

# **BUSINESS POTENTIAL OF INSECT FOOD**

**Studying the attitudes towards edible insects among  
young adults**

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Abstract  <p>It is widely accepted that the global population will reach 9 billion by 2050. In order to meet the growing demand for food, the current food production needs to double in size, which requires finding more sustainable food production methods and sources of nutrition. Edible insects could offer a potential solution to the problem.</p> <p>This paper studied the business potential of insect food by researching the attitudes and feelings that young adults have towards edible insects, and by mapping out potential approaches to the marketing and promotion of insect food products.</p> <p>The research approach in this study was qualitative. The primary data was collected through two focus group discussions with 10 participants representing both genders and five nationalities. The focus group sessions were conducted in April 2016.</p> <p>The participants were generally interested about edible insects and had mostly positive views towards them. The main concerns were related to the taste and appearance of the insect food products. The majority of the respondents felt that the insects should somehow be hidden in the food instead of being presented in their natural form. Most of the participants agreed that some kind of information about the environmental and health related benefits of edible insects should be included in the marketing of insect food products.</p> <p>Future research could concentrate on interviewing people from different age groups to get a more comprehensive understanding of the general attitudes towards insect food.</p>		
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Tiivistelmä <p>Maailman väkiluku tulee useiden ennusteiden mukaan ylittämään 9 miljardia vuoteen 2050 mennessä. Jotta kasvavaan ruoan kysyntään voitaisiin vastata, ruoan tuotannon täytyy kaksinkertaistua, mikä vaatii uusien ja ympäristöystävällisempien ravintolähteiden käyttöönottoa. Hyönteisruoka voisi olla yksi potentiaalinen ratkaisu tähän ongelmaan.</p> <p>Tutkimuksen tavoitteena oli tutkia hyönteisruoan liiketoimintapotentiaalia kartoittamalla nuorten aikuisten asenteita ja tuntemuksia hyönteisruokaa kohtaan ja löytämällä potentiaalisia lähestymistapoja hyönteisruoan markkinointiin.</p> <p>Tutkimusote oli kvalitatiivinen. Aineisto kerättiin kahden fokusryhmähaastattelun kautta, jotka järjestettiin Huhtikuussa 2016. Haastatteluihin osallistui yhteensä 10 henkilöä viidestä eri maasta.</p> <p>Haastateltavat olivat yleisesti ottaen kiinnostuneita hyönteisruoasta ja heillä oli pääosin positiivisia ajatuksia sitä kohtaan. Päähuolenaiheet liittyivät hyönteisruokatuotteiden makuun ja ulkonäköön, ja suurin osa haastateltavista olikin sitä mieltä, että hyönteiset tulisi mieluummin piilottaa muun ruoan sekaan kuin tarjota niitä sellaisenaan. Suurin osa haastateltavista oli yhtä mieltä siitä, että hyönteisruokatuotteiden markkinoinnin yhteydessä olisi syytä tarjota informaatiota syötävien hyönteisten potentiaalisista terveys- ja ympäristöhyödyistä.</p> <p>Myöhempiä tutkimusta voitaisiin tehdä suuremmalla otannalla eri ikäryhmille, täten voitaisiin saada kokonaisvaltaisempi kuva kuluttajien asenteista hyönteisruokaa kohtaan.</p>		
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## Contents

1	Introduction.....	4
2	Theory and Knowledge Base for the Research .....	7
2.1	Definition and History of Insect Food .....	7
2.2	Insect Food Today .....	9
2.3	Why Insect Food?.....	16
2.3.1	Humans .....	17
2.3.2	Environment .....	22
2.4	Business Potential of Insect Food .....	26
2.5	Theory of Consumer Behaviour .....	29
2.5.1	Consumer Perception .....	30
2.5.2	Consumer Learning.....	32
2.5.3	Consumer Attitude Formation and Change .....	34
3	Research Approach and Implementation .....	37
3.1	Research Problem .....	37
3.2	Research Design .....	38
3.3	Collection of Data.....	41
3.3.1	Quantitative and qualitative research.....	41
3.3.2	Choosing the research method .....	42
3.4	Focus Group Interview .....	44
3.4.1	Preparation .....	46
3.4.2	Implementation .....	50
3.4.3	Analysis and Interpretation .....	53
3.4.4	Advantages & Disadvantages .....	57

4	Research Results .....	60
4.1	What Are the Attitudes Towards Insect Food in the Focus Groups, and What Are Those Attitudes Based On?.....	60
4.2	According to the Focus Group Participants, Which Factors Would Lead to Increased Interest Towards Insect Food in a Retail Setting? .....	68
5	Conclusions.....	80
6	Discussion.....	86
6.1	Qualitative Approach for Judging the Soundness of the Research.....	86
6.1.1	Dependability .....	86
6.1.2	Credibility.....	88
6.1.3	Transferability.....	89
6.1.4	Confirmability .....	90
6.2	Ideas for Future Research .....	91
	References.....	92

## Boxes

Box 1	What are insects?.....	7
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## Figures

Figure 1	Recorded number of edible insect species, by country [Halloran et al. 2013, 9.].....	11
Figure 2	Number of insect species, by order, consumed worldwide [Halloran et al. 2013, 10.].....	12
Figure 3	Greenhouse gas production, energy use and land use due to the production of 1 kg of protein from mealworms, milk, pork, chicken and beef. [Halloran et al. 2013, 64.].....	24
Figure 4	Comparison of GHG and ammonia emissions between three insect species, pig and beef cattle. [Halloran et al. 2013, 63.].....	25

**Tables**

Table 1 Number of entomophagous countries [Ramos-Elorduy 1998.] .....	14
Table 2 Crude protein content, by insect order. [Halloran et al. 2013, 69.].....	18
Table 3 Comparison of average protein content among insects, fish and mammals. [Halloran et al. 2013, 69.].....	19
Table 4 Examples of insect products & services [Halloran et al. 2013, 6.] .....	20

## 1 Introduction

The global population is expected to reach 9 billion by the year 2050. Along with the growing population, average income levels are rising and urbanization is rapidly increasing – especially in developing countries where 95 percent of the population increase is taking place. [FAO 2009, 7.] Population growth is one of the leading factors changing the global demand of food, and to accommodate the growing population, the current food production will need to double in size. The oceans are overfished and agriculturally viable land is already scarce with livestock production using as much as 30 percent of the earth's land area, making expansion an unsustainable option. The global community must come up with new solutions for food production in order to meet the food demands of the ever-growing populace. This includes re-considering what kind of food we eat, and how we produce it. One potential solution could be the adoption of edible insects to Western diets.

Although often overlooked and viewed with feelings of disgust in Western cultures, insects have been a part of human diets for thousands of years. It is estimated that still today more than 2 billion people from Alaska to Australia take part in the practice of *entomophagy*, the human consumption of insects. [Halloran, Klunder, Mertens, Muir, van Huis, Van Itterbeeck, Vantomme 2013, 1; Ramos-Elorduy 1998, 20.] Insects are not only a healthy and nutritious food source, rich in protein, vitamins and fiber, they also provide numerous essential services to the environment and contribute positively to livelihoods both in developing and developed nations. There are more than 1 900 edible insect species currently identified, with thousands more expected to be found. The most popular species consumed by humans include beetles, caterpillars, bees, grasshoppers, crickets and locusts.

The increasing demand for animal proteins among the growing middle classes of developing nations is not the only reason why alternative solutions to traditional livestock should be established. According to FAO [2009, xx-xxiii], the current livestock production contributes to a wide variety of negative effects on the environment, including land degradation, freshwater scarcity, decrease of biodiversity and the acceleration of climate change. The widespread adoption of

insects as a food source could potentially provide considerable relief to many of the environmental challenges imposed by conventional livestock. For example, insects require far less water and land and emit significantly less greenhouse gases and ammonia than cattle rearing. In addition, the feed conversion rate of insects is much higher than that of cattle, meaning that insect breeding and cultivation offers a significantly more efficient way to convert consumed matter into biomass.

The purpose of this bachelor's thesis is to get an understanding of insect food as a phenomenon, study its role as an alternative food source and research how young adults would feel about adopting edible insects as a part of their diet by exploring their beliefs and perceptions surrounding the subject. The author wanted to examine the business potential of insect food by studying the attitudes, concerns and existing knowledge that young adults have about edible insects. The research was conducted as a qualitative study using focus group interviews and the data collected from them as the basis for the research. The author used an exploratory research design in creating the two research questions that are used to answer the research problem. The two main research questions of this thesis are:

1. What are the attitudes towards insect food in the focus groups, and what are those attitudes based on?
2. According to the focus group participants, which factors would lead to increased interest towards insect food in a retail setting?

These research questions help get an understanding of the attitudes, perceptions, beliefs and emotions that the focus group participants have towards insect food, while also collecting information about the factors that would increase interest towards insect food products in the focus groups. The author believes that the data gained from the focus group interviews could prove useful in determining what kind of aspects should be taken into account, or conversely, what kind of things should perhaps be avoided in the marketing, distribution and sale of insect food products. The goal of this bachelor's thesis is to spread information and awareness about the concept of insect food as a whole, and also to provide useful data about the attitudes and thoughts of a potential target market for insect food products in a retail setting.

In the theory and knowledge base part of this study the author will go through the definition and history of insect food, study its place in the modern world and explore the numerous benefits that edible insects provide to humans and the environment. In addition, the author will introduce theory about consumer perception and attitudes, both of which are relevant concepts for the purposes of this study as well as major factors influencing consumer behaviour and buying habits. The theory and knowledge part will be followed by a thorough examination of the research problem and the methods that are used to gather the data needed for the research, after which the author will present the research results by analysing the data collected from the focus group interviews. Finally, the author will demonstrate the conclusions drawn from the research, including a discussion about the credibility and confirmability of the research.

## 2 Theory and Knowledge Base for the Research

### 2.1 Definition and History of Insect Food

The word *entomophagy* refers to the practice of eating insects [Box 1]. There are numerous entomophagous animals such as other insects, birds, spiders, and lizards, but insects have also been a regular part of human diets for thousands of years. [Halloran et al. 2013, 1] Although this practice should be specified as *human* entomophagy, the author will use the word entomophagy to refer to the human consumption of insects throughout this thesis.

Box 1  
**What are insects?**

*Insects are a class of animals belonging to the arthropod group, which means that they have either limbs or articulated appendages. Their defining physical features include a chitinous exoskeleton, three pairs of jointed legs, compound eyes, two antennae and a three-part body consisting of the head, thorax and the abdomen. Unlike humans, whose bones are located internally, an insect's support structure – known as the exoskeleton – is on the outside of its body. Insects are cold-blooded animals whose body temperature can vary from below freezing to more than 30 degrees celsius.*

*The etymology of the word insect derives from the Latin word 'insectum', meaning "with a notched or divided body", literally "cut into sections." With more than 1 million described species, insects are the predominant animal group on earth, constituting four-fifths of the animal kingdom and more than half of all known living organisms. [Halloran et al.2013, 1; Ramos-Elorduy 1998, 4.] Insects have inhabited the earth for more than 300 million years, and during that time they have evolved and adapted to survive in a wide spectrum of different and even hostile habitats, from salt mines to pools of petroleum. Insects come in various shapes and sizes and their taste can range from nutty and lemony to shrimplike. [Ramos-Elorduy 1998, 4]*

Box 1 What are insects?

Entomophagy has deep roots in human history. In ancient times, before the advent of agriculture or the invention of sophisticated hunting tools capable of taking down large animals, insects were an important source of food for humans. Human coprolites found in caves in the USA and Mexico give support to such considerations.

The coprolites found in caves of the Ozark Mountains located between Arkansas and Missouri contained ants, beetle larvae, lice, ticks and mites. Cave paintings found in Northern Spain, dated from about 30 000 to 9000BC, had pictures of edible insects and wild bee nests, suggesting a possibly entomophagous society. The excavations in the Shanxi Province, China, revealed wild silkworm cocoons dating back to 2000 - 2500BC. The cocoons had holes in them, suggesting that people had eaten the pupae of the silkworms. [Capinera 2004, 1341.] Ramos-Elorduy [1998, 7] argues that these kinds of records and archaeological evidence prove the role of insects in the cuisine of our ancestors. Since the beginning of mankind's existence humans have used insects not only for nutritional purposes, but also for medicinal treatments and religious rituals. For example, the Mayans used to call the locusts of the *Schistocerca* genus "the divine flowers of God", the Huicholes believed that certain wasps carried the souls of the dead to heaven and the Teotihuacans considered a butterfly of the *Papilio daunus* genus to be the soul itself. [Ramos-Elorduy 1998, 7.]

The first literary references to insect eating can be found in biblical literature. Food habits are generally influenced by culture(s), which in turn have been historically influenced by religious beliefs. There are numerous citations to the practice of eating insects throughout Christian, Jewish and Islamic religious literature. [Halloran et al. 2013, 40]

*Yet these may ye eat of every flying creeping thing that goeth upon all four, which have legs above their feet, to leap withal upon the earth (Leviticus XI: 21)*

*Locusts are Allah's troops, you may eat them (Sunaan ibn Majah, 4.3219, 3220)*

There are documents of locusts having been served at the royal banquets of the palace of Asurbanipal as far back as the eighth century BCE, and the first reference to entomophagy in Europe comes from ancient Greece, where cicadas were considered a delicacy. References to entomophagy in this region during this time period are numerous, and they continue throughout the following centuries. There are also references to entomophagy in ancient Chinese literature, such as Li Shizhen's *Compendium of Materia Medica*, which lists a large number of edible insects as well

as highlights their medicinal benefits. [Halloran et al. 2013, 41.] Insects have been utilized as a treatment to various ailments and diseases in folk medicine for generations, and still today insects continue to be used live, cooked, ground, in infusions and in salves as medicinal tools. Different kinds of bee products have been used in Eastern European countries through inhalation, ionization, physiotherapy and electrophoresis. [Ramos-Elorduy 1998, 7]

## **2.2 Insect Food Today**

People from all over the world have consumed a vast array of insects for thousands of years, and this practice of eating insects has formed into modern-day entomophagy. Today, it is estimated that more than 2 billion people from Oceania and Southeast Asia to Africa and Latin America consume insects as a regular part of their diet. [Halloran et al. 2013, 1.] According to Capinera [2004, 1341], modern-day entomophagy can be divided into two categories. The first category includes the consumption of insects as necessary nutrition, and the second is the uptake of insects as condiments. In the first category, insects are used as protein sources in areas that host a malnourished population or experience famine. As an example Capinera [2004, 1341] uses locust outbreaks, which are especially common in Africa and the Middle East. After such migrations of locusts, edible plants tend to be scarce. Under these circumstances the local people often consume the locusts as their food. In the latter case insects are utilized as cuisine in restaurants and street food stalls in big cities.

The most common edible insect species include beetles, moths, flies, mosquitoes, crickets, locusts, caterpillars, palm weevils, termites, stink bugs and edible grasshoppers. [Halloran et al. 2013, 20-27; Ramos-Elorduy 1998, 20-24.] Insects can be eaten raw or cooked in various ways. According to Capinera [2004, 1342] the simplest and most primitive way of preparing insects is to roast them in a fire or for example by throwing them in hot ash. Other common methods include boiling or simmering in hot water or soup, roasting them in skewers or frying in hot oil. Insects are commonly cooked together with vegetables and spices. In addition to raw and cooked forms, dried insects are also available in some regions. Examples include

small water bugs (ahuahutle) in Mexico and mopany worms in South Africa, which can be found in dried form in food markets. [Capinera 2004, 1342.]

Modern-day entomophagy is mainly practiced in developing countries in Latin America, Africa and Asia, whereas in Western countries the majority of people still view entomophagy with disgust and associate eating insects with primitive behaviour. This type of attitude has led to the neglect of agricultural research regarding insects, and even though there is a vast amount of historical references to the consumption of insects as food, the topic of entomophagy has only recently begun to capture the attention of people in the Western world. [Halloran et al. 2013, xiii.]

### **Number of Edible Insects**

Providing a definitive figure on the number of edible insects is difficult, as laypersons rarely refer to insects by their Linnaean nomenclature and because many cultures have more than one vernacular name for the same insect species. [Halloran et al. 2013, 9] In her 1998 book *Creepy Crawly Cuisine: The Gourmet Guide to Edible Insects*, author Julieta Ramos-Elorduy cites a figure of 1 417 recorded edible insect species. As a more recent update, Halloran et al. [2013, 9] state that there are over 1900 edible insect species in the world according to 2012 estimates. However, as historical data suggests, there is reason to believe that the number of edible insect species will rise as the scientific community continues to study the estimated 300 to 400 million insect species in the world and determine which of those are fit for human consumption. There are also varying regional and national estimates on the amount of edible insects. According to Halloran et al. [2013, 9] the majority of edible insect species are located in Africa, Mexico, China, Southeast Asia and the Amazon. [Figure 1]

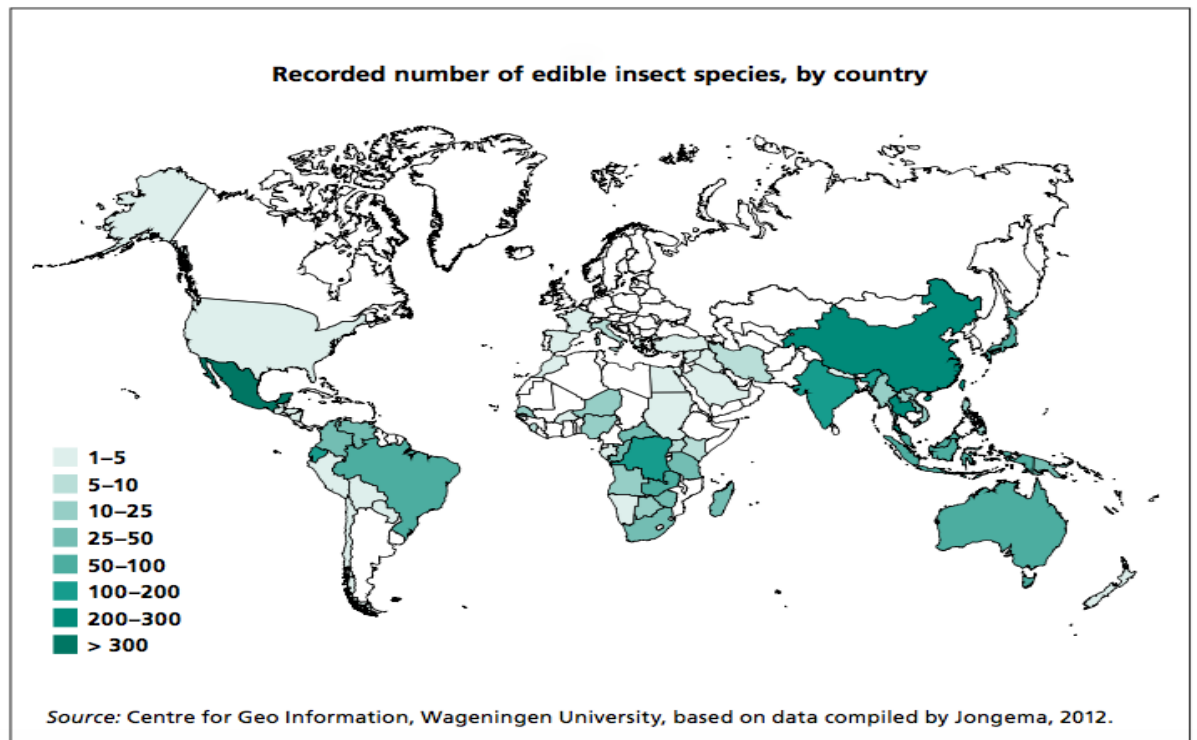


Figure 1 Recorded number of edible insect species, by country [Halloran et al. 2013, 9.]

### Major Groups of Edible Insects

Edible insect species can be divided into 15 orders – Anoplura (Lice), Orthoptera (grasshoppers, crickets and cockroaches), Hemiptera (true bugs), Homoptera (cicadas and treehoppers), Hymenoptera (bees, ants and wasps), Diptera (flies and mosquitoes), Coleoptera (Beetles), Lepidoptera (caterpillars, butterflies and moths), Megaloptera (alderflies and dobsonflies), Odonata (dragonflies and damselflies), Ephemeroptera (mayflies), Trichoptera (caddisflies), Plecoptera (Stoneflies), Neuroptera (lacewings and antlions) and Isoptera (termites) – which can then be divided to 112 families, 628 genera, 45 subgenera and 67 subspecies.

Most of the edible insects are eaten in their larval and pupal stages. [Ramos-Elorduy 1998, 3-4.] Beetles (Coleoptera) make up approximately 40 percent of all known insect species, which is why they are also unsurprisingly the most common insect group consumed by humans globally, with 31 percent of the total amount. [Figure 2.] The second most consumed group of insects, especially popular in Sub-Saharan Africa, is Lepidoptera with an estimated 18 percent of total consumption. Bees, wasps and ants (Hymenoptera), which are especially popular in Latin America, come

in third at 14 percent. The top five most commonly consumed insects also include grasshoppers, cockroaches and crickets (Orthoptera) at 13 percent as well as true bugs (Hemiptera) at 10 percent. [Halloran et al. 2013, 10.]

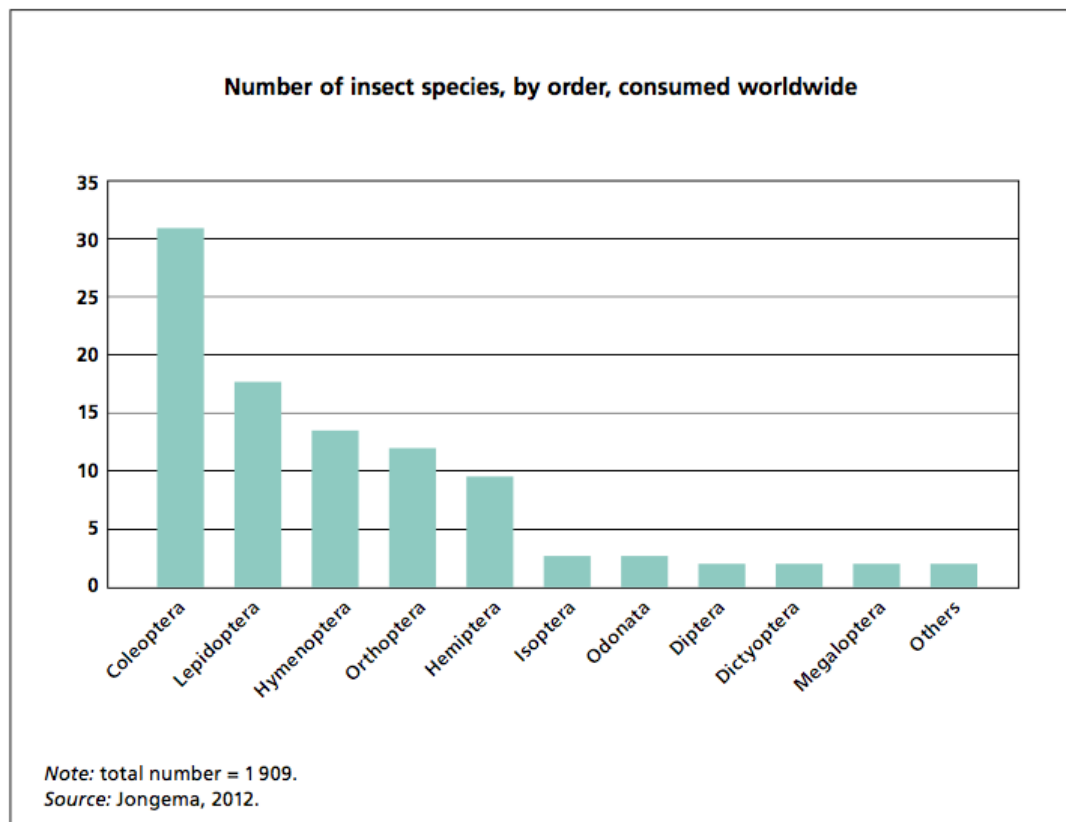


Figure 2 Number of insect species, by order, consumed worldwide [Halloran et al. 2013, 10.]

There are a lot of factors contributing to which insects are consumed as food. The time of the year and the location play a big role, but perhaps the single most important factor is the amount of time and effort required to harvest certain insects, as some species can be extremely difficult and time-consuming to collect. Insects living in large and densely grouped populations which can be quickly and conveniently collected tend to be most commonly consumed. [Ramos-Elorduy 1998, 13-14.]

### **Where Are Insects Eaten?**

According to Ramos-Elorduy [1998; 3,19], there are around 3 000 ethnic groups in at least 113 countries partaking in the consumption of insects. The vast majority – over 75 percent – of these entomophagous nations are located in Africa, Asia and the Americas. [Table 1.] Insects are an important source of food for a lot of people throughout the African continent, especially during the rainy season when game and

fish can be difficult to catch. For example in Kinshasa, the capital of the Democratic Republic of the Congo, the average household consumes approximately 300 g of caterpillars per week. [Halloran et al. 2013, 16.] After locust breaks in northern Africa the local people often catch and eat locusts, and the forests in Central Africa host an extremely wide variety of moth species which are eaten as caterpillars. Emperor moth caterpillars are widely eaten in Southern Africa during periods when other sources of food are scarce. [Halloran et al. 2013, 16; Ramos-Elorduy 1998, 19.]

Another region where entomophagy is common is Southeast Asia, where between 150 and 200 edible insect species are used as food. Among the most popular species are Red palm weevils from the Sago palm, which are widely eaten across the continent and are a coveted delicacy in many regions. In Thailand alone as many as 81 edible insect species are reported to be consumed both in rural and urban areas [Halloran et al. 2013, 17.] In Japan, the larvae of certain aquatic insect species are popular and even sold in supermarkets.

Insects are also commonly eaten in the Americas, especially so in Latin America. Sun-dried insects, such as grasshoppers, stink bugs and crickets, are a common ingredient in chili sauces and often used as a tortilla filling. Ants are a popular snack in Colombia, and in Brazil certain tree worms, bees and wasps are known for their almondy flavour. [Ramos-Elorduy 1998, 20.] Perhaps the deepest connection to entomophagy in Latin America exists in Mexico, where the local indigenous people possess an intricate knowledge of the plant and animal species they consume, including the life cycles of insects. Mexico also hosts one of the largest selections of edible insects with over 300 recorded species. [Halloran et al. 2013, 18.]

<i>Continent</i>	<i>Entomophagous countries</i>	<i>%</i>
Africa	36	31,86
America	23	20,00
Asia	29	25,60
Australia	14	12,39
Europe	11	9,73
Total	113	100,00

*Source: Ramos-Elorduy, 1998*

Table 1 Number of entomophagous countries [Ramos-Elorduy 1998.]

### **Entomophagy in Western Countries**

Traditional entomophagy is not widely adopted in Western countries, although in recent years the topic has seen increasingly more discussion in the media and the academic world. Tarkan [2015] writes that philanthropic organizations such as the Gates Foundation and the United Nations have been promoting the idea of insect food as the “superfood” of the future, which has led to a growing interest in insect food in the West. As a result, many companies and entrepreneurs are starting to work on introducing insect food to the European and US markets. Just in the past three to four years, more than 25 start-ups whose business model is based on the sales of insect food have been launched in the US and Canada. In his article Tarkan [2015] quotes Christine Spliid, a Danish entrepreneur whose company sells protein bars made with cricket flour, as saying “I think it’s just a matter of a couple of years before more regular people take it up”, suggesting that the insect food movement could be gaining considerable traction in Western countries in the coming years. Halloran et al. [2013, 161] write that “Recent developments in research and developments show edible insects to be a promising alternative for the conventional production of meat, either for direct human consumption or for indirect use as

feedstock”, lending weight to the idea of insect food becoming a considerable part of Western diets in the future. However, this goal does not come without challenges.

One of the biggest obstacles in making insect food popular among western consumers is the so called “disgust factor.” Many Western people view entomophagy with feelings of disgust and tend to associate insects with primitive behaviour.

[Halloran et al. 2013, 35.] According to Millner [2014] Valerie Curtis, an expert on hygiene and behaviour at the London School of Hygiene and Tropical Medicine, says that humans’ disgust reaction protects us from things that could potentially carry harmful diseases and parasites. This perception is strengthened by insects being typically associated with a nuisance. Mosquitoes and flies invade homes and bite people, termites destroy possessions and some insects end up in foods. Certain insect species are also transmitters of disease, such as malaria and the Lyme disease, contributing to the negative association towards insects. [Halloran et al. 2013, 39.]

Some people think that food containing bugs is dirty, unpalatable, texturally unpleasant or even culturally unacceptable. Insects are also strongly associated with hunter-gatherer cultures, which may be a major factor in their rejection by Westerners as people might unconsciously think of entomophagy as being “primitive.” Since the advent of agriculture and the emergence of sedentary societies, humans have often viewed insects only as pests and causes of economic loss through the eating and spoiling of crops. [DeFoliart 1999, 43; Halloran et al. 2013, 39; Messinger, 2015; Ramos-Elorduy 1998, 9.] In addition to the negative attitudes towards insects in Western countries, there are also historical factors that contribute to the infrequency of entomophagy in the Western world, which the author will go through in the next paragraph.

Agriculture is believed to have spread throughout Europe from the Fertile Crescent region, an area which consists of fertile lands in western Asia and the Nile Valley and Nile Delta in northeast Africa, where the first plants and animals were originally domesticated. The most important wild animals to be domesticated were terrestrial mammalian herbivores and omnivores, of which there exists 14 species. These animals not only worked as an important food source for humans, but also provided them with leather, wool, warmth, milk products, plough traction and means of transport. Out of these 14 animals, as many as 13 could be found in Europe, making

it an attractive region to practice agriculture. There is a theory that because of the wealth of benefits provided by these animals, the utilization of insects failed to gain traction in the West, with the exception of honeybees, silkworms and scale insects. [Halloran et al. 2013, 35.] Another reason may be that in the Middle East, where agriculture originated, insects were of minor nutritional importance. Instead of insects, animal and plant domestication concentrated on e.g. wheat, barley, sheep, cattle and goats. As plant and animal agriculture started to generate better productivity and efficiency and provide humans with a steady and dependable food source, it resulted in larger and more sedentary societies which abandoned the hunter-gatherer lifestyle and became more dependent on farming. Such populations could not rely on the unpredictable supply of insects, resulting in the gradual disappearance of insects as a food staple. [DeFoliart 1999, 43.]

### **2.3 Why Insect Food?**

By the year 2050 the world's population is expected to reach 9 billion, a 34 percent increase from today. Population growth is most extreme in developing countries, where the majority of this population increase will take place. Urbanization is also expected to increase rapidly, from today's 49 percent to about 70 percent in 2050. The high growth and urbanization rate of the populace will result in much higher income levels in developing countries, and the richer and more urban the population is, the more food they will want to eat. To meet these growing demands for food, global food production has to increase by as much as 70 percent by 2050. [FAO 2009, 2.] However, farmable land is scarce as it is, the oceans are overfished and climate change and related water shortages could potentially cause tremendous harm to global food production. [Halloran et al. 2013, ix.] Therefore, it is of the utmost importance for the global community to re-evaluate what kind of food we eat and how we produce it.

Insects provide various benefits to humans and the environment. Not only that, but according to Ramos-Elorduy [1998, 9], without the pollination that insects provide, mankind would cease to exist. Insects are not only a healthy and nutritious food

source for humans, but they also offer a wide range of benefits to people's livelihoods and are a source of many valuable products. Insects play a crucial role in global ecosystems, providing them with essential services such as pollination, composting, wildfire protection and pest control. [Halloran et al. 2013, 45.] In addition, entomophagy could also offer enormous alleviation to greenhouse gas emissions as well as land and freshwater usage. In the following chapters the author will go through all the areas where insect eating offers a positive impact.

### **2.3.1 Humans**

Humans benefit from insects in numerous ways. They provide a variety of valuable products, they are a highly nutritious food source with high protein, fat, vitamin and fiber content, and they can offer prosperous livelihood opportunities for people both in developing and developed countries through the gathering, cultivation, processing and sale of insects. [Halloran et al. 2013, xiv.]

#### **Nutritional Information**

The nutritional values of insects vary greatly from species to species, and even within the same insect group the values might differ depending on the particular metamorphic stage of the insect. In addition, cooking processes such as boiling or frying will also affect the nutritional composition of insects. In general, insects are a rich source of protein and minerals, and they often contain high levels of calcium, iron and zinc. Many insects are also rich in good fats which are easily converted into energy. [Halloran et al. 2013, 2, 67; Ramos-Elorduy 1998, 16.] Although insects usually comprise only a part of the diets of populations who commonly eat insects, they are still a significant food and energy source for humans. Many developing nations still face significant problems with hunger and malnutrition, and the lack of sufficient intake of food energy is in many cases due to the absence of available sources of fat. There are many edible insect species which have high fat contents, especially those living in tree trunks such as tree worms. In societies that struggle with malnutrition, such species could prove to be an invaluable part of their diets. [Ramos-Elorduy 1998, 16-17.]

The main nutritional components of insects are proteins, fats, and fiber. In this paragraph the author will give a rough overview on the nutritional composition of insects and compare them with traditional livestock. Research on 100 insect species from several different insect orders showed that the protein content varied between 13 and 77 percent of dry matter, and that there were large variations between and within insect orders. [Table 2.]

<b>Insect order</b>	<b>Stage</b>	<b>Range (% protein)</b>
Coleoptera	Adults and larvae	23 – 66
Lepidoptera	Pupae and larvae	14 – 68
Hemiptera	Adults and larvae	42 – 74
Homoptera	Adults, larvae and eggs	45 – 57
Hymenoptera	Adults, pupae, larvae and eggs	13 – 77
Odonata	Adults and naiad	46 – 65
Orthoptera	Adults and nymph	23 – 65

*Source: Xiaoming et al., 2010.*

Table 2 Crude protein content, by insect order. [Halloran et al. 2013, 69.]

The above table shows the significant variations in protein content. The Hymenoptera order has highest variation with both the lowest and highest protein contents observed in the research. The Odonata order has the highest minimum protein content with at least 46 percent of its dry matter being protein. Certain insect species such as chapulines, locusts and grasshoppers can contain similar or even higher amounts of protein per 100 g of fresh weight than fish or beef [Table 3.]

Animal group	Species and common name	Edible product	Protein content (g/100 g fresh weight)
Insects (raw)	Locusts and grasshoppers: <i>Locusta migratoria</i> , <i>Acridium melanorhodon</i> , <i>Ruspolia differens</i>	larva	14–18
	Locusts and grasshoppers: <i>Locusta migratoria</i> , <i>Acridium melanorhodon</i> , <i>Ruspolia differens</i>	Adult	13–28
	<i>Sphenarium purpurascens</i> (chapulines – Mexico)	Adult	35–48
	Silkworm ( <i>Bombyx mori</i> )	Caterpillar	10–17
	Palmworm beetles: <i>Rhynchophorus palmarum</i> , <i>R. phoenicis</i> , <i>Callipogon barbatulus</i>	Larva	7–36
	Yellow mealworm ( <i>Tenebrio molitor</i> )	Larva	14–25
	Crickets	Adult	8–25
	Termites	Adult	13–28
Cattle		Beef (raw)	19–26
Fish (raw)	Finfish	Tilapia	16–19
		Mackerel	16–28
		Catfish	17–28
	Crustaceans	Lobster	17–19
		Prawn (Malaysia)	16–19
		Shrimp	13–27
Molluscs		Cuttlefish, squid	15–18

Source: FAO, 2012f.

Table 3 Comparison of average protein content among insects, fish and mammals. [Halloran et al. 2013, 69.]

Another important nutrient in insects is fat, which, according to Halloran et al. [2013, 69] is the most energy-dense macronutrient in food. Many edible insect species, such as African palm weevils (fat content 54 percent of dry matter), grasshoppers (67 percent), termites (49 percent) and witchetty grubs (38 percent) are significant sources of fat. Fats contain valuable calories that can be further converted into energy, making insects an important part of the diets of populations who might otherwise struggle to find high calorie food sources.

Fibers are another significant nutritional component found in insects. The highest amount of fiber can be found in the insects' exoskeletons, which contain chitin, an insoluble fiber and a derivative of glucose which is linked with defence against some parasitic infections and allergic conditions. Chitin can also be used for lowering cholesterol, repairing tissue and accelerating scarring. Estimates of the chitin contents of insects vary by species, and research shows a range from 2,7 mg to 49,8 mg per kg in fresh matter, and from 11,6 mg to 137,2 mg per kg in dry matter. Most edible insects also contain vitamins that are essential in stimulating metabolic processes and strengthening the immune system. [Halloran et al. 2013, 73-74; Ramos-Elorduy 1998, 7.]

## Products from Insects

Serving as a source of food is not the only way insects benefit the lives of humans. Besides being a healthy and nutritious part of human diets, insects have also been the source of many valuable products used by humans throughout history. [Box 2.] The most commonly known insect products are honey and silk. Another popular insect product is Carmine, which is a red dye produced by scale insects that is used to color foods, textiles and pharmaceuticals. Insects are also utilized in the medical field, where numerous applications have been found. Insects' jumping ability is provided to them by the rubber-like protein called Resilin, which is used in medicine to repair arteries. Maggot therapy and bee products such as honey and venom have been used in the treatment of infected wounds and burns. [Halloran et al. 2013, 6.]

Product or service	Species
Honey	Bees
Silk	Silkworms
Carmine dye	Scale insects
Beeswax (cosmetics & candels)	Bees
Pollination	Various species
Termite hills (architectural models)	Termites
Propolis (natural medicine)	Bees

*Source: Halloran et al. 2013*

Table 4 Examples of insect products & services [Halloran et al. 2013, 6.]

Insects are also a source of inspiration in the fields of technology and engineering. In architecture, termite hills have been used as models for constructing buildings. The complex and sophisticated tunnel networks and ventilation systems of termite hills have influenced the way architects design buildings in which temperature, humidity and air quality can be efficiently regulated. Another example of this so called biomimicry – the act of imitating nature to solve human problems – is the use of silk proteins produced by arthropods such as spiders. Silk is a strong and elastic protein fiber that has a strong biocompatibility with living organisms and high thermal stability, and it has been used by humans for example by infusing a spider's silk gene with goat DNA, producing a milk that contains silk protein. This "silk milk" can be then used to produce a strong web-like material.

Insects have also influenced human culture especially in literature, art and religion. Some insects exhibit beautiful and complex color patterns and are therefore popular ornaments and collector's items. Insects have also made their way into sports, especially in Chinese culture where cricket fighting has been a long-standing tradition since the Song Dynasty (960 - 1278 CE.) [Halloran et al. 2013, 6-7.]

### **Livelihoods**

Insects offer significant opportunities for livelihood improvement for many people around the world, both in developed and developing countries. Although the vast majority of entomophagy is practiced by choice and not by necessity, insects are an important source of animal protein for many communities around the globe and in some cases can help with dealing against seasonal food shortages. Malnutrition, including protein and other nutritional deficiencies are unfortunately common in poorer countries, and are only accelerated if events such as natural disasters or widespread social conflicts occur. During such times insects can offer a cheap, efficient and highly nutritious food source to combat potential nutritional emergencies. Insects are easily accessible, they grow quickly, are easy to harvest and have a healthy nutritional composition making them a viable option for improving livelihoods and the quality of diets among vulnerable populations.

In addition to being a food source, insects are a major source of income in many parts of the world. They can improve the lives of people through the gathering and

rearing of insects as mini-livestock, whether it be at household level or industrial scale operations. Especially for poorer people living in developing countries, insects offer important opportunities for acquiring cash income and improving diets through the cultivation, gathering and sale of insects. Collecting and farming insects require minimal capital investment or technical know-how, making it a viable business opportunity even for the poorest members of society. As insects are already a part of the local diets in some cultures, insect rearing might not require almost any market introduction in certain regions. Other advantages of insect agriculture include their minimal space requirements, high reproductive rates, fast rate of generating cash flow, high financial returns and the relative ease of raising, management and transport of insects. [Halloran et al. 2013, xv, 125-131.]

### **2.3.2 Environment**

Insects play an important role in global ecosystems and provide services that are necessary for the survival of humankind. They have an enormous impact on plant reproduction through pollination and they help improve soil fertility through waste bioconversion. The high feed conversion efficiency of insects make insect rearing a viable and environmentally friendly alternative to traditional livestock agriculture. Insects produce substantially less ammonia and greenhouse gases compared to cattle and pigs, and their land and water usage is extremely low compared to that of cattle. [Halloran et al. 2013, xiii-xiv.] In the following chapters the author will describe the environmental benefits of insect rearing and how the widespread adoption of entomophagy and subsequent insect agriculture could have a positive impact on climate change and global land and water usage.

#### **Pollination**

Perhaps the single most important ecological service that insects provide to the global ecosystem is their role in the plant reproduction process. There are approximately 100 000 recorded pollinator species in the world, and at least 98 percent of those are insects. Pollination can also be accomplished by vertebrates (birds and bats) and wind, but there are numerous plant species that mostly depend on insects – especially bees – for successful pollination. Over 90 percent of the 250 000 flowering plant species and around 75 percent of the 100 or so crop species that

produce most of the world's food depend on pollinators for reproduction.

Domesticated bees alone account for the pollination of approximately 15 percent of these species, showcasing the importance of insect pollination for agriculture.

[Capinera 2004, 1084; Halloran et al. 2013, 5.] Capinera [2004, 1084], writes that according to 2001 estimates, the value of pollination in the US alone is estimated at \$3 billion.

## Water and Land Usage

The livestock sector is by far the single largest anthropogenic user of land. As much as 26 percent of the ice-free terrestrial surface of planet earth is used up by grazing, and in total livestock production accounts for 70 percent of all global agricultural land and 30 percent of the total land area of the planet. Livestock production also has a considerable impact on deforestation. This is particularly noticeable in Latin America and the Amazon, where as much as 70 percent of formerly forested land has been turned into pastures. [FAO 2006, xxi.] Insects such as mealworms require significantly less land for farming and could greatly reduce global land degradation and grazing should they be widely adopted as a part of the livestock sector. In addition, the energy usage for the production of mealworms as well as the resulting greenhouse gas emissions are lower compared to the majority of traditional livestock production. [Figure 3]

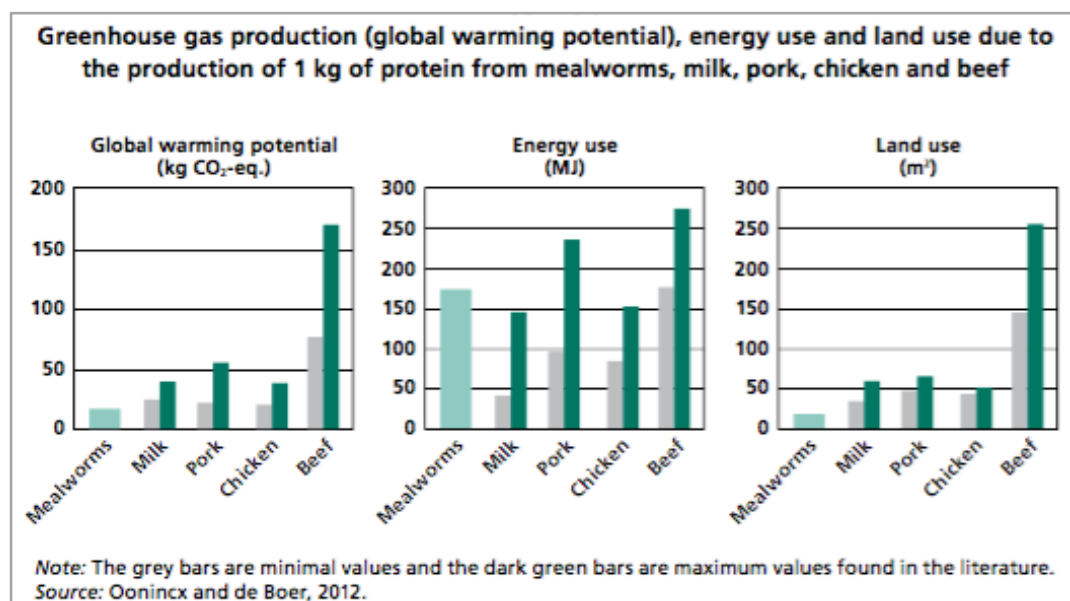


Figure 3 Greenhouse gas production, energy use and land use due to the production of 1 kg of protein from mealworms, milk, pork, chicken and beef. [Halloran et al. 2013, 64.]

Another major negative impact of agriculture is its excessive water usage. According to Halloran et al. [2013, 64] the water consumed by global agriculture accounts for about 70 percent of all fresh water found on the planet. Already today the lack of water is inhibiting agricultural output in many regions of the world, and problems with freshwater shortage, scarcity and depletion are only expected to increase in the future. It is estimated that by 2025 as many as 1,8 billion people will be living in regions with absolute water scarcity and 64 percent of the world's population is estimated to be living in water-stressed basins. [FAO 2006, xxii; Halloran et al. 2013, 64.] Traditional livestock requires a remarkable amount of water to be farmed. For example the production of 1 kg of chicken requires 2 300 litres of water, 1 kg of pork requires 3 500 litres, and estimates for beef water requirements range from 22 000 to 43 000 litres per one kilogram of beef meat. [Halloran et al. 2013, 64.] Estimates for the amount of water required to produce 1 kg of edible insects are unavailable to the author, but there are reasons to believe that the figure could be significantly lower and that widespread insect rearing could considerably reduce the freshwater use by global agriculture.

### **Greenhouse Gas Emissions**

Climate change affects the earth's ecosystems in numerous ways. As global temperatures continue to rise, glaciers and icecaps are melting, resulting in rising sea levels and changing weather patterns and ocean currents. The livestock sector has a major impact on climate change, accounting for 18 percent of all global greenhouse gas emissions measured in CO<sub>2</sub> equivalent, which is more than the whole transport sector combined. [FAO 2006, xxi.] Methane is the most common greenhouse gas emitted by the animal sector, contributing to 35-40 percent of all global methane emissions.

There is a significant difference in the amount of emitted greenhouse gas emissions between insects and traditional livestock. Cockroaches, termites and scarab beetles are the only insects that produce methane, and such edible insect species as mealworms, crickets and locusts produce about 100 times less greenhouse gas

emissions than pig and beef cattle. [Figure 4.] Another major contribution to environmental pollution comes from livestock waste. The ammonia in the urine and manure of cattle animals can lead to nitrification and soil acidification. Mealworms, locusts and crickets produce about 10 times less ammonia than pigs. [Figure 4.] Halloran et al. [2013] state that these results were taken from small-scale laboratory experiments, and that comparisons between large-scale pork and beef production should be made with caution. [Halloran et al. 2013, 63.]

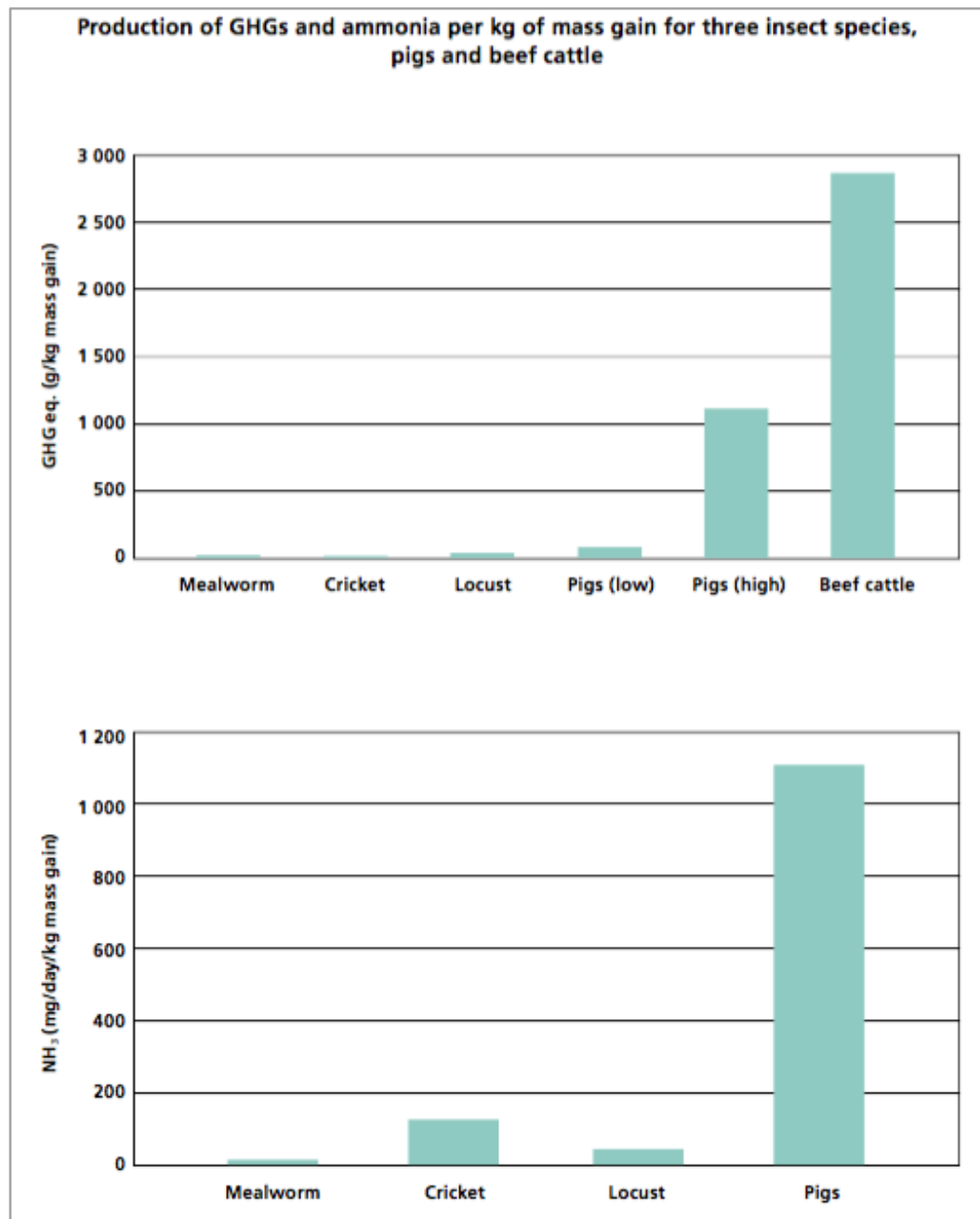


Figure 4 Comparison of GHG and ammonia emissions between three insect species, pig and beef cattle. [Halloran et al. 2013, 63.]

## 2.4 Business Potential of Insect Food

Edible insects hold considerable business potential for the future. According to some 2014 estimates, the American insect food industry was valued at around \$20 million and still growing. [Hoffman, 2014.] In March 2016, a Brooklyn-based insect food start-up Exo closed a \$4 million series A funding round attracting investors such as AccelFoods, the Collaborative Fund and the American rapper Nas. [Clark, 2016.] Exo's business model concentrates on selling protein bars made with cricket flour online and through retailers such as Whole Foods and Wegman's. The company is planning to use their newly acquired investment funds to create new insect-based products such as ready-to-eat shakes and protein powders, in order to appeal to the ever-growing market of fitness enthusiasts and consumers who avoid eating meat for ethical reasons. Clark [2016], writes that the co-founder of Exo, Greg Sewitz, believes that insect-based foods could compete with other popular protein sources in the future: "In the long term, we envision cricket powder being competitive with soy, and whey, and any other protein source." However, Exo is not the only company competing on the North American edible insect market. According to Tarkan [2015], more than 25 start-ups selling insect food have been launched in the US and Canada alone. In addition, Solon [2015] writes that according to the analysis by New Nutrition Business, the European insect food market is expected to be worth €65 million by 2020.

In their 2015 paper *Call of the Edible Insects: 5 reasons why edible insects are a business opportunity*, authors Tanhuanpää and Varjonen have highlighted five reasons why insect food possesses such significant business potential:

### 1. Market demand for high quality protein continues to grow

Consumers are increasingly aware of the importance of protein as a nutrient, and as the global population and the living standards of developing nations continue to rise, the demand for animal protein will increase as well. This rising demand will be met with a growing market for alternative protein sources. Insect protein is a complete protein containing all essential amino acids, and it conveniently fits into many current food trends such as sports nutrition, healthy snacks, wellness foods and paleo diets.

## **2. Insect protein is more appetizing in powder form**

Most consumers are not comfortable with the idea of eating insects as such, but when the insect-like appearance is hidden e.g. by grinding them into a powder, consumers are much more willing to consider eating them. The powder form also allows insect protein to be incorporated into a wide variety of products, such as bakery, spreads, sauces, seasonings and smoothies.

## **3. Insect protein can make processed foods seem less 'bad'**

Processed foods are viewed as unnatural and unhealthy by many consumers, and the popularity of natural "good for you" products has been on the rise. Given its high quality, insect protein as a food ingredient could make processed foods seem healthier and more nutritious.

## **4. Insect protein can offer benefits in cost and sustainability**

Insects can be produced very efficiently because they grow fast, have a high feed conversion rate, require minimal amounts of water and space and emit a small amount of greenhouse gasses. Such cost and sustainability benefits make insects an intriguing alternative to traditional livestock, especially if they were to be produced on an industrial scale sometime in the future.

## **5. Sustainability contributes to increased customer loyalty**

In order to make customers loyal to a product, it is important to create an emotional relationship with them. Responsibility elements such as traceability, transparency, trust and origin can help create an emotional connection with the consumer, and thus not only ensuring their loyalty to the product, but also increasing the chances of them recommending the product to others. Insect protein includes all the essential responsibility elements.

The five aspects discussed above concentrate on the reasons as to why insect food holds great business potential in Western countries. However, it is not only in the Western world where the economic benefits of edible insects are recognized. The gathering and/or farming of insects can drastically improve the livelihoods and

income earning opportunities of people in developing countries, especially for the poorest members of those societies. Many insects, such as ants, bees and silkworms offer multiple ways to generate additional income. Bees produce honey which is a staple food product all over the world, and in addition the bee larvae can be harvested and sold as food. Silkworms offer both food and fiber, and for example weaver ants are not only a food source but also act as a pest repellent. Most of the insects that are used for food in developing countries are harvested from wild populations in nature. All the insects that are not consumed as food by the gatherers themselves can easily be sold on local markets and street food stalls either directly by the gatherer or their family or through middlemen and wholesalers. [Halloran et al. 2013, 131.]

Insects and insect-related products can be mass-produced and sold for many different purposes. Human, pet and livestock nutrition is not the only market for insect products, instead, insects can also be sold for crop protection, crop pollination, health (e.g. maggot therapy), research or even as collector's items.

During the past decade, insect food products have slowly been making their way into exotic and novelty food shops especially in developing countries. This concept of insects as a novelty food is a popular market strategy for selling edible insects, and at least in the US it has been that since the 1960s, when the company Reese Finer Foods started selling items such as chocolate-covered ants, bees and grasshoppers, French fried silkworms and roasted caterpillars. The idea was to satisfy exotic palates by offering exotic food from foreign countries. Nowadays similar kinds of novelty insect food items can be found even in the most famous luxury stores such as Harrods and Selfridges, which sell fancy insect products in their stores in London. [Halloran et al. 2013, 137-138.]

Although not justified from a nutritional standpoint, the attitudes towards insects as food are still overwhelmingly negative in the West. In order to break down common myths regarding edible insects and move consumers beyond the 'disgust factor', proper education and clear communication needs to be established. The feelings of disgust that are often associated with insect food stem from the belief that entomophagy in developing countries is merely a survival mechanism and that insects are consumed as food only in time of famine and starvation by primitive

cultures. Despite being far from the truth, these attitudes are deeply rooted in Western societies and although getting rid of them will not be a quick and easy feat, it is not an impossible one either. Given that political and academic discussion concerning entomophagy is still very limited, targeting governments and ministries of agriculture should be a top priority when promoting edible insects as a food source. No matter how difficult the task may seem, it is important to remember that it would not be the first time in history when Western food attitudes were drastically changed. Arthropods such as lobsters and shrimp used to be seen as a poor-man's food in the West, and today they are considered to be prestigious delicacies. With arguments supporting insects' high nutritional value, cost-effective farming methods and low environmental impact, there is hope that Western attitudes towards entomophagy can be changed to be more positive in the near future. [Halloran et al. 2013, 141.]

## **2.5 Theory of Consumer Behaviour**

When studying the business potential of a new product – such as insect food – it is important to get an understanding of the factors that influence consumers' actions and buying habits. Consumer behaviour is strongly affected by the perceptions and attitudes of the consumer, and consumers tend to make decisions based on their perceptions instead of objective reality. Reality is a personal phenomenon that is unique to each individual based on the person's needs, wants, values and personal experiences, which is why marketers are more interested in the consumers' perception of reality rather than their knowledge of objective reality. [Hansen, Kanuk & Schiffman. 2012, 158.]

Attitudes determine whether consumers like or dislike a certain product or service. Each individual has a vast number of attitudes, and understanding prevailing consumer attitudes is of considerable strategic importance in the context of consumer behaviour. According to Hansen et al. [2012, 232], attitude research is frequently utilized to determine whether consumers will accept a proposed new product idea. This type of research is also relevant for the aim of this thesis, which is

to research the business potential of insect food by studying the attitudes of young adults towards edible insects. In the following chapters the author will briefly explain the concept of perception and which factors affect individuals' perceptual interpretation, and go through the different phases of consumer attitude formation and change.

### 2.5.1 Consumer Perception

"Perception is defined as the process by which an individual selects, organises and interprets stimuli into a meaningful and coherent picture of the world." [Hansen et al. 2012, 159.]

Simply put, perception is the way individuals see the world around them. The way each person recognises, selects, organises and interprets different stimuli is a highly individual process, based on the individual's needs, expectations and values. Even if two people were exposed to the same stimuli under similar conditions, their interpretations of the situation might be vastly different.

The perceptual process can be divided into four basic concepts. **Sensation** refers to the immediate and direct reaction to stimuli by the sensory organs. A stimulus is a sensory input to any of the five sensory receptors (the eyes, ears, nose, mouth and skin), and can include for example brand names, products, packages and advertisements. **The absolute threshold** refers to the lowest level at which an individual can experience a sensation. In other words, the absolute threshold is the point at which a person can detect a difference between 'nothing' and 'something'. As an individual's exposure to a certain stimulus increases, they will notice it less as they become more accommodated to that level of stimulation. This sensory adaptation is a challenge concerning many advertisers, which is why advertising campaigns are often regularly changed. The minimum difference that can be detected between similar stimuli is called **the differential threshold or just noticeable difference (JND.)** The JND between two stimuli is relative to the intensity of the first stimulus, which means that the stronger the initial stimulus is, the greater the additional intensity for the second stimulus has to be in order to be perceived as different. To illustrate, a 50 cent increase in the price of a €1 product is more easily recognised than a similar price increase in a €10 product.

People can also perceive stimuli without being consciously aware of doing so. Some stimuli can be too weak or brief to be consciously seen or heard, but they might still be detected by one or more receptor cells. This process of **subliminal perception** is made possible by the stimuli that are below the threshold of conscious awareness, but not below the absolute thresholds of the receptors involved. The effectiveness of so-called subliminal advertising is debated, and according to Hansen et al [2012, 163], no evidence of subliminal advertising affecting consumers' buying habits exists, despite the extensive research on the subject since the 1950s. [Hansen et al. 2012, 159-163.]

### **Perceptual Interpretation**

As mentioned above, perception is an individual phenomenon based on the person's needs, values and expectations. People perceive and react to specific stimuli based on certain psychological principles. The interpretation of those stimuli is also unique to each person, as it is based on the individual's expectations, motives and interests at the time of the perception. Stimuli can often be inconclusive and obscure, affected by factors such as poor visibility, brief exposure or constant fluctuation. Hansen et al. [2012, 172], write that "Consumers usually attribute the sensory input they receive to sources they consider most likely to have caused the specific pattern of stimuli." When stimuli are ambiguous, individuals tend to interpret them in ways that serve to fulfil their personal wishes, needs and interests.

There are several factors that can influence and distort an individual's perceptions. These perceptual distortions can be divided into five main categories:

**Physical appearances** have been found to have a significant effect on the persuasiveness of advertisements. For example, according to Hansen et al. [2012, 172-173], certain studies suggest that attractive models have a more positive influence on consumer attitudes than average-looking models, and that attractive people tend to be perceived as more successful.

**Stereotypes** serve as expectations of what certain people, events or situations will be like. They are also important in determining how such stimuli are perceived. Each individual has unique perceptions of various kinds of stimuli, and those perceptions are often based on stereotypes.

**First impressions** are usually very important and long-lasting. However, when forming those first impressions, the perceiver often does not yet know which stimuli are relevant, important or predictive of future behaviour. Because of the long-lasting nature of first impressions, it is very risky to introduce a new product that has not been perfected. Even when presented with factual information about the product's or service's advantages, consumers might ignore such information if the first impressions of said product or service are negative.

**Jumping to conclusions** before examining all relevant evidence is common among consumers, who might, for example, only listen to the beginning of an advertisement and draw their conclusions regarding the product or service based on that. Because of this, many advertisers take great care in giving their most persuasive and attractive arguments first. For instance, Hansen et al. [2012, 174] write that many consumers do not read the volume information on food labels and instead of checking which package actually contains more volume, the consumers might opt for the package they perceive to be larger, whether or not it is actually true.

**The halo effect** is a concept used for describing situations where the assessment of a single object or person on several dimensions is based on the evaluation of just one or few dimensions, or vice versa. An example of the halo effect would be a restaurant that is perceived as being high-class, expensive and luxurious because it has beautiful tablecloth. Marketers tend to take advantage of the halo effect when they extend a brand associated with one line of products to another.

Despite all the potential subjective influences on perceptual interpretation, individuals tend to react to obscure stimuli relatively 'realistically' on the basis of their previous experiences. Only unusual or constantly changing stimulus conditions lead to wrong interpretations. [Hansen et al. 2012, 172-174.]

### **2.5.2 Consumer Learning**

Academics, marketers, psychologists and consumer researchers are all interested in how individuals learn. Marketers have an interest in individuals' learning habits because they essentially want to educate consumers about products, their potential benefits, product attributes and distribution channels, among other things. Another

area of interest for marketers is how effectively they have taught the consumers to prefer their brand's products and to differentiate their products from the competitor's.

Marketing strategies are often based on both direct and indirect communication with the consumer. Direct communication is established through advertisements, whereas indirect communication comes in the form of product appearance, packaging, price and distribution channels. Marketers are especially interested in the different aspects of consumer learning process because they want these communications to be noted, believed, remembered and recalled. [Hansen et al. 2012, 195.]

There are two major schools of thought regarding the learning process – behavioural learning theory and cognitive learning theory. Behavioural theories or *stimulus-response theories* are based on the premise that observable responses to certain external stimuli are an indication of learning taking place. In other words, when a person acts or responds in a predictable manner to a known stimulus, her or she is considered to have 'learned' something. Behavioural theories are mostly concerned with the inputs and outcomes of learning, instead of the actual process of learning itself. [Hansen et al. 2012, 197.]

"Cognitive theorists view learning as a function of purely mental processes." [Hansen et al. 2012, 195.] Learning based on mental activity is called *cognitive learning*. One of the central views of cognitive learning theories is that the kind of learning that is most characteristic to human beings is problem-solving, which allows them to gain a certain amount of control over their environments. Contrary to behavioural learning theory, cognitive theory suggests that in order for learning to happen, complex mental processing of information must take place.

From a marketing perspective, consumer learning can be seen as the process by which consumers obtain the purchase and consumption knowledge and experience that can be applied to future similar behaviour. New information – gained for example from reading, discussions or new experiences – constantly changes and develops consumer learning, making it a continuous process. This newly obtained knowledge and personal experiences together serve as feedback to the individual

and provides a basis for future behaviour. However, not all learning is deliberately sought out. Some learning is incidental, gained by accident or without much effort. Both behavioural and cognitive theorists agree that in order for learning to happen, certain key elements must be present. Those include motivations, cues, response and reinforcement. [Hansen et al. 2012, 196.]

### **2.5.3 Consumer Attitude Formation and Change**

Attitudes are not directly observable, but must instead be inferred from what people say or do. Attitudes are assessed by studying consumer behaviour for example by asking questions regarding a certain product or service. For instance, if a consumer says that she constantly buys L'Oreal shampoo and even recommends it to her friends, the researcher can assume that the consumer has a positive attitude towards that particular brand of shampoo. Hansen et al. [2012, 233], describe attitudes as the following: "An attitude is a learned predisposition to behave in a consistently favourable or unfavourable way with respect to a given object." In this definition, the word 'object' should be interpreted to include specific consumption or marketing-related concepts such as product, brand, service, advertisement, price or retailer.

#### **Attitude Formation**

It is impossible to understand or influence consumer attitudes and behaviour without knowing how attitudes are formed. Attitude formation can be broadly divided in three main areas: how attitudes are learned, the sources of influence on attitude formation and the impact that personality has on attitude formation. [Hansen et al. 2012, 243.]

The formation of an attitude can be described as the shift from having no attitude towards a given object to having some attitude towards it. This shift from no attitude to some attitude is usually attributed to [consumer learning](#). In some cases, attitude formation is the result of the purchase and consumption of a product. If a consumer buys a product without having any experiences of the brand and therefore no prior attitudes towards it, the attitude will form after the consumption of said product. If the experience with the product is satisfactory, the consumer is likely to develop a positive attitude towards it. In other cases, a consumer might purchase a new

product that they associate with a favourably viewed brand. This favourable view is the result of continuous and repeated satisfaction with other products from the same brand.

Generally, the more information consumers have about a certain product or service, the more likely they are to have an attitude – either positive or negative – towards it. However, consumers are not always ready or willing to process product-related information and often only use a fraction of the information available to them. According to Hansen et al. [2012, 244], research suggests that usually only two or three important beliefs about an object are relevant in the formation of attitudes and that the rest of the beliefs provide little additional input. These findings suggest that marketers should only focus on the few key points that distinguish their product from the competition.

Personal experiences, friends, family, media and marketing are other major elements influencing attitude formation. The primary factor in the formation of attitudes is the consumer's direct experience in trying and evaluating products and services. Because of the importance of direct experience, marketers often promote their products by offering discounts or free samples. If a consumer tries a product and likes it, then it is probable that the consumer develops a positive attitude towards it and is likely to buy the product again. According to Hansen et al. [2012, 244], family is an extremely important source of influence in the formation of attitudes, because people learn most of their basic values and other less central beliefs from their families.

Direct-marketing efforts, which target small consumer niches with products and services that are relevant to their interests, are very efficient in favourably influencing the target consumers' attitudes. This is because the products and services offered and the promotional language used are carefully designed to address the needs and concerns of the specific target segment, resulting in a better 'hit rate' than mass-marketing. [Hansen et al. 2012, 244.] In addition, mass-media communications such as newspapers, magazines and television channels are effective in exposing consumers to new ideas, products, opinions and advertisements, all of which influence the formation of attitudes.

However, Hansen et al. [2012, 244], write that research has shown that attitudes developed through direct experience – for example product usage – are more resistant to attack and more likely to be confidently held than those formed through indirect experience, such as reading an advertisement.

Personality also plays an important role in the formation of attitudes. Individuals who crave information and enjoy thinking, in other words people with a high need for cognition, tend to be positively responsive to advertisements that are rich with product-related information. On the other hand, individuals with a low need for cognition are likely to form positive attitudes in response to advertisements that feature for example a well-known celebrity or model.

### **Attitude Change**

Many of the factors influencing attitude formation also apply to attitude change. Attitude changes are also learned, they are influenced by personal experience and other sources of information, and the individual's personality affects the speed and receptivity with which attitudes are altered. There are several strategies that are used by marketers to change consumer attitudes. In many product categories, competitors tend to take aim at the market leaders by attempting to change the attitudes of their customers and consequently win them over. Hansen et al. [2012, 245], have highlighted five of these strategies:

1. Changing the consumer's basic motivational function
2. Associating the product with a special group, event or cause
3. Resolving two conflicting attitudes
4. Altering components of the multi-attribute model
5. Changing consumer beliefs about competitor's brands

One possible method for changing motivation is known as the functional approach, which involves utilitarian function, the ego-defensive function, the value-expressive function and the knowledge function. Pointing out the relationships between a brand and particular social groups, events or causes can affect the attitudes towards that brand's products and services. An example of this would be companies that emphasize their sponsoring of public or civic acts in their advertising to let consumers know about the good that they are trying to do. Resolving two conflicting

attitudes can be done by for example pointing out to the consumer that their negative attitude towards a product is not in conflict with another attitude. The multi-attribute model offers additional insight as to how to influence attitude change: by changing the relative evaluation of attributes, changing brand beliefs, adding an attribute and changing the overall brand rating. Finally, changing consumer beliefs about the attributes of competitive brands or products can be used as an approach for changing consumer attitudes. However, this strategy of comparative advertising runs the risk of giving visibility to competing brands and products. [Hansen et al. 2012, 252.]

### **3 Research Approach and Implementation**

#### **3.1 Research Problem**

After researching the history and common characteristics of insect food and gathering an understanding of the numerous environmental and social benefits that edible insects could provide to the global community, the author became interested in studying the business potential of insect food especially in Western societies where insects are not widely adopted as part of people's regular diets. The author thinks that the topic of insect food encompasses a great deal of possibilities for future research and that the edible insect industry shows plenty of growth potential, as can already be seen by the rise of insect food based start-ups especially in North America. Previous research on the subject of insect food's business potential is scarce, making it an interesting, current and relevant topic for research.

The purpose of this thesis was to research the business potential of insect food by studying what kinds of attitudes, beliefs, concerns and existing knowledge young adults have concerning edible insects, and also by examining which factors would increase interest towards insect food in a retail setting. In order to fully examine the research problem and find an answer to it, the author decided to gather the primary data by conducting two focus group interviews, which will be used to answer the following research questions:

1. What are the attitudes towards insect food in the focus groups, and what are those attitudes based on?
2. According to the focus group participants, which factors would lead to increased interest towards insect food in a retail setting?

The author feels that these research questions are clear, focused and properly defined while still leaving room for new viewpoints to emerge from the primary data collection through focus group interviews. The answers to the first question are to give a general understanding of the attitudes that the focus group participants have towards insect food, and to examine what kinds of factors contribute to the beliefs and concerns the participants may have about edible insects. The second research question was designed to examine which factors the focus group participants find most important in arousing their interest towards insect food products. The author wanted to find out how strong of an effect factors such as the physical form of the insects (e.g. whole insects vs. powder), packaging, or information displayed about the products have on the overall level of interest among the focus group participants. The author thinks that the answers to these questions could prove useful for increasing consumer interest in a B2C retail setting.

### **3.2 Research Design**

The three main types of research design are Exploratory, Descriptive and Causal. Exploratory research involves data collection from primary and secondary sources and using an unstructured format in interpreting the data. Compared to the descriptive and causal designs, exploratory research includes the least amount of scientific method. [Hair, Bush & Ortinau 2006, 63.] Qualitative research methods such as focus group interviews, pilot studies and in-depth interviews are typical in exploratory research. According to Hair et al. [2006, 63] exploratory research is not normally used to gather decisive information about the research topic, instead, it is used as a tool to learn about any potential problems or opportunities surrounding the subject.

Descriptive research design, on the other hand, focuses on collecting raw data and creating data structures from them in order to define and describe the characteristics – such as attitudes, preferences or purchase behaviours – of a specific target group. This data can be collected by numerous different methods. [Happonen & Oinonen 2013, 7.] Descriptive research is often used to answer the who, what, when, where and how questions, and further to provide information about customers, target markets, competitors or other phenomena that is relevant to the researcher. [Hair et al. 2006, 63.]

The aim of causal research is to find cause-and-effect relationships between different variables, such as the effect of marketing on sales. Happonen and Oinonen [2013, 7], write that “Causal research is a good tool for decision makers as, if done correctly, it can allow them to make “if-then” statements about different variables.” For example, a decision maker could use causal research to estimate the effect of a price increase on the sales volume of a certain product. [Hair et al. 2006, 64.]

Although most qualitative research designs usually allow for deviations during the research process and changes in the research setting during the process, it is nevertheless helpful to be aware of certain key elements that should be thought of beforehand. One of the major elements of research design is the choice of the research area and the identification of the research topic. According to Eriksson and Kovalainen [2008, 26], the key principle for this element is to establish whether or not your research idea is suitable for research. It is important to have a topic that can be researched empirically, even if all the research questions were not empirical in nature. A literature review will offer the author insight as to how researchable the topic is – whether there already exists a vast amount of recent literature on the subject, or if there is very little previous research done on the topic. In addition to the researchability, it is also important that the author finds himself genuinely interested in the topic. The research topic broadly defines the area that the author is interested in, whereas the research question(s) define the issues that the author seeks to explore in more detail.

The formulation of the research questions is another crucial element of research design. When formulating the research questions, it is important to think about the kind of research you are conducting. What is the purpose of the research, why is it

worth doing and how will you start to explore the topic of your interest? The author should think about what kinds of questions he or she is trying to answer in the research, and whether those research questions are descriptive or explanatory in nature. A descriptive research question is suitable for e.g. descriptive research designs, whereas an explanatory research question is usually suitable for exploring causes and/or consequences. What, how and why are typical qualitative research questions, and according to Eriksson and Kovalainen [2008, 39], it can often be useful for the researcher to work through their research topic using all of these questions. The “what” questions are descriptive in nature and aim to explore and describe states, situations and processes. The “how” and “why” questions focus on causes and consequences and attempt to explain a certain subject in qualitative terms. [Eriksson & Kovalainen, 2008, 39.] An important thing to keep in mind is that the research problem and the research questions are the basis for the whole research project, and even with a rough research idea the author can start to organize the research topic into researchable questions. After the research topic and research questions have been defined, the next important step is to choose the appropriate research methods. The research question(s) act as a guide when choosing the research method, and the chosen method should be one that is relevant to answering the research question(s). [Eriksson & Kovalainen 2008, 27.]

The research topic of this thesis was personally chosen by the author. The author got interested in the topic of insect food after participating in a group project revolving around alternative food sources, and decided to expand the research to study the business potential of insect food in this thesis. After conducting a thorough literature review, the author found out that little previous research exists on the subject, especially in Finland. Furthermore, most of the existing studies on the subject were behind a paywall and thus not accessible to the author. Due to the author’s strong personal interest in the topic and the fact that the topic has not yet been researched a lot made edible insects a viable and researchable topic for this thesis.

When formulating the research questions, the author’s aim was to come up with questions that would provide answers revealing the underlying causes that influence the attitudes, preconceptions and interests of the focus group participants towards

insect food. Thus the author focused on explanatory “how” and “why” questions and used them to examine the causes that affect people’s attitudes on edible insects.

### **3.3 Collection of Data**

The two main sources of research data are primary and secondary data. Primary data represents raw data and data structures that have not yet been interpreted in a meaningful way and that have been collected first-hand by the researcher. Primary data is collected to solve a specific information research problem by conducting some type of exploratory, descriptive or causal research project. Secondary data is information that already exists in some form and that can be accessed e.g. inside a company, in public libraries, universities, and on the Internet. [Hair et al. 2006, 64.]

#### **3.3.1 Quantitative and qualitative research**

Research methods and research data can traditionally be placed into two basic categories: quantitative and qualitative. One of the main purposes of quantitative research is the quantification of data. It focuses on distributing questionnaires and surveys with formalized questions and predetermined response options to large amounts of respondents. [Hair et al. 2006, 171.] Although they can also be associated with exploratory research designs, quantitative research methods are traditionally more closely linked to descriptive and causal research designs. In quantitative research the research problems are typically clearly defined, and the main goal of quantitative research is to provide specific facts to decision makers that can be used to make accurate predictions about the relationships between behaviours and market factors, among other things. In quantitative research the researchers must be well versed in questionnaire design, sampling and statistical data analysis, as well as have the skills to translate numerical data into a clear and meaningful narrative. The main concerns of quantitative research are the validity and reliability of data. [Hair et al. 2006, 172.]

Qualitative research, on the other hand, focuses more on gaining a deep understanding of underlying reasons and motivations. It puts more emphasis on in-

depth information that is gathered by asking questions or observing the behaviour of relatively small samples of respondents. One of the main objectives of qualitative research is to gain preliminary insights into research problems. [Hair et al. 2006, 173.] This is achieved by using either open-ended questions or specific observational techniques to probe respondent's initial responses and observe their behaviour. The collection of data using qualitative research methods is usually a relatively quick process, but it takes more time to translate the research data into meaningful findings. Although the small sample sizes and the non-structured format of the questions makes qualitative data difficult to generalize to the population, it can still have a crucial role in understanding and resolving certain business problems. Qualitative data can be especially useful in areas of initial discovery and explanation of customer and marketplace behaviour and decision processes. By using qualitative research methods, researchers can collect important information about specific opportunities, problems and theories related to the research subject. Nevertheless, qualitative data is not generally recommended to be used when coming up with a final course of action. [Hair et al. 2006, 173.]

### **3.3.2 Choosing the research method**

For this thesis the author wanted to get a general understanding of what young adults think about insect food. More specifically, the author wanted to examine what kind of beliefs, concerns and attitudes the participants of the focus groups have towards edible insects, what kind existing knowledge they have about insect food, and which factors would lead to increased interest towards edible insects in the focus groups. The purpose of studying these particular aspects was to gain information about the business potential of insect food. By researching the attitudes of a potential target market (in this case young adults), the author could gather valuable information about what kind of things should be taken into consideration in the marketing, distribution and sale of insect food products.

It became clear to the author since the beginning that quantitative research would not be sufficient enough to gather the type of data needed for the research. The quantitative research methods do not provide enough in-depth data about the topics that are relevant to this research. The formalized questions and predetermined

nature of the response options in the surveys and questionnaires typical to quantitative research hinder the researcher's ability to probe the respondent's initial responses and thus gain enough in-depth knowledge about the subject. Quantitative research typically provides the researcher with numerical and statistical data that can be used to validate predictions, estimates and facts, but in the case of this thesis the author wanted to rather discover and identify new ideas, thoughts and feelings related to the topic. For this kind of research, the author feels that qualitative research is the proper choice. According to Hair et al. [2006, 174], qualitative research methods are appropriate when the researcher wants to obtain "preliminary insights into the motivation, emotional, attitudinal, and personality factors that influence marketplace behaviors." The aforementioned quote perfectly describes the nature of the research that the author wanted to conduct. Other advantages of qualitative research methods include the economical and timely data collection, the richness of the data and the preliminary insights on the subject gained from the data. The small size of the samples makes it possible for the researcher to complete the primary data collection faster and at a lower cost compared to quantitative research methods. The open-ended questions, specific observational techniques and the unstructured style of qualitative research methods allows the researcher to collect in-depth data about the attitudes, beliefs, concerns and perceptions of the respondents, which can further provide the researcher with important preliminary understanding of those behaviours. [Hair et al. 2006, 174-175.]

Based on the above-mentioned traits, qualities and advantages of qualitative research, the author believes that using an exploratory research design with primary data collection through qualitative research methods is the appropriate choice for conducting this research. The author chose focus group interviews as the qualitative research method for gathering the data. The author feels that the unstructured and interactive nature of focus group interviews can provide the kind of in-depth data needed for this research. By getting the group members to talk about the research topic in detail, the author feels that he can gain valuable insight into the attitudes, perceptions and beliefs related to the subject, which will be crucial when answering the research problem of this thesis. As the topic of insect food is not overly common or widely discussed in Western cultures and thus probably fairly unknown to most of

the participants of this study, the author feels that he could have a better chance of getting more in-depth answers from the respondents when they can discuss their feelings and thoughts about the subject in a group compared to a one-on-one interview. Discussing an unknown subject in a more formalized and intimate setting could potentially make some participants uncomfortable and inhibit their willingness to give in-depth answers. The more relaxed and informal nature of a focus group interview could “loosen” the participants and allow them to discuss the subject more openly. One person’s response could spark up a more detailed and in-depth conversation about the subject, thus providing the researcher with more usable data for the study. In the next chapter, the author will go through the overall nature and structure of focus group interviews in more detail, while also discussing the advantages and disadvantages of this particular research method.

### **3.4 Focus Group Interview**

Focus groups can be defined as “a group of individuals selected and assembled by researchers to discuss and comment on, from personal experience, the topic that is the subject of the research.” [Powell & Single, 1996, as cited in Eriksson & Kovalainen 2008, 173.] A typical focus group consists of about four to eight participants, a moderator who initiates and encourages conversation between the participants (usually the researcher herself), and a topic or issue that will be discussed by the group. [Eriksson & Kovalainen 2008, 175-181.] In addition to the above-mentioned key characteristics of a focus group, Morse [1994, 227], identifies the nature of the group itself, which is conveyed through the participant’s interaction and the flow of discussion, as “the most important” characteristic of a focus group. Focus groups can be used to gather exploratory data which is descriptive and process oriented in nature, giving the researcher in-depth information about the subject. [Hesse-Biber & Leavy 2011, 164.] According to Morse [1994, 225], “Focus groups provide insight into beliefs and attitudes that underlie behavior.”

The ultimate goal of focus group research is to give the researcher as much information as possible about how the participants feel about the subject of the

study. Focus group research relies heavily on the group dynamics, the respondent's willingness to engage in conversation and the facilitator's ability to encourage and guide the discussion. Hair et al. [2006, 180], have defined seven main focus group research objectives, listed below:

1. To provide data for defining and redefining marketing problems.
2. To identify specific hidden information requirements.
3. To provide data for better understanding results from other quantitative studies.
4. To reveal consumers' hidden needs, wants, attitudes, feelings, behaviours, perceptions, and motives regarding services, products, or practices.
5. To generate new ideas about products, services, or delivery methods.
6. To discover new constructs and measurement methods.
7. To help explain changing consumer preferences.

For the reasons outlined above, the author feels that focus group interviews can provide relevant and useful information for the purposes of this research. As the topic of this bachelor's thesis is to study the attitudes of young adults towards insect food, the focus group interviews seem to be the appropriate method to collect the relevant data.

In a focus group interview multiple individuals are interviewed together, making the focus group distinct from one-on-one interviews. Focus group research has many advantages over individual interviews, not only for the researcher but the participants as well. It can decrease discrimination towards people who have troubles with understanding textual data such as survey instructions, and it can encourage participation from respondents who might be reluctant to be interviewed on their own, such as people intimidated by the formality and personality of a one-on-one interview. In addition, focus group research can also encourage contributions from people who feel that they might lack the expertise for commenting or who have nothing to say. [Eriksson & Kovalainen 2008, 178.] Other advantages and disadvantages of focus group research will be discussed later in this chapter.

Before conducting a focus group interview, the researcher must carefully study and plan the three-phase process for developing a proper focus group research.

According to Morse [1994, 228-234], focus group research can be divided into three phases: preparation, implementation and analysis & interpretation. In the preparation phase, special care and consideration should be taken with the selection and recruitment of the respondents, the size and structure of the groups and where the interviews will be held. The size of the focus groups can typically be anywhere from 2 to 10-12 people, with the average being around four to eight participants. The size of the group should be large enough to allow for multiple viewpoints to emerge from the discussion, and small enough to be manageable for the moderator and to allow each participant to share their insight. The implementation phase relies heavily on the focus group moderator, who in this case is the author of this thesis. The moderator must clearly outline the topics and questions used in the session and actively guide and encourage the participants of the discussion. The final phase of analysis & interpretation should be done with the reading audience in mind, and the researcher should carefully consider the purpose of the study, the appropriate report style format and the nature of reporting the results while writing the analysis. [Hair et al. 2006, 183.] These three phases will be discussed in more detail in the following parts of this chapter.

### **3.4.1 Preparation**

According to Hair et al. [2006, 183], preparation is the most critical phase of the whole three-phase process of planning a focus group interview, as errors in this phase could directly affect the outcome of the following phases. In the planning phase, the researcher(s) must have a clear understanding of the purpose of the study as well as a precise definition of the research problem and the data requirements. The preparation also includes a careful examination of the research topic, the development of guideline questions, the selection and recruitment of the participants as well as taking care of the logistic arrangements such as the space for the interview, food and drinks for the participants and the recording equipment. [Morse 1994, 228.] Before conducting the focus group interviews, the author had carefully studied the research topic – insect food – in the literature review and consequently gained a sufficient general understanding of the subject matter. The

author decided to develop the focus group interview guideline questions around the research questions which were discussed in a previous chapter.

After researching the topic, the next phase is to decide what kinds of groups and how many of them are needed for the research. Eriksson and Kovalainen [2008, 180] state that the members of the focus groups should have some things in common so that the discussion can proceed without any major difficulties. As the topic of this thesis is to study the attitudes of young adults towards insect food, the author decided that the common denominator for the members of the focus groups would be their age. In the case of this research, the term “young adults” is defined as people ranging from 20 to 35 years of age. The author wanted to use relatively homogenous groups with participants from roughly the same age group, educational background and social status. The benefit of a homogenous focus group is that people are more likely to share information with others who are considered as similar. Participants who recognize each other’s common factors and feel comfortable with one another tend to create a more natural and relaxed group environment. [Hair et al. 2006, 184; Morse 1994, 229.] Although the groups were homogenous when it comes to the age, social status and education of the respondents, the author also wanted to include participants representing both genders and different nationalities to elicit a wide range of opinions and viewpoints to the discussion. The author feels that having some variety in the groups is imperative in order to bring out creative insights, criticism and opinions on the subject.

Another aspect to consider when forming the focus groups is the familiarity of the participants, which undoubtedly has an effect on the outcome of the focus group discussions. Some researchers try to avoid groups whose members are familiar to each other, because participants might influence each other’s comments. On the other hand, many people might feel intimidated or hesitant to voice their opinions and feelings to strangers, which is why groups with people who know each other can allow for a more “naturally occurring” discussion and make the focus group participants more willing to share their opinions. [Eriksson & Kovalainen 2008, 181; Hair et al. 2006, 184.] For this research the author decided to allow participants who are familiar to each other to join the discussions. The author felt that as the topic of insect food is still fairly unknown to the majority of people, having group members

who know each other could help some of the respondents to open up about the subject more freely and make it more comfortable for the participants to discuss and share their opinions on the subject.

The optimal size of a focus group is usually estimated to be around 4 to 12 members. [Eriksson & Kovalainen 2008, 181; Hair et al. 2006, 187; Morse 1994, 229.] Having a too small of a group might lead to a situation where only one or two people dominate the discussion, or where the moderator needs to be too active and talkative to keep the discussion going. [Hair et al. 2006, 187.] In addition, a too small of a group might not provide enough data for the researcher. However, having too many members in a group might limit each participant's chance to share their insights and observations while also making it more difficult for the moderator to manage the discussion. A smaller group allows each participant to contribute to the discussion and makes it easier for the moderator to manage the group dynamics, process the information and attend to individual members. [Morse 1994, 229.] As the author is not experienced in conducting and moderating focus group interviews, he decided to keep the group sizes relatively small to be able to manage and guide the discussion while at the same time taking notes and tending to the group members. According to Eriksson and Kovalainen [2008, 181]: "Four participants should be enough for cross-fertilization of viewpoints, and eight is a manageable number of participants for most facilitators with at least some experience in moderating group interaction." Using the aforementioned quote as a guideline, the author decided to aim for six to eight members per focus group. Due to the time constraints and limited amount of available resources, the author decided to conduct two separate focus group interviews for this research. The author will go through the size and structure of the focus group used in this study in more detail in later chapters.

The role of the moderator is crucial to conducting a successful focus group interview. The moderator should be adequately prepared to ensure the smooth running of the session. This includes studying the research topic well enough to be able to probe for important details in participant's contributions, and to know the introduction and guideline questions so that he or she does not have to refer to notes throughout the duration of the interview. Morse [1994, 231], states that the moderator should be in

a calm mental state in order to properly process the group interactions during the focus group session. The role of the moderator is both rewarding and demanding, and the single most important characteristic of a good moderator is the ability to listen to the focus group participants. [Eriksson & Kovalainen 2008, 183.] The author took these aspects into consideration while preparing for the focus group sessions.

The location of the interview is another important element to keep in mind while preparing for the focus group sessions. The space where the interviews will be held should be comfortable and offer enough privacy so that there will be as few interruptions to the discussions as possible. [Morse 1994, 230.] Since the focus group interviews can usually last between one to three hours, it is important that the setting for the interview is comfortable, uncrowded, and that it allows for a spontaneous and uninterrupted conversation to occur – such as a room where chairs can be arranged in a round format. The room should preferably be small and intimate as opposed to a large room which, according to Eriksson and Kovalainen [2008, 183], can feel “sterile.” The venue of the session should be easily accessible to all participants and neutral enough as to not bring out either negative or positive associations e.g. with the research topic itself. After considering all of the aspects mentioned above and taking into account the budget constraints of the research, the author decided to hold the focus group interviews at JAMK University of Applied Sciences’ premises. The author was able – with the help of his instructor – to reserve the room from JAMK without any additional cost. The author also thinks that the focus group participants will feel comfortable on the university’s premises as they are familiar with the surroundings and the space provided by JAMK allows for a calm and uninterrupted discussion to take place.

When it comes to the logistics of conducting a focus group interview, the location of the session is not the only thing to be taken into consideration. The moderator should also remember to provide food and beverages to the participants, as they can help in facilitating pre-session conversation and thus creating a relaxed and comfortable atmosphere for all the parties involved. By discussing with each other over food and drinks before the actual focus group interview begins, the participants can “break the ice” and get to know each other a bit, which further allows for a natural and open discussion to take place later. [Morse 1994, 230.]

### 3.4.2 Implementation

The successful implementation of the focus group relies heavily on the skills and abilities of the moderator. According to Morse [1994, 231], one of the key responsibilities of the moderator is to establish trust between themselves and the participants in order to create an accepting atmosphere for the session. The focus group session should begin by the moderator introducing him or herself and explaining the purpose of the study, how the participants were selected and how the data from the interviews will be used. The introduction should also include a brief explanation of the ground rules for the discussion, the most important ones being: only one person should speak at a time, no derogatory remarks about other member's contributions are tolerated, all opinions and insights are valid and legitimate and that everyone should understand the purpose of the session and act accordingly. The moderator should also let the participants know that they are being recorded and explain for what purposes the recording will be used. Before the actual interview starts, the participants should have an opportunity for sociable small talk coupled with snacks and beverages. Such pre-session activities help to create a warm, friendly and comfortable environment for both the participants and the moderator(s). [Hair et al. 2006, 193; Morse 1994, 231.] After going through the ground rules and introductions, the moderator may start by asking a so called warm-up question with the intention of getting the interaction between the members going. Such warm-up question could include asking the participants to tell their names and a couple of things about themselves.

At the beginning of the actual focus group session, the moderator will introduce the first topic of discussion to the participants. The moderator will keep the discussion going by asking questions that are general, open-ended, simply stated and conversational in nature. It is also important for the facilitator of the discussion to emphasize to the group members that it is fine to agree or disagree with the other respondents and that there are no right or wrong kinds of contributions to the discussion. Additionally, the moderator makes sure that each participant has a chance to express their opinions and insights, though without pressurizing anyone to speak against their own will. The discussion usually moves from broad issues to more specific ones, and as the discussion develops, the moderator must carefully probe

the respondent's answers in order to gain as many details as possible. [Hair et al. 2006, 193; Eriksson & Kovalainen 2008, 184.] Probing refers to the search of further information and details that are based on the respondent's personal experiences. Things like inconsistencies between verbal and nonverbal communication and contradictory contributions can be grounds for probing. According to Morse [1994, 232], "Personal and specific details improve the credibility and general quality of the data." The moderator must aim to encourage the respondents to share their insights and to challenge the viewpoints of others, while also remaining impartial and not endorsing or agreeing with any of the comments. Both empathy and authority are required from the moderator, as he or she must be able to bring out the best of each participant without embarrassing anyone. [Eriksson & Kovalainen 2008, 184; Morse 1994, 232.]

As there are no clearly set rules or guidelines as to how long the focus group discussions should last, it is up to the judgement of the moderator to decide when he or she wants to shift the discussion from one topic to another. The duration of the session should include enough time for proper in-depth probing of ideas and opinions to take place, while also having time to discuss the central topics of the study in detail. After all of the relevant topics have been covered, the moderator should ask the respondents an ending question that can help the participants to express their final ideas and opinions regarding the subject. After the session has ended, the moderator should give a short debriefing of the session and thank the group members for their participation to the study. [Hair et al. 2006, 193]

Due to serious time constraints and difficulties with recruiting the focus group participants, the author ended up conducting two separate focus group discussions. The first focus group session conducted by the author consisted of six participants; four males and two females, aged 22 to 23 years old and representing four different nationalities: Finnish/Australian, Russian, and American. The second focus group session was originally planned to also include six participants, but unfortunately two participants cancelled the interview just a few moments before the focus group session was supposed to start, forcing the author to conduct the second focus group interview with only four participants. Out of the four participants in the second

session, two were male and two were female and they were aged from 21 to 31 years old. The second group consisted of three Finns and one Indian participant.

The author had roughly divided the focus group discussions into three sections: a quick warmup and two main topics of discussion, which were constructed around the two research questions. These three main sections helped to structure the sessions and made it easier to follow and guide the discussion into areas that were relevant to this study. It also helped the author in moving from one topic to another smoothly without breaking the 'flow' of discussion. Both of the focus group sessions began by the author going through the ground rules of the focus group discussion and explaining the purpose of the session to the participants. Following that, the author proceeded on to the main discussion which lasted 75 minutes in the first and 45 minutes in the second focus group session. The warmup phase consisted of general discussion about the participant's food habits. The idea behind the warmup phase was to make the situation comfortable for all participants and to get the respondents talking by starting off with a relaxed and relatively easy topic of discussion. From the warmup phase the discussion moved into the first main topic, which was centered around the attitudes and feelings towards insect food among the focus group participants. This was followed by the second topic, which focused on the best potential marketing and promotion approaches for insect food.

The discussion was rich and full of responses from all participants in both of the focus group sessions, and did not require much of moderation by the author. Most of the input from the author came in the form of probing. The author actively probed participant's responses by asking more detailed and descriptive questions with the goal of underlining the reasons and justifications behind the responses. The probing was successful and helped the author to gather more relevant and specific data than what would have been possible without probing. In addition to probing, the author used his three-part discussion structure to guide the discussion from one topic to another, but all in all the discussion flowed very freely making the atmosphere and environment relaxed and comfortable for all of the parties involved. The focus group sessions were ended in a similar way to the warmup phase, with a more informal discussion about the participant's feelings about the future of food and nutrition. The goal was to end the discussion just as it had started – with a relaxed and easy-going

discussion that leaves a comfortable impression for all participants. The author feels that he succeeded in this regard and that the discussions in both focus group sessions provided the author with relevant, interesting and usable data that answered both of the research questions well.

### **3.4.3 Analysis and Interpretation**

The success of any qualitative research is dependent on the appropriate analysis of the research data. Eriksson and Kovalainen [2008, 187], suggest that the researcher should familiarize herself with the empirical data collected from the focus group interviews as soon as possible after each session. There are many advantages to this approach: right after the discussion, the details are still fresh in the researcher's mind which allows the researcher to identify and emphasize strong points, recognize possible errors and make additions to his or her notes, if needed. Furthermore, soon after the session, the researcher can reflect on the general feeling of the focus group and uncover ideas for improving the discussions, which can later be applied to further focus group sessions. [Hair et al. 2006, 194.]

Eriksson and Kovalainen [2008, 187], argue that a good way to start analysing the focus group data is to read and listen to the group discussions several times and carefully explore what happened in each group during the session. The contents of the discussions should be arranged in a way that makes sense in relation to the research question(s). According to Hair et al. [2006, 194], content analysis is the most widely used formalized procedure to create meaningful findings from focus group discussions. The purpose of content analysis is to "inspect all empirical data for recurrent instances, such as words, themes or discourses." [Eriksson & Kovalainen 2008, 187.] This requires the researcher to carry out a systematic procedure of collecting individual responses and sorting them into larger theme categories or patterns. [Hair et al. 2006, 194.] There are several factors that should be taken into consideration when doing content analysis of focus group data, such as the context where certain words and phrases are used, the frequency and extensiveness of comments and the tone and intensity with which the comments are expressed. These six main factors are discussed in more detail below:

**The words**

The researcher must carefully examine the words used by the participants and the specific meanings of those words. The researcher will have to determine the degree of similarity between the variety of words and phrases used by the group members, and classify them accordingly.

**The context**

The context in which the group members express certain words and phrases must be thoroughly examined. In addition to the actual words used, the context includes the tone and intensity of those words as well as nonverbal communication (body language.)

**The frequency of comments**

In most focus group sessions, some topics will be discussed by more people and some comments will be made more often than others. The researcher must keep in mind that the extensiveness and frequency of comments are not directly related to their importance.

**The intensity of comments**

Transcripts of recorded discussions are not able to convey the feelings and passion with which group members talk about certain topics. However, this “intensity factor” can be uncovered by carefully examining the audio recordings of the focus group discussions. The researcher should pay considerable attention to the voice tone, talking speed and emphasis placed on certain words or phrases.

**The specificity of responses**

Comments that are associated with emotional first-hand experience tend to be more intense than responses that are vague and impersonal. The researcher should give more weight to comments that are based on the respondent’s own personal experience.

**The big picture**

The data from focus group discussions come in many different forms. The words and the context in which they are expressed in, the body language and the intensity of responses are all important aspects for the researcher to consider. That is why the researcher must construct an aggregate theme or message of what is being portrayed. By painting a bigger picture of the group members’ responses, the researcher can gain preliminary insights into how consumers feel about the specified product or service.

Source: Hair, J., Bush, R., Ortinau, D. 2006. Marketing Research: Within a Changing Environment. p. 195

Content analysis should always begin by finding viewpoints and statements that are either common or exceptional, and by further identifying specific groups, subgroups, themes and patterns that emerge from the data. The researcher should especially pay attention to issues or statements that were repeated and agreed upon by several participants, or conversely, to issues that many participants made disagreeing statements about. Other aspects that the researcher should pay special attention to include issues that were repeated in many groups, issues that were strongly and passionately either agreed or disagreed with by other group members, and situations where one member of the group brought up a certain argument and a number of participants demonstrated either agreement or disagreement with it. Finally, the researcher should theorize about connections between specific statements, themes and patterns of the discussion. [Eriksson & Kovalainen 2008, 186-188.]

Focus group data analysis faces the same concern of generalization as other qualitative data analysis. In the case of focus group research, generalizations are likely to be appropriate for people who are in settings that are similar to the ones in which the focus group sessions were held. The data collected from focus group interviews represents the reality of the experiences of the focus group members in a certain time and place, and is therefore not generalizable to larger populations. Any group of people has a dynamic and interpersonal chemistry that is unique to that group. A different set of people in a different kind of setting would likely provide a different set of data. Therefore, it is not appropriate to compare any specific data across groups, but rather examine broad themes across sessions. [Morse 1994, 233.]

Morse [1994, 234], suggests that the interview guideline questions can provide a common structure for the analysis and that they can be used as initial categories which the researcher can further examine throughout the process. The data analysis should be based on examining the direction and magnitude of these categories, as well as additional categories that emerge from the data, themes that transcend the categories, and the patterns between categories, themes and individual characteristics. Focus group data analysis should not include simple counts of certain statements or issues due to the nature of the data from focus group settings. Some specific themes and categories might not be mentioned at all in the discussion due to the lack of appropriate probing of questions. A contribution by a group member

often elicits contributions from other members of the group, but if those answers are not correctly probed by the moderator, a potentially relevant contribution might not be provided. Therefore, the researcher must not assume that a certain theme or category is absent just because no relevant responses were mentioned in a session. [Morse 1994, 234.]

The author decided to start the data analysis process immediately after the interviews had been held. The author felt that it was important to remember specific details about the participant's body language and other mannerisms that could not be recorded on tape, since those small details could provide important information about the participant's opinions and attitudes that could be easily forgotten if the analysis was not done as soon as possible after the interview had taken place. The author felt that in order to make the data analysis for this study as efficient and comfortable as possible, it would be important to sort the findings in a clear format that is easy to read and examine. After transcribing the interviews into text word by word, the author decided to use the interview guideline questions as a common structure for the research results. This decision proved to be useful since the data was easy to analyse when it was arranged in a way that moved logically from one topic to another. Once the data was sorted out, the author decided to focus on finding broad themes and common statements that came up in both focus group sessions. Finding common themes from the discussions was important in order to get an understanding of the general attitudes of the focus group participants – which was the goal of this study – instead of focusing solely on individual comments. Nevertheless, some attention was also given to these individual comments as they often elicited contributions from other members and sometimes shifted the conversation into unexpected directions.

When going through the interview data, the author paid close attention not only to the spoken words but also to the nonverbal communication and signs of agreement/disagreement shown by the participants. The participants often expressed their agreement or disagreement on specific topics by either muttering in a low voice, nodding their heads or expressing other kinds of nonverbal communication. Only some of these reactions could be heard on the audio recordings, and since the interviews were not recorded on video, the author had to

think back on the interviews and recall specific details in the participant's body language that could give proof about their possible agreement or disagreement on a certain subject. It was therefore a good decision to start the data analysis process right after the actual interviews, since the sessions were still fresh in the author's mind. These agreements and disagreements from other participants are also presented in the research results chapter of this thesis, as the author felt that this kind of information was important in order to get a comprehensive understanding of the group dynamics and the opinions and attitudes of the focus group participants.

#### **3.4.4 Advantages & Disadvantages**

The authors Hair et al. [2006, 196-197] have determined five major advantages of focus group interviews: they prompt new ideas, thoughts and feelings about a subject, they underline reasons for certain kind of behaviour, they support client participation, they can bring out a wide range of responses from the participants, and they can bring together groups of people who might otherwise be difficult to reach.

The spontaneous and unrestricted nature of focus group discussions can lead to the formation of new feelings, thoughts and ideas that might not be discovered in one-on-one interviews. Focus group discussions provide a high probability for creative insights to emerge. Participants are more inclined to feed off of each other's ideas and engage freely in spontaneous discussion in an interactive group interview setting with an effective moderator. The comments of one participant can often draw out ideas and insight from other members of the group.

With the help of a skilled moderator, focus group discussions can create a comfortable enough atmosphere for the participants to share the underlying reasons as to why they feel a certain way about particular discussion topics, allowing researchers to collect important and relevant data about the fundamental reasons people act the way they do in certain market situations.

Clients – or decision makers – can also participate in focus group research. They can have an interactive role in creating the research objectives and initial research questions. Focus group sessions allow for observations to be made by the clients,

which can further lead to impressions and results that guide the clients towards particular actions.

Focus group interviews can cover a wide range of topics and management issues and involve subjects from all kinds of social groups such as children, teenagers and seniors. Modern technology has even allowed clients located in different geographical regions to take part and observe in the same sessions without having to be physically close to each other.

Finally, focus groups have a unique ability to bring together subject groups – such as doctors, lawyers and salesmen – who might not otherwise be willing to participate in a study. The format of the focus group interviews allows these types of individuals to interact with their peers and share ideas and thoughts on common topics. [Hair et al. 2006, 196-197.]

Like any other exploratory research method, focus group interviews are not without their faults. The same weaknesses and disadvantages that are related to other qualitative methods affect focus group research as well. The findings gathered from focus group interviews tend to have low generalizability. The results more often than not do not represent the target population, which makes it nearly impossible for the researcher to generalize the findings to larger market segments. It is far too big of a risk for the decision makers of big companies to make the assumption that the feelings and opinions of a few focus group participants accurately reflect those of the whole potential customer base.

According to Hair et al. [2006, 198], the researcher has no way to evaluate the reliability of the data collected from focus group interviews. This is not only because of the small sample sizes in focus group research, but also because the unstructured nature of the data prohibits the researcher to analyse the results in standard statistical formats, such as percentage and mean values. Additionally, moderator interaction bias may affect the reliability of the data. If, for example, the moderator of the focus group is overly aggressive, the participants might feel inclined to say whatever they think will please the moderator. Conversely, if the moderator tries to be too supportive of the participant's contributions it might come off as inauthentic, which again can lead to reduced reliability of the data.

In addition to the factors mentioned above, the subjectivity of interpretations of focus group research data and the potentially high cost per participant are among the major disadvantages to focus group interviews. The qualitative data gathered from focus group discussions can be interpreted subjectively if the interpreter has preconceived ideas of what might emerge from the data. Such interpretations could completely ignore any opposing data. According to Hair et al. [2006, 198], the average costs of the identifying, recruiting and compensating of the focus group participants along with the moderator and facilities fees range from \$5000 to \$8000 per session. Luckily in the case of this research, the costs of the focus group interviews were minimal due to the fact that the author was able to reserve the room for the interviews for free from JAMK University of Applied Sciences, and because the focus group members volunteered to participate free of charge. [Hair et al. 2006, 197-198.]

## 4 Research Results

### 4.1 What Are the Attitudes Towards Insect Food in the Focus Groups, and What Are Those Attitudes Based On?

The attitudes towards insect food in both of the focus groups were mainly positive and open. Virtually all participants were open to the idea of at least tasting insects and maybe even to incorporate them as a part of their diets. Some participants had already tried edible insects and their positive experiences further influenced their openness to the idea of using insects in their diets. Many respondents liked the idea of replacing for example unhealthy snacks such as chips with edible insects. However, not all of the focus group members were enthusiastic about the idea of eating insects, at least in their original form. Main concerns were related to the physical appearance of the insects, which was described by some participants as “disgusting” and “gross.”

Although open to the idea of using insects as a part of their diet, the participants did not seem willing to consider replacing meat – which was described by one participant as a “vital” part of their diet – with insects altogether. Some respondents said that instead of replacing meat with insects they would rather use insects from time to time as a way to make their meals more “fancy” and to get some variety in their diets. Another participant mentioned that the good taste and convenience of meat are such important factors to them that they would not be willing to consider replacing meats with insect food.

***Moderator: “Now I would like to ask what are your personal feelings when you hear the words “insect food”, what are the first thoughts that come to mind? How do you feel about insects as food?”***

*Participant 1 (Male): “Well since I’ve tried them personally, and I liked the taste, I would say that yeah I would consider taking it to my diet. Maybe not daily but as something... for example like I’m buying avocado once a week, I would do the same with insects if they were available in the shops. I would definitely for example add some insects to my food from time to time. I can not really consider myself as a person who eats them from day to day, and like*

*constructing his diets out of it, but from my point of view it's a nice practice to taste them from time to time, because what I tried personally tasted really nice. I would consider buying it instead of chips for example, they are much more healthy. When I'm going to the cinema I would rather eat some crickets than chips. I would get protein, like, grow my muscles while I'm watching a movie. Yeah, that is a good option for me."*

**Moderator: "You said that you could not see yourself as using them all the time, like, regularly. Why is that?"**

*P1(M): "Uhm, it's a... it's a bit hard to explain. I don't know personally why it's that, I just don't consider switching from meat to insects, but, for example as I said with avocado, I like them but I don't buy them daily because it's some additional stuff that you don't make the whole meal out of it usually. But to taste it to add it as an ingredient from time to time, that would make it work. So it's not something consistently present in my food but just to make it a bit more fancy so to say."*

*P2(M): "I would be kind of like [Participant 1], I would use it as a means to incorporate something new to my diet, but I would not, like, really be happy if I had to use it as something to replace something vital in my diet, like meat. I would not replace meat with insect food at all. "*

**Moderator: "And can you maybe go a bit deeper, why wouldn't you want to replace meat with insects?"**

*P2(M): "The same reason I have not been vegetarian successfully. Because convenience of meat and, uhm... it's just... good. It tastes really good. And, uhm, I sometimes have a craving for meat. People have cravings for doughnuts, sweets... I'm losing the taste for sweets, but I'm gaining more of a taste for meat. And it's like a legitimate craving in me that I have."*

There were a few focus group members who described insects as being "disgusting" and who had fairly strong reservations about consuming insects as food. However, only one participant out of all of the 10 respondents said outright that they would not eat insects under any circumstances.

**Moderator: "How do you feel about insect food? What do you think about it personally?"**

*P7(F): "That it's disgusting. They're gross."*

*P10(M): "Even though they might be healthy I can not think of myself trying them or eating them as a protein source, because I think they look pretty disgusting... it's the looks that matter to me the most when I'm eating, so, even if it tastes good or is healthy for me I cannot see myself eating them."*

**Moderator: "What if they would be in some other form where you could not see them, if it was like hidden in the food?"**

*P10(M): "If I'm aware that there's insects there, I wouldn't be able to eat it."*

Another big factor affecting the participant's feelings towards insects in both focus groups was the physical form in which the insects would be presented. Group members described the thought of eating whole insects as "repulsive" and "gross." Some members said that they felt too connected to the animal if they are presented in their natural form as a whole, and that it would make it more difficult to consume them as food. They sympathize with an animal – in this case insect – more if they can see it as a whole. Some respondents said that if the insects were well "disguised" so that they could not see them, they would be much more willing to incorporate them into their diets.

*P7(F): "I would eat powdered cockroaches. If they were cheap and if there was lots of protein in it, then yea. But I don't wanna see it, I don't wanna think about it."*

*P8(F): "Yeah I mean for me if you get the protein out of it, from the insect, and you mix it with vegetables for example, I think I could eat it without a problem if I liked the taste. So I wouldn't have problem with that [the powder], but a full cockroach like that I dont think I would really..."*

*P3(M): "In my point of view it's like if you have insects, they are so small, you see the complete animal that you are trying to eat. If you see a complete chicken in a store, like, western people would freak out like 'what the hell, it's not sliced and ready to cook', and I think that's one really big thing that makes it like a bit disgusting, and like thinking of the tiny legs in your mouth..."*

*\*Other participants audibly agreeing and nodding their heads\**

*"I think that's like the main point... but like I was watching a TV show about cooking in India, and then they crushed the ants and made it like ant beef. I would eat it, it was looking really good. But it's the shape, like how you prepare it. I think if you say eating insects, people think that you are just grabbing it from the ground and putting it in your mouth."*

*\*Participants agreeing strongly\**

*"I think that's like one big... because it's so small and it's not like nice and clean steak."*

*P2(M): "...if it's well disguised it would be a great idea because the thought of it, of me eating a whole insect, it repulses me. It's gross. But if it was well disguised then I could easily incorporate them to my diet."*

*P4(F): "I think for me it's exactly what [Participant 3] said about it being the whole animal and when I look at it I think it's an animal, and I can't eat an animal. But then I forget that I eat chicken and all this, and it's kind of crazy, but then if it's just like a whole animal I can not eat it."*

**Moderator: "And why is it that the idea of eating a whole insect is so difficult?"**

*P4(F): "I think it's because it's a living thing. You know, when I found out what reindeer meat is made from, I cried for like a week or something when I was 5 so... I think it would be same with this one. "*

*P4(F): "...I sympathize with the animals, yeah. If I think that, like, it has a soul and it was living a life and had a boyfriend or something, and then I ate it like, that would be bad. "*

The contribution by Participant 3 garnered widespread agreement in the group, as was evidenced by the audible and physical shows of agreement such as participants nodding their heads and murmuring in an agreeing way. This was further supported by the contributions by Participants 2 and 4, who referred to Participant 3's earlier response when expressing their personal views on the matter.

Following this discussion, the author wanted to probe the participant's responses further and identify the underlying reasons as to why the group members felt the way they did about insects. Many different viewpoints were provided by the participants. Many members agreed that the media has a big part to play in forming people's views and attitudes towards insects.

*P4(F): "I think that western media gives it the gross factor. They say it's so strange that somewhere people eat it."*

*\*Strong agreement from other participants\**

There were also other reasons identified that affect people's views on insects. According to some of the focus group participants, associating insects with bad smells and flavours based on their own personal experiences and fears contributed in making insects feel "gross."

*P3(M): "the gross one comes from like when I was a kid watching some 'Fear Factory' or like on asphalt, after a heavy rain on summer time, all of these tiny worms come up ... there's tons of them ... yeah, well 'You will get 10 bucks if you eat it.' Would you do it? Yeah, I did it. It wasn't good. It was raw and slimy..."*

*P2M: "I have a fear for spiders. So like, I don't care how you prepare it, there's a psychological problem there for me. I have arachnophobia so I wouldn't touch it with a ten-foot pole."*

**Moderator: "What about you [Participant 5]? Your first thoughts when you think about insect food?"**

*P5(M): "Uhm, along the same lines with [Participant 3.] And I think the smell of worms after rain is just absolutely awful. Which affects. I would be willing to try something new but thinking about a cockroach this size [shows size with fingers], maybe I wouldn't take it off the floor and put it in my mouth. Yeah, if it's prepared in a way and flavored, then yeah."*

Another point that amassed significant agreement from the other participants was Participant 2's response about the cleanliness of insects. The comment sparked further contribution from Participant 6, who also mentioned that her attitudes

towards insects are affected by the association between insects and unhygienic environments.

*P2(M): "And what about cleanliness? The thought of it being something that is unclean, something that's been on the ground walking around and touching all this nasty stuff."*

**Moderator: "So is that like a concern for you when you think about insects?"**

*P2(M): "Yeah like, do they steam sterilize it or something? How can they convince me that is a clean insect that was ground up into something? Or was it, like, walking around poo poo and they just collected it and packaged it and say 'It's good for you.'"*

**Moderator: "So for you it would be important to know that it's clean – that it is processed in a way that makes it clean and safe for you?"**

*P2(M): "Yeah, I'd like to know the process."*

*\*Strong audible agreement from others\**

*"In the meat factory I know they have some horrible practices and it's not entirely all that sanitary, but at least it's an established practice that we know about."*

**Moderator: "Anyone else have some similar concerns?"**

*P6(F): "Well, as I already said, my perception of insects is that they are something exotic, and I was always curious for trying something new and I also wanted to try it. So when I had those opportunities, I, uhm... yeah, I tried them, I tried all of them. But first thing when I saw this worm on the plate, I still thought that 'wow, gross, I cannot do it.'"*

*\*Participant 4 (F) agreeing strongly\**

*"I tried and what I realized, they're not that bad at all. It is... well, first thing: it was really interesting for me to try something new. Second thing, it was not bad. It remind me of something I don't even know how to explain... chips, or something. So, yeah. But still, I had some doubts."*

**Moderator: “Can you maybe go a bit deeper into what are those doubts based on?”**

*P6(F): “I hate worms. I just hate how they look like, even right now actually. When I was a child for me it was ok, but now I just... I don’t know why, after rain, when there’s lots of them on the streets, I just go and like, I hate them. They look awful, that’s it. They’re gross. When I eat something, I expect that I will enjoy fully this thing, but when I see this worm and I have like thoughts that it is gross, it was on the ground, it is just something disgusting, I will think twice. But because of curiosity and because I wanted to try something new, I tried it. And if I had a chance I would definitely try it again.”*

The participants proceeded to further discuss the underlying reasons as to why they felt that insects were “gross”, and one viewpoint that was widely agreed upon by the group identified cultural background and upbringing as a key element contributing to this particular feeling towards insects. The participants discussed how during their formative childhood years their views on insects were shaped by the negative and cautionary opinions expressed by their parents and other authority figures. These negatively charged opinions from their elders were, according to the focus group participants, a critical component in forming this association between insects and uncleanliness.

*P4(F): “Well I think I would like to say that I think the whole idea of it being gross comes from us being kids and like our parents telling us that, like, that these ants and everything are like not good for anything, you should just leave them be. You don’t need them in your life and everything like this, so you never consider them as food or even relevant in your life.”*

*\*Other group members agreeing\**

**Moderator: “Do you guys have similar...”**

*P3(M): “...like touching them or doing something with those as a kid was like ‘No no don’t do it’ and if you touch have you gloves and throw the glove away and because you are gonna get filthy, they are dirty and they like to go in the trash bags and the trash bags are nasty, so it makes like the idea of also insects going like with the dirt and...”*

*P4(F): "Yeah, we're like told to stay away from them "*

*P3(M): "Yeah, I think it's more like parental guideline. 'Don't put the spider in your mouth.'"*

***Moderator: "So you guys feel that it's the western cultural background that affects our perception?"***

*\*Everybody in the group agreeing\**

Also, the previously mentioned concern regarding the uncleanliness of insects was identified as one reason why some participants felt that insects were "gross" and "disgusting."

*P7(F): "I don't know... I think I've always been scared of bugs. They're just so dirty and they live on the ground and there's just so many of them, and it's just just... I don't know. It's like a phobia. There's just so many of them. "*

*P8(F): "...if I were to know that it is clean, because when it comes to insects, they usually have some kind of a venom in them, like, because they have to kill other insects, so I would be kinda worried about those things and if they're clean. Like not even because they're on the ground or anything like that but because of their defence mechanisms and their way of protecting themselves."*

Finally, the author asked if people had ever considered using edible insects in their diets prior to the focus group interview. The responses were mixed. Some participants had thought about it as a way to incorporate something new and exciting to their diet and as a way to make their culinary habits more interesting, some had thought about eating insects but only in a region where it is already popular as a way to assimilate themselves with a new culture. One participant had not thought about consuming edible insects, but admitted that if she was presented with evidence that proved edible insects' environmental and health benefits, then she could consider it.

***Moderator: "Before coming to this interview, had you ever actually considered to adopt insects as a part of your diet?"***

*P4(F): "No."*

*P1(M): "It wasn't a serious consideration, but if I had a chance I would probably do it. It's just to put something fresh into your life. Mostly not even about protein, just to kinda spark things up, something new, something fresh, a new kick."*

*P2(M): "I've imagined it. But never really took it seriously."*

*P4(F): "I mean if somebody like showed me the results of how much it saves the environment and all that and how healthy it is for you then I would consider it. But until then, no."*

*P6(F): "I thought if I would go to a country where it is like a cultural thing, I would probably-- no, I would definitely try it. Just because it is interesting."*

## **4.2 According to the Focus Group Participants, Which Factors Would Lead to Increased Interest Towards Insect Food in a Retail Setting?**

The focus group participants had plenty of ideas and opinions on how to maximize consumer interest towards edible insects and how to get as many people as possible to try them. One response suggested to promote edible insects with the help of recognized celebrity in order to make consumers more comfortable with the idea and help them associate with the idea of using insects as a part of their diet more easily. Another idea, which garnered plenty of agreement from the other group members, suggested that edible insects should be first introduced to customers as kind of novelty food items, such as chips or other snack, instead of "proper" food products. The reasoning was that more people might be encouraged to try insects as food if they were first offered as something that is easy and quick to consume while for example watching a movie, instead of something that requires time, skill and thought to prepare. Participant 4 also added that they felt that there are plenty of people who are not too interested in the health aspects of edible insects, and would therefore be more easily swayed into trying them in the form of snacks as opposed to something that is promoted solely as being healthy.

**Moderator: “In your view, what would be the best way to present insects in a retail setting so that consumers would be more willing to try them?”**

*P2(M): “I would suggest getting a rock star or someone famous, a celebrity, to kind of spearhead your efforts into that market education process that you have to go through. And I would have the celebrity hold up daily [inaudible] that you can incorporate insects in, so that it’s a lot easier for people to try and get associated with.”*

*P4(F): “I like what [Participant 1] said about taking it like, a kind of like a bag of chips but instead something like crushed ants or something, and take it with you to the cinema. Like that would be something I would do. And then I also think that it should start from like this kind of like, not normal foods but you know, chips or like insect candies or something like that, and then, it should become more healthier and give more healthier options also. because if you start marketing it like as just a healthy addition to your diet, people will just be like “nah, whatever” because not everybody likes the healthy stuff so you should make it more appealing like here’s a choice for you chips.”*

Additionally, Participant 7 mentioned that it could be a good idea to offer edible insects for example in bars as a snack to go with a drink. The justification was that this kind of abnormal and exotic food could appeal to consumers more when it is presented in a relaxed, fun and comfortable setting – such as a bar – where people can share this kind of exotic experience with their friends. This response was met with agreement especially from Participant 8.

*P7(F): “But you know what? I think it would be funny if like I was in a restaurant, and then there was an option, like you were drunk or something in a bar, and then there was an option that you could order a plate full of bugs, I would just get it as a gag with my friends...”*

*\*Strong agreement from Participant 8\**

*P8(F): “Yeah I could see that happening to you.”*

*P7(F): “...and then you would be like ‘eww, gross’, but, if it tasted good...”*

**Moderator: “And what would be appealing in that? Is it the novelty, like it’s something exotic...?”**

*P1(F): "It's exotic, yeah."*

*P2(F): "I think so too."*

Another interesting viewpoint suggested that it would be a good idea to offer insects to consumers so that the insects will not appear in their true form, but instead are processed in a way that "hides" them inside more familiar and recognizable food products, such as spice mixtures. According to the respondent, this kind of approach would make it easier for the consumers to get accustomed to the idea of using insects in their diets. The argument was that adopting insects to western diets is a big and scary step for a large part of the population, and instead of immediately moving a big step forward and promoting insects as they are, it would be wise to introduce edible insects slowly by first offering them in forms where the actual insects are hidden and processed in a way that they cannot be recognized. This way, the collective societal attitudes towards insects could slowly be changed to something more positive, after which the next step could be taken in which insects could be introduced to consumers in other, more open ways. This response was widely agreed upon in the group and garnered plenty of additional discussion from other participants, showcased below:

*P1(M): "Maybe one more option that applies to the supermarkets for example, would be, uh, the insects in a form of spices so to say, so they sell spices just a crushed powder, and it just says like "contains insects", so they don't really see it. For example like taco spice but it's with some cockroaches for example so people don't really see those cockroaches, but, uhm... they just have an idea and understand that it's there, but it tastes good, and then next step is to present, like, the when the mentality of the population is ready to so to say to thinking a bit forward, then the next step would be to introduce like the insects as they are. But first I think that for most of the population it would be more comfortable to try it in their daily foods so they see and understand that it's nothing special it's just a normal nutrition."*

***Moderator: "Why do you think it would be better to introduce them first as a part of something else instead of..."***

*P1(M): "It might be because of that Concept Cafe\* that we did here and most of the people were ready to try chocolates first, and only then when they take the chocolate a bite they understand that: 'Yeah, it tastes like normal chocolate, and maybe I am willing to try like go further to the next step.' for example. It's, uh, the same with everything. If you compare it when you go like you don't start swimming in the lake during the winter so if you want to do that you start slowly with like cold shower so every process is divided like step by step. You need to be prepared first and that's, uhm, it's not because of that that you will die if you would eat insects, it's just mentally more easy to... to do it this way I think. And that's also my opinion is based on the, so to say research\* that we had and I just saw the reaction of people and that's why."*

\*=Here Participant 1 refers to a group project conducted at JAMK University of Applied Sciences, where the group members offered edible insects to students and staff of the JAMK Main Campus and studied their responses.

Participant 1 also referred to his personal experiences from a group project which studied people's responses to tasting edible insects. According to those particular observations, people were generally more open to the idea of eating insects after they had first tried them in some other food product where the insects were just one of the ingredients, such as chocolate that had ants in them.

In further discussion Participant 1 added that he felt that insects should not be introduced to consumers as something to completely replace meat with, but instead as just something new and exciting that could improve people's diets by adding essential nutrition such as proteins and vitamins to them. This response was met with strong agreement from all other group members. The focus group participants unanimously felt that it would be too big of a step to try to get people to completely remove meat from their diets and replace it with insects, and that people in general are not ready to make such big changes in their dietary habits.

*P1(M): "I think that the campaign shouldn't be so precise in moving from meat to insects, but it's more like adding insects to a diet. It's not really about changing your habits completely it's just about something..."*

*P6(F): "...new options"*

*P1(M): "...new options, yeah, like..."*

*P3(M): "Minced meat with crunchy ants, why not?"*

*P2(M): "I'm not good with people telling me what to do."*

**Moderator: "Why do you think that it would be a better approach to suggest them as a new thing mixed with the others rather than replacing meat?"**

*P1(M): "Well I guess because generally people are afraid to change their habits and when we're talking about food it is really.... people are really emotional and passionate about food and, uhm, changing their food habits to something that they consider gross is a difficult task, so it's much more convenient to try to persuade them to just to try it out not to replacing it but like add it."*

\*Very strong agreement from all other group members\*

Participant 3 continued by saying that consumers in general would probably be more accepting of insects if they first had the opportunity to try them as a part of some familiar and recognizable food products, such as hamburgers. The argument was that it would be easier to get people to try familiar products with new ingredients, instead of trying completely new food products that are not familiar to the consumer at all, supporting Participant 1's earlier response. This contribution was strongly agreed upon by the other focus group members, suggesting that the idea of introducing insects first as a part of familiar and recognizable foods was popular among all the participants.

*P3(M): "I would continue that same type of idea, but it's just to hide the insects, like make some food like steak or whatever, that looks like a normal food that you used to eat it doesn't look different, but the taste might be different, like, it's kind of hard to explain. Like if you go to McDonald's ... like if one steak would be made of ants, I think that would be kinda easier to accept, because it's like more familiar than just going straight up like this is made of ants, this is made of cockroach but to like hide it into something that is familiar for the consumer."*

\*All other group members agreeing strongly\*

*P3(M): "Yeah, but it would work, I would say it would as a campaign, like people would be ready to taste like here, most of the people are okay, but then the main question is are they gonna buy it again. And that's why going slowly is better to getting introduced because if the first bite is horrible, then they are gonna go away. But if you know that it is certain that people will like it, why not? Because after they know how it tastes, the outlook or how you can use it, that's like afterwards you can think."*

In the quote above Participant 3 continued his response by suggesting that the first experience with edible insects is particularly important in maximizing consumer interest towards insect food, because if the first tasting experience is negative, the customer is unlikely to buy insects in the future. Therefore, according to Participant 3 and other group members, it would be a good idea to have the first tasting experience be similar to more traditional and familiar foods in terms of both taste and appearance, so that the experience would be as positive as possible.

Participant 3 continued by expressing his views on what would be the best strategy to enter the market. The participant suggested that promoting insects on television would be efficient because of the large exposure among the population and the idea that people would be generally more open to adopting insects as a part of their diet if they would see a respected and credible media figure promoting edible insects. This would make insect food appear more acceptable and "normal" in the eyes of the public, according to the focus group participants.

*P3(M): "How to enter, that's like, go slowly first and then make like that huge statement if it's possible. But like personally, like in entering, I would like to start slow motion from TV. Most of the people use it and, like, if it would be possible to add it in like some Finnish cooking shows, like where they would add it if they have some type of a theme, like if they are using like Asian cuisine or Indian cuisine, and then use it as an ingredient. And then I think it would be more like 'oh well he's using' so 'actually, can i try it?', and even it would be not like marketing, but seeing someone else using it it would not be so, like make it look normal, that's the main idea."*

*P1(M): "It would be also really nice I think if this person who is offering it would be some... not a celebrity but some trusted..."*

**Moderator: "...have credibility?"**

*P1(M): "Yes."*

Following the discussion above the author asked the participants if they would prefer insects being sold in their own section or perhaps in an existing section with other products such as meats or organic foods. The question sparked an interesting discussion that proceeded from the participants sharing their views on which section would be the best to present insects in, to further considering different kinds of promotion strategies for edible insects, such as free samples offered with other food products. Participant 1 argues that handing out free samples of insects – for example in the form of spice mixtures – would be a good way to introduce consumers to the idea of using insects in their food. In Participant 1's view, handing out free samples of edible insects would make customers more willing to try them as they would not have to initially pay for them.

Four participants from the first group felt that it would be best to keep edible insects in the meat section, whereas the two other participants suggested that the section that offers so called super foods would be the best choice.

**Moderator: "Would you rather see insects in their own section in a supermarket or maybe offered with some fitness food or some vegetables or some you know, organic green stuff or how do you think would be the best way to present them."**

*P3(M): "Meat section."*

*\*Three other participants agreeing\**

*P2(M): "Super food with the healthy food items and stuff."*

*\*Participant 4 agreeing\**

*P4(F): "But then again if its with like the meat section it's much more approachable."*

*P1(M): "I would also say that it would be if you're entering like a supermarket chain for example, not to consider like profit and losses, but it might be a good idea to just add a sample to some normal foods so for example you're buying not a pasta but ... I hope you will get my point. So you are buying pasta it's just a small sample stamped, you know, on the pack, so the person buys whatever he buys and anyways he's getting this small bag with the insects, so it's up to him whether to try it or not but don't have to pay for it first. So it's just a sample and it's for his first tasting."*

**Moderator: "So to offer insects as part of something else for the first try?"**

*P1(M): "Yeah, for example, you have these premade spices for tortillas, tacos and stuff, and for example just to for this premade spice just to add a small bag with it and say that try to add this on it consists of insects, but yeah we promise you it will taste good so you don't have to pay for it actually, and it's just your choice whether you try it or throw it away."*

**Moderator: "So then the barrier to trying it would be lower..?"**

*P1(M): "Yeah, if it goes with like normal foods so people think 'Yeah, if the producer of this food agrees to merchandise this stuff, then I probably won't die if I try it.'"*

The free samples of insect food products were also mentioned in the second focus group session. Participant 7 felt that the offering of free samples could help create buzz around edible insects and make it easier for consumers who have strong reservations about insect food to try it.

*P7(F): "I think it would be great if you could taste the stuff, like if there was a chef frying up some stuff and be like 'hey, you wanna taste this stuff?', yeah, that would be good."*

**Moderator: "And why do you think that would be a good idea?"**

*P7(F): "Because I think that many people have this aversion towards insects and then if they could just taste it and see that it tastes fine, it's ok, then they might... buy it? And I think it would create some buzz, like, people would go home to their friends and be like 'hey, guess what happened today at Prisma' or something or they would write about it on Facebook or social media... yeah, I think that would happen."*

*P9(M): "Yeah usually in grocery stores I try those free samples of new things like new bread or new yoghurt or whatever. If they taste good, I might buy them."*

*P8(F): "Yeah it's an easy way to do that."*

Participant 2 argued that the super food section would be the best bet for edible insects because super foods are a growing trend at the moment and insect food would fit the category well. The participant also mentioned the inclusion of banners and other informative materials to help promote insect food to consumers. This response worked as a segue to the final main question that the author had for the participants.

The author asked what kind of information should be presented about edible insects in order to increase consumer interest towards them as much as possible. Answers ranged from health and environmental benefits to general information, nutritional values and taste.

*P2(M): "I would keep it in the super food section, because I think super food is a growing hype trend going on, and I would include a lot of, like, banners and stuff, advertising it, because banners and stuff it's pretty and people will pay attention more because otherwise they will just walk right past."*

***Moderator: "What kind of information do you think should be presented about the insect food that would increase the interest of consumers?"***

*P4(F): "The health benefits. Just to like point out why its better than other protein sources."*

*P1(M): "To mention the environmental effects like the greenhouse effect and all of the things that affects it."*

*P8(F): "I think that depends on the country. Like if you're in Finland and you write 'protein' on it, you sell it. For sure. And if you put 'super food', even more."*

*P6(F): "... general information, for example those banners in the supermarket where there will be stand something 'Did you know that?'"*

*\*Other participants agreeing\**

*"...and there is some basic information, like basics because most of the people just don't know that they can eat those insects, that they consist of protein and that they can be healthy and the environmental things, and like just the awareness of people should be.."*

*P2(M): "Compare and contrast the nutritional value protein wise with insects versus traditional meat."*

Participant 10 suggested that insect food should be promoted in so called "eco shops" which concentrate on selling ecological and organic food products and which perhaps attract more environmentally conscious customers. This suggestion was met with both agreement and disagreement from other participants. Participant 8 agreed that it would be a good idea to promote the environmental benefits of edible insects especially in eco shops, whereas Participant 7 suggested that insect food should rather be sold in big supermarket and grocery stores in order to attract the attention of a wider consumer base. In addition, according to Participant 7, offering edible insects in big grocery stores and supermarkets would make them appear more "normal", as people would see them being sold in conventional grocery stores among more traditional food products instead of eco shops which often specialize in selling more exotic novelty food items.

*P10(M): "Maybe if they were marketed as the ecological choice. If I see them maybe in the eco shop there in a pack, some kind of worms... If they were there in a pack and it said, it had a logo of a like, ecological, whatever. Maybe there are some people who are into that kind of stuff and they buy it."*

**Moderator: "Ok, so to promote the environmental benefits?"**

*P10(M): "Yeah, cause there are different ways that you can look at it, like protein choice, or cultural thing or the ecological choice."*

*\*other participants agreeing\**

*P8(F): "Yeah, I totally agree with that, especially if you take it to a shop like that, where you have these ecological options and everything like that in that environment that could definitely work."*

*P7(F): "I don't know why, but I wouldn't put them in eco shops. I would put them in these big grocery stores and supermarkets like Prisma and Citymarket, because then that would make it seem like a more common thing, I don't think I would like... because it's already exotic as it is, it doesn't have to be made even more weird and obscure and more exotic. It would be nice, like, tone down a little bit, because if I could see that in Prisma then I would think 'oh, is this a normal thing now? like everybody buys this? ok, i'll have one.' it's like 'it's not that weird.' It is weird, but, not that weird."*

The mention of taste by Participant 3 sparked enthusiastic agreement and discussion from the other participants as well, which will be presented and analyzed in the following paragraphs.

***Moderator: "Anything to add there?"***

*P3(M): "I would have to say that we have to add the taste. You should have something like cooking instructions depending on what type..."*

*\*All other group members strongly agreeing\**

*"... but that just like have to be there. Because people do not know what to do with them. It can't be just like 'Hey, buy ants', what the hell would I do with these?"*

*P2(M): "That's an excellent point. Like cause even in meat packaging, they have ingredient suggestions ..."*

*P3(M): " ... like how to eat it and..."*

*P2(M): "Yeah, its more important to know what you're going to do with it rather than the information, the pool of information that you'll pour up on them, like that "hey the environment's dying we're all gonna die" blah blah blah but "What do I do with it?!" That's the key point, it's a very good point"*

*P3(M): "Yeah I mean even better for that if you go like in a big supermarket sometimes if theres like a new cheese brand or whatever, they give out samples it would give them as if you buy something. But I think like giving out this information it would be more easier if there would be like a campaign in person who has experienced like this thing, and then you could have possibility to taste it when it's like really well cooked and I think that would lower the bar because people love free stuff, that's just simple..."*

Similar responses were expressed in the second focus group as well, where Participant 8 suggested that in the early promotion of insect food the edible insect products should come with cooking instructions, making it easier for people to get familiar with cooking insects and thus lowering the barrier to trying them.

*P2(F): "I'm still stuck on thinking how to cook them. How to make them. So I think that there should be something to advise people because like I said I love octopus, and I see it in the grocery store in Spain all the time, but never bought it because I have no idea how to make it. So I think that should be part of the marketing strategy, to kind of teach people how to make food out of them. I could see myself buying insects if I knew how to cook them, and I wouldn't really care about the form of it."*

**Moderator: "So you think it would be important to educate people on how to cook the insects to make them more approachable?"**

*\*All group members agreeing\**

All the participants felt that it would be important to include some kinds of cooking instructions, recipes and general information about how to use edible insects as food with the insect food products. The group members argued that it is not enough to just hand out general information about the benefits of insects if the consumers do not know how to use them in their cooking. Insects are such a new and exotic element in Western diets that only a small fraction of the populace has any knowledge regarding the cooking of insects. Therefore, it would be important to provide consumers with information regarding the cooking process of insects, so that it would be easier for people to try them in their own diets.

Participant 3 also mentioned the free samples that were discussed by Participant 1 and Participant 7 earlier in the discussion. In his view, a good way to promote edible insects and get as many new people as possible to try them, would be to have an experienced cook prepare insects in advance and hand out free samples to consumers. This way consumers could get the chance to try how good edible insects can actually taste when they are prepared well, and it would lower the barrier for tasting them because the samples are free and customers would not have to pay for them.

After this response the author asked the other group members if they felt that this was a good idea and an important part of promoting edible insects, and the response from each group member was a resounding "yes."

## 5 Conclusions

The purpose of this study was to research the attitudes and feelings that the focus group participants have towards insect food, and to find out what would be the best ways – according to the focus groups – to present and promote edible insects so that consumer interest towards them would increase. The goal was to gather the relevant information by answering to the two research questions using the data collected from the focus group interviews.

The general attitudes towards insect food were positive in the focus groups. Out of the 10 people interviewed in the two focus group sessions, only one participant expressed utter reluctance to eating insects in any way, shape or form. The rest of the participants were open to at least trying them and in some cases even incorporating them as a part of their diets. However, none of the respondents felt that they were ready or willing to use insects to replace other protein sources – such as meat or fish – from their diets, but would rather consume them irregularly as a way to diversify their eating habits. The taste and convenience of meat were seen as important factors influencing the respondent's food choices, and the participants did not feel that insect food could provide a substitute to those factors. The consensus in the groups was that the first insect food products could work best as snacks or other novelty food products instead of being the main component of a meal. The respondents felt that because of the exotic and unknown nature of insect food, edible insects would be easier to introduce to consumers as ready-made products that can be eaten straight away without being prepared and cooked first. Insect food was mostly seen as an interesting and efficient way to introduce additional proteins, fibers and vitamins to one's diet, not as a replacement to more common sources of nutrition.

Therefore, the author feels that the early marketing of insect food products should not focus on promoting insect food as a new primary protein source or as a replacement to conventional livestock products, but rather as a way to incorporate something new, exciting, and environmentally beneficial to consumers' diets. The first wave of insect food products should perhaps concentrate on quickly and easily digestible products that do not require complex preparation or cooking techniques but can instead be consumed straight away. Examples include protein bars, cookies, candy and other snacks such as chips that include insects. Another important thing to consider is the physical form in which the edible insects are presented.

The main concern regarding insect food in the focus groups was the appearance of the insects, which was described by many respondents as "disgusting" and "gross." The most unattractive elements identified by the focus group participants were the limbs and antennae of the insects, as well as their three-part body structure. Several participants expressed their strong aversion specifically to the idea of feeling the legs of the insects in their throat. These responses were always strongly agreed upon by other group members, suggesting that this was a very common concern in the focus groups. The thought of eating whole insects was "repulsive" to many participants, and some respondent's felt more connected to the animal when they could see it in its natural form, which made the idea of consuming whole insects even more difficult. A common response by many participants was that they would be much more willing to eat insects if they were somehow hidden in the food so that their original form could not be seen. Judging by the responses from the focus group participants, it would seem that in order to attract as many new customers as possible, the insect food products should not only be easy and quick to consume, but also be presented in such a way where the original form of the insects – especially the legs, antennae and exoskeleton – is not visible. A good example would be to offer insects in powder form as part of some other foods, such as protein bars and pastry products. Many participants also thought that insect food could be more approachable to consumers if it was presented in forms that resemble existing and familiar food products, such as hamburgers. A hamburger patty made from ground insects, for example, was mentioned by a few participants as something they could see being popular among consumers. "Hiding" the insects and preparing them so

that they resemble familiar foods could attract more people and make it easier for consumers to have their first taste of insects, as they would have the chance to try food that looks something that they are familiar with, as opposed to something that is completely new and exotic. Presenting insects in the form of familiar food products could lower the barrier to trying them for many consumers.

The feelings of disgust were commonly associated with insects in the focus groups. As mentioned before, the physical appearance of the insects was a major contributing factor, but another common concern in the focus groups that also contributed to the feeling of disgust was the cleanliness – or rather, the *uncleanliness* – of the insects. The thought of insects living on the ground in potentially unclean environments, touching things that are possibly harmful to humans, was a major factor enforcing this perception of insects being unclean. One participant also mentioned being concerned that the insects could have venom in them. Several participants were concerned about the cleanliness of insects and said that a guarantee of the safety and hygiene of the insects was a prerequisite for eating them. A potential solution for overcoming this concern regarding the cleanliness of insects would be to emphasize the safety and cleanliness in the packaging of the insect food products. Some kind of guarantee that the insects have been processed and sterilized would be important to many of the focus group members and could potentially make the insect food products more attractive to consumers.

When asked what other kind of information – in addition to the safety guarantee – should be provided about edible insects, virtually all participants said that the marketing should focus on emphasizing the health and environmental benefits of insect food. Many respondents felt that the healthy nutritional composition of edible insects and the positive effects they could have on land degradation, water usage and climate change – all of which are accelerated by traditional cattle rearing – are not common knowledge among the average consumers. Therefore, the participants felt that the marketing and promotion of insect food products should include comparisons of the nutritional (especially protein, fiber and vitamin) contents and environmental impact between insect and livestock production. For example, the insect food products could be accompanied with banners that include relevant and

easily digestible information about insect food and their environmental and health benefits. This sort of information could efficiently spread knowledge and awareness about the benefits of edible insects to large amounts of consumers who might not otherwise be aware of all the positive aspects relating to insect food. It could also help fight against the negative attitudes that many people, including some of the focus group participants, have towards insects. When asked about it, many of the respondents felt that these negative attitudes have been instilled in them since early childhood, especially by their parents but also by the surrounding culture as a whole. Many respondents said that the only information about insects they got in their childhoods was negative or even fear-inducing, and mostly highlighted the dangers associated with touching or eating insects. Therefore, the kind of marketing approach that would focus on promoting the positive aspects of insects could prove useful in changing the collective attitudes of the society towards insects to be more positive. By changing these attitudes towards insects to more positive, the insect food products could become much more attractive and approachable to a large number of consumers.

In addition to information about the health and environmental benefits of edible insects, another important point that would make insect food more approachable according to all of the focus group participants, was the inclusion of some sort of cooking instructions for edible insects. All participants agreed that it would be extremely important to educate consumers on how to cook tasty food using edible insects as an ingredient, and that this could be done by including cooking instructions with the insect food products. Many existing food products already include cooking instructions in their packaging so this could be also easily incorporated to insect food products. Having some kind of knowledge about how to properly use insects as a cooking ingredient could significantly lower the barrier to trying them and make edible insects much more approachable to consumers. As some participants put it, it is not enough to provide consumers with information about the benefits of edible insects if they do not know how to properly cook them. These cooking instructions could be provided whether the insects were sold in their natural form or for example as a powder.

Another aspect that the majority of respondents felt that would also make insect food more approachable and attractive to consumers was the offering of free samples of insect food products for example in supermarkets. These free samples would give consumers the chance to try out these new and exotic food products free of charge, which would, according to the focus group participants, considerably lower the barrier to trying them. Many consumers are always open to trying out free things, even if they would be something as exotic as edible insects, and most of the respondents agreed that if the insects were prepared and cooked beforehand by a credible, skilled, and perhaps even well-known chef, they would attract even more consumers to try them. Handing out free samples of well-cooked edible insects could positively influence consumer's opinions about them, as their first taste would be not only free of charge, but also tasty and skilfully prepared so as to highlight insect's qualities as a food source.

If these free samples of ready-made edible insects would be offered for example in a supermarket, it could help make insect food seem relatively "normal" in the eyes of many consumers, as opposed to them being offered for example in an eco-shop that specializes in more exotic food items and does not attract such a wide range of customers. In a traditional supermarket, the customers could see that edible insects are being offered among other, more conventional food products, perhaps making the idea of trying them more acceptable. Nevertheless, the novelty factor would still be present, but this was not seen as a necessarily negative thing in the focus groups. Many participants felt that the exotic nature of edible insects could create an enthusiastic "buzz" around them and attract many customers who are interested to try out new foods, especially if they are aware of their health and environmental benefits. Offering edible insects in conventional supermarkets would also increase their exposure as consumers from all age groups and social classes could see them being on offer. The free samples could be cooked in advance, and perhaps, as mentioned before, be prepared in a way that resembles some existing and familiar foods such as a hamburger patty. Another way to offer these free samples could for example be in powder form, either just as powdered insects or as a part of a spice mixture.

Most of the respondents thought that it would be best to display the insect food products alongside organic and super food products. The reasoning was that edible insects fit roughly the same category and that these kinds of products would attract consumers who are perhaps more aware of the environmental impact of their food choices, and therefore more likely to try out edible insects based on their environmental benefits.

Out of all the 10 participants interviewed in the two focus group sessions, five had already tasted edible insects in some form. All of these five participants expressed very similar kinds of views when it came to their personal tasting experiences. Each participant had had some reservations and concerns about insects before trying them, especially relating to the physical appearance and taste of the insects. However, after eating them, all of the participants said that they had been positively surprised by the taste and texture of the insects. Despite having quite negative preconceptions about them, all of the five participants said that their views on edible insects had changed to more positive after tasting them. These personal anecdotes from the focus group participants further suggest that it could be a good idea to offer free samples of insect food to consumers, because the first taste might considerably change their views to be more positive and maybe even influence them enough so that they would buy insect food products in the future.

To sum up the conclusions drawn from the focus group interview data, the attitudes towards insect food in the focus groups can be generally described as positive. The overwhelming majority of respondents were open to the idea of tasting insects and perhaps even incorporating them as a part of their diet. However, no participant felt ready nor willing to completely replace meat or other protein sources with insects. The main concerns were related to the taste, appearance and cleanliness of the insects, which could be addressed by providing information about the benefits of edible insects to consumers and by preparing the insects in a way that hides their original physical form. The insect food packaging should also include instructions on how to cook and prepare the insects. Free samples of edible insects would significantly lower the barrier for trying them, which might help in changing the negative attitudes held by some people towards something more positive.

## **6 Discussion**

### **6.1 Qualitative Approach for Judging the Soundness of the Research**

The traditional criteria used for judging quantitative research are validity, reliability and objectivity. The author found it difficult to use this approach, which is more commonly used in quantitative research, and therefore decided to replace it with the alternative criteria for judging the soundness of qualitative research. These alternative criteria were proposed by Guba and Lincoln, who substituted reliability and validity with the concept of “trustworthiness”, consisting of four main aspects: dependability, credibility, transferability, and confirmability. [Eriksson & Kovalainen 2008, 294.] According to Trochim [2006], these four criteria are better at reflecting the underlying assumptions involved in qualitative research.

#### **6.1.1 Dependability**

Dependability is concerned with the researcher’s responsibility to offer the reader sufficient information about the research process. The information must show that the process of research has been logical, traceable and documented, in order to establish the trustworthiness of the research. [Eriksson & Kovalainen 2008, 294.] Trochim [2006], writes that the idea of dependability emphasizes “the need for the researcher to account for the ever-changing context within which research occurs.” Furthermore, the researcher must mention if any changes occurred in the research setting and whether or not these changes affected the way the research approached the study. [Trochim, 2006.]

The only noticeable change in the setting of this particular research occurred right before the second focus group interview, when two focus group members cancelled their participation moments before the interview was supposed to begin, dropping the total amount of participants in the second focus group from six to four. This change might have had a slight effect on the group dynamics of the second focus group session, but the author does not feel that the results would have been dramatically different had both of the cancelled participants been present. Some additional viewpoints could have probably been gathered had the group been full,

but it is difficult to speculate what those additional viewpoints might have been. The change was unfortunate as the author did not have the possibility to conduct any additional focus group sessions due to the rather strict time constraints. Therefore, the total amount of participants dropped from the expected 12 to 10 participants.

The participants for the focus group interviews were selected randomly. The focus of this study was to research the attitudes of young adults, so the author had decided to recruit participants between 20 and 35 years of age. The idea behind having the research focused specifically on young adults was because of the assumption that the views and preconceptions towards insect food could vastly differ between age groups. If the age of the participants was not restricted in any way, the scope of the research would have been too wide.

Most, but not all, of the respondents were familiar with each other before coming to the focus group sessions. The author felt that this familiarity helped the participants feel more comfortable in the interview situations and allowed them to share their opinions and feelings openly and without any restrictions. This resulted in a natural and fluid discussion in both focus group sessions where all of the participants expressed their own views on the matter. Due to the familiarity of the participants, the atmosphere in the interview sessions was relaxed and pleasant from start to finish and there was mutual respect and trust between all of the parties involved.

One notable characteristic in both of the focus group sessions was that the participants were surprisingly unified on their views towards edible insects. Only one of the 10 participants expressed total unwillingness to taste insects under any circumstances, while the rest were all open to the idea of at least trying them, and maybe even incorporating them to their diets. In general, the attitudes towards insects in the focus groups were very open and positive. The author thinks that this could at least partially be due to the familiarity of the interviewees. Some of the participants had invited other members to the focus group sessions, and the groups consisted mostly of people who were friends with each other. People often tend to gravitate towards and form friendships with people who have similar views and opinions on matters, which might be one of the reasons why the focus group participants had so unanimously positive views about insects. In addition, the overwhelming majority of the focus group participants were university students with

experiences of living abroad, and the author feels that these kinds of shared cultural backgrounds also heavily contribute to the similar kinds of views held by the participants. Therefore, the fact that most of the focus group participants were familiar with each other contributed both positively and negatively on the research results. On the one hand, the discussion was relaxed and allowed the respondents to fully express their opinions on the subject, but on the other, the focus groups might have been too homogenous and provided almost exclusively one-sided contributions to the discussion. The author feels that had the participants been unknown to each other and represented more different educational and cultural backgrounds, the results could have been very different. It would have been interesting to hear opinions from participants who have strongly negative views towards insect food, but unfortunately due to the time constraints the author did not have a chance to conduct additional focus group sessions with more heterogeneous groups.

It is also noteworthy to mention that the two focus group sessions conducted for this study were the first ever focus groups moderated by the author. Since there was only one moderator with very limited experience who had to both observe and moderate the focus group at the same time, it is possible that certain details and additional observations were overlooked.

### **6.1.2 Credibility**

When evaluating the credibility of the research, it is important to consider how familiar the researcher is with the topic and whether the data is sufficient to merit the researcher's claims. [Eriksson & Kovalainen 2008, 294.] Trochim [2006], describes credibility in qualitative research as follows: "The credibility criteria involves establishing that the results of qualitative research are credible or believable from the perspective of the participant in the research."

Before conducting the focus group sessions, the author had immersed himself with information about insect food and studied its definition and history as well as its place in the modern-day food industry. The author took the focus group discussions very seriously and so did the focus group participants. Before starting the actual discussion, the author made clear that each participant was aware of the purpose of the session by going through the ground rules and explaining in detail why the

session is being held and for what purpose will the data be used. The author emphasized that he did not expect any specific answers from the participants, but instead wished that all participants would share their genuine feelings and opinions freely, without the fear of being ridiculed by the moderator or other group members. The author also reminded the participants to feel free to agree or disagree with each other's comments and that there are no right or wrong answers in the discussion.

The author feels that these ground rules helped the participants feel at ease in the conversation and allowed them to express their views on the subject openly and without hesitation. In addition, the familiarity of the participants, which was discussed in the previous chapter, contributed to the relaxed and comfortable atmosphere in the focus group sessions. This sort of atmosphere allowed the discussion to flow organically without heavy moderation on the author's part, and the participant's responses felt genuine throughout both of the focus group sessions.

The author made sure not to show any bias in the role of the moderator, and to be as neutral as possible so as to not influence the participant's responses in any way. The author feels that he succeeded in this regard and that no influence from the author's part affected the participant's responses. In the research results and conclusions chapters of this thesis, the author has presented his findings from the interview data as realistically and neutrally as possible. The research results are gathered from the interview recordings, which the author transcribed in their entirety. No personal bias has been applied in the analysis and interpretation of the data. The author genuinely feels that the results and conclusions presented in this thesis represent the participant's contributions fairly and accurately.

### **6.1.3 Transferability**

According to Trochim [2006], the transferability criteria of qualitative research "refers to the degree to which the results of qualitative research can be generalized or transferred to other contexts or settings."

As was mentioned in the earlier chapter discussing the dependability of the research, the sample size for this study was smaller than expected due to two respondents cancelling their participation. In addition, the focus groups were rather homogenous

as they did not include any participants with strongly negative views on edible insects. A different set of participants might produce drastically different data, and therefore the results of this study should not be generalized to other groups, even to ones that consist of participants from the same age group. As with any qualitative method, the findings developed from focus group interviews tend to lack representativeness with regard to larger populations. Due to the small sample size, it is practically impossible to generalize the results of this research to larger market segments. Furthermore, this research is tied to a specific place and time, and as the insect food industry grows over time and becomes more familiar and acceptable to larger populations, the results of similar kind of focus group interviews will probably be different.

#### **6.1.4 Confirmability**

The confirmability of qualitative research refers to the degree to which the results could be confirmed or corroborated by others. According to Eriksson and Kovalainen [2008, 294], confirmability is about “linking findings and interpretations to the data in ways that can be easily understood by others.”

The author conducted two separate focus group interviews in April of 2016, and was able to get similar results from both sessions despite having participants from different countries in the groups. Both of the focus group sessions were recorded on tape and later transcribed word by word by the author. The transcriptions were done so that it would be easier to analyse the data and find broad themes and frequently mentioned topics.

Since the author did the data analysis and interpretation by himself, there was no one else who could verify the findings at the time of writing this thesis. Nevertheless, the author believes that his findings are accurate and consistent in relation to the results gathered from the focus group interview data, and that any other researcher examining the same data would come to similar conclusions.

## 6.2 Ideas for Future Research

Focus group interviews are a useful tool for mapping out consumer interests, attitudes, opinions, concerns and preconceptions on a certain topic, and the author feels that they proved to be a relevant and valuable method for carrying out this particular research. The aim of this study was to research the attitudes of young adults towards insect food, and therefore the focus group interviews were conducted with groups consisting of individuals aged from 22 to 31 years old, representing both genders and five nationalities. Future research regarding the business potential of insect food could be done by conducting group discussions with participants from different age groups, or by concentrating on interviewing people from specific regions or cultural backgrounds.

Insect food is still a relatively new and unknown topic – especially in Western countries – and the attitudes and opinions on the subject might change drastically between different age groups. Older generations could have a completely different outlook towards using insects as nutrition, and since they form such a large part of the consumer base it would be interesting to also study their views on the matter. Senior citizens, for example, who might have lived through periods of food and resource scarcity, might have unique and interesting thoughts about using insects as a part of their diets. Additionally, people from different regions and cultural backgrounds might have completely different opinions on the subject of insect food. There could be interesting differences in the opinions of urban and rural populations and for example immigrants and natives. Similar studies could be also conducted focusing solely on Finnish nationals instead of mixed nationalities groups as was the case in this study.

Future research could also focus on finding potential marketing solutions for insect food and studying what kind of approaches in the promotion of edible insects would be seen as most valuable in the focus groups. The qualitative focus group research method could also be combined with for example questionnaires or surveys, which could allow the research to collect richer data and provide even more detailed research results.

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