correlated with the expansions, hence the prospects of spreading the operation again to new regions can be assumed to derive more contacts from the local community. The increasing awareness of public (Gehman et al., 2017) mentioned before will most likely further alter the local community's attitude in the future. Therefore, the need of communication can be anticipated to increase continuously in the forthcoming years.

## 2.2 The relationship of Yara Siilinjärvi and the local community

Between 2013 and 2018 three environmental impact assessments related to expansion projects environmental permits have been carried out (Ramboll a), 2018; Ramboll c), 2018; Ramboll e), 2013). The procedure of environmental impact assessments (EIA) is illustrated in the Finnish legislation, 252/2017 "*Act on Environmental Impact Assessment*" (*Laki ympäristövaikutusten arvioinnista 252/2017,* 2017*)*. The legislation requires companies to conduct an "inhabitant survey" as part of a social impact assessment (SIA) including to the EIA ("Laki ympäristövaikutusten arvioinnista 252/2017," 2017). The survey of the SIA from 2013 differs from the two latter SIA "inhabitant surveys" by consisting from two parts (Ramboll f), 2013, Appendix 3). The first part consists of questions as regards background information, communication and information about the project and inhabitants' attitudes and opinions about the diverse project options (Ramboll f), 2013, Appendix 3). In the second part the survey grants the opportunity to give feedback about the site's impacts and explore the use of the environment nearby (Ramboll f), 2013, Appendix 3). The survey was sent to 200 inhabitants (Ramboll e), 2013, 150) whereas the survey concerning the environmental impact assessment of the expansion of the mine was sent to 344 inhabitants (Ramboll c), 2018, 209) and the latest EIA concerning the expansion of the gypsum's deposit was sent to 500 hundred inhabitants within the radius of two kilometre (Ramboll a), 2018, 160). Both of the latest surveys were also avail-

able in the municipality's library during specific time (Ramboll a), 2018, 209-216; Ramboll c), 2018, 160-163). These surveys were executed in one part and consisted from greatly similar structure (Ramboll b), 2018, Appendix 8; Ramboll d), 2018, Appendix 3). They included questions with regards to respondents background information, use of the environment nearby, the overall attitude towards Yara Siilinjärvi mine's or factory's operations, opinion about the impacts of operations, questions about the attitudes and opinions of impacts in regards to the expansion project and finally questions about Yara Siilinjärvi site's current communication measures and expectations towards future communication means (Ramboll b), 2018, Appendix 8; Ramboll d), 2018, Appendix 3).

The outcome of the "inhabitant surveys" of the EIA of the expansion of the mine in regards to the local community's attitude towards the mine's operation show a fairly positive approach with 38 % relate to the mine's operations positively, 32 % neutrally and 30 % negatively (Ramboll c), 2018, 209-216). According to the "inhabitant survey" with respect to the EIA executed later in the same year shows that the attitudes towards the factory's are fairly similar with again 38 % of the local community having a neutral attitude towards the factory, 38 % having a positive attitude and 24 % with a negative attitude (Ramboll a), 2018, 160-163). As the results do not differentiate from each others in extensive manners, it is questionable if the local community makes a distinction between the factory's and mine's operations when answering these surveys: they might easily blend with each other's from the perspective of a local community's member. All in all, the attitude towards the company's operations seems to be mainly neutral and positive.

The different stakeholders' attitude towards the communication measures and means along with the expectations towards Yara Siilinjärvi site's communication was more thoroughly investigated by an external service provider Tekir Oy between 2015 and 2016. The aims of the research were specifically to increase the understanding of what kind of information the various stakeholders desires and how Yara Siilinjärvi should develop their communication measures (Tekir Oy a), 2016, 2). The research utilized a qualitative approach instead of the quantitative method used in the environmental impact assessments (Tekir Oy a), 2016). The data was collected through five focus group interviews and two more informal discussions; one with the representatives of the local newspaper and one with Yara Siilinjärvi site's employees steward (Tekir Oy a), 2016, 7-8). Based on these focus group interviews the key stakeholders of the company and their attitudes and demands of information were identified (Tekir Oy b), 2016). According to the research Yara Siilinjärvi site's operations are in general somewhat positively in the minds of the respondents. The positive aspects included financial factors such as the increase of employment and tax receipts for the municipality (Tekir Oy a), 2016, 3). Also contradictory feelings arose during the discussions: the environmental impacts, expansion plans of the site, company's ownerships transfer to Norway, the insecurity of the future of the operations, especially after the site's operations will end concerned the respondents. The general trend throughout time of the local community's ap-

proach with respect to the company was positive, still Yara was experienced distant (Tekir Oy a), 2016, 3-4). Just like the reports name suggest; " A Distant Giant".

The research conducted by Tekir Oy concentrated on the weaknesses, strengths and development areas of the communication procedures. The research sets a valuable base for stakeholder management by identifying the different key stakeholders (Tekir Oy b), 2016) while it generates a triggering question of the overall quality of Yara Siilinjärvi site's social license to operate including also other aspects next to communication influencing the license to operate. Because of the dynamic nature of SLO discussed before and the multiple changes in Yara's operation after the focus group interviews; two new expansion plans of Yara Siilinjärvi, the possible changes in local community's attitudes due to them arises interest. The individual EIA's on the other hand lack the comprehensive insight of the operations; since they focus in a single expansion project either from the factory's or mine's point of view. That said, there is a need for current and more comprehensive insight of local community's attitudes towards the CSR operations of the entire site.

# 3 THEORETICAL FRAMEWORK

## 3.1 The role of business in society

In 1970 Milton Friedman, an influential American economist, stressed in his article published in the New York Times Magazine that the ultimate purpose of business is to increase its profits. Friedman, who was known as an advocate of free-capitalism (Kakabadse et al., 2005) criticized the thought that business would have responsibilities towards the larger society (New York Times Magazine, 1970). The duties and purposes of business have since been questioned excessively (Kakabadse et al., 2005, 278). In the following chapters the evolvement of businesses' role in the society is discussed first through development of stakeholder theories and than from the standpoint of corporate social responsibility.

### 3.1.1 Focus from shareholders to more widely on stakeholders

The first references of stakeholder theories are already from the mid 20th century (Kakabadse et al., 2005, 279). Yet it wasn't before 1984 when stakeholder theories received worldwide attention through Freeman's revolutionary stakeholder theory (Stieb, 2009). Freeman suggested that business should consider the interest of all its legitimate stakeholders instead of only focusing on the interest of shareholders (Freeman, 2004). He defined stakeholders as individuals or a group of people who can either influence the company's purpose and aims or can be influenced by the company's accomplishments. Carrol (1993) continued Freemans work by focusing the definition of stakeholders as "any individual group who can affect or is affected by the actions, decisions, policies, practices or goals of the organization" (Carrol, 1993, 60 as cited in Gibson, 2000). He emphasized the two-way interaction between the stakeholders and the company as stakeholders are "those groups or individuals with whom the organization interacts or has independencies" (Carrol, 1993, 60 as cited in Gibson, 2000). Accompanying Donaldson and Preston (1995) introduced the three dimensions of stakeholder theory: normative, descriptive and instrumental. The normative approach, being also the basis of the theory, considers the legitimate stakeholder interest (Donaldson & Preston, 1995, 66). The second dimension, descriptive, illustrates how stakeholder theory describes the corporation whereas instrumental in turn explains the connection between stakeholder management and corporate performance (Donaldson & Preston, 1995, 67).

The definition of the stakeholders where soon blamed by academics of it's broadness, suggesting that not all stakeholders are equally important ( Johnson and Scholes, 2002, 2006 as cited in Kakabadse et al., 2005, 293). Perhaps the two most commonly used frameworks for categorizing stakeholders are dividing them to external and internal stakeholders or correspondingly to

primary and secondary stakeholders leaving still some vagueness to the prioritization of stakeholders requirements (Weiss, 2003, 34 as cited in Kakabadse et al., 2005, 293). The stakeholder salience theory by Mitchell, Agle and Woods (1997) is conceived to be maybe the most extensive framework for identifying diverge stakeholder groups and further analysing their significance for the enterprise (Frooman, 1999, 193). Based on the stakeholder salience model stakeholders can obtain three different attributes, which are legitimacy, urgency and power (Mitchell et al., 1997). One can obsess either none of these characteristics (non-stakeholder) or all of them. Mitchell, Agle and Woods classify altogether seven different stakeholder types based on the previous attributes; the relevancy of the stakeholder is determined depending on the attributes the stakeholder possesses (Figure 2.).

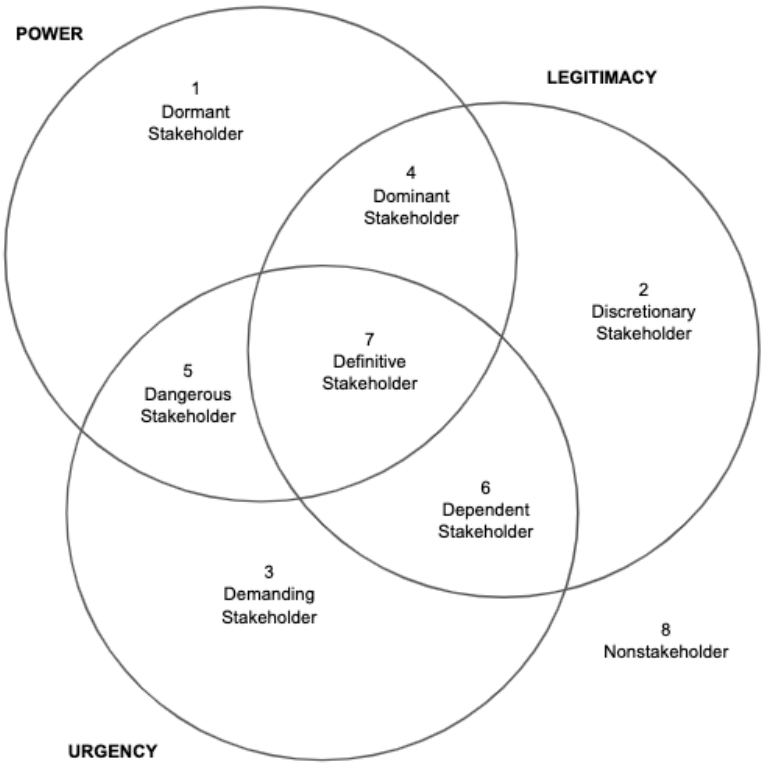



**Figure 2 Stakeholder typology based on the stakeholder salience model (Mitchell, Wood & Agle, 1997)**

The preceding stakeholder theories can be utilized as an analytical tool for management to recognize and prioritize the stakeholders to whose demands and requirements the corporation should respond immediately (Frooman, 1999). Some scholars claim the theory of being distant from the practice and call for deeper perception of the relationship between business and society and stakeholders means to influence companies (de Bakker & den Hond, 2008). However, it is acknowledged that stakeholder cooperation will lower the business-related risks, increase company's competitive advantage and have a positive influence on the financial value of the enterprise (Henisz et al., 2013; Hillman & Keim, 2001). Indeed, the stakeholder theories do not stand against company's profita-

bility objectives but broadens the traditional shareholder model allowing corporations to consider their purpose and goals from a wider position (Kakabadse et al., 2005).

### 3.1.2 The emergence of corporate social responsibility

The stakeholder theory is very much linked with corporate social responsibility as companies are encouraged to take responsibility of business in society by considering the wider perspective of the stakeholders including the interests of human society and natural environment in general (Buchholtz & Carroll, 2012; Carroll, 1995; Kakabadse et al., 2005) Next to the evolvement of the aforementioned stakeholder theories new concepts like sustainability, corporate social responsibility, corporate responsibility and corporate sustainability started to emerge (Banerjee, 2008).

In 1987 World Commission on Environment and Development defined sustainable development in the widely known Brundtlants document as following: "Humanity has the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED, 1987, 16), giving the base for the understanding of sustainability. Another classical way of looking at sustainability was introduced by Elkington (1998) who suggested that sustainability in business is based on triple bottom line (TBL); environmental responsibility, social responsibility and economic responsibility or like Fisk (2000) rhymed: people, planet and profit (Molthan-Hill, 2015, 5). The actions companies are taking to address these three dimensions and hence, carrying the responsibility of their impacts on society, are further referred as corporate social responsibility, CSR (Banerjee, 2008). CSR is a concept, which can also be found referred to as corporate citizenship, corporate sustainability or corporate responsibility. The highlight on this concept, which is important to remember, is the tri-dimensional framework, which brings attention to the social, environmental and financial aspect of businesses.

From 2000s CSR practices have increased continuously in business (Eccles & Serafeim, 2013; Loorbach & Wijsman, 2013; Luning, 2012). EU published its new policy for corporate social responsibility in 2011-2014 aiming to enhance the circumstances for sustainable growth (European Commission, 2011). Soon after this, in 2015, the EU established the 17 sustainable development goals together with the Agenda 2030 as guidelines primarily for states and governments to drive the society and business towards sustainable development (United Nations, 2015). They since have also been adopted directly by business itself by e.g. enterprises utilizing them in their long-term strategies (Sullivan, Thomas, & Rosano, 2018). Similar to stakeholder theories also sustainability and CSR are related to enhanced finance; implementing corporate social responsibility aspects into the corporate strategies increase the competitive advantage of the enterprise (Eccles & Serafeim, 2013; Hillman & Keim, 2001;

Lubin & Esty, 2010; Orsato, 2006). On the flip side, irresponsibility is linked with negative image risks and increasing costs due to the tightening legislation (Gunningham et al., 2004).

For now CSR practices are mostly voluntary bases (Faircheallaigh & Ali, 2007), yet the EU's directive 2014/95/EU, requires "large public-interest companies" employing over 500 employees such as listed enterprises, financial institutions and insurance companies to report also "non-financial" information about their operations from 2018 onwards (European Comission, 2019). Moreover, as the recent history demonstrates legislation and regulation have been increasing and there is no reason to assume this trend would stop (Gunningham et al., 2004). Therefor, companies might benefit from anticipatory compliance since "even if something is not clearly illegal today, it will sooner or later be subject to public censure, government action, and legal liability"(Gunningham et al., 2004, 308). Next, the amount of various voluntary-based international standards regarding to social and environmental responsibility e.g. EMAS, ISO 14001, ISO 26001, SA 8000, AA 1000, GRI and SASB is extensively increasing (Castka & Balzarova, 2008; von Malmborg, 2002). Yet, the voluntariness is debatable considering contemporary markets where obtaining certain standards is a prerequisite for doing business in specific industries or regions. Simultaneously the pressure from the society is growing while the youngsters stand up on barricades to defend the nature and society (Rimaila, 2019). Consequently, it is even more arguable if companies truly have an option at all when the society's pressure increases vast enough?

## 3.2 The concept of social license to operate

The power-relations between society and business have been changing from the middle of the 20th century till now as we learned in the previous chapter (chapter 3.1.). Some scholars have suggested that SLO is an enhancement of CSR (Gunningham et al., 2004) whereas others behold it as a stream of CSR (Faircheallaigh & Ali, 2007, 11), some propose SLO encourages engaging in CSR practices (Eerola & Ziessler, 2013). Since, both CSR and SLO include similar objectives of obtaining and maintaining local acceptance the relation between these two concepts seems to be evident (Esteves & Barclay, 2011) even if CSR is not solely "altruistic" but comprises also the liabilities towards other stakeholders of an enterprise e.g. shareholders (Koivurova et al., 2015). The concept of social license to operate (SLO) therefor characterizes the raising importance of the public's voice in the era of social media and the meaning of a trustworthy relationship between the company and its stakeholders (Koivurova et al., 2015).

The concept emerged first time in the late 1990's, when James Cooney, a Canadian mining executive used the term for expressing to the World Bank the social challenge mining industry was facing (Gehman et al., 2017; Prno & Slocombe, 2014). Just some year's later Bridge (2004) remarked in his study that

the legal compliance started to be insufficient for satisfying the expectations of the local community (as cited in Prno, 2013). Comprehending more than complying legal requirements, including usually some kind of voluntary behaviour from a company to meet the locally voiced requirements, SLO responds to those claims (Gunningham et al., 2004; Koivurova et al., 2015). Since the 90's SLO has gained increasingly interest among industry practitioners (Nelsen, 2007), academics (Prno, 2013) and news media (Gehman et al., 2017). According to Gehman et al. (2017) the amount of mentions about social license in the media more than doubled itself during the past decades. Nowadays, the concept is not limited only to mining industry but has become associated also with other resource-extractive operations such as pulp and paper manufacturing (Gunningham et al., 2004), alternative energy generation (Hall et al., 2014), and agriculture ( Williams and Martin, 2011 as cited in Moffat & Zhang, 2014). Some scholars have blamed the concept of being just a catchword primarily from business to business (Morrison 2014 as cited in Gehman et al., 2017), yet e.g. in Finland the subject is widely studied by sociologist (e.g. Jartti et al., 2014; Mononen & Suopajärvi, 2016; Pettersson, Sanna, Suopajärvi, 2018; Saariniemi, 2018; Sairinen, 2010). Accordingly the extensive interest,
has gained from various institutions and organisations, allows a base for communication between business and society, academics and industry.

Social license to operate is generally understood as an on-going acceptance of the local community towards the company or a project (Bursey & Whiting, 2015; Demuijnck & Fasterling, 2016; Gunningham et al., 2004; Kemp & Owen, 2013; Nelsen, 2007; Pike, 2012). The word license seems to refer to an official permit received from authorities, however SLO is unlike environmental permits, intangible and dynamic (Bursey & Whiting, 2015; Prno & Slocombe, 2014). Instead of a peace of paper SLO is "a communication process through which acceptance and trust can be maintained" as Sairinen (2018) illustrates in his blog simultaneously inferring, that once a project has obtained the social license it can be also withdrawn. Boutilier emphasizes that SLO comprehends prior to a communication process itself the stakeholders' perception of the relationship (Boutilier, 2017, 3). In contrast to third party verifications SLO concentrates on the stakeholders impression (Boutilier, 2017, 3). Finally, the concept is very much context driven as each community and each company is unique and therefor, the surrounding conditions for retaining SLO are variable (Gunningham et al., 2004; Prno & Slocombe, 2014). These five special characteristics of SLO; beyond compliance, abstract, dynamic, perception of stakeholders and concept driven challenge companies to first gain a social license to operate and than maintain it.

The hard work however pays off: even if social license to operate is not a legally sufficient license, it is essential for the business (Gunningham et al., 2004). Not gaining or losing a SLO has been related with several negative impacts for the business such as financial risks (Franks et al., 2014; Henisz et al., 2013; Nelsen, 2006; Prno, 2013), backlashes to company image (Prno & Slocombe, 2014) and tightening regulatory requirements (Gunningham et al.,

2004). The possible financial losses related to losing SLO have also found to activate tensions within the society (Zhang et al., 2015). Ernst & Young, a multinational consulting company, has included SLO during the past ten years in the industry's key challenges highlighting its significance for the business (Ernst & Young, 2018). Moreover the danger in not finding a mutual path is in confrontation that can lead to "win-lose" situation and as the conflict continues both parties usually end up sinking and finally losing in the surrounding circumstances (Wall & Callister, 1995).

Failing to build a trustworthy relationship with the society's members and neglecting the public's opinions have already caused tremendous reputational repercussions in the past. In the 90's Shell's company image received a scratch, when they overlooked the public's concerns related to sinking of the Brent Spar oil installation in the North Atlantic (Neale, 1997). Other multinational companies like Nestle (Wilburn & Wilburn, 2011), Monsanto (Moore, 2001 as cited in Gunningham et al., 2004) and Wal-Mart (Porter & Kramer, 2006) have faced similar reputational disasters, while they have failed to consider carefully enough the public's interest about responsibility aspects of their operations. Most often the image crisis are followed by financial backlashes affecting sales and stock market, possibly leading to investors stepping back (Pike, 2012; Porter & Kramer, 2006). The absence of SLO has even caused shutdowns of entire plants (Wilburn & Wilburn, 2011). Correspondingly some recent examples in Finland e.g. Dragon Mining's mining project in Valkeakoski (Koskinen & Siltanen, 2019), Beowulf Mining's mining project in Haapamäki (Voutilainen, 2019) and Smart Windpower's wind power project in Ylitornio (Tiihonen, 2019) indicate that the lack of the society's approval in the planning phase of some individual resource-extractive projects can endanger the whole operation or at least complicate the project substantially. Indeed the research of Goldman Sachs (2008) demonstrates that the most common reason for an average delay of 12 months was caused by a "non-technical" such as political or stakeholder related delays out of the 190 investigated resource-extractive operations delays (as cited in Ruggie, 2015). It seems that gaining the acceptance is a priority for projects in the beginning of their life-cycle (Pike, 2012). Also the features of the specific company and business matter: large enterprises are usually under higher social pressure compared to small and medium sized enterprises and therefore SLO is also more relevant to them (Prno & Slocombe, 2014, 347).

Even if the reasons discussed so far behind companies aiming to act responsibly and even beyond compliance have been concentrating in external factors, studies reveal that a remarkable share of the reasons generate actually from internal factors (Bossle et al., 2016; Howard-Grenville et al., 2008). The research has substantially concentrated on the external factors over the internal ones but "managerial incentives, organizational culture, organizational identity, organizational self-monitoring, and personal affiliations and commitments" are some of the established internal motivation factors (Howard-Grenville et al., 2008). The conventional one-sided image of corporations being only a big evil monster is fairly black and white and can be argued not to fit anymore into to-

day's business world. The management of these enterprises, including CEOs consists of persons with internal motivation for "doing the right thing" and hence, can lead the way to sustainable transformation (Walls & Berrone, 2017).

Overall SLO minimizes the risks related to industrial projects (Pike, 2012) and supports companies in long-term business success (Dare et al., 2014; Esteves & Barclay, 2011; Vidal et al., 2010). It is likely that the increasing awareness among public together with social media will challenge companies in the future to listen the society's voice even more carefully (Gehman et al., 2017) but whose voice matter's?

### 3.2.1 Whose voice matter?

Mining industry is usually operated by multinational companies on global markets but the impacts are very much experienced locally (Mononen & Suopajärvi, 2016). Some of the most commonly established critical stakeholder groups are regulatory stakeholders consisting of authorities and governments, trade association; organizational stakeholders including customers, suppliers, employees, shareholders; community stakeholders in terms of community and environmental organizations and the media (Carrol, 1991 as cited in Kakabadse et al., 2005). While, approaching the significance from the aspect of social license to operate, local community is generally seen as the most relevant stakeholder group (Prno & Slocombe, 2014). According to the stakeholder salience model discussed in chapter 3.1.1, local community as a stakeholder group possess two out of three attributes: urgency and legitimacy but no power (Mitchell et al., 1997). As such they depend on the other stakeholders with power to accomplish their goals. For instance if a dominant stakeholder like a governmental institution would advocate the demands of a local community the alliance would formulate a definitive stakeholder group becoming the most salient stakeholder and hence, the priority of the corporation's managers.

Lately, some academics have criticized the research of being too concentrated on the local community's attitude towards the business when trying to elaborate the dimensions of SLO (Boutilier, 2017; Dare et al., 2014). They suggest that the research should consider more carefully which stakeholder groups could be affected by the operation and on the other hand which stakeholder groups can affect the company complementary to Freeman's stakeholder theory. In the end these stakeholder groups can be located way more widely than the community living in the next village: e.g. Lesser, Suopajärvi and Koivurova (2017) discussed the issue in their article about the challenges related to SLO in Finland's Lapland. Hence, it is always not a local question and therefor, a network analyses to prioritize stakeholders should take place beforehand exploring the strength of a social license to operate (Boutilier, 2017). Instead of having one single social license to operate, Dare et. al. (2014) suggests in their study that a social license to operate can and should be obtained on multiple layers from "micro-scale to society-wide". The recent research of social license to operate on national and regional scale supports the spatiality approach: SLO exists

on local level between a single mining operation and a local community as well as on national level between an entire industry and a broader public (Hall et al., 2014; Lacey & Lamont, 2014; Moffat et al., 2014a, 2014b as cited in Zhang & Moffat, 2015).

### 3.2.2 Components of a social license to operate

Several studies have been exploring the factors influencing the achievement of a social license to operate both on micro- and macro-scale (Boutilier & Thomson, 2011; Dougherty & Olsen, 2014; Lacey & Lamont, 2014; Moffat & Zhang, 2014). Most of them are implicating that the foundation of achieving a social license to operate is trust between mining companies, governments and society. Though there are some controversial opinions if acceptance and approval are prior to trust (Boutilier & Thomson, 2011) or if acceptance and approval are something resulting from trust (Moffat & Zhang, 2014). Notwithstanding, the following factors are related in the literature to increase of trust.

The evolvement of a micro-level SLO is illustrated in the Picture 3: the circumstances such as a macro-level SLO (Jartti et al., 2014), media (Suhonen, 2006, 211-231 as cited in Jartti et al., 2014), history and previous experiences (Prno, 2013) influencing next to the company's actual actions and communication over the actions form the stakeholders impression over the three components of a SLO: social contribution, communication and involvement in decision-making, which further correlate with trust and license to operate (Moffat & Zhang, 2014). The picture aims to stress the characteristics of SLO being a perception over the company rather than actual measurement based information and simultaneously catch the impact of multiple background factors.

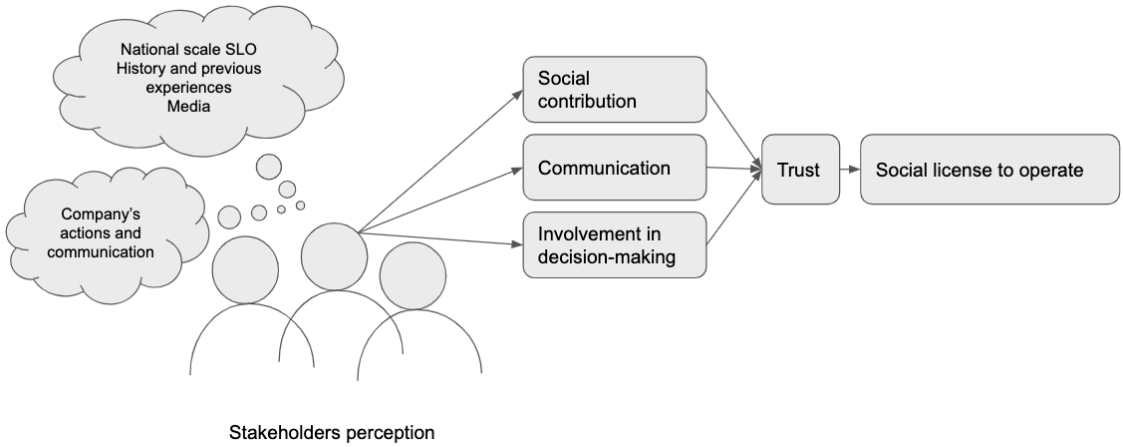



**Figure 3 Relationships between the factors influencing stakeholders' perception over the components of micro-level SLO**

#### 3.2.2.1 Acceptance on macro-scale as a prerequisite

According to Zhang et. al. (2015) extensive research in Australia, China and Chile the three fundamentals contributing to trust towards an industry on mac-

ro-scale are distributional fairness, confidence in governance and procedural fairness. Firstly, their study show a significant correlation between public's perception of receiving a fair share from the benefits of mining industry (distributional fairness) and trust. Such benefits can comprise increased revenues from export markets or taxation (Battellino, Governor, & Bank, 2010) and development of infrastructure as well as services (Fleming & Measham, 2015). Secondly, the impression of a "strong governance" holding mining industry on account of their impacts and forcing them to act responsibly was found to increase trust within public (confidence in governance). Thus, having confidence in government being able to formulate a credible legislative system for guiding the mining operations towards sustainable mining was associated with higher acceptance of the mining industry. Finally, the feeling of being heard and ability to influence the decision-making directly predicted increased trust (procedural fairness). Interestingly in Chile the correlation between confidence in governance and trust was the greatest whereas in China the greatest predictor of trust was distributional fairness. Finally in Australia the most significant correlation was found between procedural fairness and trust. Hence, as already discussed earlier the circumstances matters; cultural differences such as national identity and diverse political systems impact the experience of these different concepts (distributional fairness, confidence in governance and procedural fairness) (Zhang et al., 2015). Also the role of news coverage and public discussions in media has been established to impact the formulation of the general opinion (Suhonen, 2006, 211-231 as cited in Jartti et al., 2014).

To comprehend the cultural circumstances are not only relevant for understanding the formulation of a social license to operate on a broader scale but also when striving to interpret SLO on micro-scale. This because regional acceptance towards the industry is seen as a precondition or at least as an easing factor of the individual social license to operate (Litmanen et al., 2016; Mononen & Suopajärvi, 2016). As Prno (2013, 584) emphasizes "the context is key".

#### 3.2.2.2 Social contribution

The existence of resource-extractive operation such as mining develop extensively both indirect and direct positive as well as negative impacts to the surrounding society (Saariniemi, 2018). On a national scale the distribution of the benefits derived from the mining industry (Zhang et al., 2015); likewise on a local scale the balance of the positive and negative impacts influence the increasing confidence on the enterprise (Moffat & Zhang, 2014). Similarly to the macro-scale, the mining operation usually benefits the local community in terms of job creation (Saariniemi, 2018) and increased training opportunities (Kemp & Owen, 2013) and through development of infrastructure and taxation (Battellino et al., 2010). Research has also shown increase of business opportunities related to the mining operation by supporting services offered by the subcontractors (Franks, Brereton, & Moran, 2010).

Moffat and Zhang (2014, 61) explored "the paths to social license to operate" by conducting a longitudinal quantitative case study in Australian min-

ing sector. The aim was to investigate the possible correlation between certain concepts (impact on social infrastructure, contact quality, contact quantity, procedural fairness) and trust and furthermore acceptance (Figure 3). The participants perception on aspects of housing affordability and availability, access to health care as well as other facilities such as social service in the municipality (impact on social infrastructure) predicted trust and furthermore acceptance and approval of the project or company. Also Boutilier and Thompson (2011) reached similar conclusion in their extensive 14-years of studies on the subject (Gehman et al., 2017). They suggest that the stakeholder's impression of gaining from the relationship with the company is a precondition of a social license to operate (economic legitimacy). In addition to offering benefits the company should contribute to the societies and the region's well-being (socio-political contribution) (Boutilier & Thomson, 2011).

Research has shown that the general contribution on the society; distributing and offering benefits for the stakeholders, compensating negative side effects and commitment in development of local services are all significant components of achieving a social license to operate (Boutilier & Thomson, 2011; Dare et al., 2014; Jartti et al., 2014; Kokko et al., 2013; Moffat & Zhang, 2014; Prno, 2013; Saariniemi, 2018; Zhang & Moffat, 2015). Recent streams of business have started to discuss about the value-creation to the society (Lepak, Smith, & Taylor, 2007) and the net positive impact of companies ("Net Positive Project," 2019; "The Upright Project," 2019). The positive net-impact is a measure that sums up the negative and positive impacts an enterprise has on society aiming to simplify the company's contribution to one single and comparable (Räisänen, 2018).

#### 3.2.2.3 Communication and interaction

One of the key elements in building trustworthy relationships is an open and active communication (Jartti et al., 2014). This applies also to the relationship between a company and its stakeholders (Prno, 2013). Building an image through branding and reputation management has claimed to be insufficient when desiring to achieve a social license (Jartti et al., 2014). The company is obligated to have a genuine interest to understand the local habits, culture, language and history (Ziessler-Korppi, 2013, 35 as cited in Jartti et al., 2014). Correspondingly Boutilier and Thompson (2011) emphasize the feeling of being listened and the perception of the other party's commitment to the dialogue (Boutilier & Thomson, 2011) This all speaks on the behalf of genuinity and quality in communication and interaction, just like the results of Moffat and Zhang's (2014) study illustrate; the quality of the contact predicts trust over the quantity.

#### 3.2.2.4 Involvement in decision-making

Even if communicating and sharing information is in great importance of acquisition of a SLO, there is more to that. Being interested in the stakeholders' concerns and taking into consideration their opinion by involving them in decision-making process is the third significant factor in maintaining a social license to

operate on a micro-scale (Boutilier & Thomson, 2011).The dependence of procedural fairness and SLO has been widely acknowledged in the literature (Boutilier et al., 2012; Moffat & Zhang, 2014; Saariniemi, 2018; Zhang et al., 2015). Likewise in macro-level acceptance, Moffat and Zhang (2014) established procedural fairness concluding to trust. Procedural fairness describes how community perceives their possibility to influence the company's decision-making process in relevant matters and the impact their opinions have in the final decision-making (Moffat & Zhang, 2014). Already the opportunity to be involved in the decisions making process increases the acceptance of the final decision regardless the results (Besley, 2010; Tyler, 2000).

**Table 1 The resemblance and interdependency of terms utilized to describe the factors influencing SLO**

| | Moffat & Zhang (2014) | Boutilier & Thompson (2011) |
|---|---|---|
| **Social contribution** | **Impacts on social infrastructure**<br>The perception of "access to medical and health services, housing affordability and access to community facilities such as social services." | **Economic legitimacy**<br>"The perception that the project/company offers a benefit to the perceiver."<br><br>**Socio-political trust**<br>"The perception that the project/company contributes to the well-being of the region, respects the local way of life, meets expectations about its role in society, and acts according to stakeholders' views of fairness." |
| **Communication** | **Contact quality**<br>The perception "the pleasance and positiveness of the communication with the personnel of the company". | **Interactional trust**<br>"The perception that the company and its management listens, responds, keeps promises, engages in mutual dialogue, and exhibits reciprocity in its interactions." |
| **Involvement in decision-making** | **Procedural fairness**<br>The perception of "the community having opportunities to participate in the decisions made by the company, the extent the company listens to and respects their opinions, and is prepared to change its practices in response to the community sentiment." | **Institutionalized trust**<br>"The perception that relations between the stakeholders' institutions (e.g., the community's representative organizations) and the project/company are based on an enduring regard for each other's interests." |

Even though Boutilier and Thompson (2011) designated the components of a SLO differently than Moffat and Zhang (2014) they resemble each others a lot with the exception of few items utilized measuring the determinants. The division of the components introduced in above builds on premises from both studies. Table 1. aims to clarify the interdependency between the different terms used in literature for describing the components of a SLO.

### 3.2.3 Mapping out the strength of a social license to operate

While the academics have reached out to define the concept with models and measurements, the complexity of the framework creates huge challenges in measuring the level and strength of a social license to operate (Prno & Slocombe, 2014). Thomson's and Boutilier's (2011) research about modelling and measuring the SLO can be comprehend as pioneering work in the field (Gehman et al., 2017). They distinguished four separate levels for a social license: withdrawal, acceptance, approval and psychological identification (Figure 4.).

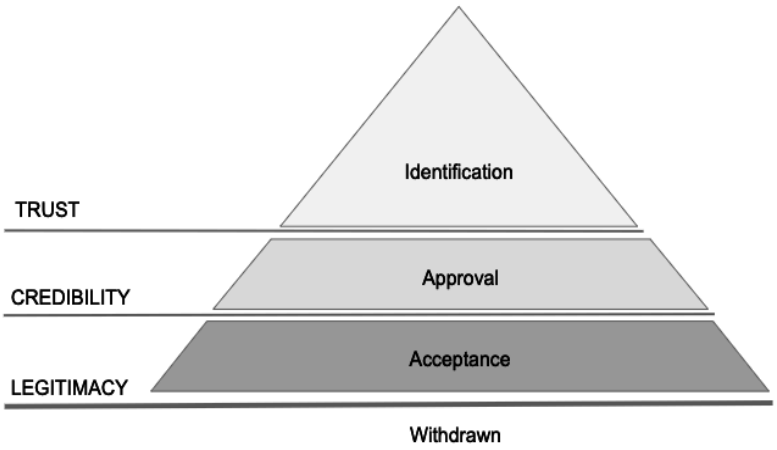



**Figure 4 The Pyramid Model of SLO (adopted from Boutilier & Thompson, 2011)**

First the operation needs to earn legitimacy to rise on the lowest level of social license to operate. If not succeeding in this, the operation will be under considerable risk of being revoked. On the lowest level the operation is tolerated but once it gains credibility it will be also deeper approved. Finally, the highest level of social license is achieved when the stakeholders trust the operation and experience it as a significant part of their identity. The model was first illustrated as a pyramid model (Figure 4.) and later modified into an arrowhead model (Figure 5.). The latter allows measuring the factors influencing the SLO individually illustrating simultaneously continuity whereas the pyramid model assumes that each level of the pyramid must me fully met before entering the next level. The gradient colouring in the Figure 5. indicates the levels of the pyramid model from acceptance to identification. The pyramid model has been approved by the Australian Centre for Corporate Social Responsibility (ACCSR) (Gehman et al., 2017) and enjoys recognition from other scholars (Black, 2013). The model has however been also under heavy critique. Mainly because of unsuccessful validation of the hypothesis by the authors themselves (Gehman et al., 2017; Moffat & Zhang, 2014). Indeed, many academics have criticized the (Gehman et al., 2017; Moffat & Zhang, 2014) concept of its difficulty of measuring, claiming it is still not clarified when does a company obtain a SLO let alone determining distinct levels of SLO (Post, Preston and Sauter-Sachs', 2002 as

cited in Wilburn & Wilburn, 2011). It should be remembered that the level of social license to operate is based on the perception of the stakeholder in question (Boutilier, 2017). Hence, the measurement cannot be absolute, e.g. measuring the environmental impacts of the operation or a benefit derived from the project but an evaluation of the impression of the relevant stakeholder, thus the line of obtaining or not is largely debatable.

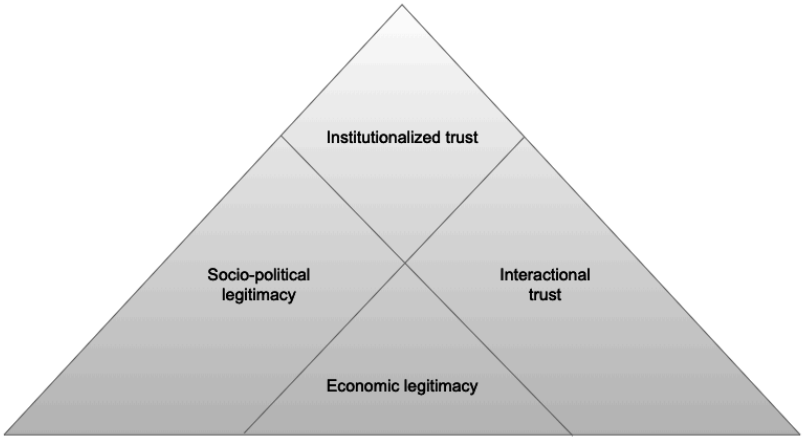



**Figure 5 The Arrowhead Model of SLO together with the four factors influencing SLO (adopted from Boutilier & Thompson, 2011)**

Although measuring the concept contains several unanswered questions and a consensus for a universal limit of obtaining a social license to operate has not been reached, the scholars agree that one can achieve a social license or it can be withdrawn. Additionally, fluctuations in the depth and strength of social license to operate have been acknowledged. For instance the study conducted by Batel, Devine-Wright, and Tangeland (2013) elaborated that accepting a project was related to more of a passive relationship than supporting it, indicating that there is a difference between accepting and approving. Taking into consideration all the risks related with losing the social license to operate (chapter 3.2.), it is more than justified for companies to reach out and invest in mapping out the strength of their SLO even if the validation of the measurements call for more research. Saariniemi (2018) note in her paper that continuous or regular data-collection of the stakeholders impressions of the SLO boosts the company's possibilities to react already pre-emptively to the concerns and fears generating from the local community.

All in all several determinants and prerequisites for gaining and retaining the SLO are identified in the literature, from which the most important are social contribution, genuine communication and involvement in decision-making processes (Jartti et al., 2014). SLO is a continuously evolving and complex concept affected by several different factors, which than are influenced by the surrounding circumstances. As Zhang et. al. ( 2015) note there is no panacea to obtain or maintain a SLO. Moreover it is the combination of the determinants (national-scale SLO, social contribution, communication, involvement in deci-

sion-making) that lead to stronger trust and acceptance of mining industry (Zhang et al., 2015). Finally to overcome complexity a company needs to be versatile and flexible (Prno, 2013). Promisingly, the ability to meet the local needs, expectations and aspirations in long-term as well as the adaptability of the operation increase the SLO resilience (Prno & Scott Slocombe, 2012).

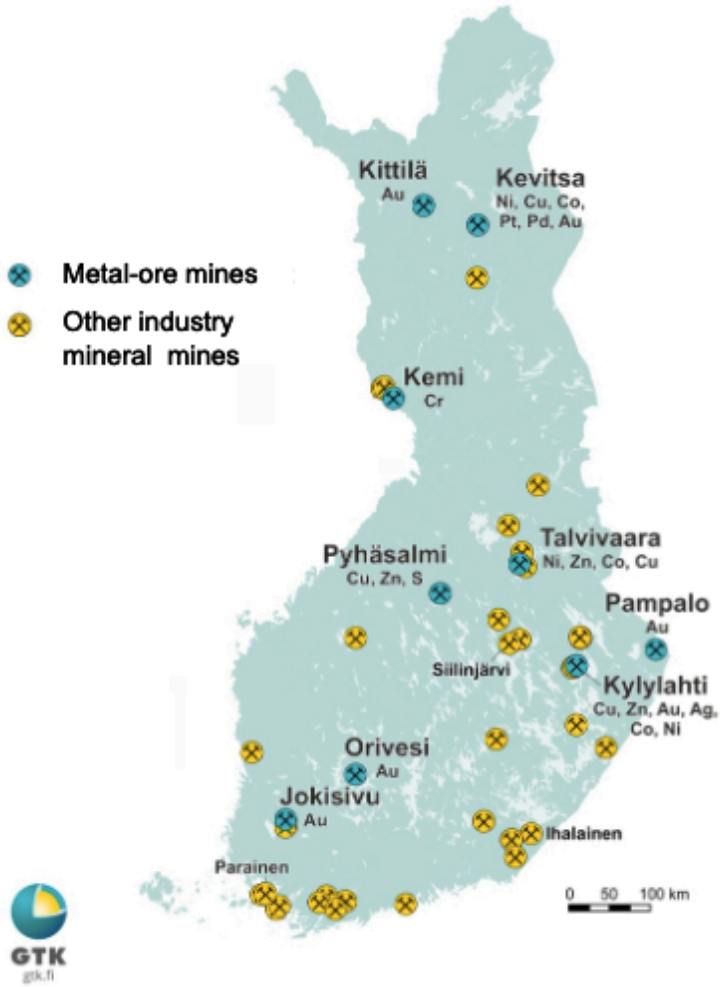
## 3.3 Mining and its social acceptability in Finland

The concept of social license to operate arrived in Finland in the beginning of the 2010s; around ten years later it was coined in Canada (Sairinen, 2018). Assumedly the Canadian-based mining companies introduced the concept, which nowadays is used quite broadly by the industry but also policy makers and other governmental authorities in the conversations related to the Finnish mining industry (Koivurova et al., 2015). The SWOT-analysis (an analysis to explore the strengths, weaknesses, opportunities and threats companies or business faces) executed by the Business Sector Services by the Ministry of Economic Affairs and Employment of Finland highlights the citizens negative approach towards the sector as one of the main threats challenging the mining industry (Vasara, 2018, 13-14). Yet, the framework of SLO itself remains unfamiliar for the mainstream (Koivurova et al., 2015). As discussed prior the public image and the macro-scale approval as well as the centricity of circumstances and previous experiences should be considered when evaluating the social license to operate of an individual case(Jartti et al., 2014; Prno, 2013). Hence, to interpret the social license of this specific case study the underlying attitude towards mining in Finland must be comprehended. Next the history of mining in Finland is discussed briefly before exploring the fundamentals of the social license to operate on national level: confidence in Finnish governance, perceived social contribution and procedural fairness. Finally an attempt of an overview about the social acceptability of mining in Finland is given.

### 3.3.1 Background and current measures of mining in Finland

Mining in Finland has long traditions starting already from the 16th century (Vasara, 2018). Back then and the next four centuries since that the mines were mainly in the hand of Finland's state (Mononen & Suopajärvi, 2016). A fundamental change took place when the national legislation was amended in the 1990s (Hernesniemi, Berg-Andersson, Rantala & Suni, 2011 as cited in Mononen & Suopajärvi, 2016) and the ETA agreement came into force opening the markets also for foreign companies (Mononen & Suopajärvi, 2016; Rytteri, 2012). Soon after this the global market for mining minerals started to grow substantially turning also the Finnish ore-assets profitable and competitive (Mononen & Suopajärvi, 2016). Simultaneously population growth, strong urbanisation, increasing income levels and development of new businesses boosted the demand of mining minerals to a totally new level (Mononen & Sairinen 2011 Mononen & Suopajärvi, 2016). This lead to a new wave of mining in Finland but

compared to the mining operations earlier, there was something significantly diverge: the ownership of the mines was mostly foreign (Rytteri, 2012).




**Picture 2 Mines in Finland in 2017 (TUKES, includes information obtained from National Land Survey of Finland)**

Nowadays there are altogether 42 mines in Finland, from which nine produce metal ores, and the rest, 30 other mining minerals (Vasara, 2018, 10). Most of the metal mines are located in North- and East-Finland whereas other mining minerals are mined mainly in the east and south parts of Finland (Mononen & Suopajärvi, 2016, 10) as seen from the picture 2. The current ore finding projects are on the other hand mainly centralized in the northern part of Finland (Vasara, 2018, 21). In 2017 49,5 million tonnes of different metals and minerals were mined in Finland (Vasara, 2018, 5). Still the amount of mined minerals does not meet the demand of Finnish refineries and therefor part of the processed minerals are imported (Vasara, 2018). The demand-based global markets of mining minerals fluctuate heavily reflecting also to the mining operations in Finland (Vasara, 2018, 34). Especially year 2015 was reported to be tough for the industry but already the year after the future seemed brighter (Vasara, 2018, 34). The already existing mines have expanded their operations

increasing investments 25 % from 2016 till 2017, simultaneously the investments in ore finding grew substantiate 50 % (Turvallisuus- ja kemikaalivirasto, 2019). Finland's attractivity in the eyes of mining companies seems to be high. According to Fraser institute's yearly survey, Finland is the most appealing country for mining investments (Turvallisuus- ja kemikaalivirasto, 2019).

### 3.3.2 Confidence in Finnish governance

Maybe the most dramatic conflict in the national mining industry, the case of Talvivaara (Sairinen, Tiainen, & Mononen, 2017), is unavoidable while portraying the context of mining operations in Finland. Talvivaara was founded in 2003, right in the beginning of the new mining boom in Finland (Sairinen et al., 2017,4-5). During its most successful years (between 2007-2009) it was even referred as "Sotkamo miracle" (Sairinen et al., 2017, 4-5). However, soon after this the first problems emerged and till 2012 Talvivaara had driven to a complete chaos (Sairinen et al., 2017, 4-5). The severe environmental challenges in terms of wastewater leakage culminated to salinization of the local lakes (Sairinen et al., 2017, 4-5). Concerns rising from the neighbourhood soon received strong backup from the media and NGO's leading to political discussions (Sairinen et al., 2017, 4-5). The amount of articles concerning Talvivaara in Helsingin Sanomat, one of the largest subscription newspapers in Finland, increased from only few articles in 2005 to nearly 100 articles in 2012 (Tiainen, Sairinen, & Mononen, 2014, 18). The environmental complications and reputational conflicts eventually lead to serious economic crises and finally to the company's bankruptcy (Sairinen et al., 2017). Afterwards the incidents of Talvivaara have affected the general image of mining and other resource-extractive operations in various terms. Mainly it has decreased the confidence in Finnish authorities and governance (Sairinen et al., 2017). The distrust grew due to the insufficient environmental surveillance on the behalf of authorities and the ever-increasing environmental problems (Tiainen et al., 2014, 54-55).

However, Talvivaara is not the only case drawing a dreadful image of mining operations in Finland. Also Dragon Mining, an Australian mining company, has been accused in publicity of damaging the environment (Muhonen, 2019). The accusations were based on an illegal landfill found from the mine in 2016 and later they were investigated of illegal harvestings (Muhonen, 2019). Again, the faith in Finnish governance being capable of securing the society and environment of negative impacts through sufficient regulation and surveillance shrinked (Muhonen, 2019).

The new *Mining Act* was published in 2011 (*Mining Act 621/2011*, 2011). One of the main features of the new regulation was the enhanced position of the stakeholders, who are affected by the mining operations (Rytteri, 2012, 7). Despite the amendments, the new law was claimed to prioritize the interest of mining (Rytteri, 2012, 7). The mining legislation is again under reconstruction, which has elaborated the public debates (Kainulainen, 2019). In recent months the discussion about the validity of the regulation has heated to the point that it

has become one of the central subject in the political discussions (Teittinen, 2019). One Finnish politician even named Finland the Congo of Europe, referring to the irresponsible mining actions taking place in central Africa (Muhonen, 2019). The legislation is questioned of not guaranteeing that the mining operations won't substantially harm the nature (Jartti et al., 2017) and not securing the distributional fairness through equitable taxation (Muhonen, 2019; Teittinen, 2019). According to the conversation in Finnish media, many believe Finland hands over the national resources down-market (Muhonen, 2019). In addition almost all the political parties would be willing to increase the taxation of mining companies (Teittinen, 2019). The Finnish Association of Nature Conservation contributes to the conversation by further supporting taxes for mining operations and of suggesting a fund for possible future accidents and harms caused by the mines (Bruun, 2019). They continue with criticizing the current legislation especially of ignoring circular economy and not being able to protect regions included in Natura 2000 -network from ore finding and mining operations. In general the association blames Finnish mining legislation of being insufficient of securing environmentally sustainable mining (Bruun, 2019). Assumedly such public debate between politicians, media and NGOs will influence the trust in governance unfavourable and further decrease the acceptance of mining operations in general. According to Jartti et. al. (2017) over 50 % of Finns do not trust the environmental legislation nor the officials being capable of securing the Finnish nature from the environmental harms resource-extractive operations could cause. Nonetheless, the authorities are trusted slightly more than environmental legislation (Jartti et al., 2014, 214).

### 3.3.3 Perceived social contribution and involvement in decision-making

The concerns inside the Finnish society of not receiving the fair share of mining industry has been increasing after the ore finding and mining operations were opened also for foreign companies in 1994 and the following acquisitions of Finnish mining companies by multinational corporations entering the markets (Litmanen et al., 2016; Hernesniemi, Berg-Andersson, Rantala & Suni, 2011 as cited in Mononen & Suopajärvi, 2016). The problematic perceived around the current taxation weaken not only trust in governance as discussed above but also further the experience of distributional fairness (Litmanen et al., 2016).

One of the main perceived contributions of mining industry is job-creation (Jartti et al., 2017). The Business Sector Services by the Ministry of Economic Affairs and Employment of Finland estimated in their yearly industry report that the direct and indirect employment impact of mining is approximately 13 000 man-years (Vasara, 2018, 5). In addition, the mining companies operate primarily outside of the growth centres, creating jobs to the rural areas (Vasara, 2018, 8). Even if creation of jobs has been seen as an important benefit derived from mining sector it has also been argued most recently. For instance a Finnish politician remarked that Finnish employees in the fairly new pulp-mill in middle-Finland were a minority (Paananen, 2017). The reasons behind this stay unclear but from the viewpoint of SLO it is important to notice that the so-

cial acceptability of an industry might be questioned, if the employment is focused increasingly in foreign-based employees (Petterson & Suopajärvi, 2018).

In accordance with the international studies, other benefits perceived from mining industry in Finland are development of infrastructure, social well-being and other general regional benefits (Jartti et al., 2017) whereas experienced negative impacts were environmental hazards and increased health and living costs (Jartti et al., 2017). The mining industry's impact on value-added tax is estimated to be around 1 200 million euros in 2016 (Vasara, 2018) and employs altogether i.e. directly and indirectly 13 000 man-years (Kaivosteollisuus, 2018). Based on the public discussion in the beginning of 2010s the Finns expect from mining to bring incomes resulted from export, to create more jobs and impacting the Finnish economy positively (Rytteri, 2012).

In addition to these practical expectations Finns seemed to have also moral anticipations in terms of development of the national well-being. According to Jartti et. al. (2017) Finns perceived that an "average Finn is wealthier because of mining" but did not distinguish any impact on his or hers own nor family's finance. All in all mining was perceived strongly necessary for the vitality in eastern and northern parts of Finland (Jartti et al., 2014; Saariniemi, 2018). The network between mining and other industry actors is extensive (Vasara, 2018, 15) enhancing the business opportunities of supplying enterprises but also possibly causing negative impacts e.g. for tourisms (Mononen & Suopajärvi, 2016, 86-110), The arguments displayed by some NGO's confronting resource-extractive projects indicate increasing awareness of nature's monetary value e.g. through tourism but also other nature-based values such as health and general well-being which might be contrary to mining (Hämäläinen, 2018; Ruotsalainen, 2018).

### 3.3.4 Social acceptance of mining in Finland

All things considered the position of mining in Finnish society is not as secure as it used to be and the acceptance needs to be earned by distributing the benefits and harms equally (Rytteri, 2012). Likewise Jartti and Rantala (2014) remarked in their research that the boundaries for social acceptability have changed within time. Mononen and Suopajärvi published recently (2018) a book, "A mine in the Finnish society" (in Finnish: "Kaivos suomalaisessa yhteiskunnassa"), that extensively and successfully describes the position of mining in the Finnish society. In their work the authors explain interdimensionally the circumstances where mines in Finland started to operate from the beginning of the 20th century till today. They illustrate the general atmosphere and Finns attitude toward mining, based on some recent research published in Finland. Further, the piece of work gives a voice to several other Finnish researchers, who have done pioneering work in exploring the relationship of mines and Finnish society and business. As it turns out scholars have ap-

proached the Finnish attitudes toward mining industry from various perspectives.

Whereas Koivurova et. al. (2015) brought a qualitative perspective to the literature by investigating altogether eight different mines in Nordics from which two were located in Finland. Jartti and Rantala on the other hand addressed the subject with a quantitative approach in 2014. Their research is the first attempt to understand the Finnish attitudes toward mining in a broader sense (Jartti et al., 2014).The survey examined the social acceptability on mining and generally the "preconditions and limits" of social license to operate in four different regions in Finland: Uusimaa, North Karelia, Kainuu and Lapland. Later in 2017 Jartti published together with fellow researchers Litmanen, Lacey and Moffat another quantitative research concentrating on the national attitudes toward mining operations. As it appears, research of mining attitudes in Finland is a relatively new stream of research, which is continuously growing together with the increasing interest received from public, industry and political governments.

Both the results of Jartti and Rantala (2014) and the findings of Jartti et al. (2017) confirm that the social acceptability of mining is consistent between Finnish regions. Though, Jartti and Rantala (2014) found references of NIMBY (not in my backyard) - phenomenon in Finland; the Finns do not wish to have a mine in their backyard but are more likely to accept mining in general if it was located somewhere else than in their home municipality. Maybe slightly aberrantly Meriläinen-Hyvärinen, Heikkinen and Kunnari explored that the Finns were willing to accept the negative personal impacts if the mine's contribution towards broader society was positive while studying the Finnish attitudes and opinions towards mining industry by investigating conversation in internet based forums (Mononen & Suopajärvi, 2016, 213-242). Furthermore Jartti and Rantala (2014) discovered that the subject of mining matters the social acceptability significantly. The mining of aggregate and natural stone was accepted over mining of metals and minerals, yet the far most lowest acceptance rate was on uranium mining (Jartti et al., 2014, 184). In general the national approval of mining is just above moderate (Jartti et al., 2017). Also all Finnish political parties identified mining necessary with a boundary condition of operating sustainably (Teittinen, 2019).

# 4 DATA AND RESEARCH METHODOLOGY

## 4.1 Research strategy and design

The "primary stress" in research methodology related to the SLO has been on a qualitative approach (Howard-Grenville et al., 2008; Koivurova et al., 2015; Prno, 2013; Prno & Slocombe, 2014; Rytteri, 2012; Santiago & Demajorovic, 2016; Wilson, 2004), however recently also studies based on a quantitative perspective have been increasingly published (Boutilier & Thomson, 2011; Jartti et al., 2014; Moffat & Zhang, 2014; Saariniemi, 2018). Even though the qualitative research is often seen suitable for individual case studies (Lichtman, 2017), it has been suggested that the literature would onwards benefit further from the quantitative research on the field Prno and Scolombe (2014). While the ways these two different research streams view the surrounding world vary from subjective interpretation to objective reality (Lichtman, 2017, 8), they serve each other's by fulfilling the understanding of the SLO as a phenomena (Mononen & Suopajärvi, 2016, 115).

The contemporary study took place in the community where one of the Finland's largest mine pits (Issakainen, 2018) is located. The mine and the factory have a long history operating in the immediate vicinity of the municipality of Siilinjärvi, located in eastern Finland (Jaakko Pöyry Infra, 2004). The circumstances and background of the study are more elaborated in the chapter 2. Regarding the subject of the case study qualitative focus group interviews aiming to elaborate the entire site's communication from the viewpoint of the local community (Tekir Oy a), 2016) and several limited inquiries within EIA's surveying the local community's attitude (Ramboll a), 2018; Ramboll c), 2018; Ramboll e), 2013) had been conducted during the past years. Hence, to gain an even more comprehensive picture of the local community's expectations and attitudes towards Yara Siilinjärvi through the framework of social license to operate, a quantitative approach (Heikkilä, 2014, 16-19) was placed. Aiming to test the strength of the social license to operate comparable results based on measurable data (Lichtman, 2017) were seen to fulfil best the purposes of the research. Even if the nature of this empirical case study is descriptive while it concentrates to describe the phenomena at a single point in time (cross-sectional) within the local community of Siilinjärvi (Rose, Spinks, & Canhoto, 2014, 81-103), the repeatability of the research was as a point of interest during the study design. Quantitative methods (Heikkilä, 2014, 16-19) and data collection via survey empowers the aforementioned intentions enabling Yara Siilinjärvi to measure the strength of their SLO now and in the future. In this manner the company is also able to evaluate in the coming years, if the measures implemented for maintaining and strengthening the SLO have contributed to the desired results. Generally case studies investigating the SLO have applied induction as their form of reasoning (Gehman et al., 2017; Tiainen, Sairinen, &

Sidorenko, 2015). However combining the existing theories in the literature of the SLO derived through longitudinal empirical researches (R. G. Boutilier et al., 2012; Moffat & Zhang, 2014) the present research targets to interpret the strength of Yara Siilinjärvi site's SLO within the local community reflecting the theoretical framework. This type of abductive approach, constructs explanations based on the empirical observations and the existing theories (Mantere & Ketokivi, 2013).

## 4.2 Data collection

Despite the critiques addressed to general surveys, a well-structured questionnaire is a valuable tool for collecting quantitative data (Valli, 2015, 42). One of the undeniably benefits increasing the reliability of the research (Heikkilä, 2014, 28-29; Vilkka, 2007, 149) based on general surveys is the way questions are introduced to the respondent in the same format (Valli, 2015, 44). The questionnaire formulation phase is one of the most essential steps of a research design, since after collecting the data the possible errors caused by the questionnaire cannot be fixed anymore (Vilkka, 2007, 78-80) and therefor the questionnaire was carefully planned and tested before collecting the data. One of the features considered while designing the inquiry was the length of the questionnaire. Research has shown that an overly long questionnaire might intimidate respondents and cause sloppiness in answering (Heikkilä, 2014). The guideline of the maximum length; the approximate time used for answering should not extend 15 to 20 minutes (Heikkilä, 2014), was adopted. Also clarity, balance and logic throughout the questionnaire (Heikkilä, 2014) were essential features considered in the design phase. The language used in the survey was Finnish as it was the native language of the respondents'. The inquiry was introduced as a research study of local residents' attitudes toward Yara Siilinjärvi aiming to describe the relationship between the facility and local community. Participants were informed that the survey would take approximately 10 minutes and their responses were anonymous and confidential. Prior to the data collection the inquiry was tested among two specialists and two persons comparable to the members of the population for recognizing and further avoiding the possible inconsistencies and items potentially causing confusion (Heikkilä, 2014, 58) while increasing the validity of the research (Heikkilä, 2014, 27-28; Vilkka, 2007, 150). The survey consisted of three background questions, eleven statements and two open-ended questions (Appendix 1.). Next the different parts of the survey and their formulation are introduced.

While information of the respondents' age and gender are derived directly from the register used in sampling phase, the respondents' profession, level of education and the type of relationship with Yara was gathered as additional background information via the questionnaire. The relationship was categorized between seven groups; a current employee of Yara, a current employee of a sub-contractor of Yara, a former employee of Yara, a former employee of a

sub-contractor of Yara, a person that has heard from Yara but has no direct contact, a person that has been in contact otherwise with Yara and finally a person that doesn't know what Yara is.

The part of the survey concentrating on the measurable SLO is based on the statements validated in previous literature, especially the thorough studies of Moffat and Zhang (2014), Boutilier and Thomson (2011) including around 5,000 stakeholders in 60 project (Black, 2013) and more recent research conducted by Saariniemi (2018). Boutilier later factor analysed the 15 statements utilized in his and Thomson's study (2011) leaving only 12 statements, this breakthrough and the remaining statements were furthermore notified while structuring the present questionnaire. Since "one size does not fit all" (Ruggie, 2015, 31), the statements into the current survey were furthermore chosen with respect to the circumstances of the case study by considering the aforementioned previous subject-related studies (chapter 2.2) conducted during the company's history (Ramboll a), 2018, 160-163; Ramboll c), 2018, 209-216; Ramboll e), 2013, 149-153; Tekir Oy a), 2016). The statements selected to the survey and further modified to fit the case study are expected to act as reflective measures (Bagozzi, 2017; Jarvis, MacKenzie, & Podsakoff, 2003), having high inter-correlations (Cronbach's Alpha) between each others especially regarding to the three components of the SLO (social contribution, communication, involvement). One of the most well known and broadly used ordinal scales (Holopainen & Pulkkinen, 2008, 15; Valli, 2015), five-point Likert's scale (1932) (1 = completely disagree – 5 = completely agree) (Heikkilä, 2014, 51-52) was chosen as the measurement scale for the statements of the present research. Additionally to the options based on the Likert's scale, "I don't know" (IDK) was offered as the sixth option to avoid the problematic situation of forcing the participants to choose an answer (Valli, 2015, 57).

**Social contribution** was measured with four statements adopted from Boutilier (2017) and Saariniemi (2018) (statements 2,3,4,9). Moffat and Zhang (2014) measured the impact on social infrastructure similarly with four different statements. The statements included aspects of housing affordability and availability, access to health care and other facilities such as social service in the municipality. Also Boutilier (2017) and Saariniemi (2018) utilized statements, which measured the impacts on society in their research in different case studies aiming to measure the level of SLO. In the present study the statements from the aforementioned studies were chosen because of their simplicity. The participants were asked in the present research to rate to which extent they agree "Yara impacts positively to the well-being of the region", Yara considers the local sources of livelihoods in its operation", "Yara is engaged into the development of Siilinjärvi municipality" and " Yara is committed to the aftercare of its regions".

**Communication** and interaction was measured with two statements (statements 1,10). Even though, Moffat and Zhang (2014) established that contact quality correlates significantly with trust, the questions related to this factor

where somewhat problematic to utilize in this specific study. This is because the questions included a presupposition of a relationship between the company and the local community. In reality just few members of the local community were anticipated to possess such a relation. Similar issues were faced with the statements Boutilier (2017) utilized in his research. Instead of measuring the contact quality as such, it was seen more useful for the company to investigate, how pleasant and easy the members of the local community estimate the possible contacting of the personnel of Yara Siilinjärvi would be. The respondents were asked to which extent they agree with the following items: "Yara shares sufficiently information on matters that affect us, the residents of Siilinjärvi" and "If I would like to contact the staff of Yara Siilinjärvi, it would be easy."

**Involvement in decision-making** was measured with four statements (statements 5,6,7,8) as follows: "Yara listens and appreciates the opinion of us, residents of Siilinjärvi", "Yara compensates sufficiently the harm caused by its operations", We as residents of Siilinjärvi have the opportunity to be involved in making decision concerning Yara", "Yara is prepared to make adjustments in its operations with regards to the opinions of the residents of Siilinjärvi". The items utilized were adapted from Moffat and Zhang (2013), Boutilier (2017) and Saariniemi (2018).

**Trust** towards the company was measured with one statement (statement 11). Measuring trust had two-fold aims: first to contribute to the level of the SLO as well as to evaluate, how other factors correlate to trust. The respondents were asked to rate to which extent they agree, "Yara acts responsibly" (adapted from Moffat & Zhang, 2013).

Finally, the optional open-ended questions aimed to provoke comments, which describe more in-depth the underlying thoughts, attitudes as well as hopes and concerns amongst the members of local community (Boutilier, 2017; Valli, 2015). Giving the respondents an opportunity to summarize their feelings was expected to derive ideas and thoughts that could not have been anticipated (Heikkilä, 2014, 47-48; Valli, 2015), constructing valuable information for understanding strengths and weaknesses from the perception of the local community. The open-ended questions were divided by their nature into one accelerating the respondents to express the positive impressions related to the operation and into one stimulating the participants to open up about the negative notions. The aim of this form of distinguishing was to ensure the generation of answers to both viewpoints (strength and development area) (Aldrige & Levine, 2001, 101-102). The first open-ended question was formulated as follows "In which has Yara in your opinion succeeded?" and the second "In which measures does Yara still have to develop itself?". These additional questions were not considered when evaluating the acceptance by measuring the level of the social license to operate but were be separately analysed.

As discussed in the theoretical framework (chapter 3) the stakeholder network granting the social license to operate is not geographical limited but

should consider all relevant stakeholders that are affected or can affect the company identified through a stakeholder analysis. In this case study, the research is restricted to comprise the level of social license grant by local community as the local community was identified as a key stakeholder in regards with the social license to operate (Tekir Oy b), 2016) while the impacts of the operation mostly land on them (Ramboll e), 2013). Secondly, the image of Yara among the local community is in central interest of the future expansion plans, which would affect above all the residents of the nearby municipality (Ramboll a), 2018). Lastly, the aim is to better understand the community's attitude towards the company and enable to build a working communication model between the company and local community on that understanding. A working communication would further enable a win-win situation for both parties as the local community could be involved in decision-making of the future scenarios which onwards would strengthen the SLO and ensure the continuity of the operation (Prno, 2013).

The survey was accordingly to this, targeted to residents of Siilinjärvi aged between 18-79 years. As the population is rather large a sufficient sample of 150 respondents (Heikkilä, 2014, 40-43) was decided on. As the sample can never represent fully the population e.g. due to the restricted amount of known phone numbers and possible update delays even in the most trustworthy register, there is always some under-coverage in the sample (Holopainen & Pulkkinen, 2008, 41). Accordingly, unattainability and e.g. lack of language skills among the respondents could cause next to the under-coverage biases to the data (Holopainen & Pulkkinen, 2008, 41). The data collection phase was completed entirely by an external service provider, Taloustutkimus Oy. A simple random sampling was applied to form the sample from Bisnoden register ("Yaran imago," 2019) with respect to the socio-demographic structure (age and gender) of the municipality of Siilinjärvi ("Yaran imago," 2019). Afterwards the results were also weighed representing the population according to age and gender, yet the differences between weighted and unweight data were marginal as the variance was only from 0,0 to 0,2 %. The unweight data is recommended to use while analysing T-test as with weighted data the growing sampling size biases the deviation in a way that already marginal variances appear as significant (Hickey, Grant, Dunning, & Siepe, 2018). Hence, it is justifiable to exploit the unweight data for the analyses of this particular sample study.

Furthermore to accumulate an adequate amount of data within reasonable time, the collection was decided to execute via telephone (Heikkilä, 2014; Pahkinen, 2012, 192). The impact of the interviewer over interviewee in telephone surveys does exist but is rather low (Heikkilä, 2014, 65-66). The interviews were carried out from a controlled telephone interview centre located in Helsinki by nine professional inquirer trained by Taloustutkimus Oy ("Yaran imago," 2019), further lowering the inquirers impact. Other benefits related to data collection via telephone are the low rate of misconceptions and higher accuracy in answers compared to postal and internet-based surveys (Heikkilä,

2014, 65-66). The telephone interviews were conducted between 25. - 27.2.2019 ("Yaran imago," 2019).

## 4.3 Data analysis

The questionnaire of the present quantitative-nature case study consists of two diverse sections: the background information and the statements next to the open-ended questions, constituting quintessentially divergent data to analyse. Subsequently the quantitative analyses targeted to the statements are demonstrated and second the analyses of the open-ended questions based on more qualitative nature are exemplified. The analysing process is illustrated as whole in the Figure 6 below.

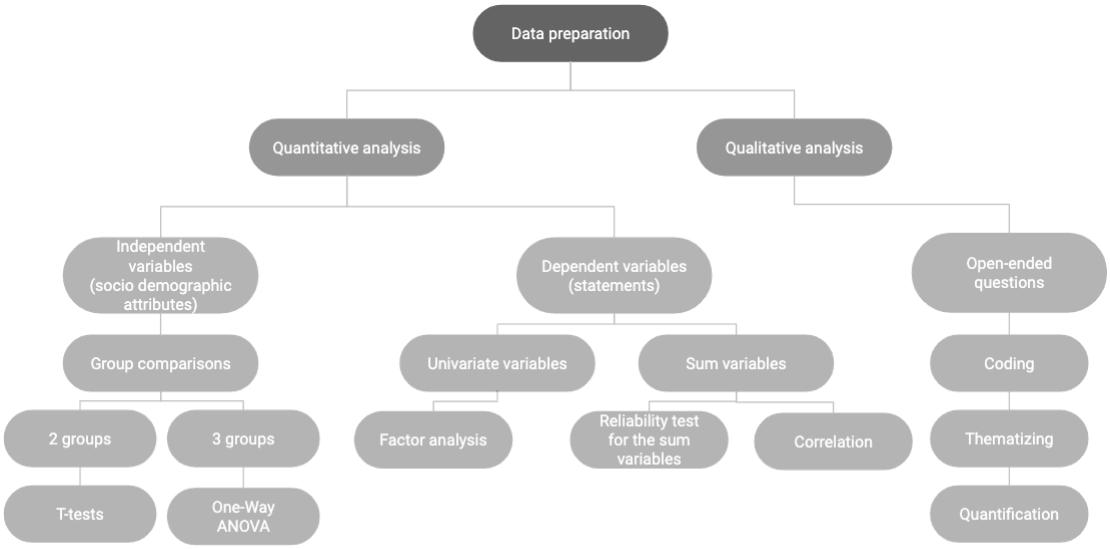



**Figure 6 The process of data analyses**

To analyse the measurable data (the independent and the dependent variables; the background information and the statements) IBM SPSS software was utilized. Prior to analyses the collected data had to be first prepared (Heikkilä, 2014). The respondents who, did not know Yara beforehand were excluded of the data, as a result of n = 146. Next some of the independent variables including marginally participants were grouped into new variables in order to derive reliable results (Table 2.).

**Table 2 Overview of the grouping of the independent variables to new variables**

| | | |
|---|---|---|
| Profession | Employed | Employed and entrepreneurs (working) |
| | Entrepreneurs | |
| | Pensioners | Others |
| | Students | |
| | Homemakers | |
| | Unemployed | |
| | Others | |
| Education | Comprehensive school or equivalent | Comprehensive education |
| | Vocational school or equivalent | Vocational or post secondary education |
| | Post secondary education (historical) | |
| | University of Applied Sciences | Higher education |
| | University | |
| Relationship | Heard of Yara but not in direct contact with Yara or the contractors of Yara | Heard of Yara but not in direct contact with Yara or the contractors of Yara |
| | Currently employed by Yara | Has been employed or is currently employed by Yara or Yara's contractor |
| | Currently employed by Yara's contractor | |
| | Has been employed by Yara | |
| | Has been employed by Yara's contractor | |
| | Has been in contact with Yara in other ways | Has been in contact with Yara in other ways |
| | Does not know what Yara is | Excluded from the research analyses |

As the Table 2. illustrates profession was grouped into two new variables, education into three variables and relationship respectively into three new variables. Age was already grouped by the data provider (Taloustutkimus Oy) into the following three classes: under 40 years old, between 40-59 years old and 60 and over years old. As the "I don't know" answers were given in the data collection the measure of six (6), these answers were transformed to missing data before analysing the statistics and the mean tests to avoid the biases in means. After the data transformation and preparation, statistics as in mean, standard deviation, percentage distribution of the dependent variables were analysed (Muijs, 2011, 79-96; Watson, 2015) and group comparisons to test the possible differentiation between the socio-demographic attributes and the participants'

relationship with Yara through significance tests (Valli, 2015, 103-120) were calculated (Figure 6.). Following the calculations executed for the dependent variables are discussed before the tests for the independent variables.

The overall mean (Valli, 2015) of the eleven statements (univariate variables) resembling the general level of the SLO and the means of each statement were calculated and compared for establishing the possible weaknesses and strengths in the social license to operate of Yara Siilinjärvi. The percentages of answers accordingly to the measures of the Likert's scale (5 = "Completely agree", 4 = "Somewhat agree", 3= Do not agree or disagree, 2 = " Somewhat disagree", 1 = "Completely disagree") related to each statement were calculated. Even though median is suggested to be utilized as the descriptive statistics for order scale (Valli, 2015) also mean is commonly used when it comes to attitude surveys (Heikkilä, 2014, 81) like the research in question typifies. As a single mean is quite general, a standard deviation, describing how the data is scattered between the scales is introduced next to it (Valli, 2015). The standard deviation characterizes the extent of the variation between answers (Valli, 2015).

According to the literature there are three components predicting the acceptability; social contribution, communication and involvement in decision-making (see chapter 3.2.2.) Next sum variables were formulated from the univariate variables to establish the statistics of these components and to explore the possible strengths and weaknesses of Yara's sites SLO. First a factor analyses for univariate variables was executed to investigate the possibilities for formulating the sum variables as such like illustrated in the Figure 6. (Muijs, 2011, 198-217). The eleventh variable was excluded from the factor analyses as it measures trust (Moffat & Zhang, 2014), leaving ten statements for the factor analyses. However, it was known that receiving sufficient results was rather unlikely as the amount of variables (10 statements) is in comparison to the amount of factors (three sum variables) rather small (Valli, 2015, 127). Accordingly, the reliability of the theory-based sum variables (Valli, 2015, 142-143): social contribution, communication and involvement were likewise examined (Boutilier & Thomson, 2011; Moffat & Zhang, 2014). After ensuring the reliability of the sum variables, the means and the standard deviations were calculated similarly to the univariate methods. Subsequently the correlation between the sum variables and trust is calculated with Spearman's nonparametric correlation (Valli, 2015, 97-99). This form of covariation analysis reveals the possible relationship between variables, however not the cause-effect logic (Holopainen & Pulkkinen, 2008, 233-259). The aim is to ensure that likewise in previous studies the statements correlate with trust, the precondition of acceptance, also in this specific case-study and hence, the results of the study can be reliably interpret as the strength of the social license to operate.

To compare the possible differences in attitudes between the diverse socio-demographic groups in a point of time, group comparison with significance tests (T-test and One-Way ANOVA) were utilized (Heikkilä, 2014, 209-216). The significant tests allows to scrutinize the "null hypothesis" with comparing the

means and examining if there are any statistically significant differences between the groups (Holopainen & Pulkkinen, 2008, 175-178) in so that the results illustrate more than random fluctuation (Valli, 2015, 103-104). Generally the statistical significance (Holopainen & Pulkkinen, 2008, 177) is divided into the following three categories: * Statistically somewhat significant ($p < 0,05$), ** Statistically significant ($p < 0,01$) and *** Statistically highly significant ($p < 0,001$). Although nonparametric tests e.g. Mann Whitney U-test are usually recommended for ordinal scales (Valli, 2015, 111-114), the background variable groups are in this specific research large enough to calculate the significances with commonly used parametric T-test (Holopainen & Pulkkinen, 2008, 203-204). Even if the nonparametric tests could be utilized for testing the univariate dependents, the sum variables being continuous variables require the parametric tests (Valli, 2015, 40). As T-test can be only calculated for variables including two different groups (gender and profession) (Holopainen & Pulkkinen, 2008, 187-189), One-Way Analyses of Variances (One-Way ANOVA) was used for the variables including more than two different groups (the age group, the education and the relationship) (Valli, 2015, 118-119). To test the variances between single pair's (Post Hoc) next to One-Way ANOVA tests, Tykey's HSD test was used when the variances of the dependent variable were equal in F-test and in scenarios where the variances were unequal Tamhene's test was used (Metsämuuroinen, 2009, 794). As the F-test does not give a reliable result when the variances are unequal, a robust test like Brown-Forsyth and Welch were calculated to examine the significance in these situations (Metsämuuroinen, 2009, 795). While analysing the statistics, T-tests and One-Way ANOVAs of social contribution and involvement in decision-making, only data covering answers to more than 50 % of the statements comprising (at least to three out of four statements) of the sum variable were approved to insure the sum variables credibility. Such defining was not conducted to communication variable as it consists only of two statements.

Analysing the open-ended question offer a diverse challenge compared to the results derived from the structured part of the questionnaire. According to the literature the qualitative data analysis differs from the quantitative based analysis principally by the nature of the processes way of proceeding; while the quantitative data analysis tends to progress rather straight-forward from prior step to next, the qualitative data analysis proceeds iteratively as the data is revisited while new questions and interlinks appear and the understanding of the data deepens (Hair Jr., Celsi, Money, SAmouel, & Page, 2015, 295). Tuomi and Sarajärvi (2018) distinguish the qualitative analysis into two categories; analyses guided by theory e.g. the grounded theory, the phenomenological or the phenomenological-hermeneutic analysis and analyses, which are not primarily directed by a theory such as the content analysis. The content analysis being the fundamental approach in the qualitative analysis can be furthermore diversely applied in any kind of qualitative data analysis (Tuomi & Sarajärvi, 2018, 103) and hence, was also chosen to exploit in the present research.

As Tuomi and Sarajärvi (2018) illustrate, the prevalence techniques of analysing the content are classifying, thematizing and typifying. In typifying the data is grouped into sort of representatives groups or "types" (Tuomi & Sarajärvi, 2018, 107), yet this was not considered to bring any added value for the analysis of the study in question. Hence, in the present research the respondents' comments were first classified by coding them and afterwards thematized when applicable. Even if coding is widely used in the qualitative content analysis the background of these methods lay on the quantitative methods (Tuomi & Sarajärvi, 2018, 103-107). Coding, maybe the simplest form of organizing data means in practice splitting data into sections, which than are given shorter code names (Tuomi & Sarajärvi, 2018, 105). Hence, coding simplifies and reduces data efficiently, leaving only the most representative parts of text for closer analysis (Hair Jr. et al., 2015). Indeed the goal of coding is to enable the researcher to concentrate on the relevant characteristics of the data (Hair Jr. et al., 2015). Thematizing on the other hand can be interpreted to be a slightly more enhanced version of coding. While thematized an interpretation by underlining what is said about each theme is added to the code (Tuomi & Sarajärvi, 2018, 103). As the comments received in the current study are rather short, deeper thematizing was partially challenging to implement and hence, was utilized only on applicable comments. While analysing the comments from open-ended questions in this specific case-study theory guiding analyses, a sort of space pattern of the data-driven (inductive) and theory-driven (deductive) approaches are utilized (Tuomi & Sarajärvi, 2018, 109-110). This form of abductive reasoning allows reflecting the observations next to the existing theory (Tuomi & Sarajärvi, 2018, 112-114). As Tuomi and Sarajärvi (2018) note in their book, the aforementioned approach might occur in practice more often than granted as the researcher is usually familiar with prevailing theories and hence the reasoning never takes place in isolation. Accordingly, to explore and identify patterns and themes from the respondent's comments on the open-ended questions coding (Hair Jr. et al., 2015) and further thematizing was used on an analysis structure based on the existing theories of the SLO. However, space for spontaneous classifications were left. The practical analysing work was conducted manually in Microsoft Excel. Before formulating the analysis structure (Tuomi & Sarajärvi, 2018, 127-132), the comments were given initial codes. Despite the shortness of the comments, they were mostly given more than one code. Next the initial codes were crosschecked with the before-known components of the social license to operate and thematized based on them. Finally, the codes were quantificated by calculating the frequencies of the formed codes (Tuomi & Sarajärvi, 2018, 135).

# 5 RESEARCH FINDINGS

## 5.1 Background information

To confirm the generalizability of the results the respondents should represent fairly well the socio-demographic structure of the population of Siilinjärvi (Heikkilä, 2014, 31-32). This was partially considered already in the data collection phase while the sampling was collected representative to the population based on age and gender. Next rest of the characteristics; education and profession are reflected on the population.

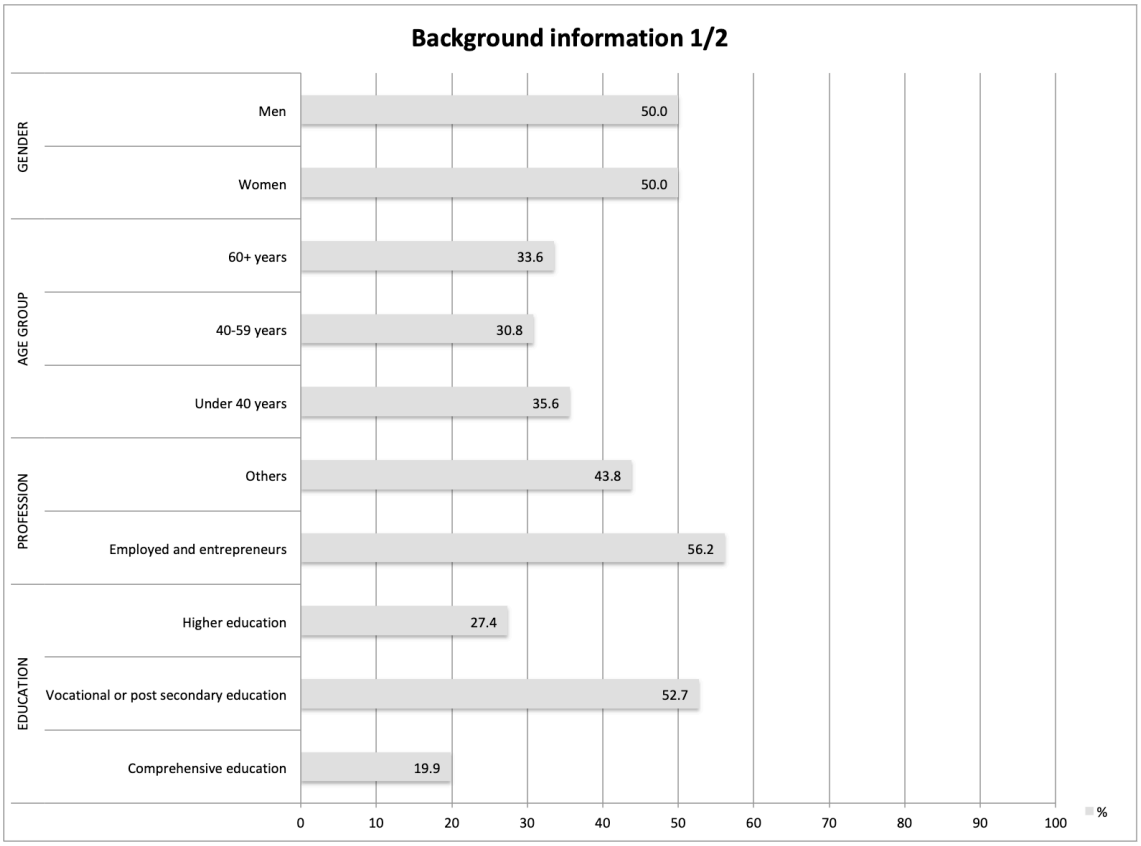



**Figure 7 The distribution of the respondents according to their gender, age, profession and education**

According to the Statistics of Finland the proportion of working residents in Siilinjärvi was 75,7 % in 2017 (Tilastokeskus, 2017). From the participants of the survey altogether 56,2 % was employed or entrepreneurs and the rest 43,8 % consisted of pensioners, students, and homemakers, unemployed and other unclassified (Figure 7.). Hence, the working residents were slightly under represent in the sampling. Some bias could cause the situations where one is simultaneously both working and studying. Although, this cannot cover the whole gap as the share of students was only 6 % of the respondents (Appendix 3). The sample represents however relatively well the educational struc-

ture of Siilinjärvi, at least when it comes to vocational or post secondary and higher education. The amount of participants with higher education is 27,4 % and the amount with at least vocational or post secondary education is 80,1 % (Figure 7.). Based on Statistics of Finland the amount of residents in Siilinjärvi obtaining a higher education was 31,6 % and at least vocational or post secondary education 76,6 % in 2017.

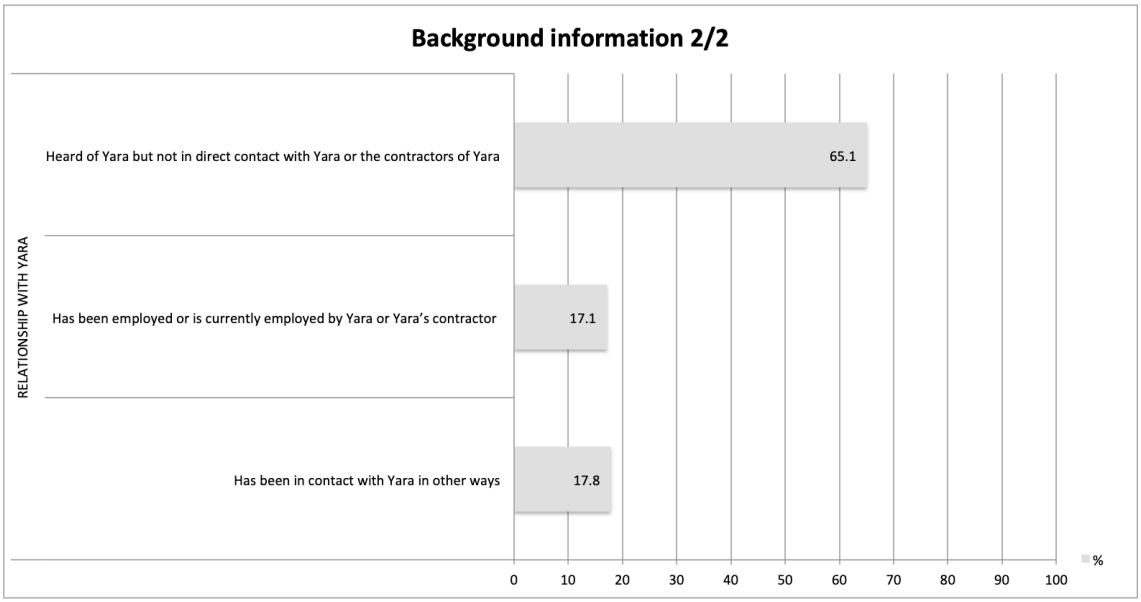



**Figure 8 The distribution of the respondents according to their relationship with Yara Siilinjärvi site**

Also the relationship with Yara was explored in the survey. The vast majority (65,1 %) of the participants had heard about Yara and its operation but had not dealt directly with Yara or the contractors of Yara (Figure 8.). Only 17,1 % of the respondents had either been in an employee relationship with Yara or its contractors or is currently in one (Figure 8.) and respectively 17,8 % had been in connection with Yara other ways. The four respondents out of total 150, who did not know what Yara is, were excluded from the results (n=146).

## 5.2 The strength of Yara's social license to operate

To evaluate the strengths of different components of the SLO, the eleven statements were divided into three groups (sum variables): social contribution, communication and involving in decision-making (see more in chapter 4.2.) based on the existing theory. The hypothesis is that the statements included in one sum variable measure the same factor (Metsämuuroinen, 2009, 544; Valli, 2015, 121-122). To confirm the reliability of the sum variables two analysis are utilized: the factor analysis (Valli, 2015, 121-128) and the reliability test through Cronbach's alpha for the theory-based sum variables (Metsämuuroinen, 2009, 544-552). The factor analysis illustrates, which of the statements measure the same factor. The results of the factor analysis differ slightly from the theory-based grouping into the sum variables (Appendix 6.), which was anticipated

due to the restricted amount of statements compared to the amount of sum variables (chapter 4). The suggested amount of sum variables out of the original variables is 20 %, which in this case (3 sum variables out of 11 statements) is exceeded (Valli, 2015, 127) and is therefore arguable. However the reliability test through Cronbach's alpha supports the theory-based sum variables (Table 3.). The Cronbach's alpha value exceeds 0,500 that is generally comprised as the lower limit of reliability (Muijs, 2011, 217-221) with two sum variables: social contribution and involvement in decision-making (Table 3). The value remains lower for the third sum variable: commitment (a = 0,410). While there are only two statements included to the aforementioned sum variable, it is mostly unlikely that the reliability test would rise over the lower-limit (Muijs, 2011, 217-221). Hence, the theory-based sum variables can be held reliable and it was furthermore justifiable to continue with them.

**Table 3 The results of the reliability test for theory-based sum variables**

| Sum variable | Statement | Cronbach's alpha |
|---|---|---|
| Social contribution | 2. Yara impacts positively to the well-being of the region. | 0,754 |
| | 3. Yara considers the local sources of livelihoods in its operation. | |
| | 4. Yara is engaged into the development of Siilinjärvi municipality. | |
| | 9. Yara is committed to the aftercare of its regions. | |
| Communication | 1. Yara shares sufficiently information on matters that affect us, the residents of Siilinjärvi. | 0,410 |
| | 10. If I would like to contact the staff of Yara Siilinjärvi, it would be easy. | |
| Involvement | 5.Yara listens and appreciates the opinion of us, residents of Siilinjärvi. | 0,792 |
| | 6.Yara compensates sufficiently the harm caused by its operations. | |
| | 7. We as residents of Siilinjärvi have the opportunity to be involved in making decision concerning Yara. | |
| | 8. Yara is prepared to make adjustments in its operations with regards to the opinions of the residents of Siilinjärvi. | |

The correlation between the sum variables (social contribution, communication and involvement) and trust was calculated to ensure that the theory is fit in the present case study. As the Figure 9. below illustrates the aforementioned three components of SLO do predict likewise to existing theories trust, which again is according to the literature the bases of acceptance and the license

to operate (Moffat & Zhang, 2014). The covariation analysis (Figure 9) reveals the relationship between the variables, however not the possible cause-effect logic (Holopainen & Pulkkinen, 2008, 233-259). The closer the correlation coefficient is to the absolute value of one, the stronger the correlation between the components is (Valli, 2015, 99). In this study the correlation between each of the components of the SLO and the correlation between the components and trust is between 0,412 and 0,643, which can be interpret important for the practice in these sociological circumstances (Holopainen & Pulkkinen, 2008, 246). The correlation between the different components and trust is moderately equal; the strongest correlation was established between social contribution and involvement (r=0,643**) and the weakest between communication and trust (r=0,412**). As the probability of randomness in the results is 1 % (** significant at the level 0,01) the correlation can be generalized to the population (Valli, 2015, 99).

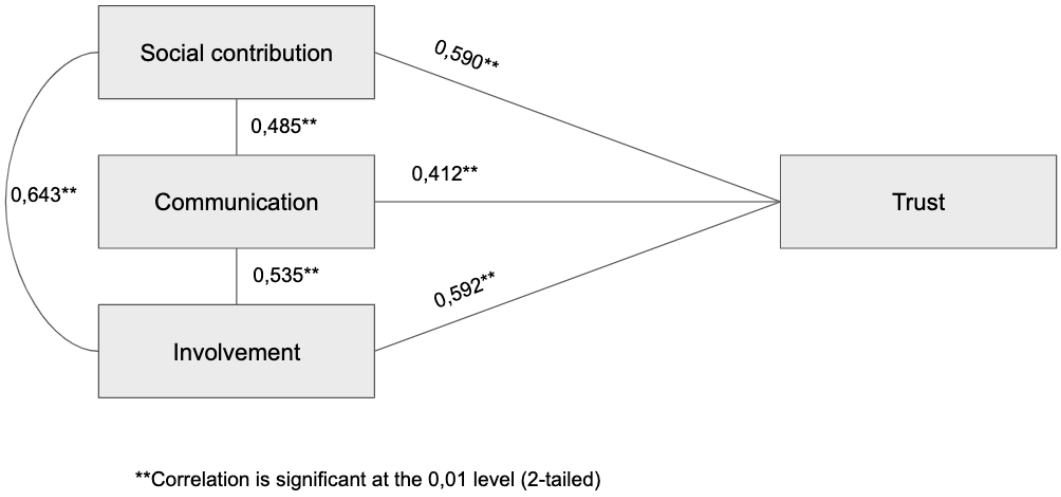



**Figure 9 The correlation (r) between the sum variables and trust (adopted from Moffat & Zhang, 2014)**

The overall mean of the eleven statements was 3,31 (sd. 0,67), which is slightly above midpoint on the scale of 1 to 5 (Table 4). As illustrated in the Table 4. the results demonstrate that the strongest component of the SLO of Yara Siilinjärvi is social contribution while performing in communication and involvement in decision-making was perceived weaker.

**Table 4 The means and standard deviations of sum variables and trust**

| | Mean (M) | Standard deviation (sd.) |
|---|---|---|
| Social contribution | 3,47 | 0,73 |
| Communication | 3,25 | 0,88 |
| Involvement in decision-making | 3,02 | 0,72 |
| Trust | 3,56 | 0,89 |
| Total | 3,31 | 0,67 |

To explore the possible differentiation in attitudes between different the background variables (socio-demographic and relationship with Yara), the significant tests (T-test and One way-ANOVA) were executed for the following independent variables: gender, age, profession, education and relationship. The possible significance of the results is divided into three categories; * statistically somewhat significant ($p < 0,005$), ** statistically significant ($p < 0,01$) and *** statistically highly significant ($p < 0,001$) are utilized (Holopainen & Pulkkinen, 2008, 177). The values indicate the risk included into the generalization of the results; the possibility of randomness in statistically somewhat significant is 5 % whereas in statistically significant it is 1 % and correspondingly in statistically highly significant the coincidence is only 0,1 % (Valli, 2015, 103). No statistically significant differences between the independent variables were found while testing the sum variables (social contribution, communication, involvement). However, when analysing the possible differences between the same independent variables on the statement level, some statistically significant (*) differences were explored. The aforementioned statements and differences between the background groups are discussed more precisely in the corresponding chapters below.

### 5.2.1 Social contribution

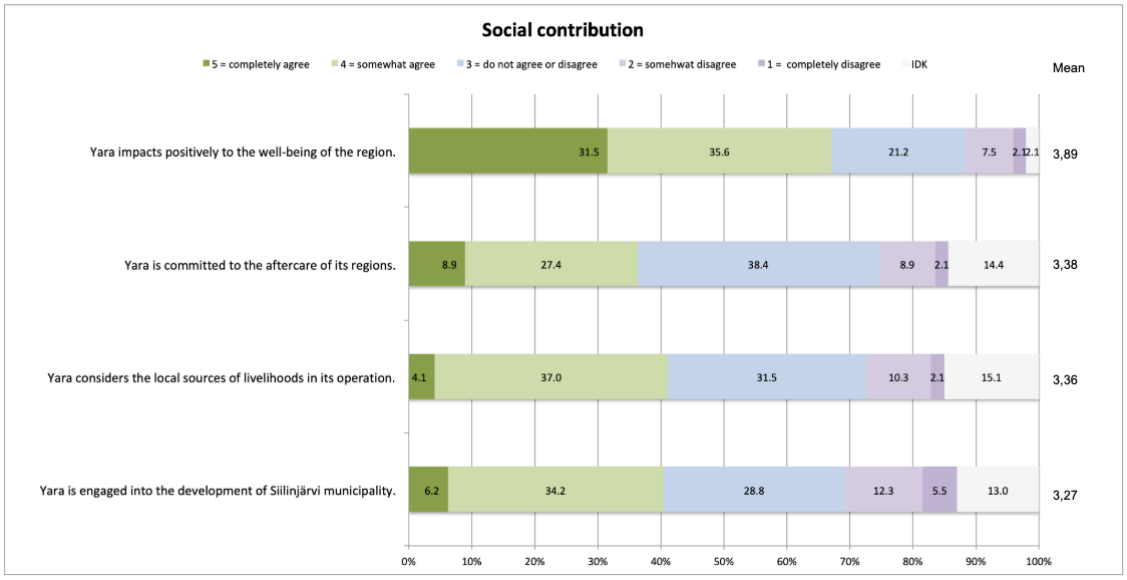



**Figure 10 The statistics of the statements linked with social contribution**

The social contribution was measured with four diverse statements as illustrated in Figure 10. above. The company's positive effect towards the region was agreed the most as altogether over 67 % of the participants agreed completely or somewhat with the statement. Only 4,2 % of the respondents completely disagreed or somewhat disagreed with the statement. Clearly the perception of the company's positive effect to the region is strong. The statement had also the highest answer rate as only 2,1 % of the participants respondent "I don't know" and moreover shared opinions as also the percentage of par-

ticipants with neutral view (21,2 %) was far most the lowest. Men perceived the positive effect stronger than women (Sig. 0,031*) and the older generation (60 + years old) agreed with the positive impact over the younger generation (under 40 years old) (Sig. 0,040*). A linear correlation was explored between the age and agreement with the company's positive effect towards the region.

Most of the respondents, 38,4 %, neither agreed or disagreed with the statement "Yara is committed to the aftercare of its regions." whereas 36,3 % of the participants either completely or somewhat agreed and only 11 % somewhat or completely disagreed with the statement. If the company considers local business next to its activity and the company's commitment to develop the municipality of Siilinjärvi was perceived similarly somewhat positive. No statistically significant differences between the background variables in the aforementioned statements were confirmed. Overall, social contribution was explored to be the strongest component of Yara's social license to operate with the mean of 3,47 (sd. 0,73) as elaborated in table 4 in the beginning of this chapter.

### 5.2.2 Communication and interaction

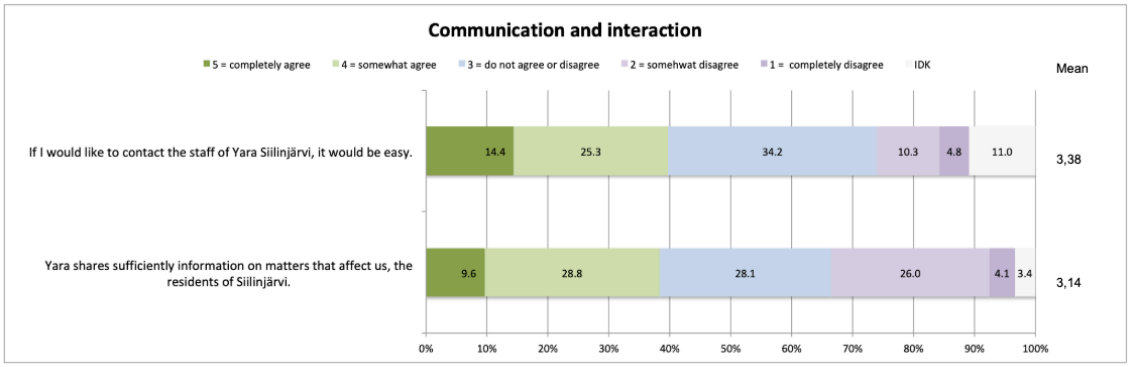



**Figure 11 The statistics of the statements linked with communication and interaction**

Communication and interaction was measured with two factors (Figure 11.). Altogether 39,7 % of the respondents perceived it completely or somewhat effortless to contact Yara's employees if they wanted, while 15,6 % completely or somewhat disagreed with the statement and correspondingly 34,2 % did not agree or disagree. The participants that were either entrepreneurs or employed grasped it easier to contact Yara's staff if they wanted than the others; pensioners, students, homemakers, unemployed and other unclassified (Sig. 0,011*). Also education was established to correlate linear with the perceived effortlessness in contacting the company; participants with higher education (University and University of Applied Sciences) experienced contacting easier than the respondents with a lower education (comprehensive school or equivalent) (Sig. 0,025*).

The share of participants completely or somewhat agreed with the second statement: "Yara shares sufficiently information on matters that affect us, the residents of Siilinjärvi"." was 38,4 % whereas 30 % completely or somewhat disagreed. Only 3,4 % of the respondents replied, "I don't know", which is one

of the lowest rates. Regarding to the aforementioned statement no statistically significant differences between independent variables was determined. With the mean of 3,25 (sd. 0,88) communication and interaction was weaker than social contribution but stronger than involvement in decision-making (Table 4.).

### 5.2.3 Involvement in decision-making

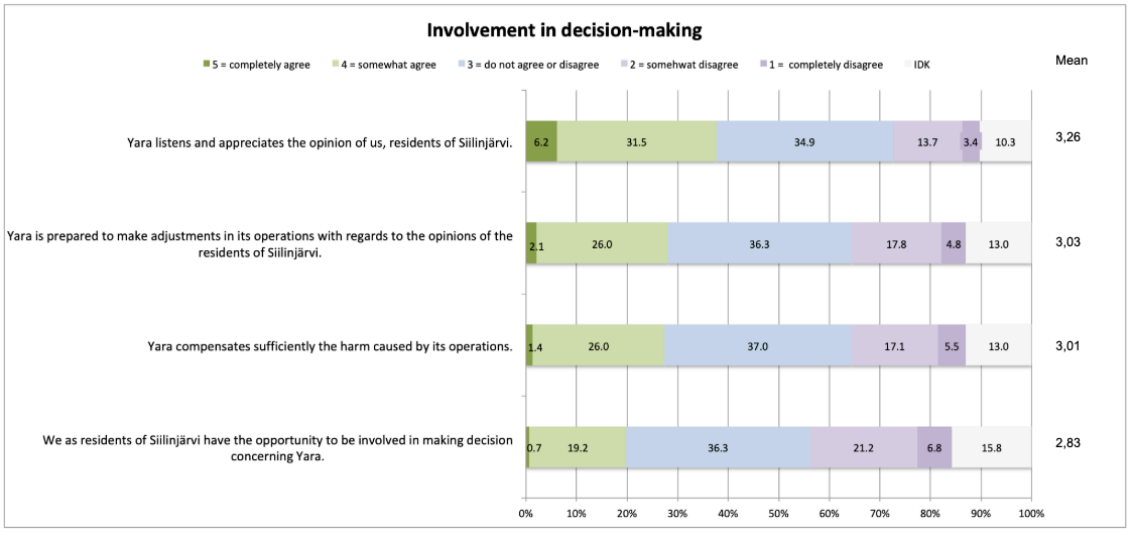



**Figure 12 The statistics of the statements linked with involvement in decision-making**

Involvement in decision-making was measured again with four statements elaborated in Figure 12. 37,7 % of the respondents did either completely agree or somewhat agree with the statement "Yara listens and appreciates the opinion of us, residents of Siilinjärvi". Almost the same amount of participants, 34,9 %, neither agreed or disagreed with the statement and 17,1 % either somewhat or totally disagreed. The participants over 60 + agreed significantly over the respondents between 40-59 years old that the company listens and appreciates the local community's opinion (Sig. 0,040*). However no linear correlation was explored since the respondents under 40 agreed with the statement more than the participants between 40-60 years old. Correspondingly the participants with a comprehensive school or equivalent education agreed statistically almost significantly more with the statement than participants with a vocational or post secondary education (Sig. 0,049). However, again no linear correlation was explored since the respondents with a higher education agreed with the statement more than the ones with a vocational or post secondary education.

The next two statements: "Yara is prepared to make adjustments in its operations with regards to the opinions of the residents of Siilinjärvi" and "Yara compensates sufficiently the harm caused by its operations" was perceived similarly. The participants with a comprehensive school or equivalent education agreed significantly more with both statements than the participants with a vocational or post secondary education (Sig. 0,033* and Sig. 0,026*). Yet, again no linear correlation was explored since the respondents with a higher education agreed with the statement more than the ones with a vocational or post secondary education.

Lastly, 28 % of the participants perceived that the residents of Siilinjärvi are not able to participate in making decision concerned Yara while just fewer than 20 % completely or somewhat agreed. The majority, 37 %, did not agree or disagree that the residents of Siilinjärvi have the opportunity to participate in the decision-making process. 15,8 %, replied that they don't know, which is the highest rate between all the statements. No statistically significant differences were established between the background variables while exploring the statement in question. Involvement and decision-making was perceived as the weakest link between the factors of Yara Siilinjärvi license to operate. The mean was only 3,02 and the standard deviation 0,72 (Table 4.).

### 5.2.4 Trust

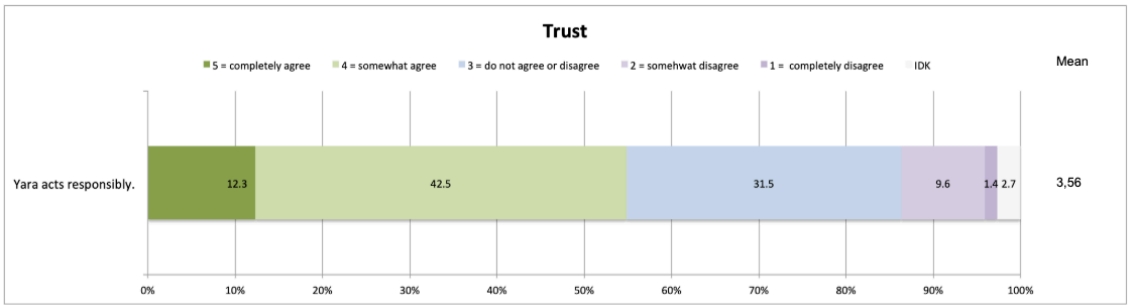



**Figure 13 The statistics of the statement linked with trust**

Trust was measured with one statement: "Yara acts responsibly.". Like the Figure 13. illustrates, the statement is next to the statement measuring the perceived company's positive impact to the region, the only statement to which over 50 % of the respondents either completely or somewhat agreed. Only 11 % of the participants either completely or somewhat disagreed while 31,5 % either agreed or disagreed and just 2,7 % replied "I don't know". The statement shared opinions between the participants with a comprehensive school or equivalent education and the participants with a vocational or post secondary education. While the first ones agreed statistically almost significantly more with the statement than the latters (Sig. 0,005*). Though, no linear correlation was established since the respondents with a higher education agreed with the statement over the ones with a vocational or post secondary education.

## 5.3 The open-ended answers shedding light on the statistics

The questionnaire of the present research included two open-ended questions from two different perspectives: strengths and development areas of the company (Appendix 1.). These standpoints serve as fundamentals of the content analyses dividing the comments into positive and negative categories. The open-ended questions (Appendix 1.) served the aim of more thorough understanding of the local community's attitudes and the possible concerns, simulta-

neously shedding light on the statistical results. The answering rate of the open-ended questions was relatively high: 86,3 % and for the latter question 69,8 %. Thus, the questions regarding the strengths was commented approximately 15 % more than the one concerning the company's development areas.


**Figure 14 The strengths of Yara Siilinjärvi thematized based on the comments received from the first open-ended question**

Through coding nine different subjects were determined on and further grouped into three themes perceived as the strengths of Yara Siilinjärvi (Figure 14.). The comments received from the open-ended questions confirmed that Yara's contribution to the local society in general is perceived benefitting the municipality and anticipated as the strength of their business above all other. Social contribution was mentioned as the company's strength 119 times out of 126, consisting of comments divided into following categories: job-creation, development of local infrastructure through investments, positive impact on the image of Siilinjärvi municipality, municipality's well-being, financial contribution through taxes, continuity. Job-creation to the region received altogether 88 mentions, which was the far most compared to any other theme. Creating jobs for the region was multiple times linked with a strong positive effect on the local and youth employment as well as municipality's well-being through taxation.

R: "*Yara has been a strong employer in the region the past decades. Because of that, Yara is significant for the whole region's industry.*"

R: "*Generally well and is a big employer. For many a good and a long-term employer.*"

R: "*Has developed work as well as jobs and through that created such a flow to the surrounding region that people want to stay and live here.*"

Next to the strong positive social contribution Yara was perceived successful in its own business. Producing fertilizers, investing to the development of their operations and to occupational health and safety was mentioned 23 times out of 126 answers. This form of standpoint was not anticipated in the questionnaire as it is outside of the traditional framework of the social license to operate, generating new kind of dimension to the company's image from the local community's perception. As the third strength from the local community's perception with 15 mentions, rose environmental management consisting of environmental protection and emission management.

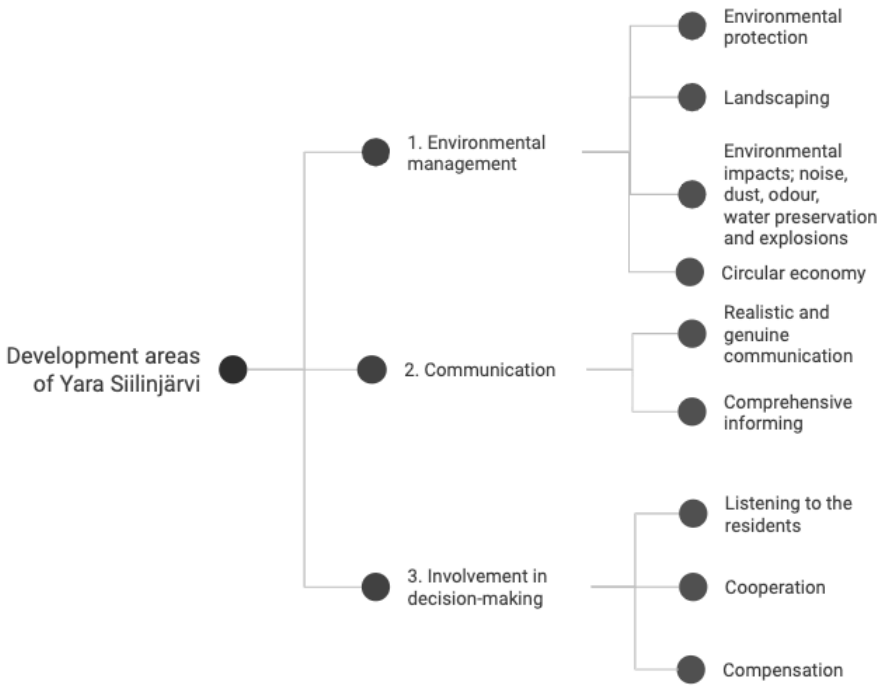



**Figure 15 The development areas of Yara Siilinjärvi thematized based on the comments received from the second open-ended question**

Even though some of the respondents complimented the company's emission management and nature preservation the ones perceiving it as a development area of Yara Siilinjärvi evidently outnumbered them. 70 respondents highlighted the importance of developing procedures linked to the environmental management such as reduction of the environmental impacts (e.g. noise, dust, odour and water preservation), enhancements in landscaping and contribution to circular economy (Figure 15.). The timing and strength of the explosions of the mining were perceived unfavourable. 21 of the respondents pointed out that Yara should concentrate on establishing new practices to utilize the by-products like gypsum and gangue generated by the mining.

R: *"Rather on the environmental issues: general environmental preservation and thinking of sustainable development."*

R: *"Waste piles: to utilize them rationally i.e. where to put them."*

Only after the concerns regarding to the environmental protection came the preferences of developments in communication and involvement in decision-making (Figure 15.). Yet, communication and environmental protection were interlinked as the desire of more comprehensive information and genuine communication was often connected with aspects of environmental management and protection. Uncertainty of the realistic environmental impacts was a prevailing apprehension among the respondents.

R: *"How does mining impact the environment? Are there emissions? Decreasing the emissions. Wondering about these things."*

R: *"Environmental issues, always a small worry about them, even though I don't really know much about Yara."*

Altogether 30 respondents required more thorough and transparent communication. Parallel to communication participants called for opportunities to be involved in decision-making. Respondents stressed that specifically the nearby residents should be listened more carefully. Some further claimed after sufficient compensations for the possible losses fallen upon them because Yara's operations. Also the cooperation with the local community and municipality was acknowledged contemporary as a shortage that should be considered in the future.

R: *"Communication, flow of information, it could be more open and rapid, to both villagers and those living outside."*

R: *"Communication. I don't know the company too well. I don't know at all if Yara listens the residents of Siilinjärvi."*

Hence, the development areas of Yara were divided into three overarching themes: environmental management, communication and involvement in decision making which further consisted from nine divergent sub-codes (Figure 15.). Finally, uncertainty in general appeared comparably often in association with the comments linked to Yara's strength as well as the ones concerning Yara's development areas.

# 6 DISCUSSION AND CONCLUSION

## 6.1 Addressing the research tasks

The targets of the present research were twofold: to build a credible tool for Yara Siilinjärvi to measure the development of their social license to operate based on the local community's perspective (Bursey & Whiting, 2015; Demuijnck & Fasterling, 2016; Gunningham et al., 2004; Kemp & Owen, 2013; Nelsen, 2007; Pike, 2012) and with assistance of this questionnaire to estimate the strength of the current SLO as it stands. The primary aim was to build a comprehensive picture of the contemporary license to operate while the secondary interest was related to the possible differences between the attitudes of participants' diverse socio-demographic background and relationship with Yara Siilinjärvi. The preceding research tasks complement each other's in portraying fairly thorough the local community's image of Yara Siilinjärvi. The tasks addressed with this study revealed the strengths and development areas as regards the SLO of Yara Siilinjärvi, providing valuable insight with respect to the future plans of stakeholder management (Dare et al., 2014) and further actions to be implemented. The repeatability of the research design further allows exploring if the actions have borne fruit in years to come.

The results indicate that the site enjoys acceptance among the local community as the complete site's general level of social license to operate is above midpoint with the mean of 3,31 and sd. 0,67 on the scale of 1-5 (Table 4.). From the three components of a SLO (Moffat & Zhang 2014) social contribution was encountered to be distinctly the strongest one with the mean of 3,47 (sd. 0,73) while communication with the mean of 3,25 (sd. 0,88) and involvement in decision-making with the mean of 3,02 (sd. 0,72) were perceived as development areas (Table 4.). Furthermore the data suggest that the socio-demographic attributes along with the current relationship with Yara poorly predict the attitudes towards Yara Siilinjärvi. Overall there were only minor variances in the attitudes between the diverse socio-demographic factors: age, gender, profession, education and relationship with Yara. Participants with a different socio-demographic background along with a different kind of relationship with Yara, were actually fairly homogeneous when it came to their attitudes of Yara's social contribution, communication and involvement in decision-making as no statistically significant fluctuations on the image regarding the aforementioned sum variables were established (Appendix 5., Tables 1. - 5.). Only while testing the variances related to the single statements, statistically somewhat significant variances were detected.

The following two statements: "Yara impacts positively to the well-being of the region" and "If I would like to contact the staff of Yara Siilinjärvi, it would be easy." divided opinions in accordance with the socio-demographic

attributes, in that linear correlation was encountered. The elderly residents (60 + years old) perceived Yara's positive effect on the region over the younger generation (under 40 years old) (Sig. 0,040*) while women were not as affirmative as men about the favourable impact of the company (Sig. 0,031*). Next, participants that were working (entrepreneurs and employed) grasped it easier to contact Yara's staff if they wanted while the others; pensioners, students, homemakers, and unemployed along with the other unclassified perceived it more difficult (Sig. 0,011*). Likewise education was discovered to correlate linear with the perceived easiness in contacting the company, namely participants with higher education (University and University of Applied Sciences) experienced contacting easier than respondents with lower education (elementary school or equivalent) (Sig. 0,025*).

### 6.1.1 The level of the SLO of Yara Siilinjärvi

#### 6.1.1.1 Social contribution as the foundation

The current resource of Yara's social license to operate in Siilinjärvi is without questions its contribution to the society (mean 3,47, sd. 0,73). The results suggest that Yara is perceived impacting positively within great extent to the well-being of the region. Besides the evitable results of the questionnaire, demonstrating strongly perceived positive impact on the society's infrastructure (Moffat & Zhang, 2014) also the responses from the surveys latter part with open-ended questions highlight the relatively firmly perceived benefits from Yara's social contribution in regards with job-creation, municipality's well-being, financial contribution via taxation, continuity, positive impact on the image of Siilinjärvi and investments in infrastructure (Figure 14.). Especially job development was mentioned multiple times in the respondents' comments on Yara's accomplishments in the region referring to excessively perceived positive impact on the social contribution. This comes with no surprise as the previous literature illustrates job-creation as the prevailing positive impact of resource-extractive industry (Nelsen, 2007; Pike, 2012; Sullivan et al., 2018; Tiainen et al., 2015). While digitalization and automatization are increasingly implemented in technological processes simultaneously decreasing the scale of employees needed (Cosbey et al., 2016), the positive impact through direct job-creation might fall in the future. To tackle this possible shortcoming Yara Siilinjärvi should evolve alternative ways to contribute to the society to strengthen the resilience of their SLO. For doing so, it can be anticipated that the current weaknesses of Yara Siilinjärvi's SLO, communication and involvement in decision-making, needs to be improved to enable to explore the desired contribution.

When surveying in which has Yara succeeded in, the members of the local community underlined that the company has accomplished next to social contribution in different parts of business and its own operations through developing its processes generating quality fertilizers (Figure 14.). Also successful pioneering work in occupational health and safety received recognition among the participants (Figure 14.). Such success could onwards be linked with positively charged feelings and further increase the approval of the operation. Yet, it

remains somewhat unclear to which extent such perceptions could impact the license to operate as this form of positively related attention has not been acknowledged among the traditional frameworks of a social license to operate (Boutilier & Thompson, 2011; Moffat & Zhang, 2014).

#### 6.1.1.2 Gaps in communication and involvement in decision-making

Communication in general was perceived as one of the two development areas linked to the acceptance of Yara Siilinjärvi. The mean of the variable was 3,25 (sd. 0,88), which is only 0,22 lower than the mean of social contribution. The results of the reliability test for the aforementioned sum variable remained under 0,500 (Cronbach's alpha value), which are generally comprised as the lower limit of reliability (Muijs, 2011, 217-221), indicating weakness of the measure itself. Therefore the results of this sum variable could be held arguable, however in practice, the responds derived from the open-ended questions affirmed that the participants conceived a lack in communication (Figure 15.). Hence, through the confirmation of open-ended comments the communication can be interpreted as a defect.

The second development area of Yara Siilinjärvi with respect to their social license to operate according to the survey is involvement in decision-making processes (Figure 15.). Involving locals into making decisions concerning the operations of Yara was as the matter of point perceived as the Achilles heel among the components of the SLO of Yara Siilinjärvi with the mean of 3,02 (sd. 0,72). While Yara Siilinjärvi maps out the possibilities to ensure the continuity of its operations by exploring potential expansion opportunities (Yara Suomi Oy d), 2019), it should simultaneously ensure the local community's involvement in decision-making to maintain the SLO. Not succeeding in this could predict conflicts and major delays in the possible future expansion projects (Pike, 2012; Porter & Kramer, 2006). Next to the adverse attitude, an interesting remark can be discovered while reviewing the share of the missing data related to the particular sum variable. In all three statements linked with involvement in decision-making, the rate of "I don't know" answers rose over 10 %, referring to relatively high unconsciousness related to the possibilities to be involved leading to question the sufficiency of communication.

The responses of the open-ended questions shed light to the subjects that might be favourable to concentrate on while adopting more extensive communication with the local community and reaching to a higher level of involvement. While the preservation of nature and environmental management rose as a substantial concern in the open-ended questions (Figure 15.) and was perceived as the major development area of the company, it was most often linked together with uncertainty and direct desires of more information on environmental impacts. In relation to the environmental management, the respondents required greater input from Yara in participating in the development of circular economy to discover manners to re-utilize the by-products i.e. gypsum and gangue generated from the operation. Interestingly, Yara has been participating in research aiming to restrict the nutrient load from the fields to the coastal sea

and lakes (Yara Suomi Oy e), 2019). Hence, the results suggest that there might be a gap in information flow among the respondents regarding to Yara's involvement in research aiming to increase circular economy, which further could be interpret as a shortcoming of Yara's communication with the local community.

The ambivalence in some of the open-ended answers can be explained in two ways: a cultural way of self-expression or genuine ambiguity between the respondents. The case study is located in northern Savo, where the nature of speech is very much indirect and circuitous (Nupponen, 2011); hence the vagueness and doubtfulness could represent the local characteristics of communication. On the other hand, the prior mentioned high amount of missing data in the statements related to involvement in decision-making and the generally rather high amount of participants neither agreeing or disagreeing with the eleven statements of the survey (Figure 10. - 13.), supports the latter interpretation. In respect with the comments in open-ended questions concerning the shortage of information flow and the amount of respondents not taking a stance on the statements it is most likely an embodiment of both. While the results exclusively illustrate communication and involvement in decision-making being the development areas of Yara's SLO, the importance for thorough communication can't be stressed enough: SLO is a concept build on the stakeholders' perception suggesting that not only the veritable impacts and contributions of Yara play a role but the way stakeholders perceive them matters. Without sufficient information the perception is build on inaccurate and possibly faulty images. By taking responsibility of a sufficient and comprehensive communication, the amount of uncertainty among residents linked with the environmental issues could tremendously decrease and hence, reflect favourable on the social acceptability (Jartti et. al., 2016, p. 36). While adopting new platforms for increasing communication and involvement in decision-making the rather indirect relationship between the local community and Yara Siilinjärvi should be acknowledged. The survey confirmed that the vast majority is familiar with Yara but has not been in any direct contact with the company (Figure 8). This information can further benefit Yara while deciding on the relevant forums for reaching out the members of local community.

#### 6.1.1.3 Turbulence on the macro-level SLO

As discussed in the previous chapters (see more in chapter 3.2.2.1.), a macro-level acceptance predicts a license to operate on micro-level (Jartti et al., 2014). Consequently the resource-extractive operation's national acceptance in Finland along with the surrounding circumstances of the case study influences the level of Yara's license to operate. The prevailing atmosphere in Finland towards mining operations is fairly permissive, yet while compared to other "key industries" it was perceived as least favourable for the future (Jartti et al., 2017). From the end of 2018, the industry's legitimacy has been under radar due to the increasingly heated public discussion related to the future direction of the national mining policy and correspondingly the sufficiency of the national mining and environmental legislation (Kainulainen, 2019; Muhonen, 2019; Teittinen, 2019).

The debates reflect the lack of trust towards the government and legislators, which restrains the acceptance of the entire industry (Moffat & Zhang, 2014). Again, this form of debates in the media presumably cutbacks the strength of Yara's social license to operate in Siilinjärvi. To estimate the magnitude of such effect is however unanswerable as no prior studies concentrating specifically on the extensiveness of the macro-scale SLO's influence over the micro-scale SLO exists. Beyond turbulence on the national level, EU has acknowledged mines as the key players in tackling the climate change due to the increasing mineral resources for constructing a carbon-free world (Ali, 2018; Sairinen, 2018) as well as fulfilling the growing need of fertilizers to increase the cultivation while population growth (Vollaro et al., 2016). Future will show, how this reflects on the Finnish government's decisions about the forthcoming course of the mining policy and the domestic perception on the industry.

Consequently the continuously evolving circumstances of mining and the discussions around it might cause confusion and further mistrust among those respondents in Siilinjärvi that have no direct connection with the site (Figure 8.) and hence, staying quite possibly somewhat distant from the mining-related knowledge. While knowledge over the resource-extractive operations has been discovered to increase the acceptability (Jartti et. al., 2014), Yara Siilinjärvi would most likely benefit of more extensive communication about their operation to the broader audience but especially to the members of local community. Despite the recent instability of the industry's image, the resource-extractive operation located in Siilinjärvi has an almost fifty years long and fairly steady tradition nearby the municipality ("Yara Siilinjärvi site," 2019). While the operation process-wise has stayed rather stable the company structure has undergone various phases since it was established; the state-owned company was privatized before listing into the stock market and later on sold to a foreign-based company (Yara Suomi Oy b), 2019). The rather pessimistic and unfavourable approach that the foreign mining companies have received (Jartti et. al., 2016, 36) was reflected only in few of the comments received through the open-ended questions of this research whilst the continuity of the operation ensured by the Norwegian company was perceived significantly positive (Figure 14.).

#### 6.1.1.4 The existing acceptance

All in all, most of the respondents perceived that Yara acts responsibly (Figure 13.). Moreover, the results strongly indicate that Yara Siilinjärvi obtains a social license to operate among the local community. The level of Yara's social license to operate is according to the social license scores (Table 5.) high acceptance as the mean of all eleven statements was 3,31 (sd. 0,67) out of five. The results furthermore suggest that the operation has gained broad legitimacy among the local community as each of the components of SLO exceeds the level of acceptance. However, the means remain under the level of approval concluding to a lack of credibility. While the statements utilized in the current research slightly alter from the previous studies conducted internationally (Boutilier & Thompson, 2011), a resemblance in the means can be found as the mean of pre-

ceding investigations consisting of over two thousand interviews was 3,39 (sd. 0,96) (Boutilier, 2017, 6). Hence, Yara's site in Siilinjärvi scores average compared to other resource-extractive operations worldwide (Boutilier, 2017). Since the SLO is a context driven concept, also the surrounding atmosphere and conditions need to be acknowledged while evaluating the existence of a SLO and the strength of it (Prno, 2013). Perhaps comparing the social licenses between operations is hardly fruitful and instead one should concentrate on the progress of the SLO in question. Hence, the outcomes of this exploratory case study are first and foremost case-specific and applicable only to the present circumstances.

**Table 5 Levels of social license to operate according to the sextiles based on the scores derived from 2 152 international interviews (Boutilier, 2017, 7)**

| Sextile (1/6th) | Lower limit | Upper limit | Verbal label |
|---|---|---|---|
| 6 | > 4,30 | 5,00 | Full trust |
| 5 | > 3,93 | 4,30 | High Approval |
| 4 | > 3,56 | 3,93 | Low Approval |
| 3 | > 3,08 | 3,56 | High Acceptance |
| 2 | > 2,40 | 3,08 | Low Acceptance |
| 1 | 1,00 | 2,40 | Withdrawal |

This cross-sectional case study is the first attempt to measure the level of the complete site's SLO in Siilinjärvi. It presents an overview about the level of the SLO while contributing a clearer understanding of the development areas to tackle when striving towards a higher acceptance. While the previous research of Yara's site in Siilinjärvi has based on narrow quantitative research focusing on either the mine or the factory (Ramboll c), 2018, 209; Ramboll e), 2013, Appendix 3; Ramboll f), 2013, Appendix 3) and qualitative focus group interviews concentrating on communication, the results of the present research provide a more comprehensive understanding about the level of the current SLO. The results further suggest that Yara has for now found a fine balance between its industrial operations and the local community's aims and requirements. Yet, how the local community will be considered while planning the operations future and to which extent Yara succeeds in involving the members of the local community and efficiently communicating about the forthcoming decisions and their impacts towards the environment and the society will play a major role in the development of the acceptance. It seems that currently both parties, the local community and Yara Siilinjärvi, are gaining from the relationship. While planning the possible future expansions this standpoint is extremely critical to remain as literature has shown that without a sufficient cooperation aiming to find mutual gains, the parties easily slip to a situation where only one of them can gain and in case the conflict escalates both parties end up losing (Wall &

Callister, 1995). If the local community builds a coalition with a stakeholder obtaining power such as policy-makers (Mitchell et al., 1997) the possibility for delays in the potential expansion projects increases (Ruggie, 2015). Therefore, also the other stakeholders out of the scope of this present study should be acknowledged while building a strong stakeholder network. Addressing the explored development areas, communication and involvement in decision-making sufficiently would onwards strengthen the SLO within extent. The results should be taken into account when considering how to manage the stakeholder relationships and especially the relationship with the local community in the coming years. Next, the ability to adapt and fulfil the needs and expectations of the local community in the long term would increase the resilience of the social license (Prno & Slocombe, 2014). Time and the possible future measurements will finally show the longitudinal steadiness of the SLO of Yara Siilinjärvi.

### 6.1.2 The differentiation between the background groups in acceptance

According to this case study the background variables including social-demographic attributes (age, gender, profession and education) and the relationship with Yara Siilinjärvi predict poorly the attitudes towards the operation as no statistically significant differences between the independent variables were found while testing the sum variables (social contribution, communication, involvement). However, when comparing the possible differences in acceptance between the background groups on a statement level, some interesting statistically significant (*) differences were explored.

While the social contribution acts currently as the major asset of Yara's social license to operate the future generations differing attitude might eventually change the situation (Appendix 4., Table 2.). Indeed the notion of younger generations significantly (*) more distrustful attitude towards the operation's positive impact to the region is an interesting remark to consider in the future stakeholder management. To build credibility in the eyes of youngsters through finding a mutual path for evolving the company's operations towards circumstances where the younger generation perceives benefitting from the operation can be comprehend as one of the key issues to tackle in order to ensure the company's continuity in regards with the license to operate. While in previous research age has not been identified predicting acceptance of resource-extractive operation (Jartti et. al., 2014) the results of this study provides a new insight into the relationship between acceptance of resource-extractive operation and age. Next to older generation also men perceived Yara's positive impact to the well-being of the region statistically stronger than women. These results build on the existing evidence of women addressing the benefits of resource-extractive operation to the well-being more critically (Jartti et. al., 2014; Saariniemi, 2018). According to Saariniemi (2018) such differentiation could reflect the gendered career and education choices and should furthermore be addressed via open and equal working culture. Also the easiness of contacting Yara's staff was perceived diversely among the participants. Based on the re-

sults the residents currently not working (students, pensioners, un-employed, homemakers and others) and the ones with lower level of education are the primary groups to consider while aiming to improve the two-way interaction as they grasped it significantly more demanding to contact the employees of Yara than entrepreneurs and employed ones or the ones with higher education. These results might reflect more about the participants' involvement in society and correspondingly the readiness to take action in contacting (Levitas, 1996) than the easiness to contact exactly Yara's employees. As there were no significant differences explored in the way different age groups perceived communication, a conclusion that Yara interacts sufficiently within the diverse communication platforms that different generations utilize can be drawn from the results (Appendix 5, Table 2).

All things considered the acceptance cannot be explained very clearly or systematically according to the background variables based on the result of the present study. This could indicate that Yara Siilinjärvi acts unbiased with the different socio-demographic groups while succeeding in communication both to the ones that have direct contact with the employees of Yara or are currently or have been employed by Yara along with the ones that lack a direct contact.

## 6.2 Limitations of the study and suggestions for the future research

Even though the quantitative nature of the research approach serves adequately the aims of the present study, it limits any deeper understanding of the license to operate in question (Aldrige & Levine, 2001, 12-14). It can be questioned in which extent this type of measurable study design simplifies the complex attitudes and hence constraints to illustrate the full range of the social perspective (Litmanen et al., 2016). Future studies should continue the dialogue between quantitative and qualitative research to explore the various dimension of social license to operate as a concept. Collecting data through telephone interviewing might for its part inhibit expressing sensitive opinions on the subject and restrict the extensiveness of answers in open-ended questions (Heikkilä, 2014, 65-66). As the results elaborate the site's development areas regarding to stakeholder management and license to operate, the company could benefit from exploring the deeper essence of the local community's expectations linked with involvement in decision-making while the profound strengths and development areas regarding to communication where covered in the focus group interviews conducted in 2015 (Tekir Oy a), 2016). As the results of this cross-sectional study can only be applied to this particular time (Rose et al., 2014, 81-103), to evaluate the progress and possible resilience of the SLO (Prno & Scolombe, 2014) of Yara Siilinjärvi longitudinal studies are required. Repeating the study would not only reveal the resilience of the SLO (Prno & Scolombe, 2014) but also if the actions targeted to the development areas have been successful.

In the stakeholder network analysis in respect with communication management (Tekir Oy b), 2016) the key stakeholders of Yara Siilinjärvi were identified. While the present research concentrates in illustrating the SLO granted by the local community, the possible differentiation between other key stakeholders is beyond the boundaries of this study. Hence, it might be compelling to investigate also the possible variances in the attitudes between these key stakeholders.

Through the open-ended questions the respondents' extensive concern on the environmental issues were uncovered (Figure 15.). Even though the survey addressed environmental subjects by measuring the stakeholders' perception with respect to the regions aftercare, the compensation of the negative impact and the responsibility, the outcomes do not quite resemble each other's. The outcome of the open-ended questions indicate that there is a relatively strong concern about the environmental impacts of Yara Siilinjärvi while the measure of the sum variable of social contribution, weighing the balance of the perceived positive and negative impact does not clearly imply to strong concerns over the environment. The means of the corresponding statements fluctuate between 3,01-3,56 indicating to low and high acceptance (Table 4.) while the comments derived from open-ended questions imply environmental management being the greatest development area from the local community's perspective. One of the statements included into the sum variable of social contribution measured the perceived responsibility. Evidently responsibility as a concept embodies next to environmental sustainability also other dimensions like social and economic sustainability (Molthan-Hill, 2015, 5), which on its part might explain the differentiation between the open comments and the outcome for this statement (mean 3,56, sd. 0,89). Saariniemi (2018) encountered similar contradictions while the level of the SLO in her case studies located in Lapland were fairly high but the open comments revealed major concerns on the negative environmental impacts generated from the example cases. The negative environmental impacts (e.g. water emissions, dust and noise) influence the recreational value of the nature and hence impact the local community and local industries e.g. tourism (Mononen & Suopajärvi, 2016; Saariniemi, 2018) and through that also social acceptance. Yet, as the somewhat contradictory results of the present study demonstrate the measurement related to the perception of the operation's environmental impacts appears to lack from the extensive studies considering the level of the SLO (Boutilier & Thompson, 2013) and the components of a micro-scale SLO (Moffat & Zhang, 2014). Later, the negative environmental impact has been however associated with acceptance (T. Jartti et al., 2017, 31). Hence, the future research could benefit from exploring more extensively how the level and sufficiency of operations environmental management reflect with trust and social acceptance and furthermore with the social license to operate.

Another shortcoming in the measures of the questionnaire was revealed by the reliability test run for the sum variables. As only two variables measured communication, the Cronbach's alpha value remained just under the critical limit of reliability. Even though the open-ended comments revealed perceived

lack in communication, the reliability of the measure is somewhat questionable. Future research would most likely benefit of adding more variables to measure communication. Moreover the factor analysis (Appendix 6.) calculated to the dependent variables suggests that there could be also alternative ways to formulate the sum variables. Further research is needed to establish the most fit variables and sum variables.

The literature illustrates almost no examples of longitude case studies where a scarce SLO in the planning phase has during the operation phase turned towards high acceptance among the relevant stakeholders. To explore this form of learning curves and successful cases more closely could offer advantageous information while aiming towards balance between the society and industries. All in all, multiple open questions related to the measurement of the SLO remain waiting to be covered by the future research while the interests towards the concept among industry practitioners, policy-makers and academics increases (Gehman et al., 2017; Nelsen, 2007; Prno, 2013). While this paper explores the framework from the industry practitioner's standpoint, the comprehensive nature of the concept serving several parties interests should be notified (Sairinen, 2018). Indeed the framework could offer numerous applications from operating as industry's tool for risk management serving the interest of both corporations' management and potential investors as a strong and resilient SLO ensures the continuity of the operation (Dare et al., 2014; Esteves & Barclay, 2011; Pike, 2012; Vidal et al., 2010) and for legislators enabling to consider social acceptability broader next to environmental and social impact assessments while amending new legislation aiming towards sustainable business and finally as a way for the members of local community to express their voices.

Above all SLO serves as a platform for communication and interaction enabling to explore a mutual path towards future. Though the concept is criticized of its complexity (Owen & Kemp, 2013), challenges of measurement (Post, Preston and Sauter-Sachs', 2002 as cited in Wilburn & Wilburn, 2012; Prno & Scolombe, 2014) and even of being just a catchword from business to business (Morrison 2014 as cited in Gehman et. al., 2017) it might be one of the most fittest contemporary framework to explore the stakeholders' attitudes towards an operation. The measures generate valuable information for both policy-makers and authorities about the legitimacy and the acceptance of a resource-extractive project. On top of that the measures produce extremely beneficial insight for the company's management about the soundness of the relationship between the company and its stakeholders. The results of a SLO measurement indicate clearly the development areas, which the management should consider while planning sufficient stakeholder management strategies. A follow-up study will verify if the strategy has borne fruits through successful implementation. Acknowledging the circumstances influencing the SLO of individual cases, the framework leaves space for modifying the questionnaire to fit the respective case study. It has been suggested that conflicts should be approached as opportunities (Bebbington, Fash, & Rogan, 2019). Yet it only applies when the parties of the conflict are willing to trust each other's in so that they have the courage to

speak out their own concerns without having to fear the other party would take advantage of them. Next to that building a trustworthy relationship demands competent listening skills to identify each other's needs and aims. Only so a new mutual direction towards the future can be accomplished and the danger of slipping to a disruptive confrontation can be avoided (Wall & Callister, 1995). Measuring the SLO will benefit the companies in revealing the structure of the relationship with their relevant stakeholders and hence, to build such trustworthy connection to further explore the path towards sustainable future.

**REFERENCES**


Aldrige, A., & Levine, K. (2001). *Surveying the Social World: Principles and Practice in Survey Research* (1st Edition). Philadelphia, USA: Open University Press.

Ali, S. H. (2018). The materials science imperative in meeting the Sustainable Development Goals. *Nature Materials*, *17*(12), 1052–1053. https://doi.org/10.1038/s41563-018-0228-9

Argenti, P. A. (2006). How technology has influenced the field of corporate communication. *Journal of Business and Technical Communication*, *20*(3), 357–370. https://doi.org/10.1177/1050651906287260

Bagozzi. (2017). Measurement and Meaning in Information Systems and Organizational Research: Methodological and Philosophical Foundations. *MIS Quarterly*, *35*(2), 261–292. https://doi.org/10.2307/23044044

Banerjee, S. B. (2008). Corporate social responsibility: The good, the bad and the ugly. *Critical Sociology*, *34*(1), 51–79. https://doi.org/10.1177/0896920507084623

Batel, S., Devine-Wright, P., & Tangeland, T. (2013). Social acceptance of low carbon energy and associated infrastructures: A critical discussion. *Energy Policy*, *58*, 1–5. https://doi.org/10.1016/j.enpol.2013.03.018

Battellino, R., Governor, D., & Bank, R. (2010). Ric Battellino : Mining booms and the Australian economy. *BIS Review*, *20*, 1–9. Retrieved from https://www.bis.org/review/r100224d.pdf

Bebbington, A., Fash, B., & Rogan, J. (2019). Socio-environmental Conflict, Political Settlements, and Mining Governance: A Cross-Border Comparison, El Salvador and Honduras. *Latin American Perspectives*, *46*(2), 84–106. https://doi.org/10.1177/0094582X18813567

Besley, J. C. (2010). Public engagement and the impact of fairness perceptions on decision favorability and acceptance. *Science Communication*, *32*(2), 256–280. https://doi.org/10.1177/1075547009358624

Black, L. (2013). *The Social Licence to Operate : Your Management Framework for Complex Times*. Oxford: Routledge. Retrieved from http://search.ebscohost.com.ezproxy.jyu.fi/login.aspx?direct=true&db=nlebk&AN=779353&site=ehost-live

Bossle, M. B., Dutra De Barcellos, M., Vieira, L. M., & Sauvée, L. (2016). The drivers for adoption of eco-innovation. *Journal of Cleaner Production*, *113*, 861–872. https://doi.org/10.1016/j.jclepro.2015.11.033

Boutilier, R. (2017). A Measure Of The Social License To Operate For Infrastructure And Extractive Projects. Retrieved April 12, 2019, from https://socialicense.com/publications/A dozen statement for measuring the social license.pdf

Boutilier, R. G., Black, L. D., & Thomson, I. (2012). How the Social License to Operate can Stabilise the Socio-Political Environment for Business. *International Mine Management 2012 Proceedings*, 227–237. Retrieved from https://www.researchgate.net/publication/303061443_From_metaphor_to_management_tool_how_the_social_license_to_operate_can_stabilise_the

_socio-political_environment_for_business

Boutilier, R. G., & Thomson, I. (2011). Modelling and Measuring the Social License to Operate: Fruits of a Dialogue Between Theory and Practice. Retrieved April 10, 2019, from https://socialicense.com/publications/Modelling and Measuring the SLO.pdf

Bruun, O. (2019). Kaivokset aiheuttavat 75 prosenttia Suomen jätteistä - Luononsuojeluliitto vaatii Kaivoslakiin viittä parannusta. [Mines cause 75 percent of Finland's waste - The Finnish Association for Nature Conversation requires five improvements into the Mining Act] Retrieved April 14, 2019, from https://www.sll.fi/2019/02/20/kaivokset-aiheuttavat-75-prosenttia-suomen-jatteista-luonnonsuojeluliitto-vaatii-kaivoslakiin-viitta-parannusta/?fbclid=IwAR1rmJ__AFhh6xFGAZAIdSGiLCOkby-BZgNCdccLQhxZWelgiITGcEuBfhQ

Buchholtz, A., & Carroll, A. (2012). *Business & Society: Ethics & Stakeholder Management* (7th Edition). Mason, USA: Cengage Learning.

Bursey, D., & Whiting, V. (2015). Rethinking Social Licence to Operate: A Concept in Search of Definition and Boundaries. *BCBC: Environment and Energy Bulletin*, *7*(2), 1–10. Retrieved from https://www.bcbc.com/reports-and-research/rethinking-social-licence-to-operate-a-concept-in-search-of-definition-and-boundaries

Carroll, A. B. (1995). Stakeholder Thinking in Three Models of Management Morality: A Perspective with Strategic Implications. In *Understanding Stakeholder Thinking* (pp. 47–74). Helsinki, Finland: LSR-Publications. Retrieved from https://www.researchgate.net/profile/Archie_Carroll/publication/275771163_Stakeholder_Thinking_in_Three_Models_of_Management_Morality_A_Perspective_with_Strategic_Implications_Book_Chapter/links/554687390cf234bdb21d8f21.pdf

Castka, P., & Balzarova, M. A. (2008). Social responsibility standardization: Guidance or reinforcement through certification? *Human Systems Management*, *27*(3), 231–242. https://doi.org/10.3233/HSM-2008-0681

Cosbey, A., Mann, H., Maennling, N., Toledano, P., Geipel, J., & Brauch, M. D. (2016). *Mining a Mirage? Reassessing the shared-value paradigm in light of the technological advances in the mining sector*. Winnipeg, Canada. Retrieved from https://static1.squarespace.com/static/54d667e5e4b05b179814c788/t/58593f6cbe6594df9a31b166/1482243963748/mining-a-mirage.pdf

Daily, G., Dasgupta, P., Bolin, B., Crosson, P., du Guerny, J., Ehrlich, P., … Walke, B. (1998). Food Production, Population Growth, and the Environment. *Science*, *281*(5381), 1291–1292. https://doi.org/10.1126/science.281.5381.1291

Dare, M. (Lain), Schirmer, J., & Vanclay, F. (2014). Community engagement and social licence to operate. *Impact Assessment and Project Appraisal*, *32*(3), 188–197. https://doi.org/10.1080/14615517.2014.927108

de Bakker, F. G. A., & den Hond, F. (2008). Introducing the Politics of Stakeholder Influence. *Business and Society*, *47*(1), 8–20. https://doi.org/10.1177/0007650307306637

Deloitte Sustainability, Survey, B. G., Minières, B. de R. G. et, & Research, N. O. for A. S. (2017). Study on the review of the list of critical raw materials. Non-critical raw materials factsheets. *European Commission*. https://doi.org/10.2873/398823

Demuijnck, G., & Fasterling, B. (2016). The Social License to Operate. *Journal of Business Ethics*, *136*(4), 675–685. https://doi.org/10.1007/s10551-015-2976-7

Donaldson, T., & Preston, L. e. (1995). The Stakeholder Theory of the Corporation : Concepts , Evidence , and Implications. *Academy of Management Review*, *20*(1), 65–91. Retrieved from http://www.jstor.org/stable/258887

Dougherty, M. L., & Olsen, T. D. (2014). They have good devices: Trust, mining, and the microsociology of environmental decision-making. *Journal of Cleaner Production*, *84*, 183–192. https://doi.org/10.1016/j.jclepro.2014.04.052

Eccles, R. G., & Serafeim, G. (2013). A Tale of Two Stories: Sustainability and the Quarterly Earnings Call. *Journal of Applied Corporate Finance*, *25*(3), 8–19. https://doi.org/10.1111/jacf.12023

Eerola, T., & Ziessler, S. (2013). Sosiaalinen toimilupa kannustaa kaivosyrityksiä yhteiskuntavastuullisuuteen. *Geologi*, *65*, 100–105. Retrieved from http://www.geologinenseura.fi/geologi-lehti/4-2013/Geologi_4_2013_kommentti.pdf

Elinkeino- liikenne- ja ympäristökeskus Pohjois-Savo. Yhteysviranomaisen lausunto Yara Suomi Oy:n Siilinjärven kaivoksen louhosjatkumohanketta koskevasta ympäristövaikutusten arviointiselostuksesta (2018). [Statement by the contact authority in the Environmental Impact Assessment Report of the Yara Suomi Oy's Siilinjärvi site's quarry expansion project] Retrieved from https://docplayer.fi/108112223-Yhteysviranomaisen-lausunto-yara-suomi-oy-n-siilinjarven-kaivoksen-louhosjatkumohanketta-koskevasta-ymparistovaikutusten-arviointiselostuksesta.html

Elkington, J. (1998). Cannibals with Forks: The Triple Bottom Line of 21st Century Business. Gabriola Island, BC. *Environmental Quality Management*, *8*(1), 37–51. https://doi.org/10.1002/tqem.3310080106

Ernst & Young. (2018). *Top 10 business risks facing mining and metals Risk radar for mining and metals*. Retrieved from https://www.ey.com/Publication/vwLUAssets/ey-top-10-business-risks-facing-mining-and-metals-2017-2018/$FILE/ey-top-10-business-risks-facing-mining-and-metals-2017-2018.pdf

Esteves, A. M., & Barclay, M. A. (2011). New Approaches to Evaluating the Performance of Corporate-Community Partnerships: A Case Study from the Minerals Sector. *Journal of Business Ethics*, *103*(2), 189–202. https://doi.org/10.1007/s10551-011-0860-7

European Comission. (2019). Non -financial reporting. Retrieved from https://ec.europa.eu/info/business-economy-euro/company-reporting-

and-auditing/company-reporting/non-financial-reporting_en

European Commission. (2011). *A renewed EU strategy 2011-14 for Corporate Social Responsibility. COM(2011) 681*. Retrieved from https://www.employment.gov.sk/files/slovensky/ministerstvo/spolocenska-zodpovednost/new-communication-on-csr-2011-2014.pdf

Faircheallaigh, C. O., & Ali, S. H. (2007). Introduction. *Greener Management International*, *53*(Corporate Social Responsibility, Extractive Industries and the Environment: Regulation, Reporting and Performance (Spring 2006)), 3–6. Retrieved from https://www-jstor-org.ezproxy.jyu.fi/stable/greemanainte.53.3

Fleming, D. A., & Measham, T. G. (2015). Understanding the resource curse ( or blessing ) across national and regional scales : Theory , empirical challenges and an application *. *Australian Journal of Agricultural and Resource Economics*, *59*, 624–639. https://doi.org/10.1111/1467-8489.12118

Franks, D. M., Davis, R., Bebbington, A. J., Ali, S. H., Kemp, D., & Scurrah, M. (2014). Conflict translates environmental and social risk into business costs. *Proceedings of the National Academy of Sciences*, *111*(21), 7576–7581. https://doi.org/10.1073/pnas.1405135111

Franks, Daniel M., Brereton, D., & Moran, C. J. (2010). Managing the cumulative impacts of coal mining on regional communities and environments in Australia. *Impact Assessment and Project Appraisal*, *28*(4), 299–312. https://doi.org/10.3152/146155110X12838715793129

Freeman, R. E. (2004). The Stakeholder Approach Revisited. *Zeitschrift Für Wirtschafts- Und Unternehmensethik*, *5*(3), 228–254. Retrieved from https://www.ssoar.info/ssoar/bitstream/handle/document/34707/ssoar-zfwu-2004-3-freeman-The_stakeholder_approach_revisited.pdf?sequence=1

Frooman, J. (1999). Stakeholder influence strategies. *Academy of Management Review*, *24*(2), 191–205. https://doi.org/10.5465/AMR.1999.1893928

Gehman, J., Lefsrud, L. M., & Fast, S. (2017). Social license to operate: Legitimacy by another name? *Canadian Public Administration*, *60*(2), 293–317. https://doi.org/10.1111/capa.12218

Gibson, K. (2000). The moral basis of stakeholder theory. *Journal of Business Ethics*, *26*(3), 245–257. https://doi.org/10.1023/A:1006110106408

Gunningham, N., Kagan, R. A., & Thornton, D. (2004). Social License and Environmental Protection: Why Businesses Go Beyond Compliance. *LAW & Social Inquiry*, *29*(2), 307–341. https://doi.org/10.1111/j.1747-4469.2004.tb00338.x

Hair Jr., J. F., Celsi, M., Money, A., SAmouel, P., & Page, M. (2015). *The Essentials of Business Research Methods*. *The Essentials of Business Research Methods* (3rd Edition). New York, USA: Routledge. https://doi.org/10.4324/9781315716862

Hall, N., Lacey, J., Carr-Cornish, S., & Dowd, A.-M. (2014). Social licence to operate: understanding how a concept has been translated into practice in energy industries. *Journal of Cleaner Production*, *86*, 301–310. https://doi.org/10.1016/j.jclepro.2014.08.020

Hämäläinen, V.-P. (2018, August 6). Yli tuhat kuopiolaista on ilmoittautunut vastustamaan miljardiluokan havusellutehtaan perustamista kaupunkiin – Finnpulp: “Ihmetyttää.” [Over a thousand resident's of Kuopio have signed up to protest the establishment of the billion-euro softwood factory to the city - Finnpulp: "Surprises"] *Yle Uutiset*. Retrieved from https://yle.fi/uutiset/3-10339380

Heikkilä, T. (2014). *Tilastollinen tutkimus* (9th). [Quantitative research] Helsinki: Edita.

Henisz, W. J., Dorobantu, S., & Nartey, L. J. (2013). Spinning gold: the financial results to stakeholder engagement. *Strategic Management Journal*, *35*, 1727–1748. https://doi.org/10.1002/smj.2180

Hickey, G. L., Grant, S. W., Dunning, J., & Siepe, M. (2018). Statistical primer: Sample size and power calculations-why, when and how? *European Journal of Cardio-Thoracic Surgery*, *54*(1), 4–9. https://doi.org/10.1093/ejcts/ezy169

Hillman, A. J., & Keim, G. D. (2001). Shareholder Value , Stakeholder Management , and Social Issues : What ’ s the Bottom Line ? *Strategic Management Journal*, *22*(2), 125–139. Retrieved from http://www.jstor.org/stable/3094310

Holopainen, M., & Pulkkinen, P. (2008). *Tilastolliset menetelmät* (5th). [Quantitative methods] Helsinki: SWOY Oppimaateriaalit Oy.

Howard-Grenville, J., Nash, J., & Coglianese, C. (2008). Constructing the license to operate: Internal factors and their influence on corporate environmental decisions. *Law and Policy*, *30*(1), 73–107. https://doi.org/10.1111/j.1467-9930.2008.00270.x

Issakainen, K.-P. (2018, May 8). Teija Kankaanpää johtaa Suomen syvintä avolouhosta. [Teija Kankaanpää leads the deapest open pit of Finland] *Savon Sanomat*. Retrieved from https://www.savonsanomat.fi/talous/Teija-Kankaanpää-johtaa-Suomen-syvintä-avolouhosta/765535

Jaakko Pöyry Infra. (2004). *YVA-selvitys Siilinjärven kaivoksen toiminnan jatkamisesta vuoden 2010 jälkeen, uusien alueiden käyttöönotto*. [Environmental Impact Assessment Report on continuing the operation of Siilinjärvi mine adter 2010, the introduction of new areas]

Jartti, T., Litmanen, T., Lacey, T., & Moffat, K. (2017). *Finnish Attitudes Toward Mining, Citizen Survey -2016 Results*. *YFI Publications 4*. Retrieved from https://jyx.jyu.fi/bitstream/handle/123456789/56561/978-951-39-7299-8.pdf?sequence=1&isAllowed=y

Jartti, T., Rantala, E., & Litmanen, T. (2014). *Sosiaalisen toimiluvan ehdot ja rajat*. [The preconditions and limits of social license to operate] Retrieved from https://jyx.jyu.fi/dspace/bitstream/handle/123456789/44460/sosiaalisen-toimiluvan-ehdot-ja-rajat.pdf?sequence=3

Jarvis, C. B., MacKenzie, S. B., & Podsakoff, P. M. (2003). A Critical Review of Construct Indicators and Measurement Model Misspecification in Marketing and Consumer Research. *Journal of Consumer Research*, *30*(2), 199–218. https://doi.org/10.1086/376806

Jenkins-Smith, H. C., Silva, C. L., Nowlin, M. C., & DeLozier, G. (2011).

Reversing Nuclear Opposition: Evolving Public Acceptance of a Permanent Nuclear Waste Disposal Facility. *Risk Analysis*, *31*(4), 629–644. https://doi.org/10.1111/j.1539-6924.2010.01543.x

Kainulainen, J. (2019, March 17). Kaivoksista halutaan nostaa mörkö päivänvaloon: Haluamme vihreitä sähköautoja, mutta koboltti pitäisi nostaa Afrikasta orjatyövoimalla. [We want to raise the rumble from the mines to daylight: We want green electric cars, but cobalt should be lifted from Africa by slave labor] *Karjalainen*. Retrieved from https://www.karjalainen.fi/uutiset/uutis-alueet/maakunta/item/212659

Kaivosteollisuus. (2018). Tutkimus: Kaivokset kasvattavat Suomen bkt:tä 1,2 miljardilla. [Research: The mines are raising Finnish GDP by 1.2 billion] Retrieved May 22, 2019, from https://www.kaivosteollisuus.fi/uutiset/tutkimus-kaivokset-kasvattavat-suomen-bkttä-12-miljardilla

Kaivosvastuu a). (2017). Kaivosvastuu: Kaivosvastuujärjestelmä. [Mining Responsibility: Mining Responsibility System] Retrieved from https://www.kaivosvastuu.fi/toimintaperiaatteet/

Kaivosvastuu b). (2019). Kaivosvastuu: Kaivosvastuujärjestelmän arviointityökalut. [Mining responsibility: Evaluation tools for the mining responsibility system] Retrieved from https://www.kaivosvastuu.fi/arviointityokalut/

Kakabadse, N. K., Rozuel, C., & Lee-Davies, L. (2005). Corporate social responsibility and stakeholder approach: a conceptual review. *International Journal of Business Governance and Ethics*, *1*(4), 277. https://doi.org/10.1504/IJBGE.2005.006733

Kemp, D., & Owen, J. R. (2013). Community relations and mining: Core to business but not "core business." *Resources Policy*, *38*(4), 523–531. https://doi.org/10.1016/j.resourpol.2013.08.003

Koivurova, T., Buanes, A., Riabova, L., Didyk, V., Ejdemo, T., Poelzer, G., … Lesser, P. (2015). 'Social license to operate': a relevant term in Northern European mining? *Polar Geography*, *38*(3), 194–227. https://doi.org/10.1080/1088937X.2015.1056859

Kokko, K., Oksanen, A., Hast, S., Heikkinen, H. I., Jokinen, M., Komu, T., … Soudunsaari, Leena, Suikkanen, Asko, Suopajärvi, L. (2013). *Hyvä kaivos pohjoisessa, opaskirja ympäristösääntelyyn ja sosiaalista kestävyyttä tukeviin parhaisiin käytäntöihin*. [A good mine in the north, guidebook for environmental regulation and best practices for social sustainability] Oulu, Finland: Multiprint Oy. Retrieved from https://www.ulapland.fi/loader.aspx?id=22dfba05-2a51-438f-a9db-c465e14dbbdc

Koskinen, A. L., & Siltanen, M. (2019, January 2). Mielenosoittajat sulkivat tien kultakaivokselle Valkeakoskella. [The protesters closed the road to the gold mine in Valkeakoski] *Yle Uutiset*. Retrieved from https://yle.fi/uutiset/3-10578341

Kuvaja, S., & Koipijärvi, T. (2017). *Yritysvastuu - johtamisen uusi normaali* (1. Painos). [Corporate responsibility - a new standard of management]

Helsinki: Kauppakamari.

Lacey, J., & Lamont, J. (2014). Using social contract to inform social licence to operate: an application in the Australian Coal Seam Gas Industry. *Journal of Cleaner Production*, *84*, 831–839. https://doi.org/10.1016/j.jclepro.2013.11.047

*Laki ympäristövaikutusten arvioinnista* 252/2017. (2017). [Act on Environmental Impact Assessment] Retrieved from https://www.finlex.fi/fi/laki/alkup/2017/20170252

Lepak, D. P., Smith, K. G., & Taylor, M. S. (2007). Value Creation and Value Capture: A Multilevel Perspective. *Academy of Management Review*, *32*(1). Retrieved from https://doi.org/10.5465/amr.2007.23464011

Lesser, P., Suopajärvi, L., & Koivurova, T. (2017). Challenges that mining companies face in gaining and maintaining a social license to operate in Finnish Lapland. *Mineral Economics*, *30*(1), 41–51. https://doi.org/10.1007/s13563-016-0099-y

Levitas, R. (1996). The concept of social exclusion and the new Durkheimian hegemony. *Critical Social Policy*, *16*(46), 5–20. https://doi.org/10.1177/026101839601604601

Li, J. C. (2008). *Environmental Impact Assessments in Developing Countries: An Opportunity for Greater Environmental Security?* Retrieved from http://www.fess-global.org/workingpapers/eia.pdf

Lichtman, M. (2017). Introcuction. In *Qualitative Research for the Social Sciences* (pp. 3–26). London, UK: SAGE Publications Ltd. https://doi.org/0.4135/9781544307756

Litmanen, T., Jartti, T., & Rantala, E. (2016). Refining the preconditions of a social licence to operate (SLO): reflections on citizens' attitudes towards mining in two Finnish regions. *Extractive Industries and Society*, *3*(3), 782–792. https://doi.org/10.1016/j.exis.2016.04.003

Loorbach, D., & Wijsman, K. (2013). Business transition management: Exploring a new role for business in sustainability transitions. *Journal of Cleaner Production*, *45*, 20–28. https://doi.org/10.1016/j.jclepro.2012.11.002

Lubin, D. A., & Esty, D. C. (2010). The Sustainability Imperative. *Harvard Business Review*, *88*(5), 42–50. Retrieved from https://hbr.org/2010/05/the-sustainability-imperative

Luning, S. (2012). Corporate Social Responsibility (CSR) for exploration: Consultants, companies and communities in processes of engagements. *Resources Policy*, *37*(2), 205–211. https://doi.org/10.1016/j.resourpol.2011.02.004

Mantere, S., & Ketokivi, M. (2013). Reasoning in organization science. *Academy of Management Review*, *38*(1), 70–89. https://doi.org/10.5465/amr.2011.0188

Mercer-Mapstone, L., Rifkin, W., Louis, W., & Moffat, K. (2017). Meaningful dialogue outcomes contribute to laying a foundation for social licence to operate. *Resources Policy*, *53*(July), 347–355. https://doi.org/10.1016/j.resourpol.2017.07.004

Metsämuuroinen, J. (2009). *Tutkimuksen tekemisen perusteet ihmistieteissä* (1st. Edition). [The basis of research in human sciences] Helsinki: International

Methelp Oy.

*Mining Act 621/2011*. (2011). Retrieved from https://www.finlex.fi/en/laki/kaannokset/2011/en20110621.pdf

Mitchell, R. K., Wood, D. J., & Agle, B. (1997). Toward a Theory of Stakeholder Identification and Salience : Defining the Principle of Who and What Really Counts. *Academy of Management Review*, *22*(4), 853–886. https://doi.org/10.5465/AMR.1997.9711022105

Moffat, K., & Zhang, A. (2014). The paths to social licence to operate: An integrative model explaining community acceptance of mining. *Resources Policy*, *39*(1), 61–70. https://doi.org/10.1016/j.resourpol.2013.11.003

Molthan-Hill, P. (2017). *The business student's guide to sustainable management: Principles and practice* (2nd ed.). Abingdon, UK: Routledge.

Mononen, T., & Suopajärvi, L. (2016). *Kaivos suomalaisessa yhteiskunnassa*. [A mine in the Finnish society] *Lapin Yliopistokustannus*. Rovaniemi, Finland: Lapin Yliopistokustannus.

Muhonen, T. (2019, January 12). Tervetuloa lohikäärmeen luolaan. [Welcome to the dragon cave] *Helsingin Sanomat*. Retrieved from https://dynamic.hs.fi/2019/dragonmining/index.html

Muijs, D. (2011). *Doing quantitative research in education with SPSS* (2nd ed.). London: SAGE Publications Ltd. https://doi.org/10.4135/9781849203241.n5

National Land Survey of Finland. (2019). Maps and spatial data. Retrieved from https://www.maanmittauslaitos.fi/en/maps-and-spatial-data

Neale, A. (1997). in Contested Environments : Lessons From Brent Spar. *Business Strategy and the Environment*, *6*, 93–103. https://doi.org/10.1002/(SICI)1099-0836(199705)6:2<93::AID-BSE95>3.0.CO;2-U

Nelsen, J. L. (2006). Social licence to operate. *International Journal of Mining, Reclamation and Environment*, *20*(3), 161–162. https://doi.org/10.1080/17480930600804182

Nelsen, J. L. (2007). *Social license to operate: Integration into Mine Planning and Development*. The University of British Columbia. Retrieved from https://open.library.ubc.ca/cIRcle/collections/ubctheses/831/items/1.0081173

Net Positive Project. (2019). Retrieved May 22, 2019, from https://www.netpositiveproject.org/

Nupponen, A.-M. (2011). *"Savon murre" savolaiskorvin : kansa murteen havainnoijana*. ["Dialect of Savo" through Savonian ears: a nation as a observer of dialect] Joensuu: Publications of the University of Eastern Finland Dissertations in Education, Humanities, and Theology 11. Retrieved from http://urn.fi/URN:ISBN:978-952-61-0354-9

Ohmori, S., Yamao, Y., & Nakajima, N. (2000). The future generations of mobile communications based on broadband access technologies. *IEEE Communications Magazine*, *38*(12), 134–142. Retrieved from http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=888267

Orsato, R. J. (2006). Competitive Environmental Strategies: When does it pay to

be green? *California Management Review*, *48*(2), 127–144. https://doi.org/10.1108/sd.2006.05622had.003

Owen, J. R., & Kemp, D. (2013). Social licence and mining: A critical perspective. *Resources Policy*, *38*, 29–35. https://doi.org/10.1016/j.resourpol.2012.06.016

Paananen, H. (2017, December 3). Harkimo ihmettelee : Miksei Äänekosken biotuotetehtaan työmaa työllistä keskisuomalaisia ? [Harkimo wonders: Why does the construction site of Äänekoski Bioproduct Factory employ middle Finns?] *Keskisuomalainen*. Retrieved from https://www.ksml.fi/talous/Harkimo-ihmettelee-Miksei-Äänekosken-biotuotetehtaan-työmaa-työllistä-keskisuomalaisia/886464

Pahkinen, E. (2012). *Kyselytutkimusten otantamenetelmät ja aineistoanalyysi*. [Samplin methods and data analysis of surveys] Jyväskylä: JULPU; Jyväskylä University Library Publishing Unit.

Peltonen, L. (2004). NIMBY-kiistojen asukaskeskeiset ja kontekstuaaliset selitykset. [Resident-centered and contextual explanations of NIMBY disputes] *Alue Ja Ympäristö*, *33*(2), 43–54.

Petterson, S., & Suopajärvi, L. (2018). *Sosiaalinen toimilupa kaivos-, metsä- ja matkailualalla, Toimialojen paikallinen hyväksyttävyys Lapissa*. [Social license for mining, forestry and tourism, Local acceptance of industries in Lapland] *Lapin Yliopisto*. Lapin Yliopisto. Retrieved from http://urn.fi/URN:ISBN:978-952-337-066-1

Pike, R. (2012). The Relevance of Social Licence to Operate for Mining Companies. *Schroders*, (July), 1–11. Retrieved from https://www.schroders.com/staticfiles/Schroders/Sites/Americas/US Institutional 2011/pdfs/Social-Licence-to-Operate.pdf

Porter, M. E., & Kramer, M. R. (2006). Strategy & Society. *Harvard Business Review*, *23*(5), 78–92. https://doi.org/10.1108/sd.2007.05623ead.006

Prno, J. (2013). An analysis of factors leading to the establishment of a social licence to operate in the mining industry. *Resources Policy*, *38*(4), 577–590. https://doi.org/10.1016/j.resourpol.2013.09.010

Prno, J., & Scott Slocombe, D. (2012). Exploring the origins of "social license to operate" in the mining sector: Perspectives from governance and sustainability theories. *Resources Policy*, *37*(3), 346–357. https://doi.org/10.1016/j.resourpol.2012.04.002

Prno, J., & Slocombe, D. S. (2014). A systems-based conceptual framework for assessing the determinants of a social license to operate in the mining industry. *Environmental Management*, *53*(3), 672–689. https://doi.org/10.1007/s00267-013-0221-7

Räisänen, K. (2018, March 14). Annu Nieminen, 33, etsi Piilaaksosta hanketta, joka pyrkisi pelastamaan maailman – kun sitä ei löytynyt, hän perusti sen Suomeen. [Annu Nieminen, 33, seeked a project in Silicon Valley that would aim to save the world - when it was not found, he established one in Finland] *Helsingin Sanomat*. Retrieved from https://www.hs.fi/talous/art-2000005602590.html

Ramboll a). (2018). *YVA-selvitys: Kipsin läjitysalueen laajennuksen ympäristövaikutusten arviointiselostus*. [EIA report: Environmental impact

assessment report for the gypsum landfill extension] Retrieved from https://www.ymparisto.fi/yarankipsilajitysYVA

Ramboll b). (2018). *YVA-selvitys: Kipsin läjitysalueen laajennuksen ympäristövaikutusten arviointiselostuksen liitteet*. [EIA report: Annexes to the Environmental Impact Assessment Report for the gypsum landfill extension] Retrieved from https://www.ymparisto.fi/yarankipsilajitysYVA

Ramboll c). (2018). *YVA-Selvitys: Louhosjatkumon ympäristövaikutusten arviointiselostus*. [EIA Report: Environmental Impact Assessment Report for Quarry Expansion] Retrieved from https://www.ymparisto.fi/yaranlouhosjatkumoYVA

Ramboll d). (2018). *YVA-selvitys: Louhojatkumon ympäristövaikutusten arviointi, Liite 8*. [EIA report: Environmental Impact Assessment for Quarry Expansion, Annex 8.]Retrieved from https://www.ymparisto.fi/yaranlouhosjatkumoYVA

Ramboll e). (2013). *YVA-selvitys: Siilinjärven kaivoksen sivukivialueiden laajennus*. [EIA report: Extension of the gangue areas of the Siilinjärvi mine] Retrieved from https://www.ymparisto.fi/yaranlouhosjatkumoYVA

Ramboll f). (2013). *YVA- selvitys Yara Suomi Oy:n Siilinjärven kaivoksen sivukivialueiden laajennus Liitteet 1-3*. [EIA report Extension of Yara Suomi Oy's gangue areas in Siilinjärvi mine Appendices 1-3] Retrieved from https://www.ymparisto.fi/yaranlouhosjatkumoYVA

Rimaila, E. (2019, March 15). Koko maailman ilmastolakko. [THe whole world's climate strike] *Helsingin Sanomat*. Retrieved from https://www.hs.fi/ulkomaat/art-2000006036750.html

Rose, S., Spinks, N., & Canhoto, A. I. (2014). *Management Research Applying the Principles* (1st Edition). London: Routledge. Retrieved from https://doi-org.ezproxy.jyu.fi/10.4324/9781315819198

Ruggie, J. (2015). The Corporate Responsibility to Respect Human Rights. *World Petroleum Council: Official Publication 2010*, *108*, 30–32. Retrieved from http://www.world-petroleum.org/docs/docs/publications/2010yearbook/P30-32_John_Ruggie.pdf

Ruiz Martín, A., Rodríguez Díaz, M., & Ruíz San Román, J. A. (2014). Measure of the mining image. *Resources Policy*, *41*(1), 23–30. https://doi.org/10.1016/j.resourpol.2014.01.004

Ruotsalainen, P. (2018, October). Pro Heinävesi: Grafiittikaivos tuottaisi useita miljoonia tappiota vuosittain. [Pro Heinävesi: The graphite mine would produce several million losses every year] *Karjalainen*. Retrieved from https://www.karjalainen.fi/uutiset/uutis-alueet/maakunta/item/197120

Rytteri, T. (2012). Suomessa toimivien kaivos - yhtiöiden vastuustrategiat ja yhtiöihin kohdistuvat odotukset. [Responsibility strategies for mining companies operating in Finland and expectations directed towards companies] *Alue Ja Ympäristö*, *41*(1), 54–67. Retrieved from https://aluejaymparisto.journal.fi/article/view/64716

Saariniemi, J. (2018). Kaivostoiminnan koetut vaikutukset Sodankylässä -

seurantatutkimus. [Experienced impacts of mining operations in Sodankylä follow-up study] *Terra*. Retrieved from https://lauda.ulapland.fi/bitstream/handle/10024/63787/Kaivostoiminnan koetut vaikutukset Kittilässä_ Busk projektin projektiraportti 2019.pdf?sequence=1&isAllowed=y

Sairinen, R. (2011). Kaivosteollisuuden yhteiskuntavastuu ja muuttuva suhde paikallisyhteisöön. [Social responsibility of the mining industry and the changing relationship with the local community] *Terra*, *123*(3), 139–146. Retrieved from http://elektra.helsinki.fi/se/t/0040-3741/123/3/kaivoste.pdf

Sairinen, R. (2018). Sosiaalinen toimilupa viheliäisten kaivos- ja ilmasto-ongelmien työkaluna. [Social license as a tool for malicious mining and climate problems] Retrieved from http://www.collaboration.fi/2018/05/24/sosiaalinen-toimilupa-viheliaisten-kaivos-ja-ilmasto-ongelmien-tyokaluna/

Sairinen, R., Tiainen, H., & Mononen, T. (2017). Talvivaara mine and water pollution: An analysis of mining conflict in Finland. *Extractive Industries and Society*, *4*(3), 640–651. https://doi.org/10.1016/j.exis.2017.05.001

Santiago, A. L. F., & Demajorovic, J. (2016). Social license to operate: a case study from a Brazilian mining industry. *Latin American J. of Management for Sustainable Development*, *3*(1), 19–34. https://doi.org/10.1504/lajmsd.2016.078622

Stieb, J. A. (2009). Assessing Freeman's stakeholder theory. *Journal of Business Ethics*, *87*(3), 401–414. https://doi.org/10.1007/s10551-008-9928-4

Sullivan, K., Thomas, S., & Rosano, M. (2018). Using industrial ecology and strategic management concepts to pursue the Sustainable Development Goals. *Journal of Cleaner Production*, *174*, 237–246. https://doi.org/10.1016/j.jclepro.2017.10.201

Suurimmat työnantajat 2016. (2016). [The biggest employers in 2016] Retrieved from https://www.siilinjarvi.fi/minun-siilinjarvi/tietoa-siilinjarvesta/tilastot/yritykset/

Teittinen, P. (2019, March 11). Kuusi eduskuntapuoletta näyttää vihreää valoa kaivosverolle. [Six parliamentarian parties show green light on mining taxes] *Helsingin Sanomat*. Retrieved from https://www.hs.fi/politiikka/art-2000005963997.html

Tekir Oy a). (2016). Yaran Fokusryhmäkeskustelut 2016, loppuraportti, Etäinen jättiläinen keskellä kylää. [Yara Focus Group Interviews 2016, Final Report, Distant Giant in the middle of the village] Internal document; a report of the focus group interviews investigating the Siilinjärvi mine's and factory's operation from the local communication viewpoint. Information shared by Hanna Luukkonen, Environmental Manager of Yara Siilinjärvi mine.

Tekir Oy b). (2016). Yara Siilinjärvi Sidosryhmäanalyysi. [Yara Siilinjärvi Stakeholder analysis] Internal document; a presentation illustrating the key stakeholders of Yara Siilinjärvi site. Information shared by Hanna Luukkonen, Environmental Manager of Yara Siilinjärvi mine.

The Upright Project. (2019). Retrieved May 22, 2019, from

https://www.uprightproject.com/

Tiainen, H., Sairinen, R., & Mononen, T. (2014). Talvivaaran kaivoshankkeen konfliktoituminen. [Conflicting of Talvivaara mining project] *Ympäristöpolitiikan Ja -Oikeuden Vuosikirja VII 2014*, 7–79. Retrieved from https://docplayer.fi/61398034-Talvivaaran-kaivoshankkeen-konfliktoituminen.html

Tiainen, H., Sairinen, R., & Sidorenko, O. (2015). *Governance of Sustainable Mining in Arctic Countries: FInland, Sweden, Greenland & Russia*. *Arcic Yearbook 2015: Arctic Governance and Governing*. Retrieved from http://library.arcticportal.org/1903/1/arctic-yearbook-2015.pdf

Tiihonen, J. (2019, February 25). Ylitorniolle suunnitellut suuret tuulivoimahankkeet eivät etene. [The large wind power projects planned for Ylitorni do not progress] *Yle Uutiset*, pp. 3–5. Retrieved from https://yle.fi/uutiset/3-10662329

Tilastokeskus. (2017). *Kuntien avainluvut*. [Municipalities key figures] Retrieved from http://www.stat.fi/tup/alue/kuntienavainluvut.html#?year=2019&active1=749

Toimipaikan kehityssuunnitelma. (2019). [The site's development plan]Internal document; the aim of the document is to align the relevant development aims and targets. Information was shared Hanna Luukkonen, Environmental Manager of Yara Siilinjärvi mine.

Tuomi, J., & Sarajärvi, A. (2018). *Laadullinen tutkimus ja sisällön analyysi*. [Qualitative research and content analysis] Helsinki: Kustannusosakeyhtiö Tammi.

Turvallisuus- ja kemikaalivirasto. (2019). Malminetsintä voimakkaassa kasvussa. [Ore exploration in strong growth] Retrieved April 3, 2019, from https://tukes.fi/artikkeli/-/asset_publisher/malminetsinta-voimakkaassa-kasvus-1

Tyler, T. R. (2000). Social Justice: Outcome and Procedure. *International Journal of Psychology*, *35*(2), 117–125. https://doi.org/doi.org/10.1080/002075900399411

United Nations. (2015). *The 2030 Agenda for Sustainable Development*. *United Nations Department of Economic and Social Affairs*.

UPM. (2019). UPM Tietoa meistä. Retrieved from https://www.upm.com/fi/tietoa-meista/

Valli, R. (2015). *Johdatus tilastolliseen tutkimukseen* (2nd Edition). [Introduction to statistical research] Jyväskylä: PS-kustannus.

Vasara, H. (2018). *Toimialaraportit, Kaivosala*. *Työ- ja elinkeinoministeriön julkaisuja* [Industry Reports, Mining. Publications of the Ministry of Employment and the Economy] (Vol. 40/2018). Retrieved from http://julkaisut.valtioneuvosto.fi/handle/10024/161162

Vidal, N. G., Bull, G. Q., & Kozak, R. A. (2010). Diffusion of corporate responsibility practices to companies: The experience of the forest sector. *Journal of Business Ethics*, *94*(4), 553–567. https://doi.org/10.1007/s10551-009-0281-z

Vilkka, H. (2007). *Tutki ja mittaa: määrällisen tutkimuksen perusteet*. [Explore and Measure: Basics of Quantitative Research] Helsinki: Tammi.

Vollaro, M., Galioto, F., & Viaggi, D. (2016). The circular economy and agriculture: new opportunities for re-using Phosphorus as fertilizer. *Bio-Based and Applied Economics*, *5*(3), 267–285. https://doi.org/10.13128/bae-18527

von Malmborg, F. B. (2002). Environmental and Organizational of Environmental. *Business Strategy and the Environment*, *11*, 312–323. https://doi.org/doi.org/10.1002/bse.337

Voutilainen, K. (2019, March 12). Beowulf Mining luopuu Haapamäen kaivoshankkesta. [Beowulf Mining will give up the Haapamäki mining project] *Soisalon Seutu*. Retrieved from https://www.soisalonseutu.fi/beowulf-mining-luopuu-haapamaen-kaivoshankkeesta/

Waldeck, J., Durante, C., Helmuth, B., & Marcia, B. (2012). Communication in a Changing World: Contemporary Perspectives on Business Communication Competence. *Journal of Education for Business*, *87*(4), 230–240. https://doi.org/10.1080/08832323.2011.608388

Wall, J. A., & Callister, R. R. J. (1995). Conflict and Its Management. *Journal of Management*, *21*(3), 513–556.

Walls, J. L., & Berrone, P. (2017). The Power of One to Make a Difference: How Informal and Formal CEO Power Affect Environmental Sustainability. *Journal of Business Ethics*, *145*(2), 293–308. https://doi.org/10.1007/s10551-015-2902-z

Watson, R. (2015). Quantitative research. *Nursing Standard*, *29*(31), 44–48. https://doi.org/10.7748/ns.29.31.44.e8681

WCED (World Commission on Environment and Development). (1987). *Our Common Future*. Oxford University Press, Oxford, UK.

Wilburn, K. M., & Wilburn, R. (2011). Achieving Social License to Operate Using Stakeholder Theory. *Journal of International Business Ethics*, *4*(2), 3–16. Retrieved from http://www.scholarspress.us/journals/JIBE/pdf/JIBE-2-2011/v4n211-art1.pdf

Wilson, L. J. (2004). Riding the resource roller coaster: Understanding socioeconomic differences between mining communities. *Rural Sociology*, *69*(2), 261–281. https://doi.org/10.1526/003601104323087606

Yara Siilinjärvi site. (2019). Internal document; Siilinjärvi site, Bread from stones, an overwiev of Yara Siilinjärvi site and its operations, information shared by Hanna Luukkonen, Environmental Manager of Yara Siilinjärvi mine.

Yara Suomi Oy a). (2019). Tehtaat ja kaivos. [Factories and mine] Retrieved March 20, 2019, from https://www.yara.fi/tietoa-yarasta/yara-suomi/toimipaikat/siilinjarvi/tuotantolaitos/

Yara Suomi Oy b). (2019). Yara Suomen historia. [History of Yara Finland] Retrieved March 20, 2019, from https://www.yara.fi/tietoa-yarasta/yara-suomi/historia/

Yara Suomi Oy c). (2019). Kiertotalous Yaran toiminnassa: Yara ja UPM kehittävät yhteistyössä kierrätyslannoitetta. [Circular economy in Yara's

operations: Yara and UPM collaborate to develop recycled fertilizer Project] Retrieved March 21, 2019, from https://www.yara.fi/tietoa-yarasta/ymparisto/kiertotalous/kierratyslannoite/

Yara Suomi Oy d). (2019). Yara selvittää mahdollisuuksia jatkaa toimintaa Siilinjärvellä vuoden 2035 jälkeen. [Yara will explore the possibilities to continue operations in Siilinjärvi after 2035] Retrieved March 23, 2019, from https://www.yara.fi/uutiset-ja-tapahtumat/uutiset/2018-05-09-siilinjarvi/

Yara Suomi Oy e). (2019). Kipsi - Tutkitusti tehokkain menetelmä Itämeren fosforikuormituksen vähentämisessä. [Gypsum - The most efficient method for reducing phosphorus load in the Baltic Sea] Retrieved March 23, 2019, from https://www.yara.fi/tietoa-yarasta/ymparisto/itameri/kipsi/

Yara Suomi Oy f). (2019). Veolia and Yara partner to propel European circular economy. Retrieved May 29, 2019, from https://www.yara.com/corporate-releases/veolia-and-yara-partner-to-propel-european-circular-economy/

Yaran imago. (2019). [Yara's Image] Internal document; an overwiev about the research data and results compiled by Taloustutkimus Oy. Information shared by Anne Kosonen,Taloustutkimus Oy.

Yaran Ympäristötarkkailu. (2019). [Yara's Environmental Monitoring] Internal document; an overwiev about contemprary environmental monitoring of Yara Siilinjärvi site. Information shared by Hanna Luukkonen, Environmental Manager of Yara Siilinjärvi mine.

Zhang, A., & Moffat, K. (2015). A balancing act: The role of benefits, impacts and confidence in governance in predicting acceptance of mining in Australia. *Resources Policy*, *44*, 25–34. https://doi.org/10.1016/j.resourpol.2015.01.001

Zhang, A., Moffat, K., Lacey, J., Wang, J., González, R., Uribe, K., … Dai, Y. (2015). Understanding the social licence to operate of mining at the national scale: A comparative study of Australia, China and Chile. *Journal of Cleaner Production*, *108*, 1063–1072. https://doi.org/10.1016/j.jclepro.2015.07.097

# APPENDICES

## Appendix 1 Questionnaire outline in English

**Gender**

- ❍ 1 Woman
- ❍ 2 Man

**Age group**

- ❍ 1 18-19
- ❍ 2 20-24
- ❍ 3 25-29
- ❍ 4 30-34
- ❍ 5 35-39
- ❍ 6 40-44
- ❍ 7 45-49
- ❍ 8 50-54
- ❍ 9 55-59
- ❍ 10 60-64
- ❍ 11 65-69
- ❍ 12 70-74
- ❍ 13 75-79

**First name**

**Surname**

**Phone number**

**Post office**

**May I interview You. I am AgentName from Taloustutkimus good day/evening. We are currently concluding a phone survey targeted to 18-79 years old residents of Siilinjärvi regarding the social license to operate of Yara Siilinjärvi.**

**The aim of the interview is to explore the attitudes of the residents of Siilinjärvi towards Yara Siilinjärvi site and illustrate the relationship between the site and local community. The survey consists of three background questions, 11 statements and two open-ended questions. It takes approximately 10 minutes to answer the questionnaire. The answers of this survey are dealt completely anonymous.**

- ❍ 1 Participates
- ❍ 2 Declines

**1. Are You…?**

- ❍ 1 Employee
- ❍ 2 Homemaker
- ❍ 3 Student
- ❍ 4 Pensioner
- ❍ 5 Unemployed
- ❍ 6 Entrepreneur or practitioner
- ❍ 7 Something else

**2. What is Your highest vocational education?**

- ❍ 1 Comprehensive school or equivalent
- ❍ 2 Vocational school or equivalent
- ❍ 3 Post secondary education

- ❍ 4 University of Applied Sciences
- ❍ 5 University

**3. What is Your relationship with Yara?**

- ❍ 1 I have heard of Yara but not been in direct contact with Yara or the contract tors of Yara.
- ❍ 2 I am currently employed by Yara.
- ❍ 3 I am currently employed by Yara's contractor.
- ❍ 4 I have been employed by Yara but not currently.
- ❍ 5 I have been employed by Yara's contractor but not currently.
- ❍ 6 I have been in contact with Yara in other ways.
- ❍ 7 I do not know what Yara is.

**4. To which extent do You agree with the following statements?**
**Use scale 5= completely agree, 4= somewhat agree, 3= do not agree or disagree, 2= somewhat disagree and 1= completely disagree**

| | 5 completely agree | 4 somewhat agree | 3 do not agree or disagree | 2 somewhat disagree | 1 completely disagree | IDK |
|---|---|---|---|---|---|---|
| 1. Yara shares sufficiently information on matters that affect us, the residents of Siilinjärvi. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 2. Yara impacts positively to the well-being of the region. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 3. Yara considers the local sources of livelihoods in its operation. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 4. Yara is engaged into the development of Siilinjärvi municipality. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 5. Yara listens and appreciates the opinion of us, residents of Siilinjärvi. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 6. Yara compensates sufficiently the harm caused by its operations. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 7. We as residents of Siilinjärvi have the opportunity to be involved in making decision concerning Yara. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 8. Yara is prepared to make adjustments in its operations with regards to the opinions of the residents of Siilinjärvi. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 9. Yara is committed to the aftercare of its regions. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 10 If I would like to contact the staff of Yara Siilinjärvi, it would be easy. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 11. Yara acts responsibly. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |

**5. 1. In which has Yara succeeded in Your opinion?**

**5.2. In which has Yara still to develop in Your opinion?**

## Appendix 2 Questionnaire outline in Finnish

**Sukupuoli**

- ❍ 1 Nainen
- ❍ 2 Mies

**Ikäryhmä**

- ❍ 1 18-19
- ❍ 2 20-24
- ❍ 3 25-29
- ❍ 4 30-34
- ❍ 5 35-39
- ❍ 6 40-44
- ❍ 7 45-49
- ❍ 8 50-54
- ❍ 9 55-59
- ❍ 10 60-64
- ❍ 11 65-69
- ❍ 12 70-74
- ❍ 13 75-79

**Etunimi**

**Sukunimi**

**Puhelinnumero**

**Postitoimipaikka**

**Voiko haastatella, olen AgentName Taloustutkimuksesta hyvää päivää/ iltaa. Teemme parhaillaan Yaran Siilinjärven toimipaikan sosiaaliseen toimilupaan liittyvää puhelinhaastattelua 18-79-vuotiaille Siilinjärven alueella.**

**Haastattelun tavoitteena on selvittää siilinjärveläisten asenteita Yaran Siilinjärven toimipaikkaa kohtaan sekä kuvata toimipaikan ja paikallisyhteisön välistä vuorovaikutusta. Kysely koostuu kolmesta taustakysymyksestä, 11 väittämästä sekä kahdesta avoimesta kysymyksestä. Kyselyn vastaamiseen kuluu aikaa noin 10 minuuttia. Vastaukset käsitellään anonyymisti.**

- ❍ 1 Suostuu
- ❍ 2 Kieltäytyy

**1. Oletteko…?**

- ❍ 1 Palkansaaja
- ❍ 2 Kotiäiti- tai isä
- ❍ 3 Opiskelija
- ❍ 4 Eläkeläinen
- ❍ 5 Työtön
- ❍ 6 Yrittäjä tai ammatinharjoittaja
- ❍ 7 Jokin muu

**2. Mikä on korkein ammatillinen koulutuksenne?**

- ❍ 1 Perus- tai kansakoulu
- ❍ 2 Ammattikoulututkinto (myös oppisopimuskoulutus, ammatti- ja erikoisammatti tutkinnot)
- ❍ 3 Opistoasteen tutkinto
- ❍ 4 Ammattikorkeakoulututkinto
- ❍ 5 Yliopistotutkinto

**3. Mikä on suhteenne Yaraan?**

- ❍ 1 Olen kuullut Yaran toiminnasta mutta en ole ollut suoraan tekemissä Yaran tai Yaralle toimivien urakoitsijoiden kanssa.
- ❍ 2 Minulla on voimassaoleva työsuhde Yaraan.
- ❍ 3 Minulla on voimassaoleva työsuhde Yaralle toimivan urakoitsijan kanssa.
- ❍ 4 Olen ollut työsuhteessa Yaraan mutta en tällä hetkellä ole.
- ❍ 5 Olen ollut työsuhteessa Yaralle toimivan urakoitsijan kanssa mutta en tällä hetkellä ole.
- ❍ 6 Olen ollut muulla tavoin tekemisissä Yaran kanssa.
- ❍ 7 En tiedä, mikä Yara on

**4. Kuinka samaa tai eri mieltä olette seuraavien väittämien kanssa?**
**Käyttäkää asteikkoa 5= täysin samaa mieltä, 4= jokseenkin samaa mieltä, 3= ei samaa eikä eri mieltä,**
**2= jokseenkin eri mieltä ja 1= täysin eri mieltä**

| | 5 täysin samaa mieltä | 4 jokseenkin samaa mieltä | 3 ei samaa eikä eri mieltä | 2 jokseenkin eri mieltä | 1 täysin eri mieltä | EOS |
|---|---|---|---|---|---|---|
| 1. Yara jakaa riittävästi meitä siilinjärveläisiä koskevaa informaatiota. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 2. Yara vaikuttaa positiivisesti alueemme hyvinvointiin. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 3. Yara huomioi paikalliset elinkeinot toiminnassaan. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 4. Yara on sitoutunut Siilinjärven kunnan kehittämiseen. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 5. Yara kuuntelee ja arvostaa meidän siilinjärveläisten mielipiteitä. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 6. Yara kompensoi riittävästi toiminnastaan aiheutuvia haittavaikutuksia. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 7. Meillä siilinjärveläisillä on mahdollisuus osallistua Yaraa koskevien päätösten tekoon. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 8. Yara on valmis tekemään muutoksia toiminnassaan siilinjärveläisten näkemysten mukaisesti. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 9. Yara on sitoutunut alueidensa jälkihoitoon. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 10 Halutessani, minun on vaivatonta ottaa yhteyttä Yaran henkilökuntaan. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |
| 11. Yara toimii vastuullisesti. | ❑ | ❑ | ❑ | ❑ | ❑ | ❑ |

**5. 1. Missä Yara on mielestänne onnistunut?**

**5.2. Missä Yaralla on mielestänne kehitettävää?**

## Appendix 3 Background information raw statistics

Table 1. The share of participants according to the original age groups

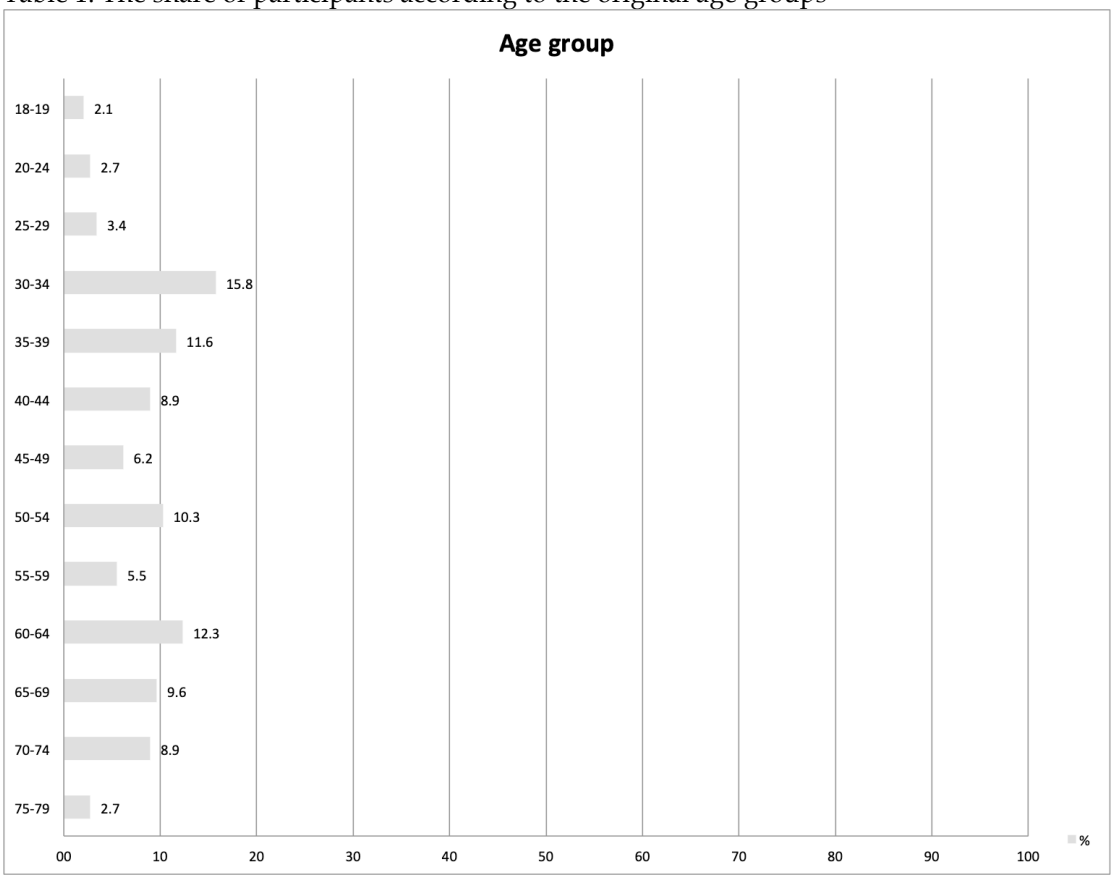



Table 2. The share of participants according to the original profession division

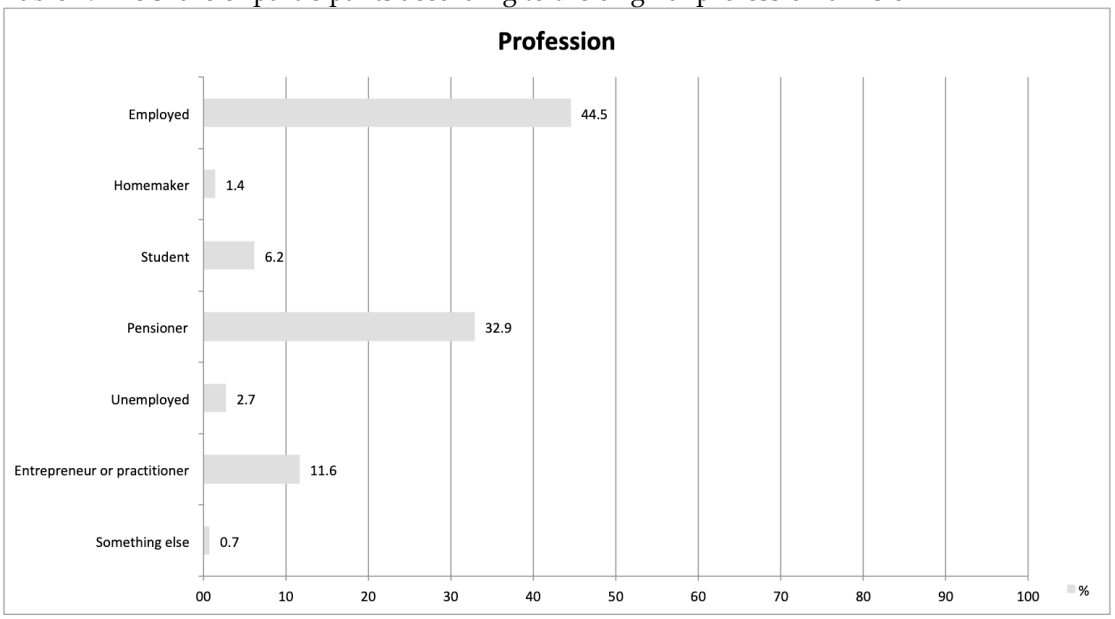


Table 3. The share of participants according to the original education division

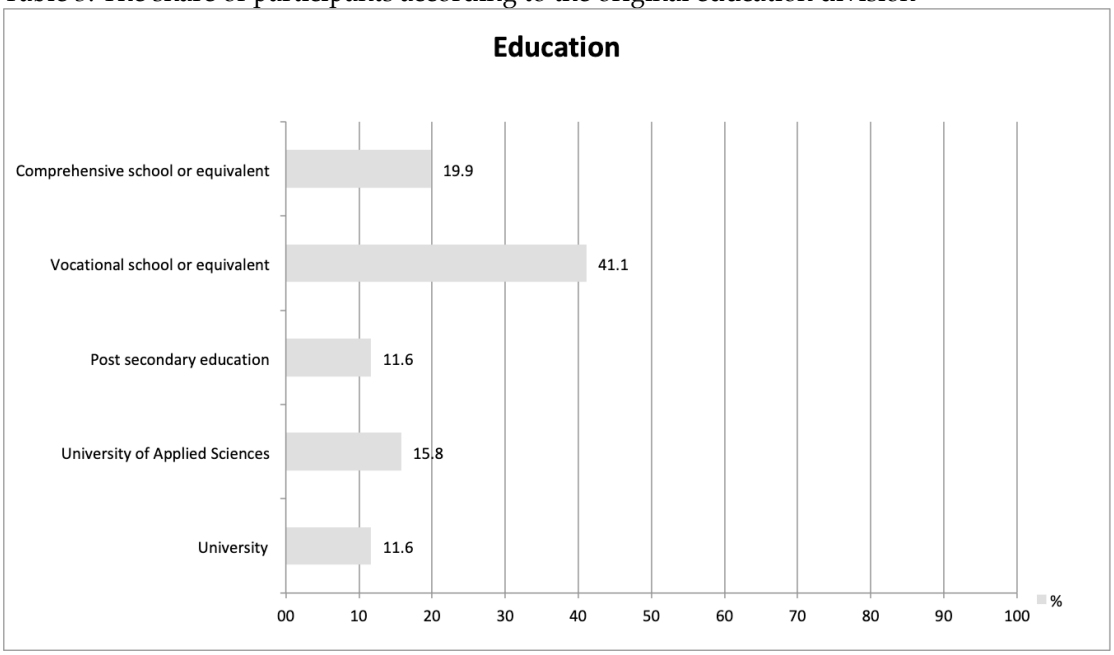
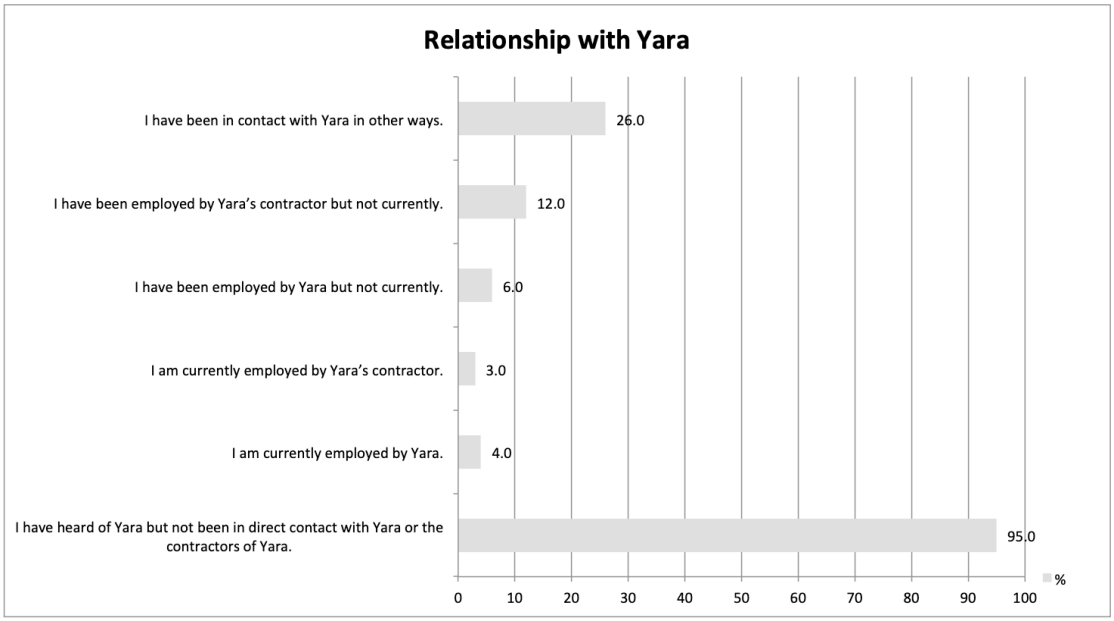



Table 4. The share of participants according to the original division regarding to the relationship with Yara



## Appendix 4 Statistics and results of significant tests (T-test / ne-way ANOVA) per statement

Table 1. The statistics and results of significant tests (T-test) according to gender

| Gender | | | | | | |
|---|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error Mean | T-Test |
| Yara shares sufficiently information on matters that affect us, the residents of Siilinjärvi. | Woman | 70 | 3,06 | 1,062 | 0,127 | 0,348 |
| | Man | 71 | 3,23 | 1,058 | 0,126 | |
| Yara impacts positively to the well-being of the region. * | Woman | 71 | 3,70 | 1,006 | 0,119 | 0,031 |
| | Man | 72 | 4,07 | 0,998 | 0,118 | |
| Yara considers the local sources of livelihoods in its operation. | Woman | 57 | 3,35 | 0,813 | 0,108 | 0,885 |
| | Man | 67 | 3,37 | 0,885 | 0,108 | |
| Yara is engaged into the development of Siilinjärvi municipality. | Woman | 61 | 3,36 | 0,932 | 0,119 | 0,318 |
| | Man | 66 | 3,18 | 1,066 | 0,131 | |
| Yara listens and appreciates the opinion of us, residents of Siilinjärvi. | Woman | 65 | 3,23 | 0,948 | 0,118 | 0,728 |
| | Man | 66 | 3,29 | 0,924 | 0,114 | |
| Yara compensates sufficiently the harm caused by its operations. | Woman | 61 | 3,08 | 0,781 | 0,100 | 0,377 |
| | Man | 66 | 2,94 | 1,006 | 0,124 | |
| We as residents of Siilinjärvi have the opportunity to be involved in making decision concerning Yara. | Woman | 59 | 2,86 | 0,899 | 0,117 | 0,680 |
| | Man | 64 | 2,80 | 0,912 | 0,114 | |
| Yara is prepared to make adjustments in its operations with regards to the opinions of the residents of Siilinjärvi. | Woman | 61 | 3,03 | 0,912 | 0,117 | 0,988 |
| | Man | 66 | 3,03 | 0,911 | 0,112 | |
| Yara is committed to the aftercare of its regions. | Woman | 59 | 3,34 | 0,779 | 0,101 | 0,664 |
| | Man | 66 | 3,41 | 0,992 | 0,122 | |
| If I would like to contact the staff of Yara Siilinjärvi, it would be easy. | Woman | 64 | 3,44 | 1,097 | 0,137 | 0,577 |
| | Man | 66 | 3,33 | 1,028 | 0,127 | |
| Yara acts responsibly. | Woman | 70 | 3,60 | 0,788 | 0,094 | 0,629 |
| | Man | 72 | 3,53 | 0,978 | 0,115 | |

*Almost significant differentiation

Table 2. The statistics and results of significant tests (One-way ANOVA) according to age group

| Age group | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error | One-way ANOVA - Post Hoc: Tukey HSD or Tamhane | |
| Yara shares sufficiently information on matters that affect us, the residents of Siilinjärvi. | > 40 years | 51 | 3,12 | 1,032 | 0,145 | 40-59 years | 0,972 |
| | | | | | | 60+ years | 0,841 |
| | 40-59 years | 44 | 3,07 | 1,043 | 0,157 | Under 40 years | 0,972 |
| | | | | | | 60+ years | 0,727 |
| | 60+ years | 46 | 3,24 | 1,119 | 0,165 | > 40 years | 0,841 |
| | | | | | | 40-59 years | 0,727 |
| Yara impacts positively to the well-being of the region. * | > 40 years * | 52 | 3,65 | 1,101 | 0,153 | 40-59 years | 0,483 |
| | | | | | | 60+ years * | 0,040 |
| | 40-59 years | 45 | 3,89 | 0,959 | 0,143 | > 40 years | 0,483 |
| | | | | | | 60+ years | 0,423 |
| | 60+ years * | 46 | 4,15 | 0,918 | 0,135 | > 40 years * | 0,040 |
| | | | | | | 40-59 years | 0,423 |
| Yara considers the local sources of livelihoods in its operation. | > 40 years | 47 | 3,43 | 0,801 | 0,117 | 40-59 years | 0,199 |
| | | | | | | 60+ years | 0,715 |
| | 40-59 years | 42 | 3,12 | 0,861 | 0,133 | > 40 years | 0,199 |
| | | | | | | 60+ years | 0,051 |
| | 60+ years | 35 | 3,57 | 0,850 | 0,144 | > 40 years | 0,715 |
| | | | | | | 40-59 years | 0,051 |
| Yara is engaged into the development of Siilinjärvi municipality. | > 40 years | 49 | 3,41 | 0,888 | 0,127 | 40-59 years | 0,437 |
| | | | | | | 60+ years | 0,656 |
| | 40-59 years | 41 | 3,15 | 1,038 | 0,162 | > 40 years | 0,437 |
| | | | | | | 60+ years | 0,950 |
| | 60+ years | 37 | 3,22 | 1,109 | 0,182 | > 40 years | 0,656 |
| | | | | | | 40-59 years | 0,950 |
| Yara listens and appreciates the opinion of us, residents of Siilinjärvi. * | > 40 years | 48 | 3,25 | 0,863 | 0,125 | 40-59 years | 0,477 |
| | | | | | | 60+ years | 0,375 |
| | 40-59 years * | 42 | 3,02 | 0,897 | 0,138 | > 40 years | 0,477 |
| | | | | | | 60+ years * | 0,044 |
| | 60+ years * | 41 | 3,51 | 1,003 | 0,157 | > 40 years | 0,375 |
| | | | | | | 40-59 years * | 0,044 |
| Yara compensates sufficiently the harm caused by its operations. | > 40 years | 44 | 2,95 | 0,888 | 0,134 | 40-59 years | 0,934 |
| | | | | | | 60+ years | 0,882 |
| | 40-59 years | 42 | 3,02 | 0,811 | 0,125 | > 40 years | 0,934 |
| | | | | | | 60+ years | 0,991 |
| | 60+ years | 41 | 3,05 | 1,024 | 0,160 | > 40 years | 0,882 |
| | | | | | | 40-59 years | 0,991 |
| We as residents of Siilinjärvi have the opportunity to be involved in making decision concerning Yara. | > 40 years | 44 | 2,89 | 0,920 | 0,139 | 40-59 years | 0,654 |
| | | | | | | 60+ years | 1,000 |
| | 40-59 years | 42 | 2,71 | 0,891 | 0,138 | > 40 years | 0,654 |
| | | | | | | 60+ years | 0,661 |
| | 60+ years | 37 | 2,89 | 0,906 | 0,149 | > 40 years | 1,000 |
| | | | | | | 40-59 years | 0,661 |
| Yara is prepared to make adjustments in its operations with regards to the opinions of the residents of Siilinjärvi. | > 40 years | 47 | 2,94 | 0,845 | 0,123 | 40-59 years | 0,983 |
| | | | | | | 60+ years | 0,182 |
| | 40-59 years | 41 | 2,90 | 0,917 | 0,143 | > 40 years | 0,983 |
| | | | | | | 60+ years | 0,147 |
| | 60+ years | 39 | 3,28 | 0,944 | 0,151 | > 40 years | 0,182 |
| | | | | | | 40-59 years | 0,147 |
| Yara is committed to the aftercare of its regions. | > 40 years | 46 | 3,50 | 0,753 | 0,111 | 40-59 years | 0,407 |
| | | | | | | 60+ years | 0,766 |
| | 40-59 years | 43 | 3,26 | 0,902 | 0,138 | > 40 years | 0,407 |
| | | | | | | 60+ years | 0,862 |
| | 60+ years | 36 | 3,36 | 1,046 | 0,174 | > 40 years | 0,766 |
| | | | | | | 40-59 years | 0,862 |
| If I would like to contact the staff of Yara Siilinjärvi, it would be easy. | > 40 years | 49 | 3,55 | 0,843 | 0,120 | 40-59 years | 0,849 |
| | | | | | | 60+ years | 0,133 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 40-59 years | 44 | 3,43 | 1,021 | 0,154 | > 40 years | 0,849 |
| | | | | | | 60+ years | 0,354 |
| | 60+ years | 37 | 3,11 | 1,308 | 0,215 | > 40 years | 0,133 |
| | | | | | | 40-59 years | 0,354 |
| Yara acts responsibly. | > 40 years | 52 | 3,48 | 0,918 | 0,127 | 40-59 years | 0,985 |
| | | | | | | 60+ years | 0,412 |
| | 40-59 years | 45 | 3,51 | 0,815 | 0,122 | > 40 years | 0,985 |
| | | | | | | 60+ years | 0,535 |
| | 60+ years | 45 | 3,71 | 0,920 | 0,137 | > 40 years | 0,412 |
| | | | | | | 40-59 years | 0,535 |

*Almost significant differentiation

Table 3. The statistics and results of significant tests (T-Test) according to profession

| **Profession** | | | | | | |
|---|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error Mean | T-Test |
| Yara shares sufficiently information on matters that affect us, the residents of Siilinjärvi. | Employed/entrepreneurs | 80 | 3,14 | 1,016 | 0,114 | 0,956 |
| | Others | 61 | 3,15 | 1,123 | 0,144 | |
| Yara impacts positively to the well-being of the region. | Employed/entrepreneurs | 82 | 3,85 | 1,044 | 0,115 | 0,639 |
| | Others | 61 | 3,93 | 0,981 | 0,126 | |
| Yara considers the local sources of livelihoods in its operation. | Employed/entrepreneurs | 75 | 3,27 | 0,875 | 0,101 | 0,119 |
| | Others | 49 | 3,51 | 0,794 | 0,113 | |
| Yara is engaged into the development of Siilinjärvi municipality. | Employed/entrepreneurs | 75 | 3,25 | 0,902 | 0,104 | 0,847 |
| | Others | 52 | 3,29 | 1,143 | 0,159 | |
| Yara listens and appreciates the opinion of us, residents of Siilinjärvi. | Employed/entrepreneurs | 74 | 3,19 | 0,822 | 0,096 | 0,327 |
| | Others | 57 | 3,35 | 1,061 | 0,140 | |
| Yara compensates sufficiently the harm caused by its operations. | Employed/entrepreneurs | 73 | 3,00 | 0,833 | 0,098 | 0,910 |
| | Others | 54 | 3,02 | 1,000 | 0,136 | |
| We as residents of Siilinjärvi have the opportunity to be involved in making decision concerning Yara. | Employed/entrepreneurs | 70 | 2,74 | 0,943 | 0,113 | 0,224 |
| | Others | 53 | 2,94 | 0,842 | 0,116 | |
| Yara is prepared to make adjustments in its operations with regards to the opinions of the residents of Siilinjärvi. | Employed/entrepreneurs | 73 | 2,93 | 0,855 | 0,100 | 0,150 |
| | Others | 54 | 3,17 | 0,966 | 0,132 | |
| Yara is committed to the aftercare of its regions. | Employed/entrepreneurs | 73 | 3,42 | 0,848 | 0,099 | 0,474 |
| | Others | 52 | 3,31 | 0,961 | 0,133 | |
| If I would like to contact the staff of Yara Siilinjärvi, it would be easy. * | Employed/entrepreneurs | 77 | 3,58 | 0,978 | 0,111 | 0,011 |
| | Others | 53 | 3,09 | 1,114 | 0,153 | |
| Yara acts responsibly. | Employed/entrepreneurs | 82 | 3,50 | 0,864 | 0,095 | 0,321 |
| | Others | 60 | 3,65 | 0,917 | 0,118 | |

*Almost significant differentiation

Table 4. The statistics and results of significant tests (One-way ANOVA) according to education

| Education | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error | One-way ANOVA - Post Hoc: Tukey HSD or Tamhane | |
| Yara shares sufficiently information on matters that affect us, the residents of Siilinjärvi. | Comprehensive education or eq. | 27 | 3,37 | 1,115 | 0,214 | Vocational or post sec. education | 0,511 |
| | | | | | | UAS & University | 0,454 |
| | Vocational or post sec. education | 75 | 3,11 | 1,021 | 0,118 | Comprehensive education or eq. | 0,511 |
| | | | | | | UAS & University | 0,962 |
| | UAS & University | 39 | 3,05 | 1,099 | 0,176 | Comprehensive education or eq. | 0,454 |
| | | | | | | Vocational or post sec. education | 0,962 |
| Yara impacts positively to the well-being of the region. | Comprehensive education or eq. | 27 | 4,11 | 0,974 | 0,187 | Vocational or post sec. education | 0,427 |
| | | | | | | UAS & University | 0,783 |
| | Vocational or post sec. education | 76 | 3,80 | 1,020 | 0,117 | Comprehensive education or eq. | 0,427 |
| | | | | | | UAS & University | 0,949 |
| | UAS & University | 40 | 3,90 | 1,033 | 0,163 | Comprehensive education or eq. | 0,783 |
| | | | | | | Vocational or post sec. education | 0,949 |
| Yara considers the local sources of livelihoods in its operation. | Comprehensive education or eq. | 22 | 3,55 | 0,739 | 0,157 | Vocational or post sec. education | 0,542 |
| | | | | | | UAS & University | 0,601 |
| | Vocational or post sec. education | 65 | 3,32 | 0,886 | 0,110 | Comprehensive education or eq. | 0,542 |
| | | | | | | UAS & University | 1,000 |
| | UAS & University | 37 | 3,32 | 0,852 | 0,140 | Comprehensive education or eq. | 0,601 |
| | | | | | | Vocational or post sec. education | 1,000 |
| Yara is engaged into the development of Siilinjärvi municipality. | Comprehensive education or eq. | 23 | 3,48 | 1,163 | 0,242 | Vocational or post sec. education | 0,345 |
| | | | | | | UAS & University | 0,893 |
| | Vocational or post sec. education | 65 | 3,14 | 0,966 | 0,120 | Comprehensive education or eq. | 0,345 |
| | | | | | | UAS &University | 0,524 |
| | UAS & University | 39 | 3,36 | 0,959 | 0,154 | Comprehensive education or eq. | 0,893 |
| | | | | | | Vocational or post sec. education | 0,524 |
| Yara listens and appreciates the opinion of us, residents of Siilinjärvi. * | Comprehensive education or eq.* | 24 | 3,67 | 1,007 | 0,206 | Vocational or post sec. education* | 0,049 |
| | | | | | | UAS &University | 0,133 |
| | Vocational or post sec. education* | 68 | 3,15 | 0,851 | 0,103 | Comprehensive education or eq. | 0,049 |
| | | | | | | UAS &University | 0,947 |
| | UAS &University | 39 | 3,21 | 0,978 | 0,157 | Comprehensive education or eq. | 0,133 |
| | | | | | | Vocational or post sec. education | 0,947 |
| Yara compensates sufficiently the harm caused by its operations. * | Comprehensive education or eq.* | 24 | 3,42 | 0,929 | 0,190 | Vocational or post sec. education * | 0,033 |
| | | | | | | UAS & University | 0,146 |
| | Vocational or post sec. education* | 68 | 2,88 | 0,890 | 0,108 | Comprehensive education or eq.* | 0,033 |
| | | | | | | UAS &University | 0,880 |
| | UAS & University | 35 | 2,97 | 0,857 | 0,145 | Comprehensive education or eq. | 0,146 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | Vocational or post sec. education | 0,880 |
| We as residents of Siilinjärvi have the opportunity to be involved in making decision concerning Yara. | Comprehensive education or eq. | 19 | 2,95 | 0,911 | 0,209 | Vocational or post sec. education | 0,859 |
| | | | | | | UAS & University | 0,788 |
| | Vocational or post sec. education | 68 | 2,82 | 0,845 | 0,103 | Comprehensive education or eq. | 0,859 |
| | | | | | | UAS & University | 0,968 |
| | UAS & University | 36 | 2,78 | 1,017 | 0,170 | Comprehensive education or eq. | 0,788 |
| | | | | | | Vocational or post sec. education | 0,968 |
| Yara is prepared to make adjustments in its operations with regards to the opinions of the residents of Siilinjärvi. * | Comprehensive education or eq.* | 22 | 3,50 | 0,913 | 0,195 | Vocational or post sec. education* | 0,026 |
| | | | | | | UAS &University | 0,057 |
| | Vocational or post sec. education* | 68 | 2,93 | 0,852 | 0,103 | Comprehensive education or eq.* | 0,026 |
| | | | | | | UAS &University | 0,994 |
| | UAS & University | 37 | 2,95 | 0,941 | 0,155 | Comprehensive education or eq. | 0,057 |
| | | | | | | Vocational or post sec. education | 0,994 |
| Yara is committed to the aftercare of its regions. | Comprehensive education or eq. | 23 | 3,39 | 1,118 | 0,233 | Vocational or post sec. education | 0,904 |
| | | | | | | UAS & University | 0,866 |
| | Vocational or post sec. education | 67 | 3,30 | 0,835 | 0,102 | Comprehensive education or eq. | 0,904 |
| | | | | | | UAS & University | 0,484 |
| | UAS & University | 35 | 3,51 | 0,853 | 0,144 | Comprehensive education or eq. | 0,866 |
| | | | | | | Vocational or post sec. education | 0,484 |
| If I would like to contact the staff of Yara Siilinjärvi, it would be easy. * | Comprehensive education or eq.* | 22 | 3,00 | 1,309 | 0,279 | Vocational or post sec. education | 0,447 |
| | | | | | | UAS &University * | 0,025 |
| | Vocational or post sec. education | 68 | 3,31 | 1,040 | 0,126 | Comprehensive education or eq. | 0,447 |
| | | | | | | UAS & University | 0,113 |
| | UAS &University * | 40 | 3,73 | 0,847 | 0,134 | Comprehensive education or eq.* | 0,025 |
| | | | | | | Vocational or post sec. education | 0,113 |
| Yara acts responsibly. * | Comprehensive education or eq.* | 26 | 4,04 | 0,824 | 0,162 | Vocational or post sec. education* | 0,005 |
| | | | | | | UAS & University | 0,066 |
| | Vocational or post sec. education | 76 | 3,41 | 0,882 | 0,101 | Comprehensive education or eq.* | 0,005 |
| | | | | | | UAS & University | 0,676 |
| | UAS & University | 40 | 3,55 | 0,846 | 0,134 | Comprehensive education or eq. | 0,066 |
| | | | | | | Vocational or post sec. education | 0,676 |

*Almost significant differentiation

Table 5. The statistics and results of significant tests (One-way ANOVA) according to relationship with Yara

| Relationship with Yara | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error | One-way ANOVA - Post Hoc: Tukey HSD or Tamhane | |
| Yara shares sufficiently information on matters that affect us, the residents of Siilinjärvi. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 92 | 3,05 | 1,020 | 0,106 | Has been employed / currently employed by Yara/ contractor | 0,998 |
| | | | | | | Has been in contact with Yara other ways | 0,086 |
| | Has been employed / currently employed by Yara/ contractor | 24 | 3,04 | 1,042 | 0,213 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,998 |
| | | | | | | Has been in contact with Yara other ways. | 0,198 |
| | Has been in contact with Yara in other ways. | 25 | 3,56 | 1,158 | 0,232 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,086 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,198 |
| Yara impacts positively to the well-being of the region. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 92 | 3,77 | 0,973 | 0,101 | Has been employed / currently employed by Yara/ contractor | 0,790 |
| | | | | | | Has been in contact with Yara other ways. | 0,070 |
| | Has been employed / currently employed by Yara/ contractor | 25 | 3,92 | 1,038 | 0,208 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,790 |
| | | | | | | Has been in contact with Yara other ways. | 0,431 |
| | Has been in contact with Yara in other ways. | 26 | 4,27 | 1,079 | 0,212 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,070 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,431 |
| Yara considers the local sources of livelihoods in its operation. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 76 | 3,32 | 0,804 | 0,092 | Has been employed / currently employed by Yara/ contractor | 0,316 |
| | | | | | | Has been in contact with Yara in other ways. | 0,960 |
| | Has been employed / currently employed by Yara/ contractor | 25 | 3,60 | 0,913 | 0,183 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,316 |
| | | | | | | Has been in contact with Yara in other ways. | 0,352 |
| | Has been in contact with Yara other ways. | 23 | 3,26 | 0,915 | 0,191 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,960 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,352 |
| Yara is engaged into the development of Siilinjärvi municipality. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 79 | 3,38 | 0,938 | 0,106 | Has been employed / currently employed by Yara/ contractor | 0,177 |
| | | | | | | Has been in contact with Yara in other ways. | 0,713 |
| | Has been employed / currently employed by Yara/ contractor | 23 | 2,96 | 1,065 | 0,222 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,177 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | | Has been in contact with Yara other ways. | 0,676 |
| | Has been in contact with Yara in other ways. | 25 | 3,20 | 1,118 | 0,224 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,713 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,676 |
| Yara listens and appreciates the opinion of us, residents of Siilinjärvi. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 83 | 3,28 | 0,874 | 0,096 | Has been employed / currently employed by Yara/ contractor | 0,785 |
| | | | | | | Has been in contact with Yara other ways. | 0,978 |
| | Has been employed / currently employed by Yara/ contractor | 23 | 3,13 | 1,058 | 0,221 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,785 |
| | | | | | | Has been in contact with Yara in other ways. | 0,764 |
| | Has been in contact with Yara other ways. | 25 | 3,32 | 1,030 | 0,206 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,978 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,764 |
| Yara compensates sufficiently the harm caused by its operations. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 77 | 3,03 | 0,843 | 0,096 | Has been employed / currently employed by Yara/ contractor | 0,647 |
| | | | | | | Has been in contact with Yara in other ways. | 0,894 |
| | Has been employed / currently employed by Yara/ contractor | 25 | 2,84 | 1,028 | 0,206 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,647 |
| | | | | | | Has been in contact with Yara other ways. | 0,521 |
| | Has been in contact with Yara in other ways. | 25 | 3,12 | 0,971 | 0,194 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,894 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,521 |
| We as residents of Siilinjärvi have the opportunity to be involved in making decision concerning Yara. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 75 | 2,89 | 0,847 | 0,098 | Has been employed / currently employed by Yara/ contractor | 0,660 |
| | | | | | | Has been in contact with Yara other ways. | 0,779 |
| | Has been employed / currently employed by Yara/ contractor | 24 | 2,71 | 0,955 | 0,195 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,660 |
| | | | | | | Has been in contact with Yara other ways. | 0,986 |
| | Has been in contact with Yara other ways. | 24 | 2,75 | 1,032 | 0,211 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,779 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,986 |
| Yara is prepared to make adjustments in its operations with regards to the opinions of the residents of Siilinjärvi. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 78 | 3,17 | 0,859 | 0,097 | Has been employed / currently employed by Yara/ contractor | 0,124 |
| | | | | | | Has been in contact with Yara other ways. | 0,349 |
| | Has been employed / currently employed by Yara/ contractor | 25 | 2,76 | 0,926 | 0,185 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,124 |
| | | | | | | Has been in contact with Yara other ways. | 0,895 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Has been in contact with Yara other ways. | 24 | 2,88 | 0,992 | 0,202 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,349 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,895 |
| Yara is committed to the aftercare of its regions. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 78 | 3,33 | 0,878 | 0,099 | Has been employed / currently employed by Yara/ contractor | 0,892 |
| | | | | | | Has been in contact with Yara other ways. | 0,240 |
| | Has been employed / currently employed by Yara/ contractor | 25 | 3,24 | 1,012 | 0,202 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,892 |
| | | | | | | Has been in contact with Yara other ways. | 0,210 |
| | Has been in contact with Yara other ways. | 22 | 3,68 | 0,780 | 0,166 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,240 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,210 |
| If I would like to contact the staff of Yara Siilinjärvi, it would be easy. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 82 | 3,34 | 0,946 | 0,104 | Has been employed / currently employed by Yara/ contractor | 0,754 |
| | | | | | | Has been in contact with Yara other ways. | 0,969 |
| | Has been employed / currently employed by Yara/ contractor | 23 | 3,52 | 1,201 | 0,250 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,754 |
| | | | | | | Has been in contact with Yara other ways. | 0,917 |
| | Has been in contact with Yara other ways. | 25 | 3,40 | 1,291 | 0,258 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,969 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,917 |
| Yara acts responsibly. | Heard of Yara but no direct contact with Yara /contractors of Yara. | 91 | 3,56 | 0,763 | 0,080 | Has been employed / currently employed by Yara/ contractor | 0,703 |
| | | | | | | Has been in contact with Yara other ways. | 0,665 |
| | Has been employed / currently employed by Yara/ contractor | 25 | 3,40 | 1,155 | 0,231 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,703 |
| | | | | | | Has been in contact with Yara other ways. | 0,381 |
| | Has been in contact with Yara other ways. | 26 | 3,73 | 1,002 | 0,197 | Heard of Yara but no direct contact with Yara /contractors of Yara. | 0,665 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,381 |

*Almost significant differentiation

## Appendix 5. Results of significant tests (T-test / One-way ANOVA) per sum-variables

Table 1. The statistics and results of significant tests (T-Test) for sum variables according to the gender

| Gender | | | | | | |
|---|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error Mean | T-test |
| Social contribution | Woman | 60 | 3,4292 | 0,71864 | 0,09278 | 0,517 |
| | Man | 70 | 3,5131 | 0,74666 | 0,08924 | |
| Communication and interaction | Woman | 71 | 3,2254 | 0,86515 | 0,10267 | 0,724 |
| | Man | 72 | 3,2778 | 0,90339 | 0,10647 | |
| Involvement in decision-making | Woman | 59 | 3,0268 | 0,66477 | 0,08655 | 0,889 |
| | Man | 66 | 3,0088 | 0,76308 | 0,09393 | |
| General, includes all the statements | Woman | 73 | 3,3143 | 0,62438 | 0,07308 | 0,907 |
| | Man | 73 | 3,3012 | 0,72401 | 0,08474 | |

Table 2. The statistics and results of significant tests (One-way ANOVA) for sum variables according to the age group

| Age group | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error | One-way ANOVA - Post Hoc: Tukey HSD or Tamhane | |
| Social contribution | > 40 years | 48 | 3,5191 | 0,70548 | 0,10183 | 40-59 years | 0,404 |
| | | | | | | 60+ years | 0,901 |
| | 40-59 years | 43 | 3,3217 | 0,74081 | 0,11297 | > 40 years | 0,404 |
| | | | | | | 60+ years | 0,229 |
| | 60+ years | 39 | 3,5876 | 0,74559 | 0,11939 | > 40 years | 0,901 |
| | | | | | | 40-59 years | 0,229 |
| Communication and interaction | > 40 years | 51 | 3,3235 | 0,74715 | 0,10462 | 40-59 years | 0,925 |
| | | | | | | 60+ years | 0,669 |
| | 40-59 years | 45 | 3,2556 | 0,91467 | 0,13635 | > 40 years | 0,925 |
| | | | | | | 60+ years | 0,889 |
| | 60+ years | 47 | 3,1702 | 0,99059 | 0,14449 | > 40 years | 0,669 |
| | | | | | | 40-59 years | 0,889 |
| Involvement in decision-making | > 40 years | 45 | 2,9833 | 0,72466 | 0,10803 | 40-59 years | 0,889 |
| | | | | | | 60+ years | 0,450 |
| | 40-59 years | 42 | 2,9127 | 0,70301 | 0,10848 | > 40 years | 0,889 |
| | | | | | | 60+ years | 0,236 |
| | 60+ years | 38 | 3,1732 | 0,71065 | 0,11528 | > 40 years | 0,450 |
| | | | | | | 40-59 years | 0,236 |
| General, includes all the statements | > 40 years | 52 | 3,3054 | 0,65746 | 0,09117 | 40-59 years | 0,846 |
| | | | | | | 60+ years | 0,837 |
| | 40-59 years | 45 | 3,2296 | 0,68506 | 0,10212 | > 40 years | 0,846 |
| | | | | | | 60+ years | 0,520 |
| | 60+ years | 49 | 3,3820 | 0,68583 | 0,09798 | > 40 years | 0,837 |
| | | | | | | 40-59 years | 0,520 |

Table 3. The statistics and results of significant tests (T-Test) for sum variables according to the profession

| Profession | | | | | | |
|---|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error Mean | T-test |
| Social contribution | Employed/Entrepreneurs | 76 | 3,4561 | 0,71161 | 0,08163 | 0,738 |
| | Others | 54 | 3,5000 | 0,76633 | 0,10428 | |
| Communication and interaction | Employed/Entrepreneurs | 81 | 3,3519 | 0,85310 | 0,09479 | 0,125 |
| | Others | 62 | 3,1210 | 0,90846 | 0,11537 | |
| Involvement in decision-making | Employed/Entrepreneurs | 71 | 2,9413 | 0,70167 | 0,08327 | 0,174 |
| | Others | 54 | 3,1173 | 0,72784 | 0,09905 | |
| General, includes all the statements | Employed/Entrepreneurs | 82 | 3,3014 | 0,66998 | 0,07399 | 0,898 |
| | Others | 64 | 3,3159 | 0,68371 | 0,08546 | |

Table 4. The statistics and results of significant tests (One-Way ANOVA) for sum variables according to the education

| Education | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error | One-way ANOVA - Post Hoc: Tukey HSD or Tamhane | |
| Social contribution | Comprehensive education or eq. | 23 | 3,6522 | 0,79996 | 0,16680 | Vocational or post sec. education | 0,290 |
| | | | | | | UAS and University | 0,792 |
| | Vocational or post sec. education | 69 | 3,3865 | 0,70869 | 0,08532 | Comprehensive education or eq. | 0,290 |
| | | | | | | UAS & University | 0,611 |
| | UAS & University | 38 | 3,5263 | 0,72728 | 0,11798 | Comprehensive education or eq. | 0,792 |
| | | | | | | Vocational or post secondary education | 0,611 |
| Communication and interaction | Comprehensive education or equivalent | 27 | 3,1852 | 1,09323 | 0,21039 | Vocational or post sec. education | 0,998 |
| | | | | | | UAS & University | 0,593 |
| | Vocational or post secondary education | 76 | 3,1974 | 0,82897 | 0,09509 | Comprehensive education or eq. | 0,998 |
| | | | | | | UAS & University | 0,470 |
| | UAS and University | 40 | 3,4000 | 0,82586 | 0,13058 | Comprehensive education or eq. | 0,593 |
| | | | | | | Vocational or post sec. education | 0,470 |
| Involvement in decision-making | Comprehensive education or eq. | 21 | 3,3532 | 0,68511 | 0,14950 | Vocational or post sec. education | 0,056 |
| | | | | | | UAS & University | 0,110 |
| | Vocational or post sec. education | 68 | 2,9436 | 0,66424 | 0,08055 | Comprehensive education or eq. | 0,056 |
| | | | | | | UAS and University | 0,992 |
| | UAS & University | 36 | 2,9606 | 0,78717 | 0,13120 | Comprehensive education or eq. | 0,110 |
| | | | | | | Vocational or post sec. education | 0,992 |
| General, includes all the statements | Comprehensive education or eq. | 29 | 3,4896 | 0,73586 | 0,13665 | Vocational or post secondary education | 0,176 |
| | | | | | | UAS & University | 0,593 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Vocational or post sec. education | 77 | 3,2278 | 0,62999 | 0,07179 | Comprehensive education or eq. | 0,176 |
| | | | | | | UAS & University | 0,715 |
| | UAS & University | 40 | 3,3299 | 0,69835 | 0,11042 | Comprehensive education or eq. | 0,593 |
| | | | | | | Vocational or post sec. education | 0,715 |

Table 5. The statistics and results of significant tests (One-Way ANOVA) for sum variables according to the relationship with Yara

| **Relationship with Yara** | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | N | Mean | Std. Deviation | Std. Error | One-way ANOVA - Post Hoc: Tukey HSD or Tamhane | |
| Social contribution | Heard of Yara but no direct contact with Yara /contractors of Yara. | 81 | 3,4630 | 0,74045 | 0,08227 | Has been employed / currently employed by Yara/ contractor | 0,999 |
| | | | | | | Has been in contact with Yara other ways | 0,916 |
| | Has been employed / currently employed by Yara/ contractor | 25 | 3,4567 | 0,78067 | 0,15613 | Heard of Yara but no direct contact with Yara /contractors of Yara | 0,999 |
| | | | | | | Has been in contact with Yara other ways | 0,933 |
| | Has been in contact with Yara other ways | 24 | 3,5313 | 0,67826 | 0,13845 | Heard of Yara but no direct contact with Yara /contractors of Yara | 0,916 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,933 |
| Communication and interaction | Heard of Yara but no direct contact with Yara /contractors of Yara | 93 | 3,1667 | 0,80869 | 0,08386 | Has been employed / currently employed by Yara/ contractor | 0,862 |
| | | | | | | Has been in contact with Yara other ways. | 0,139 |
| | Has been employed / currently employed by Yara/ contractor | 24 | 3,2708 | 0,98884 | 0,20185 | Heard of Yara but no direct contact with Yara /contractors of Yara | 0,862 |
| | | | | | | Has been in contact with Yara other ways | 0,529 |
| | Has been in contact with Yara other ways | 26 | 3,5385 | 0,99923 | 0,19597 | Heard of Yara but no direct contact with Yara /contractors of Yara | 0,139 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,529 |
| Involvement in decision-making | Heard of Yara but no direct contact with Yara /contractors of Yara | 77 | 3,0898 | 0,65236 | 0,07434 | Has been employed / currently employed by Yara/ contractor | 0,250 |
| | | | | | | Has been in contact with Yara other ways | 0,785 |
| | Has been employed / currently employed by Yara/ contractor. | 24 | 2,8229 | 0,81920 | 0,16722 | Heard of Yara but no direct contact with Yara /contractors of Yara | 0,250 |
| | | | | | | Has been in contact with Yara other ways | 0,729 |
| | Has been in contact with Yara other ways | 24 | 2,9792 | 0,79028 | 0,16132 | Heard of Yara but no direct contact with Yara /contractors of Yara | 0,785 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,729 |
| General, includes all the | Heard of Yara but no direct contact with Yara /contractors of | 95 | 3,3041 | 0,59371 | 0,06091 | Has been employed / currently employed by | 0,710 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| statements | Yara | | | | | Yara/ contractor | |
| | | | | | | Has been in contact with Yara other ways | 0,635 |
| | Has been employed / currently employed by Yara/ contractor | 25 | 3,1844 | 0,80106 | 0,16021 | Heard of Yara but no direct contact with Yara /contractors of Yara | 0,710 |
| | | | | | | Has been in contact with Yara other ways | 0,368 |
| | Has been in contact with Yara other ways | 26 | 3,4399 | 0,81108 | 0,15907 | Heard of Yara but no direct contact with Yara /contractors of Yara | 0,635 |
| | | | | | | Has been employed / currently employed by Yara/ contractor | 0,368 |

## Appendix 6. Structure Matrix of factor analysis

Table 1. Structure Matrix of factor analysis

| Structure Matrix | | | |
|---|---|---|---|
| | Factor | | |
| | 1 | 2 | 3 |
| Yara is committed to the aftercare of its regions. | **0,757** | 0,484 | 0,400 |
| Yara listens and appreciates the opinion of us, residents of Siilinjärvi. | **0,741** | 0,596 | 0,691 |
| Yara is engaged into the development of Siilinjärvi municipality. | **0,692** | 0,572 | 0,582 |
| Yara compensates sufficiently the harm caused by its operations. | **0,646** | 0,526 | 0,556 |
| Yara shares sufficiently information on matters that affect us, the residents of Siilinjärvi. | **0,615** | 0,491 | 0,574 |
| If I would like to contact the staff of Yara Siilinjärvi, it would be easy. | **0,383** | 0,148 | 0,315 |
| Yara impacts positively to the well-being of the region. | 0,490 | **0,879** | 0,441 |
| Yara considers the local sources of livelihoods in its operation. | 0,533 | **0,595** | 0,531 |
| Yara is prepared to make adjustments in its operations with regards to the opinions of the residents of Siilinjärvi. | 0,498 | 0,602 | **0,831** |
| We as residents of Siilinjärvi have the opportunity to be involved in making decision concerning Yara. | 0,502 | 0,306 | **0,684** |