

University of Helsinki,
Institute of Behavioural Sciences,

THE FINNISH ORGANIC FOOD CHAIN
Modelling towards 2020 goals with change and
innovation

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Abstract

The current Finnish food chain generates negative externalities for the environment, human beings and animals. Organic food and its production represent an alternative that aims at reducing those externalities. Such an approach is supported by international authorities, and features in Finnish government goals that are intended to diminish these externalities, among others, by increasing the share of organic production. None of the goals previously set by the Finnish authorities for the organic sector have been reached, and this also applies to the target for 2020 according to trends in organic production and expanding market share in Finland. Several other European Union countries are making more significant progress in this regard in comparison with Finland.

This thesis proposes a Finnish food chain model tackling the challenging aim to enable the government goals for organic food and its production to be reached. Simultaneously, it may enhance greater sustainability, with benefits to society and enhanced profitability for those enterprises acting for the common good. The model combines three theories: Activity Theory for the model with its elements, Economy of Common Good for the values and Co-creation for the collaboration of the food chain actors that pertain to the model. A change from the current to the suggested model, generating the desired outcomes, can be possible if a path of certain actions based on the principles of the Finnish national innovation system is followed. Organic food and its production need to be recognized (legitimacy) and integrated into strategic development and research topics, in Finland, for development in this area to be sufficient to reach the goals set.

This thesis comprises four articles. The first article is based on the results of a survey to establish the extent of acceptance of the review's four most commonly mentioned organic quality attributes among the different parts of the Finnish food chain (agriculture, industry, retail, catering, consumers). The second article presents the first stage of the suggested Finnish food chain model. Using local and national focus group analyses, the third article was written to explore two of the major challenges, raised from the literature and interviews, that prevent the

development of organic production in the Finnish food chain. The concluding article presents the second stage model for the suggested Finnish food chain. The findings in this thesis and its four component articles link to the associated theories that gain support from the literature on the food system. The connection with Finnish food chain actors was made through the survey and the focus groups. The suggested food chain model is, therefore, based on official reports, theories and empirical studies. The suggested model encourages food-chain-level cooperation that would lead to a fairer division of power and easier interference in legislation and taxation, making it easier to set the common good values and to use them to influence affect to the tools of food chain activities. The resulting production methods, and the food itself, will enable the goals set for organic production to be reached. The path of actions suggests tax incentives, better education and research on organic food and its production, more effective information policy and a tailored SHOK-type organic consortium to spearhead the project as an integral component of the Finnish strategic research agenda.

The activity system model, based on cultural-historical Activity Theory (AT) is used here in a different way to its normal use. The model discussed in this thesis was created by initially identifying the outcome as the set goal, and then analysing the other elements that constitute the outcome. Economy of Common Good brings a different set of values to the activity of the food chain and Co-creation deepens the relationship between food chain actors. The three theories have been tested separately and with qualified success. The Economy of Common Good principles are used in numerous companies and a few municipalities, and Co-creation has been accepted as a basic instrument of planning in various areas of business

The resilience of planet Earth is rapidly decreasing, and small actions remain largely without effect. The entire food chain has to be redeveloped in a comprehensive and radical way. The model suggested is theoretical: a combination of several theoretical approaches proven to have been successful in existing business environments. It is difficult to imagine that, under the currently prevailing conditions of materialism and egocentricity, the proposed system could be comprehensively adopted right away at the national level, but a gradual change towards the greater common good and organic goals can be expected to be possible by following the action plan proposed in the synthesis presented here.

Key words: organic, food chain, Activity Theory, Co-creation, Economy of Common Good, national innovation system, Nordic welfare model

Jaakko Nuutila

SUOMEN LUONNONMUKAINEN RUOKAKETJU

Mallintaen kohti 2020 tavoitteita muutoksen ja innovaation avulla

Tiivistelmä

Suomen tämänhetkinen ruokaketju aiheuttaa haittavaikutuksia ympäristölle, ihmisille ja eläimille. Luonnonmukainen tuotanto ja ruoka edustavat vaihtoehtoista toimintatapaa, jonka tavoitteena on voida vähentää näitä negatiivisiksi ulkoisvaikutuksiksi nimettyjä haittavaikutuksia. Tätä ajattelutapaa puoltavat useat kansainväliset toimijat sekä myös Suomen hallituksen asettamat tavoitteet, joiden tehtävänä on vähentää näitä haittavaikutuksia mm. lisäämällä luonnonmukaisen tuotannon osuutta. Aiempia luonnonmukaiselle tuotannolle asetettuja tavoitteita ei ole saavutettu ja tämänhetkisten tuotantoala- ja markkinaosuustrendien perusteella ei vuodelle 2020 asetetut tavoitteet näytä realistisilta. Useat Euroopan yhteisön jäsenmaat kehittyvät näissä asioissa Suomea huomattavasti paremmin.

Tämä väitöskirja esittelee suomalaisen ruokaketjun mallia, joka voisi auttaa saavuttamaan hallituksen luonnonmukaiselle tuotannolle ja ruoalle asettamat haastavat tavoitteet. Samanaikaisesti se lisäisi kestävyyttä, mikä hyödyttäisi koko yhteiskuntaa sekä parantaisi ruokaketjussa yhteishyvän talouden mukaan toimivien yritysten kannattavuutta. Malli yhdistää kolme teoriaa: toiminnan teoria tuo siihen mallin elementteineen, yhteishyvän talouden kautta toiminta saa arvot ja yhteiskehittely lisää ruokaketjun toimijoiden välistä yhteistyötä johtaen mallin syntymiseen. Muutos nykyisestä ruokaketjun mallista uuteen, tässä työssä ehdotettuun malliin, joka johtaa haluttujen tulosten saavuttamiseen, on mahdollista, mikäli noudatetaan toimenpiteitä, jotka perustuvat Suomen innovaatiojärjestelmään. Luonnonmukainen tuotantotapa tulee tunnustaa (legitimiteetti) suomalaisessa yhteiskunnassa ja se tulee saattaa osaksi tutkimus- ja kehitysstrategioita, jotta niille asetetut tavoitteet voidaan saavuttaa.

Tämä väitöskirja koostuu neljästä artikkelista. Ensimmäinen artikkeli perustuu suomalaisen ruokaketjun eri osissa (alkutuotanto, teollisuus, kauppa, ruokapalvelut, kuluttajat) toimivien ihmisten mielipiteisiin yleisimmistä luonnonmukaiseen tuotantoon ja ruokaan liitettävistä laatutributeista. Toinen artikkeli esittelee ensimmäisen version ehdotetusta uudesta ruokaketjun toiminnan mallista. Kolmannessa artikkelissa analysoitiin alueellisen ja

kansallisen fokusryhmätyöskentelyn avulla kahta merkittävällä tavalla luonnonmukaisen tuotannon kehittymistä hidastavaa tekijää. Neljäs ja koko työn kokoava artikkeli esittelee lopullisen version hallituksen tavoitteiden mahdollistamiseen keskittyvästä suomalaisen ruokaketjun mallista. Luonnonmukaista tuotantoa ja ruokaa käsittelevä kirjallisuus ja valitut teoriat tukevat tämän väitöskirjan ja siinä olevien artikkeleiden tuloksia. Yhteys suomalaisen ruokaketjun toimijoihin syntyi mielipidekyselyn ja fokusryhmätyöskentelyn avulla. Ehdotettu suomalaisen ruokaketjun malli perustuu raportteihin, teorioihin ja empiirisiin tutkimuksiin. Malli rohkaisee toimijoita ruokaketjutason yhteistyöhön, mikä osaltaan johtaa reilumpaan ruokaketjun toimijoiden väliseen vallan jakoon sekä mahdollistaa paremmin lainsäädäntöön ja verotukseen vaikuttamisen. Tämä osaltaan mahdollistaa tälle toiminnalle yhteishyvän arvojen asettamisen ja niiden avulla vaikuttamisen toiminnan välineisiin. Tuotantotavan muutos yhdistettynä kuluttajat mukaan ottavaan yhteiskehittämiseen mahdollistaa asetettujen tavoitteiden saavuttamisen. Esitetyt toimenpiteet liittyvät verotukseen, parempaan koulutuksen tasoon, luonnonmukaisen tuotannon ja ruoan tutkimukseen, tehokkaampiin informaatiokäytäntöihin, sekä räätälöityyn SHOK:in tapaiseen luonnonmukaiseen konsortioon, joka asettaisi tämän mallin sekä luonnonmukaisen tuotannon kehittämisen kiinteäksi osaksi Suomen kansallista tutkimusstrategiaa.

Kulttuurihistorialliseen toiminnan teoriaan perustuvaa mallia on tässä työssä käytetty tavanomaisesta poikkeavalla tavalla. Tässä työssä esitettyä mallia lähdettiin luomaan tunnistamalla ensiksi toiminnan tulos ja tämän jälkeen analysoimalla muita elementtejä, jotka mahdollistavat sen. Yhteishyvän talous tuo ruokaketjun toimintaan uusia arvoja ja yhteiskehittely voimistaa ruokaketjun toimijoiden välisiä suhteita. Kaikkia kolmea valittua teoriaa on kokeiltu muissa yhteyksissä menestyksellä. Yhteishyvän talouden periaatteet ovat käytössä lukuisissa yrityksissä ja muutamissa kunnissa ja yhteiskehittelyä käytetään toiminnan suunnittelun välineenä liiketoiminnan eri osa-alueilla.

Pienet toimenpiteet eivät enää kykene estämään maapallon resilienssin heikkenemistä. Koko ruokaketjun toimintaa tulee muuttaa perusteellisella ja radikaalilla tavalla. Tässä väitöskirjassa esitelty suomalaisen ruokaketjun malli on teoreettinen: yhdistelmä eri teoreettisia lähestymistapoja, joiden on osoitettu toimivat menestyksekkäästi liiketoiminnan eri aloilla. On tosin vaikea kuvitella, että nykyisessä materialistisuuteen ja itsekkyyteen rakentuvassa yhteiskunnassa, esitetty malli voitaisiin hyväksyä kokonaisuudessaan, ja kansallisella tasolla, mutta asteittainen siirtyminen kohti suurempaa yhteistä hyvää ja luonnonmukaisen tuotannon ja ruoan tavoitteita on mahdollista noudattamalla tämän työn synteisissä esitettyjä toimenpiteitä.

Avainsanat: luonnonmukainen, luomu, ruokaketju, toiminnan teoria, Co-creation, yhteiskehittely, Economy of Common Good, yhteishyvän talous, kansallinen innovaatiojärjestelmä, pohjoismainen hyvinvointimalli

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During the research and writing process of this thesis, I had several research questions and approaches to the organic food system. At the beginning, the reason to writing this thesis was the chef's curiosity regarding organically produced ingredients, in my opinion with more wholesome taste and natural appearance. During the research process my understanding widened to the ecological and ethical dimensions of producing food and also to the healthiness and safety of our daily food, and I understood the greater good that the organic food and its production creates by diminishing the negative externalities that the current food chain is causing to the environment, production animals and humans. The focus changed from the egocentric values to the common good, and I started to study organic as a holistic phenomenon and its interaction with Finnish society. Although this thesis discusses the organic food chain, it promotes several useful actions for the current food chain on its way to better sustainability and greater common good.

I am grateful for the financial support from the Ministry of Agriculture and Forestry and to my employer Natural Resources Institute Finland. There are numerous individuals who have helped me during this process, some of them from the scientific point of view, some assisting in the empirical parts, and some supporting me by giving me the strength to carry this demanding process to its end. I am most grateful to Professor Sirpa Kurppa, who supervised my research from the very beginning. I could never have succeeded without your support and care. You made a chef into a research scientist! Thank you for that. I am grateful also for my other supervisors; Professor Yrjö Engeström, I thank you for accepting me into your department and for supporting me in my multidisciplinary work, and Docent Laura Seppänen, I thank you for your most valuable comments. Professor Raija Tahvonen, Professor Helena Kahiluoto and Jukka Rajala, I am very grateful for the literature you gave me during my research process. I also want to thank Professor Pirjo Siiskonen for your support and understanding.

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Sebastian, Vilma, Otto and Ella, will read this thesis and understand, the reason why I have been absent even when at home and the piles of articles that have occupied our tables for the last few years. This thesis will guide you to better food choices in your future lives.

On the 20.9.2016

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ABBREVIATIONS

AT	Activity theory
CC	Co-creation
ECG	Economy of Common Good
GPP	Green Public Procurement
MTK	Union of Agricultural Producers and Forest Owners
NIS	National Innovation System
SFFCM	Suggested Finnish food chain model
SHOK	Strategic centers for science, technology and innovation
SPP	Sustainable Public Procurement
TIM	Finnish Research and Innovation Board
VAT	Value added tax

LIST OF ORIGINAL ARTICLES

I Acceptance of the most common quality attributes of organic food in the Finnish food chain, Nuutila, J., 25th NJF congress 16 – 18 June, 2015, Riga

II The Finnish organic food chain – an activity theory approach, Nuutila, J.; Kurppa, S., Journal of Organic Agriculture, 2016, 6(1), 49-56

III Two main challenges that prevent development of organic food chain at local and national level - an exploratory study in Finland, Nuutila, J.; Kurppa, S. Journal of Organic Agriculture Doi: 10.1007/s13165-016-0163-5

IV Reaching goals for organic food in Finland – which changes should occur in the food chain? Nuutila, J.; Kurppa, S., Journal of Organic Agriculture, 2016. Doi: 10.1007/s13165-016-0158-2

Contributions

	Article I	Article II	Article III	Article IV
Initial idea	JN, SK	JN, SK	JN	JN, SK
Logic of reasoning	JN, SK	JN, SK	JN	JN, SK
Material	JN	JN	JN	JN
Analyses	JN	JN, SK	JN, SK	JN, SK
Manuscript	JN	JN, SK	JN, SK	JN

JN=Jaakko Nuutila, SK= Sirpa Kurppa

1 INTRODUCTION

1.1 Organic production

Organic food production is a controlled and certified system. Finland follows the European Union legislation that applies in all member states (European Union 2007; European Commission 2010a). The legislation frames organic production thus: *“Organic production means the use of the production method compliant with the rules established in this Regulation, at all stages of production, preparation and distribution; stages of production, preparation and distribution means any stage from and including the primary production of an organic product up to and including its storage, processing, ‘organic’ means coming from or related to organic production”*(European Union 2007). The legislation provides objectives and definitions for all the above-mentioned areas of the organic food chain.

FAO¹/WHO² and Codex Alimentarius³ defined organic agriculture in 1999: *“Organic agriculture is a holistic production management system which promotes and enhances agro-ecosystem health, including biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. This is accomplished by using, where possible, agronomic, biological, and mechanical methods, as opposed to using synthetic materials, to fulfil any specific function within the system.”* (FAO 2012).

IFOAM⁴ (2016) explains the organic food system as follows: *“Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies in ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.”*

The Finnish Food Safety Authority Evira is responsible for planning the monitoring, and controlling the manufacturers, of organic foodstuffs and organic animal feed. Organic production, transport and import are also under supervision

¹ Food and Agriculture Organization of the United Nations

² World Health Organization

³ Collection of international food standards and recommendations

⁴ International Federation of Organic Agriculture Movements

and the certificates are given to prove the authenticity of organic food. Evira (2012a) describes organic production principles for generating products, the production methods of which are not harmful to the environment or the welfare and health of humans, plants or animals. Organic products are manufactured from organically produced ingredients and marketed as organic. The use of approved additives is limited, and the use of artificial colorants and sweeteners is prohibited.

1.2 Food chain as part of the food system

This thesis focuses on the Finnish food chain and the part that organic food and its production play in it. The food chain is part of the food system and can be defined as conceptualized relationships between the different forces acting on the commodity flows from producer to consumer (Atkins & Bowler 2001). Whatmore (1995) divides the food system into: 1) Agri-technology industries (inputs); 2) factors of production (capital, labour, training etc.); 3) farming industry; 4) intermediate (wholesale, imports/exports etc.); 5) food industries; 6) regulation (health and nutrition policy, food security etc.), and 7) food consumption. Food systems can be defined as local and global food systems (Hinrichs 2000:2003; Renting, Marsden & Banks 2003; Ericksen 2007) and the local one as an alternative system for the globalized and industrialized one (Hinrichs 2003). The local food system has a strong connection with rural development and the vitality of the countryside (Renting, Marsden & Banks 2003). The food chain is simpler than the food system and comprises agriculture, industry, retail, catering and consumers (Nuutila 2015; Nuutila & Kurppa 2016). The same division of areas applies to the food supply chain, but at the individual organization level (Marsden, Banks & Bristow 2000). Christopher (2005) defines the supply chain as *“the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer”*. In this thesis, the Finnish food system means the whole of society with its political, cultural, social, environmental, economic aspects and also the government interactions through legislation and taxation. The food chain includes conventional and organic processes from “field to fork”. The differences between production methods are defined in European Union legislation and the organic component is a certified production system (European Commission 2010a).

1.3 Externalities of the food chain

Human activity has resulted in crossing the planetary boundaries (Rockström et al. 2015). For example, agriculture is facing challenges in connection with climate change, land degradation, reduced access to natural resources, bioenergy demands, and trade (IAASTD 2008)⁵ and food inequality are marked: 1) 3 billion tonnes of food are wasted every year; 2) almost 1 billion people are undernourished and 1 billion are starving when 5 billion people are overweight or obese and 3) 30% of global energy consumption is by the food sector, and causes 22% of total greenhouse gas emissions (UN 2015a).

Agriculture provides positive ecosystem services such as food, fibre, fuel and materials (Tilman et al. 2002) but also negative externalities that can have an impact on environment, humans and production animals, such as:

1) on the environment by unsustainable use of non-renewable natural resources (Alekklett et al. 2008; Rockström et al. 2009), eutrophication (Bleken, Steinshamn & Hansen 2005; Knudsen et al. 2006), global warming (Muller et al. 2011) and the loss of biodiversity (Bengtsson, Ahnström & Weibull 2005; Holzschuh, Steffan-Deventer & Tschardtke 2008; Rundlöf, Nilsson & Smith 2008; Jonason et al. 2011), poor soil quality (Mondelaers, Aertsens & Van Huylenbroek 2009; Tuomisto et al. 2012);

2) on livestock by the current European Union and national minimum regulations for conventional animal husbandry (VN 14/EEO/2002; VN 592/2010 2010; VN 375/2011 2011) resulting in poor animal welfare (Hämeenöja 2001; Duncan 2005; Ferrante et al. 2008; Lusk 2008; Mondelaers, Aertsens & Van Huylenbroeck 2009; Vaarst 2009; Krüger et al. 2014), and

3) on humans in terms of food that might contain pesticide residues (Newby & Howard 2005; Baranski et al. 2014), antibiotic resistant bacteria (WHO 2011), veterinary drug residues (FAO 2011) and synthetic food additives and colourants (Lau et al. 2006; Mpountoukas et al. 2010), as well as genetically modified organisms (Vendomois et al. 2009: 2010).

The legislation on organic food production (European Commission 2010a) prohibits the use of e.g. synthetic pesticides, industrial fertilizers, synthetic colourants, GMOs and radiation, and provides for higher food safety by using veterinary drugs more strictly than in conventional production. It also enables

⁵ International Assessment of Agricultural Knowledge, Science and Technology for Development

more spacious living conditions, access to outdoors, natural light and fresh air mandatory to be provided for all production animals (European Union 2007; European Commission 2010a).

Some of the latest concerns include the negative influence of pesticide residues on male reproductive capacity in many western countries (Hauser et al. 2015), on cancer (Guyton et al. 2015; Bellanger et al. 2015) and on children living in low income and agricultural communities (Bradman et al. 2015). The United Nations International Agency for Research on Cancer has assessed the carcinogenicity of five organophosphate pesticides, including glyphosate (IARC 2015), but the EFSA⁶ finds it unlikely that glyphosate causes cancer (EFSA 2015). Also, the lack of positive microbes in food is discussed. Microbes received from vegetables are important to human health (Ramirez-Puebla et al. 2013). The food from increased industrial farming that uses pesticides which reduce the amounts of useful microbes, causes infections in those having poor resistance (Berg et al. 2014), and a link between the use of additives and obesity and diabetes has been established (Legler et al. 2015).

The research on some of the earlier mentioned negative externalities is as yet not completely unanimous. Comparing the life cycle assessment of organic farming with conventional farming on a per hectare basis, the ecological soundness is less, but larger when using a per unit yield measurement (de Backer et al. 2009; Meier et al. 2015). The fluxes of nitrous oxide and methane and nitrogen leaching are sometimes higher in organic production than in conventional production (Syväsalo et al. 2006). The energy use per product and area in organic production is lower than in conventional production because the industrial fertilizers and feed and synthetic pesticides need a remarkable amount of energy for their production (Gomiero, Pimentel & Paoletti 2011; Tuomisto et al. 2012; Pehme & Matt 2014). Although the organic legislation offers better living conditions for production animals than conventional production, animal welfare is highly dependent on the farmer or the animal caretaker (Hämeenoja 2001) and is occasional (Hovi, Sundrum & Thamsborg 2003; Vaarst et al. 2011).

WHO and FAO (JECFA 2012) and the European Union (EFSA 2010c) evaluate veterinary drug residues in food and provide safety limits according to the test results. Furthermore, the use of food additives (EFSA 2010b; EFSA 2010d) and pesticides (EFSA 2010a) is strictly controlled by the authorities. According to EFSA and EVIRA, the use of all approved veterinary drugs, food additives, pesticides and GMOs is safe for humans, animals and the environment even when used simultaneously, and when used according to the regulations. According to the meta-analysis of Baranski (2014) the nutritional superiority of

⁶ European Food Safety Authority

organic food is based on higher levels of antioxidants, and other meta-analyses showed positive results for fatty acids in organic milk products (Palupi et al. 2011; Średnicka-Tober et al. 2016b) and organic meat (Średnicka-Tober et al. 2016a). Two meta-analyses comparing the nutrition of organic and conventional food concluded that the differences are insignificant and have no effect on human health (Dangour et al. 2009; Smith-Spangler et al. 2012).

Sustainability approach to food chain

Sustainability has economic, environmental and social aspects (DEFRA 2002; Council of the European Union 2006; UNEP 2012; Beras 2015). The United Nations (UN 2015b) has set 17 goals with specific targets to be achieved over the next 15 years, and those that are directly connected to the food chain include: 2) zero hunger; 3) good health and well-being; 10) reduced inequalities 11) sustainable cities and communities; 13) climate action; 14) life below water, and 15) life on land. The European Union set its first sustainable strategy in 2001 and it was renewed in 2006 (Council of the European Union 2006) with operational objectives and targets for, for example, sustainable consumption and production: promotion by addressing social and economic development within the capacity of ecosystems, improving the environmental and social performance for products and processes, aiming to achieve by 2010 an EU average level of Green Public Procurement (GPP) equal to the currently best performing states and increasing the global market share in environmental technologies and eco-innovations. The same GPP goal was set again in 2008 (European Commission 2008b), but it was not reached (Renda et al. 2012).

In 2006, the European Union published a handbook for *Procurement saving the environment* (European Commission 2005) and in 2008 *Public procurement for a better environment* (European Commission 2008b). The European Union also has specific GPP toolkits (European Commission 2008a) with purchasing recommendations. The food and catering services toolkit deals with 1) use of pesticides and fertilizers; 2) soil degradation, forest destruction and loss of biodiversity; 3) GMOs; 4) intensive husbandry, fishing and aquaculture; 5) energy and water consumption and waste generation in manufactured food production; 6) additives used in processed food and 7) waste generation.

The economic performance is often judged on an operator level that shows context-specific differences in profitability between conventional and organic food production. Apart from profitability, the organic food system may provide benefits in economic resilience. On a policy level, food security plays an important role. Organic food systems can provide sufficient food if consumption patterns change towards less resource-consuming products. (Schader, Stolze & Niggli 2014). A study in the UK estimated that converting to organic production

would reduce the external environmental costs of agricultural production by 75% (Pretty et al. 2005).

As a result of a recent meta-analysis of four key sustainability metrics: productivity, environmental impact, economic viability and social well-being, and a comparison of organic and conventional agricultural systems, Reganold and Wachter (2016) created an assessment illustrating twelve sustainability areas. They conclude that 1) conventional exceeds organic in yields; 2) organic and conventional are equal in nutritional quality and total costs, and 3) organic exceeds conventional in profitability, minimizing water pollution, biodiversity, minimizing energy use, soil quality, minimizing pesticide residues, reduced worker exposure to pesticides, the employment of workers and ecosystem services.

1.4 Organic food and its production in the Finnish food chain

In 2013, there was certified organic production in 170 countries accounting for 43.1 million hectares of organic agricultural land (0.98% of total) and 2 million producers (Willer & Lernoud 2015). The biggest shares of organic production area in 2014 were in Liechtenstein (30.9%), Austria (19.4%), Sweden (16.4%) and Estonia (16.2%). The corresponding figure in Finland was 9.4% in 2014. The highest annual per capita consumption was in 2014 in Switzerland (€221.50), Luxembourg (€163.70) and Denmark (€162.10). The corresponding figure in Finland was €41.30 in 2014. The biggest shares from the markets in 2014 were in Denmark (7.6% in 2014 and 7.6% in 2012), in Sweden (6% and 3.9% in 2012) and in Austria (6.5% and 6.5% in 2012). In Finland, the market share in 2014 was 1.7% and in 2012 1.6% (Meredith & Willer 2016). The world's largest non-agricultural organic area (e.g. forests) is in Finland (9 million ha) (Willer & Lernoud 2015). In 2015, there were 4,322 organic producers in Finland, representing 8.3% of all producers and the share of organic production from all agricultural land was 10%. Regions with the highest shares of all agricultural land in 2015 were Åland (30.4%), Kainuu (18.2%), North Karelia (15.3%), Pirkanmaa (11.5%) and South Savonia (11.1%) (Evira 2015). Finnish consumers bought organic food mainly from supermarkets (88%), marketplaces (27%) and specialty shops (21%) and directly from farms (12%). From the selection of organic food in retail chain markets in 2014, 60% was

produced in Finland and the most sold product was milk. Other organic product groups with a large share were fruits and vegetables, mill and bakery products and eggs. The share of organic food in public catering was approximately 5% (in kg) (Pro Luomu ry 2014).

According to the *Organic consumer barometers*, Finns are willing to buy organic food. The number of weekly users has increased and was, in 2015, more than every fourth person (Saarnivaara 2015). In 2012, the reasons to increase consumption were the certainty that the producers would get a better share and that the products were authentic (Tapionlinna & Leppänen 2012). For all barometers, the quality attributes were named beforehand, and the consumers put them in order of importance. In the first barometer, the four most named quality attributes (“totally agree” and “agree”) were related to *safety* (organic food is clean from harmful products), *ecology* (organic production is good for the well-being of the environment), *ethicality* (organic production has a positive effect on the well-being of production animals) and *authenticity* (organic food offers authentic and clean tastes). In 2010, sensory quality (taste) was the fifth most important, in 2012 the ninth and, in 2013, it was the second most important attribute. Healthiness was not among the quality attributes named by the researcher in the first two barometers. In the third barometer, it was the fifth most important attribute. Another barometer was conducted among the organic food chain actors. The respondents were positive regarding the continuous but slow development of the organic food chain towards 2020. The biggest reasons for the slow development are the consumers’ unwillingness to pay for organic food and also the bureaucracy caused by the responsible authorities (Ristiluoma 2015).

A review of *Consumer perception towards organic food* (Shafie & Rennie 2012) shows results of the studies – on consumers’ willingness to pay for organic food and consumer perception of organic food quality – that consumers associate organic food with *natural process, care for the environment and the animal welfare and the non-use of pesticides and fertilizers. Consumers’ perception of organic product characteristics; A review* (Schleenbecker & Hamm 2013) (N=48) concludes the organic product design and values into *health, nutrition, sensory properties and ethical properties*. Ecology is not mentioned. A large review *Consumption behaviour regarding organic food from a marketing perspective – a literature review* (Hemmerling, Hamm & Spiller 2015) of 227 studies concludes that the top purchase motives and most important product attributes are: *health protection, taste, environmental protection, no/less chemicals/pesticides, safety, nutritional value*. Animal welfare was the 11th most important. The most investigated topics are *cost to the consumer and consumer value and benefits* (Hemmerling, Hamm & Spiller 2015). The attributes found in

the organic barometers for organic food and its production in Finland are also found in the reviews. Therefore, it is possible to conclude that *safety, ecology, ethicality, authenticity, taste* and *healthiness* are among the most important quality attributes of organic food and its production for the consumers.

The development of the Finnish organic food chain

This chapter, based on the literature and interviews, gives a short description of the development and the nature of the Finnish organic food chain for recent decades and the visions of individuals interviewed concerning its future. The interviews were conducted in November 2012.

Organic has been small-scale production in Finland for quite a long time. In addition to environmental reasons, there has been a need for more ethical food production. Despite the poor development of the organic food chain, the interaction between the farmers and the consumers was strong. In 1986, the general principles of organic production were launched and the practice of having a conversion period started in 1990. The authorities became responsible for the control in 1994. Organic food production was regarded as a specialty in our agriculture, and it was accepted in the strategies of the Ministry of Agriculture and Forest in 1996. In mid-1990, the processing of organic food started to develop and the training, education, research and consultation were established. (Ruralia Institute 2007)

Specialty shops were the first to introduce organic food with the producers to the Finnish consumers. *“There are more and more organic producers, processors, wholesalers and Internet operators. The amount of those consuming organic food has increased”* (Terhemaa 2012). *“Organic continues its brave path from marginal towards mainstream and has become a relevant and realistic option for common consumers.”* (Koskinen 2012). According to Kalliokoski (2012) from FoodKesko Ltd, a major food retail company, the sales and the amount of organic products in the selection of RuokaKesko doubled in 2008 – 2012. The selection in S-group retail shops is inclusive, and the customers from specialty shops are coming to big supermarkets, therefore the specialty shops have now to find their approach *“The expenses are higher for the specialty shops and the consumers are not ready to pay whatever prices. Old habits have to be changed and the shopkeepers have to make longer-lasting deals with the producers converting to organic. Organic food sector has to be modernized and all that does not support commerce has to be removed. Business is not based on idealism.”* (Alarotu 2012)

The organic produce is sold cheaper in retail chain markets than in specialty shops and more and more people buy from internet shops (Terhemaa 2012).

“The sudden need of organic products of the two retail chain companies (FoodKesko, S-group) can be fulfilled only by increased export. The centralized Finnish food industry enters the area of organic food and local food with further processed food. The unique selling point of organic food is mixed with industrialized and further produced products.”(Rislakki 2012). Rajala (2012) stated that the organic food chain is overheated. In addition to the current development, there is also distortion. *“The organic vegetable producers give up because the retailers break the deals and buy from abroad. Signals to the producers are clear; retail chain companies are not interested in developing the domestic production, the producers will not convert.”*

The large food industry joined the development of the organic food chain in 2000, but only for couple of years because there were no adequate organic markets. Large-scale processing of organic food started again in 2010 (Malmberg 2012). Finland’s biggest dairy company Valio has been a forerunner for organic processing for years. *“There has been discussion about organic products for a long time, more than ten years, but only during the last five years organics has gained a position with real commercial value.”* (Hurme 2012). Marttila (2012) from MTK⁷ estimates the domestic supply to grow fast during the next five years, the amount of products entering the markets will double and activity will be market-driven and sustainable price level and adequate value added can be maintained.

In terms of market structure, Finland does not differ on the development of the organic food chain from the UK or Denmark, where the large-scale food industry and retail chain companies are running the organic markets that can reduce the number of small enterprises and make organic lose even its identity (Wier, Millock & Rosenkvist 2005; Aschemann et al. 2007). The organic food brands and private labels are owned by big food industry and they lose their origin (Howard 2009a; 2009b). There has been a development in the opposite direction in the UK and Denmark, where consumers are increasingly supporting alternative marketing channels and buying directly from the producers and specialty shops. (Wier, Millock & Rosenkvist 2005; Aschemann et al. 2007)

According to the statistics (Section 1.4) and the interviews, the Finnish organic food chain is developing and there is a strong movement from small-scale to large-scale operations. That will bring organic produce nationwide and closer to all consumers, but the risk is that organic food will become bulk because of the intensified process. It seems that the primary contradiction between the exchange value (price) and the use value (organic quality) turns into another contradiction between small-scale and large-scale operations (see Section 1.9.). The movement from small- to large-scale operations leads to the

⁷ Union of Agricultural Producers and Forest Owners

confrontation between small and large, where the latter is holding the power. The unbalanced power can prevent cooperation among all food chain actors. That is discussed in Article III.

The common legislation and the controlling authorities form a solid base for the organic food chain and ensure high quality in production and products to the benefit of all stakeholders and the trust of the consumers. In a research conducted by Pro Luomu ry (2012), the organic stakeholders mentioned the control, bureaucracy and regulations as bottlenecks that prevent the development of the organic food chain: e.g. the civil servants' uneven way of interpreting the common legislation, slow handling process with the documents, the threat of increasing bureaucracy and sanctions. Finland has a Finnish Organic Research Institute and the aforementioned topics are mentioned in its research program (Nuutila et al. 2014).

1.5 Global and European Union goals set for the development of organic food and its production

There are qualitative and quantitative goals set for organic food and its production. The former means the need for having an alternative to conventional food (FAO 2002) or making the world ecologically, socially and economically more sustainable (IFOAM 2009). The European Union has a *European Action Plan for Organic Food and Farming* (European Commission 2004), but it has no specific quantitatively measured goals. Organic food and its production are well noted in the public procurement guidelines in SPP⁸ and GPP (European Commission 2007: 2008a: 2008b; Euroopan Komissio 2009; MMM 2012). In the Commission staff working document, "Public procurement for a better environment", there is an official GPP goal: for 2010 the average GPP level has to be at least the same as that of the best country at the moment (2006)(European Commission 2008b). That goal was never reached (Renda et al. 2012). The draft opinion of the European Parliament Committee on the Environment, Public Health and Food Safety is to get 20% of agricultural land into organic production before 2030 (European Community 2015). Several countries have set quantitative goals: in 2020 the share of organic production of the entire agricultural area is to be 20% in Finland, 15% in Denmark, 14% in the Netherlands and 5% in Ireland. A 20% goal was set by Austria for 2013

⁸ Sustainable Public Procurement

(achieved 19.5%), Sweden for 2014 (16.3% in 2013) and Slovenia for 2015 (8.4% in 2013) (Meredith & Willer 2014).

1.6 Goals set for the development of organic food and its production in Finland

The first organic food strategy was published in Finland in 2001 for 2002 – 2006. According to the goal for 2006, 10% of the agricultural area is to be under organic production and 1,100 livestock farms ought to be under organic control (MMM 2001). In 2005 the Ministry of the Environment and the Ministry of Trade and Industry presented a report on sustainable production and consumption “Less is more and better” (YM 2005). According to the report, 10% of the agricultural area will be under organic production in 2010 and 25% in 2015, and the use of organic food in public catering will increase annually by 10 – 15%. The national strategy team for organic markets (Luomustrategiaryhmä 2006) set a goal in 2006: *“In 2015 Finland is among the leading countries in Europe for organic production and consumption. The share of organic food will be 6% of the national retail market. All public kitchens use organic ingredients; the use in private kitchens will increase by 15% annually and 10% of food exports will be organic.”*

The government decision on sustainable public procurement (VN 2009) advises that: *“Organically produced, vegetarian or seasonal food is served in all governmental kitchens at least once a week before 2010 and twice a week before 2015.”* The Organic Strategy for 2007 – 2015 indicates a goal of 6% for the market share of organic food before 2015 and the use of organic ingredients in all public kitchens (Luomustrategiaryhmä 2006). A national food strategy group set a goal of 15% increase in the use of organic ingredients in public catering (Ruokastrategiaryhmä 2010). The steering group’s suggestion for the national food strategy (MMM 2010a; RVJ 2010) included a goal that the value of national organic production, including exports, will double before 2030. That means a 4% annual increase in exports and an increase in processed food in the markets. The government’s briefing on food politics (MMM 2010b) has a qualitative strategy for 2030: it is important to secure the availability of a large variety of organic foods for retail and catering. The use of organic and local ingredients in public procurement will be promoted.

A high level delegation (Foreign Ministry 2008; Maabrändivaltuuskunta 2010) to develop a country brand for Finland set a goal for organic production: half of the production is to be organic in 2030. In the development programme

for the organic food chain, ordered by the ministry for agriculture and forests, Pro Luomu ry⁹, set a vision for organic production and food: *“In 2015 organic food is part of consumers’ and food chain actors’ ordinary lives. The selection meets the consumers’ needs in all essential product groups”* (Kottila 2011). Prime Minister Jyrki Katainen’s government programme set frames for the national development program of the organic product sector and objectives (MMM 2014): “Organic 20/2020” means that in 2020: 1) 20% of the agricultural land will be under organic production; 2) the production will be sufficient for national consumption; 3) the sales of Finnish organic products will triple in retail and catering and 4) 20% of the food served in day-care centres and schools will be organic.

1.7 Reasons for setting the goals in Finland

The reasons and motives for setting the aforementioned goals are very similar in different declarations and strategies. The national strategy team for organic markets (Luomustrategiaryhmä 2006) points out the need to increase the *welfare of nature, animals and humans*. The proposal of the national food strategy is based on the needs to secure *safe, tasty, healthy and responsibly produced and reasonably priced food* and in its background report (Ruokastrategiaryhmä 2010) the need to secure *sufficiency of daily food and the sustainable solutions in reducing climate change*. “Organic 20/2020” (MMM 2014) is based on the need for products, the production of or production methods which are *not harmful to the environment or to the welfare and health of humans, plants and animals*.

The government decision on sustainable public procurement (VN 2009) points out the *impact on the environment in procurement in addition to economic aspects*. Public procurement of high volumes plays an important role in contributing to welfare. The lifelong impact of food production for the *sustainability of the environment and human health* is mentioned in the “Less is more and better” programme (YM 2005). The goal set by the National country brand delegation is the highest so far. Rauhala (2015), a member of the delegation, states the reasons for that goal: *“Finland is an expensive country that lives on exports. Most of our industries will not be competitive in the near future other than in creativeness and innovation. Nature and purity are the only sectors*

⁹ Finnish Organic Food Association

where we are strong. Organic production provides clean food and also pure water. The high goal of 50% is symbolic and concrete, it also provides for national self-sufficiency”. The above-mentioned reasons for the goals set for organic food and its production are in harmony with the *ecology, ethicality, economy, safety, healthiness and taste of food*.

There were several goals set for organic food and its production in Finland between 2001 and 2012, but none were reached. To enable the attainment of the next set of goals, such as 20/2020, strong growth is needed for the whole organic food chain, in its all parts. The growth needs cooperation among all stakeholders (MMM 2010a: 2010b; Ruokastrategiaryhmä 2010; Kottila 2011). The share of organic production grows continuously in agriculture and its markets. Figure 1 shows the growth in organic agricultural area (share of total) and also the goals set: 2006 10% (MMM 2001), 2010 10% and 2015 25% (YM 2005), 2020 20% (MMM 2014). An annual growth of 16% is sufficient to reach the goal of 20% in 2020 (counting from the 2015 level). The reason for this thesis is to present a proposed Finnish food chain model (SFFCM) that open up a scientifically justified path for reaching the goals set for its share of organic production, markets and food served in public catering.

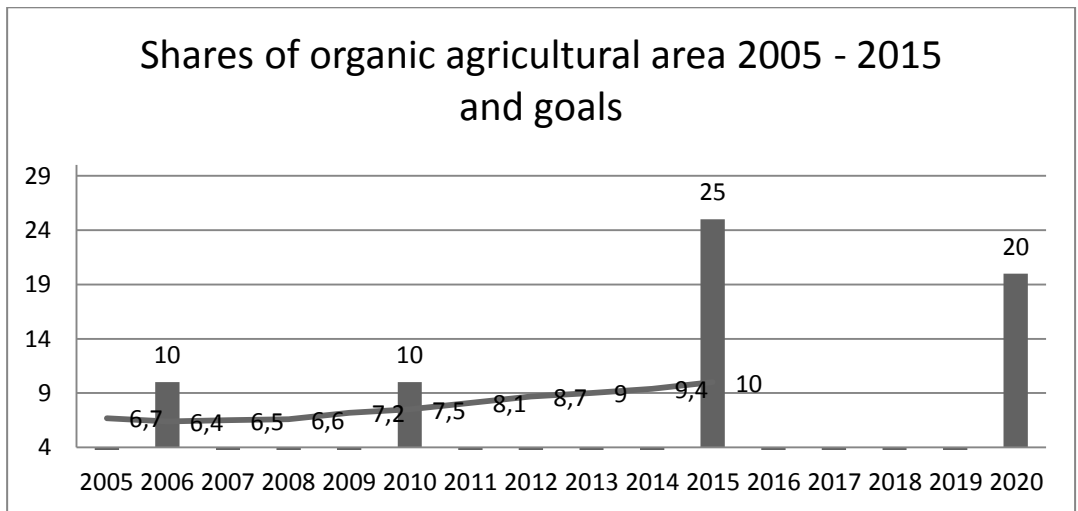


Figure 1. The share of organic production (%) in Finland as a proportion of the total agricultural area in 2005 – 2015 and goals set for 2006, 2010, 2015 and 2020.

1.8 Innovation system and Nordic welfare

This section presents the Finnish national innovation system and the Nordic welfare model. The welfare society that provides for the success of Finnish national innovation and innovative activity is needed to mobilize the potential generated from the theoretical, professional and practical knowledge of a well-educated people (Miettinen 2013). The development of organic food and its production is discussed based on the principles of the national innovation system and the welfare society in the synthesis of this thesis. The reason for this is to seek legitimacy and acceptance for organic food and its production among other branches of business that are referred to in the national innovation policy.

Definition of innovation

Baregheh et al. (2009) reported 60 definitions of innovation from six different disciplines and summarized it in this way “*Innovation is a multi-stage process whereby organizations transform ideas into new/improved products, services or processes, in order to advance, complete and differentiate themselves successfully in their marketplace*”. The Finnish Research and Innovation Council (TEM 2015e) defines innovation as a knowledge-based competitive edge, used to the benefit of business, society and well-being and comprising: application of new knowledge, competencies or technology; a new product, process or technical solution; a new expert service; a new design or brand; a new operating business model, value chain or network; new working practices, management or organization model, and a public service realized in a new way. Innovation is also described as a driven force of welfare that contributes to an increase in the standard of living (Prahalad et al. 2009), and as a utilized competence-based competitive advantage that can emerge from scientific research, technology, business models, service solutions, design, brands or method of organizing work and production (VN 2008).

The innovation processes are very complex and insecure (Schienstock & Hämäläinen 2001). Innovation can be 1) demand-driven: growing demand stimulates the development of new products or 2) user-driven: engaging users as active participants in innovation activity (TEM 2015b) as co-innovators (Alexander et al. 2009). Historically, innovation has been understood only as technological development, but to become broad-based it needs both technological and non-technological contents that complement each other (TEM 2015g). Scientific and technological research creates new information (TEM

2015f) that is needed in order to have skilled people and close-knit communities to create innovation (TEM 2015a; TEM 2015e).

Innovation policy refers to “*public measures which influence the opportunities to innovate, the effectiveness of the innovation environment, and the creation and leveraging of innovation in the economy of society*” and a broad-based innovation policy supports the reform of policy sectors through innovation (VN 2008). In Finland, the Ministry of Employment and the Economy is responsible for most of those decisions on innovation policy, and coordination of the innovation system is managed by the Research and Innovation Council, led by the Prime Minister (TEM 2015d).

Nordic welfare model

The Nordic welfare model has the following characteristics: 1) a comprehensive public responsibility for basic welfare tasks; 2) a strong government role in all policy areas; 3) based on high degree of universalism; 4) income-based basic security for everyone; 5) strong commitment to the social and health sectors; 6) relatively even distribution of income; 7) gender equality; 8) tripartite cooperation based, well-organized labour market and high level of work participation, and 9) funding from taxation and redistribution (Kautto et al. 1999). The Nordic welfare model has led to the success of the Nordic countries in innovation policy because, in addition to the previous characteristics, it has a high level of basic education free for all citizens, and a culture of lifelong learning, providing well-educated and motivated people to the community, at all levels and for all areas (Miettinen 2013).

The Nordic welfare model faces the following challenges in the near future: 1) to include all in the labour market to provide income through taxes and social involvement; 2) to have an open debate, because welfare schemes affect all citizens; 3) to have the political courage to handle crises and prepare for globalization, aging population and the use of new technology; 4) to establish welfare technology as a strategic area, because the low birth rate will lead to reduced numbers of tax payers to support the welfare state; 5) to provide a high level of public responsibility and comprehensive social rights for all, and 6) to create a Nordic simulation model for calculating future welfare service needs (Norden 2013).

The Finnish national innovation policy

The economic crises of the late 2000s and inequality have stimulated an interest in the Nordic welfare societies, where competitive edge, social equality, high quality education and trust in institutions are combined. Finland was the first

country to present its national innovation system (NIS). The Finnish NIS has gone through various eras, from the 1980s technology-based approach, with a strong input from universities, firms and research institutions to a point in the 2000s when social innovation and broad-based innovation were introduced. The uncertainty of the global economy (TIM 2014)¹⁰ and globalization have changed the nature of innovation activities and competitive advantage in business.

Miettinen (2013), in his book *Innovation, Human Capabilities, and Democracy – Towards an Enabling Welfare State*, discusses the future of the Nordic welfare model. That model is facing major challenges with the adaptation to a globalized and rapidly changing working life and ensuring its citizens' welfare. Miettinen presents an enabling welfare state as the next stage in the Nordic welfare model. First, the Nordic model differs from other European models in its strong focus on the provisions of high-quality public services instead of the direct transfer of money. Second, because of the education of professionals in 1970s and 1980s, to provide services and the development of research, highly competent multi-professional communities now take care of education. Third, a welfare-state-organized education system provides the population with a huge potential for theoretical and practical knowledge in all areas of society. Fourth, decentralized public services have led to a tradition of municipality-level governance. Fifth, the people in the Nordic countries are more active members of different associations. An enabling state develops further, the activities and services and the system will become self-supporting, creating a high level of competitiveness and educated labour to provide taxes that maintain the welfare state as the basis for high quality research, education and innovation. The innovation model for an enabling welfare state, as proposed by Miettinen (2013), emphasises the bottom-up activeness of citizens' participation as part of innovation policy.

This thesis strengthens the position of organic food and its production in Finnish society by examining it as part of the Finnish national innovation system and the Nordic welfare model. There are various similarities in values and principles among the NIS, Nordic model and organic food production and also regarding the goals set for the future. It is crucial to prove the functionality and competitiveness of organic food and its production among the other branches of business. That gives organic food and its production legitimacy and access to various high level forums and incentives to enable its successful development.

¹⁰ Finnish Research and Innovation Board

1.9 The background and aims of the research

The current Finnish food chain is examined with the model of an activity system (Engeström 1987), (see Section 2.1). Within human activities, like those of the current Finnish food chain, there are always contradictions that will lead to the need to change the activity. The contradictions can be in an element (such as subject, object, rules, etc.), among the elements, or between two interacting activity systems (Engeström 2001). To develop the activity, the contradictions have to be identified and new solutions found to replace the old (Virkkunen & Ahonen 2011). The primary contradiction in all productive activity is between exchange value (money) and use value (quality) (Engeström 2016). In the organic food chain, this primary contradiction is between price and quality. In practical activities, these primary contradictions produce secondary contradictions between different elements of an activity system, and later, tertiary contradictions between old and new forms of activities. They can also be manifested as quaternary contradictions between neighbouring activity systems (Engeström, 1987).

In this research, the phenomena that prevent attainment of reaching the government organic goals are regarded as obstacles emerging from a specific kind of tertiary contradiction, namely that between the current Finnish food chain model and its unreachd outcome. The fact is that the previous organic goals have not been attained (Section 1.6). The current model of the food chain has not enabled reaching those goals and, according to the development trend, it is highly unlikely to reach the next goals set for 2020 (Figure 1.). The obstacles were identified by the literature and empirical research, and the Suggested Finnish Food Chain Model (SFFCM) was designed to correct the situation and to enable the outcome. The obstacles are:

1. **Scarce knowledge of organic food and farming:** According to the principles of the Nordic welfare model, high level education provides skillful professionals and research that enables innovations for the welfare and activity of the society (Miettinen 2013). The scarcity of knowledge (Article I) retards the development of organic food and production.
2. **Unbalanced power weakening the collaboration:** The centralization of the current food chain leads to confrontation, where the large-scale actors have the power (Niemi, Jansik & Huan-Niemi 2011) and the unbalanced power weakens the possibilities of collaboration (Article III).

3. **Reduced competitiveness and negative foreign trade balance:** Finland's competitiveness based on strong expertise has decreased (IMD 2013; 2015), and its foreign trade balance in food is negative (Herlin 2015). New operating models are needed to encourage renewal and transcending boundaries (OKM & TEM 2012).
4. **Legislation's inadequate influence to prevent the negative externalities:** The activity of the current food chain is guided towards sustainability with legislation (EC 882/2004 2004), taxation (MF 2009) and subsidies (European Commission 2014). Yet the food chain provides negative externalities to humans, environment and animals (Section 1.3).

These four obstacles show the contradictions between the current food chain activity and the requested outcome. Tewksbury (2013) has modified the model of the transition and system changes on a multi-level perspective designed by Geels and Schot (2007). There is a lock in the current socio-technical regime in dimensions of *competence*, *power relations*, *infrastructure*, *policy*, *technology* and *investments*. Developments in the society put pressure on the existing regime, which opens up for novelties such as niche innovations. Adjustments occur in the socio-technical regime and a new regime is generated. The obstacles can be assimilated to the aforementioned dimensions: 1) scarce knowledge of organic food and farming to *competence*, 2) unbalanced power weakening the collaboration to *power relations*, 3) reduced competitiveness and negative foreign trade balance to *infrastructure*, 4) legislation an inadequate influence to prevent the negative externalities to *policy*. The tertiary contradiction between the (unreachable) organic goals and the current food chain corresponds to the dimensions of *technology* and *investments*.

In this thesis, organic production is approached as a part of the Finnish food chain "from field to fork", because the whole food chain has to be developed in order to increase the volume of production and to reach the goals set by the authorities and the needs of the consumer. The food system influences the food chain through legislation, taxation, politics, trends, culture, etc. Another reason for focusing on the food chain is that the increase in agricultural area, processing, markets and consumption comes from the share of conventional food.

The research problem is to find a solution for how to develop a model for the Finnish food chain so as to improve the potential of reaching the goals set for organic food and its production by the Finnish government

The research process of this thesis involves several approaches, and its author has different motives that have been used in the examination of the organic food chain. At the beginning, he wanted to synthesize available consumer-driven research-based information on the food chain externalities as a comparison of two production methods, conventional and organic. That raised his interest in the differences between conventional and organic production and processing methods. When the Finnish government launched its current organic goals (MMM 2014), it became obvious to focus on food chain activity and possible ways of reaching the newly set goals. The reviews of consumer attitudes and food chain externalities are partly presented in this thesis and its articles. The author's personal interest was to qualify as a researcher and also contribute to the development of the Finnish organic food chain. His motives are discussed further at the end of Chapter 5.

The thesis is organized as follows. The theoretical part discusses the three theories chosen and their approaches to the research problem. In the methodology section, the research design, data collection and analysis methods that constitute the findings described in the articles are explained. The findings are presented in the summarized results and then related to the results of this thesis in a synthesis presented in the context of the Finnish national innovation system. The SFFCM and the path of actions for the change are dealt with in the discussion and analysed with SWOT (Houben et al. 1999). The conclusion provides ideas for further research and the appended articles give more detailed information.

2 THEORETICAL APPROACHES TO THE FINNISH FOOD CHAIN AND THE RESEARCH DESIGN

Three distinct theoretical approaches are used in this thesis. The research problem, *to find a solution to how to develop a model for the Finnish food chain to improve potential of reaching the goals set for organic food and its production by the Finnish government* led to the need to understand the activity of the current food chain and the interactions among its elements. Activity theory, AT, (Engeström 1987) offered a suitable model to analyse food chain activity. Consumer values, accepted in the Finnish food chain, were introduced into the activity model using the principles of co-creation theory, CC, (Payne, Storbacka & Frow 2008) and the economy of common good, ECG, (Felber 2015). The use of AT in this thesis differs from most other research that has used it: 1) in this thesis, the elements in the food chain context were identified from the literature and not from the food chain by analysing the activity using different methods; 2) the outcome was identified using the literature and Finnish government sources as the target of the activity when reaching the object, and 3) contradictions were specified and a change from the present activity model to the new one was designed. The activity model and the elements constituted a useful platform for analysing the Finnish organic food chain, but AT process itself, with its historical-cultural approach, was not used. The ECG was used in this thesis to introduce a sustainable approach, in addition to an economic one, to the Finnish food chain. Organic food and its production were related; consumers supported values that were included among the values of the ECG and a modified ECG Matrix (Appendix 1) was designed as an Organic Matrix (Appendix 2) for the Finnish food chain to lead it more towards sustainability and organic production. The core of the theory is: 1) harmony with the environment and economy while increasing everybody's quality of life; 2) competitiveness of the ECG companies by prioritization of customers with equal values; 2) common decision-making and rules, and 3) the community's contribution to ECG companies to develop the action plan to reach the goals set by the Finnish Government.

The food system and food chain end with consumption (Whatmore 1995; Hinrichs 2000), and the consumption of organic food is increasing continuously (Willer & Kiltcher 2010; Willer & Lernoud 2015). However, the consumers have been left outside of the decision-making apparatus in the food chain

(Kottila 2010), and have not been motivated towards making a bigger commitment to organic food. Consumers lack information about organic food and its production (Nuutila 2015). These problems can relatively easily be solved by making the consumers co-creators (Storbacka et al. 2012; Roser, DeFillippi & Samson 2013), co-innovators (Chathoth et al. 2013) and value creators (Grönroos 2011). CC theory builds the important link from the consumers to other parts of the food chain, on the one hand to motivate consumers to make sustainable choices, and on the other hand to garner consumer opinions and needs for production, processing and retail of organic food.

2.1 Activity theory

Cultural-historical AT offers a conceptual framework for studying human behaviour (Engeström 1987) and has been used in different studies and interventions, such as workplace learning (Owen 2001), musical interactions (Burnard & Younker 2008), digital technology (Rückriem 2010), healthcare (Greig, Entwistle & Beech 2012) and distance learning (Kang & Gyorke 2008). In the field of food systems, this theory has been applied to organic farming (Seppänen, 2004), to biogas production in the food chain (Pereira-Querol, 2011) and sustainable agriculture (Mukute, 2015). Activity is object-oriented and tool-mediated (Burnard & Younker 2008). The strength of the theory is that it draws attention to history and change, and therefore enables analysis of contexts of both institutional structures influencing everyday actions and the meaning assigned to the interaction by the participants (Owen 2001). The theory was created by Lev Vygotsky. The triad of *subject*, *object* and *artefact* explains the cultural mediation of actions. The first generation model remained individually focused, and Alexei Leont'ev developed it towards collective activity. The second generation model has new elements: *rules*, *community*, *division of labour* and *an outcome* of the activity, and it offers a representation of activity that mediates interaction among individuals, groups and collective motives. The third generation model has two interacting activity systems (Engeström 2001; Avis 2009; Bakhurst 2009). In the second and third generation models, the rules are between the subject and community, and the rules enable or prevent the subject reaching its object. The division of labour is between the community and object, and the division of labour enables or limits the subject to reach the object. Artefacts enable the subject to reach the object. Community combines the subject and the object and the objects become outcome (Lim & Hang 2003;

Roine 2005; Engeström 2008; Kang, Gyorke 2008; Seaman 2008; Larkin 2011; Virkkunen & Ahonen 2011). There is a connection between all elements, and they act both ways (McAndrew, Taylor & Clow 2010) (Figure 2).

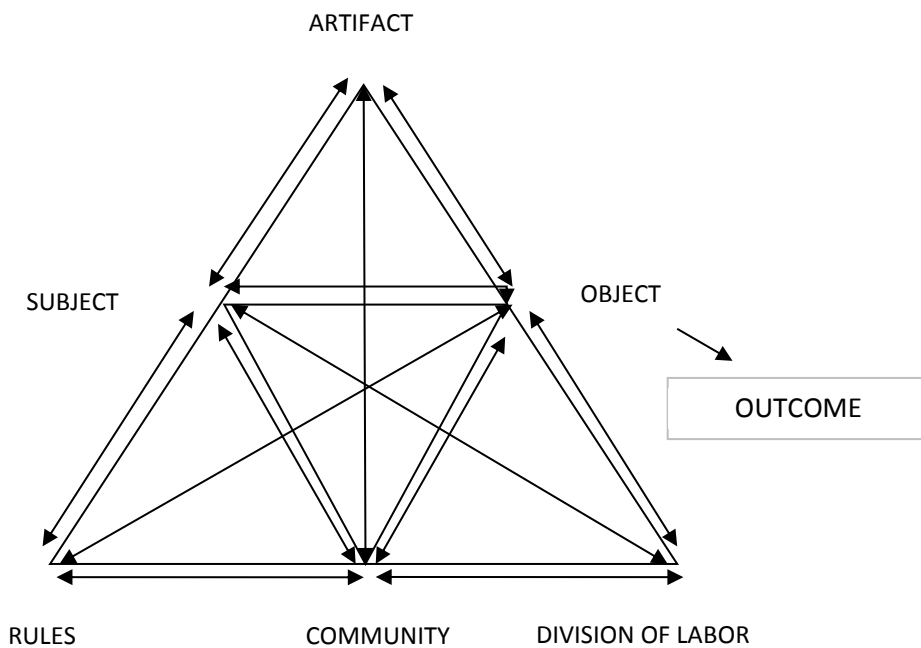


Figure 2. The second generation model of AT based on Vygotsky's model. There are six interacting elements and an outcome of the activity (Engeström 1987: 2008)

Asking questions helps define the elements: *In what way is the subject interacting with the community to interpret the rules?* (McAndrew, Taylor & Clow 2010) or *What is your goal? What resources do you need?* (Yamagata-Lynch & Smaldino 2007). The data can be collected by interviewing and observing people and by analysing the literature so as to identify the subjects, objects and other elements (Lauche 2005; Anthony 2012). There can be several subjects, and they can act at a semiotic or a technical level (Engeström 1987), e.g. the subject can be a teacher or a user of the Moodle-system, and the object can be the planning of the course or the implementation of the system (Engeström 1987; Blin & Munro 2008). The elements are named according to the context, as in research on air traffic control (Owen 2001) the controllers' object is to control the air traffic successfully and the artefacts are radar, maps and radio used to reach the object. The work is guided by rules and air traffic

control procedures. The controller belongs to a community with other controllers and aviation employees.

It has also become part of the educational discourse and projects develop in positive directions (Martin & Peim 2009). The model helps the participants discuss personal, group and partner level goals, and it has components that enable the analysis of customer relations (Yamagata-Lynch & Smaldino 2007).

2.2 Economy of common good

The ECG is a tool for political, social and economic change, whose goal is to increase everybody's quality of life, instead solely of the wealthy of few, by supporting and advancing human values and rights and environmental responsibility in companies' everyday actions. The ECG is suitable for companies and actors of different sizes, and the goal is to acquire a market benefit for them with other ECG-oriented companies through their choices. The basic idea comes from the doctrines of Aristotle, Cicero and Rousseau. An association was founded in 2011 to promote the theory and to make it widely recognized (ECG 2014).

The present system centralizes the wealth among few people, leaving the poor without money (Cobb 1995), and that leads to inequality: privately owned schools, highways with road tolls, telephone, security and rail companies. The community should secure those services for all citizens (Ogletree 2002). The maximization of the profits leads to: 1) centralized and misused power; 2) cartels that are founded to prevent competition; 3) countries that compete for companies with less strict environmental legislation; 4) price formation that is inefficient; 5) increased social confrontation and threat; 6) basic needs that are not met; 7) environment destruction; 8) imports (meaning) disappear; 9) values decay and 10) paralyzed democracy (Felber 2013).

The ECG model aims at a future that is built on communal principles in harmony with the environment and a sustainable economy, where local and national activity is preferred to global activity (Daly & Cobb 1989). At the political level, the theory aims at influencing legislation and moulds it to be supportive of the common economy, and at the social level at influencing all actors, motivating them to cooperate (ECG 2014). The common good of each community is built by the members that understand it and are willing to share it with others (Argandoña 1998). With a more efficient use of sustainable natural resources, the global system can tolerate increasing consumption by the poor, only if the consumption of the rich remains the same (Cobb 1995).

Local products are more competitive than those products generated in countries with cheaper labour if the production is based on common rules, e.g. on minimum wages, occupational safety and environment protection (Cobb 1995). It is possible to produce commodities such as food locally (ECG 2014), but the production of cars, for example, can be national and international (Cobb 1995). In the ECG model companies are more competitive because their values and goals are equal to those of their customers, and that makes the customers prioritize their products, bringing them a bigger market share (ECG 2013: 2014). The common good of a company is not the sales volume or financial result, but fulfilment of the company's meaning as a company: creating circumstances that enable the personal goals of all people (Argandoña 1998). The positive, ethical, social and ecological actions of these companies create expenses, and the community should be compensated with lower taxation, lower loan rates and public procurement deals (ECG 2014).

The ECG association has created an ECG Matrix (Appendix 1) to support the change of activity and the evaluation of the action. The actors of the value chain (food chain) are evaluated using the same value criteria: human dignity, cooperation and solidarity, ecological sustainability, social justice and democratic co-determination and transparency. An official report is written after the evaluation (ECG 2013; Felber 2013;). The higher the scores, the stronger the support from the community with lower VAT, lower customs' duties, better deals with bank loans, priorities for contracts with public procurement institutes, co-operation with research institutes and direct subsidies (Felber 2013). The matrix is under a constant development process (see <https://wiki.gwoe.net>).

2.3 Co-creation

The principle of CC is that the customer (consumer) is the benefiter, value creator and possibly also co-designer (Grönroos 2012). Quite often, customers are not listened to or understood, and therefore the actors should: a) establish the customers' needs (not same as desires or hopes); b) involve the customers in open conversation as open questions reveal a lack of competence; c) create trust by open interaction, that could be used to increase market knowledge, and d) discuss only feasible solutions and present them in a realistic way (Gylden 2012). CC is a political form of power that aims to create different life styles for consumers (Zwick, Bonsu & Darmody 2008). CC with a customer is not always self-evident, but sometimes a company has the possibility to co-create value

together with its customers (Grönroos 2011), which can be another company or a customer (Ordanini & Pasini 2008). CC is getting the customer involved in a service or a product creation that needs innovation together with the customer (Chathoth et al. 2013).

Consumption is linked to production (Etgar 2008). Value creation is linked to a customer's values, when CC is interactive (Grönroos & Voima 2013), and once the customer's values have been accepted, becomes for the customer a value-creator and the company a value co-creator (Grönroos 2008). CC is built on knowledge-sharing and openness (Ordanini & Pasini 2008). Each member supports the network with their own knowledge and the possibility to share others' knowledge motivates the members (Haukkamaa, Yliräisänen-Seppänen & Timonen 2010). One missing person can prevent the others from reaching the common goal. It is important that there is: 1) openness among the participants: it makes for a strong network; 2) good cooperation based on mutual trust, and 3) shared knowledge increasing the motivation for CC. When planning a service chain, the nature of CC values has to be understood to be able to respond to stakeholder motivation (Haukkamaa, Yliräisänen-Seppänen & Timonen 2010).

Co-production and CC form a continuum with service innovations and customization of services. The forms of creating services are built with the co-innovation of the customers (Chathoth et al. 2013). The openness of the customer is important in co-production, otherwise the service provider cannot maximize the benefit provided by the cooperation (Ordanini & Pasini 2008). Co-production has the following features: 1) creating suitable circumstances; 2) identifying the motivators to commit to the consumers; 3) counting the profits and expenses of co-production; 4) co-production is activated once the consumers are committed and 5) creating the products and evaluation of the results (Etgar 2008). The most important thing in CC is to listen to the customers/consumers and establish and define their needs. The customer has to be involved in an open discussion with the best experts, and their shared knowledge increases mutual trust, and as a bonus the information can be used for a company's marketing purposes (Gylden 2012).

2.4 Integration of the three theoretical approaches

The three theories were used to create a new hypothetical model for the functioning of the Finnish food chain. Figure 3 shows the current situation of the food chain and system as well as the government's set goals (MMM 2014). The

previous goals have not been reached (Section 1.6), and it is uncertain that the current food chain model will reach the next goals.

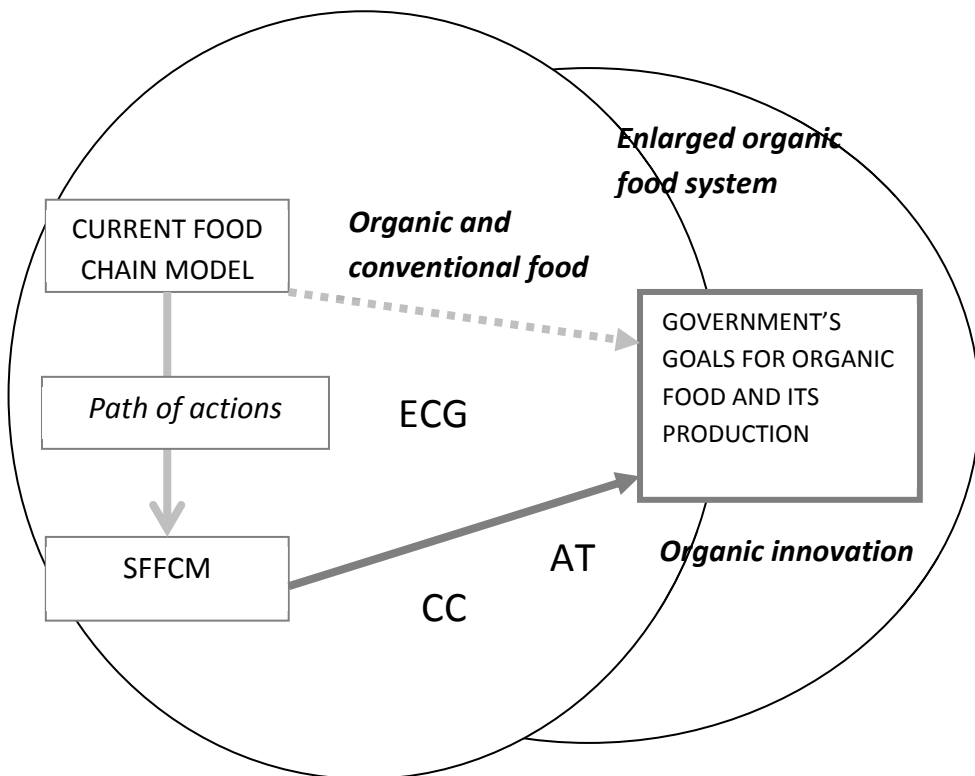


Figure 3. The three theories, AT, ECG and CC, in the context of this thesis, creating a suggested Finnish food chain model (SFFCM) that takes the challenge to enable the goals set by the Finnish government (MMM 2014) to be reached. The current model does not lead to the required outcome. AT represents a method by which to analyse and demonstrate the current situation, which is changed with an action plan and follows the principles of CC and ECG towards the SFFCM, which accepts organic food and its production into the national innovation system and promotes reaching the government goals.

AT serves as a model for analysis of the elements that interact in the food chain. CC creates a strong bond among the food chain stakeholders (agriculture, industry, retail and catering) and the consumers as end-users. That increases the exchange of information and mutual target setting (Grönroos 2012). ECG is partly modified – not violating its fundamental doctrines – to fit even better into

the food chain context so as to ensure the common good values to be taken into account. Following the principal ideas of all three theories, the current Finnish food chain model (that does not reach the goals) is modified into a suggested Finnish food chain model (SFFCM) that concentrates to take the challenge to enable reaching of the goals. CC and ECG are used to create an action plan and an Organic Matrix, modified from the ECG Matrix, to evaluate the actors' performance. SFFCM enhances the acceptance of organic food and its production into the national innovation system, and will increase the share of organic food and its production.

2.5 Research design

The research was conducted between 2010 and 2015. The thesis is based on relevant literature as well as literature on the three theories and associated methodologies. The link to the Finnish food chain actors was created using a survey and focus group discussions. The research design is shown in Figure 4. Initially, focus was on *the acceptance of superior quality attributes of organic food in the Finnish food chain*. At the beginning, two reviews were carried out: one of European Union consumer attitudes towards organic food and its production, and another on the externalities of the food chain, focusing on the safety and healthiness of the food and the ecology and ethicality of its production. That data has been partly used in Sections 1.1 – 1.4 and in the introductions of the articles. A survey was carried out among the Finnish food chain actors in order to understand their acceptance of organic food and its production in different parts (environments in Article I) of the food chain (Article I). AT made possible analysis of the food chain activity and the first stage model was created (Article II) with a CC link to the food chain actors to enable collaboration and common target setting and with a minor ECG approach. In 2014, the ECG brought the missing tools for the conversion from the current model to the second model, which is more sustainable and economically attractive (Article IV). An exploratory focus group study (Article III) was designed to obtain support for two of the major challenges that prevented development of the organic food and its production according to the literature and interviews presented in Section 1.4. Article IV concludes the thesis.

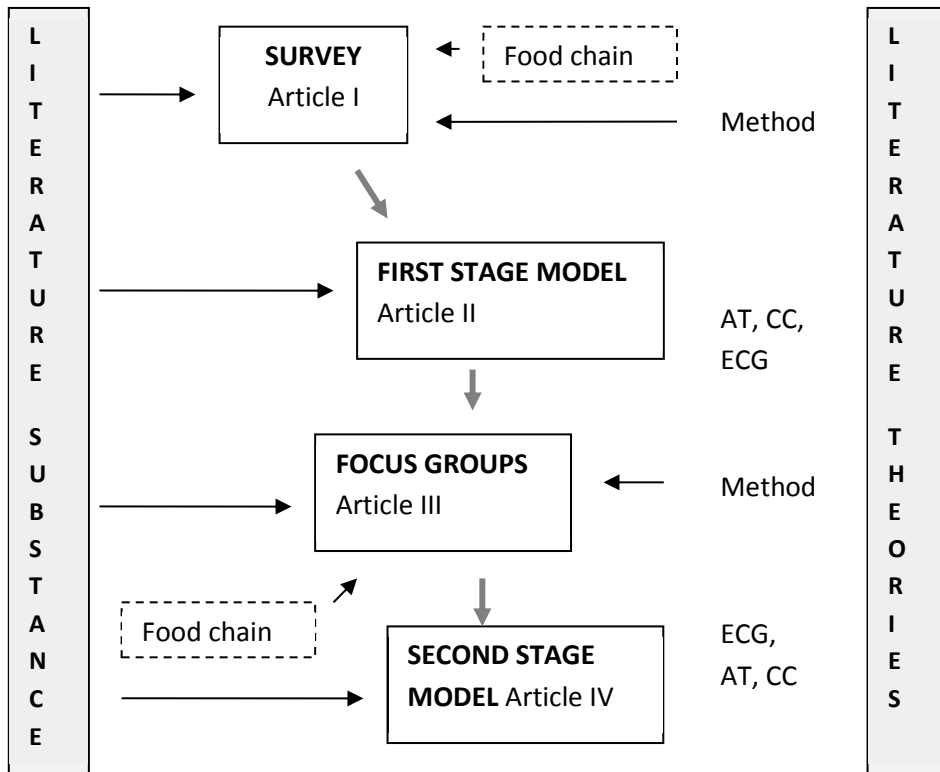


Figure 4. The research design with all stages and articles included in the thesis. The Figures (I-IV) indicate the articles. Literature on consumer studies provided data for the survey (Article I) conducted among the Finnish food chain actors. The survey provided data for the first stage model (Article II) based on the AT model and the principles of CC, and ECG. Focus group analysis conducted among the Finnish food chain actors (Article III) supports the second stage model (Article IV) that is created following the principles of ECG and CC for the AT model

2.6 Data and analysis

The most commonly mentioned quality attributes of organic food and its production (Sections 1.1 – 1.4) were presented at the national level using the survey (Article I). The thesis discusses food chain activity at the national level with its first and second stage models (Articles II and IV), and also at the local

level with the focus group analysis (Article IV). The data and the methods chosen are explained more thoroughly in each article.

The data for Articles II and IV is based on the relevant literature: peer-reviewed articles and official Finnish government and European Union documents. The research method and analysis were created using the three theories chosen: the AT model and its elements as the method to form the SFFCM and associated literature chosen to support and complete it using the principles of CC and ECG. The elements, as well as interaction among the elements, supported by the literature, were analysed to create the more developed model, with the requested outcome (Article IV).

AT principles provided the method of analysis and these were used in these two articles (II and IV) in an inverted manner from the outcome set by the government towards the object and other elements by answering the following questions:

1) How can the food chain provide the outcome: larger volume of organic food to reach the goals set by the Finnish government; availability of ECG principles for e.g. to reduce the negative food chain externalities; and fair financial profit for food chain actors following ECG principles

2) What objects will lead to the demanded outcomes? The present food chain provides food, but, according to the literature, it has negative externalities (Section 1.8). The volume of organic food is not sufficient to reach the goals (MMM 2014) and it does not lead to the desired outcomes.

3) What tools (artefacts in AT) will enable the subject to reach the object? With the present tools, the object has not been reached, so the tools have to be changed or modified to include the values of sustainability and organic food and its production set by the food chain actors according to the principles of ECG (ECG 2014).

4) Who are the subjects of the activity of the food chain? The actors from different parts of the food chain form the subject of the food chain activity, but the consumers have been left outside the decision-making in the food chain (Kottila 2010) and have to be included as co-creators (Payne, Storbacka & Frow 2008).

5) What are the rules that guide and control the activity of the food chain? What is the role of the food chain actors in the policy actions and legislative process?

6) *What is the community of the subjects? According to the literature, the activity is more at the level of individual food chain parts than at the common food chain level (Kottila 2010).*

7) *How is the power (division of labour in AT) divided among the food chain actors? The literature supports the argument that the price margin is getting wider (Niemi, Jansik & Huan-Niemi 2011) and that the retail companies are using their power when buying and selling food (Kuosmanen & Niemi 2009; Richards & Pofahl 2010).*

Article I represents a survey covering 1,527 respondents from different parts of the Finnish food chain. The actors were approached through their interest groups, and the consumer part of the study was outsourced. The aim of the study was to establish the acceptance of the most common quality attributes of organic food and its production (*safety and healthiness of food and ecology and ethicality of production*) from Article I. In addition to the demographic questions (Appendix 3 for the questions and Appendix 4 for the demographic description of the respondents), the respondents had to choose between organic and conventional food on the basis of the safety and the healthiness of the food and the ecology and ethicality of the production. There were also questions about the availability of the information concerning the above-mentioned quality attributes, and also about the support from the respondents' food chain part regarding their opinions concerning those quality attributes of organic food (Appendix 5). *Weppol* automatically transfers the data to *Professional analytics* for the statistical analysis program. The data was in ordinal and nominal format and the analysis covered the p-value, share (%) and Pearson correlation.

Article III was a focus group study containing two groups, one regional and the other national. The members were from each part of the food chain with either regional or national level civil servants. For the discussion of the focus groups, two challenges were presented to support the arguments from Article II: *the lack of food chain level community and the uneven distribution of power in the food chain*. The local focus group discussion was documented on video and the national discussion was voice-recorded. The discussions were transcribed and all statements were assigned an identification code according to the respondents' status. The nature of the discussion was coded according to qualitative features (supportive, doubtful, constructive and critical). The national focus group was more active than the local one. Direct citations were chosen to support and explain the results. The table (Figure 5.) was divided into four areas: A: local, from small- to medium-sized enterprises cooperating at food chain

level, B: national, from medium- to large-sized enterprises cooperating at the food chain level, C: local, from small- to medium-sized enterprises acting and cooperating at their own food chain part level (e.g. farms) and D: national and international, large-sized enterprises cooperating at the food chain level for logistical reasons (e.g. food industry and retail chain companies). The data and the analysis of Articles I and III are explained in Table 1.

Table 1. The data, research questions, research method, analysis and outcome of articles I and III.

Article	Data	Research method and data analysis	Research questions	Outcome
I Survey	<ul style="list-style-type: none"> - 1,527 respondents: agriculture 136, industry 50, retail 87, catering 158, consumers 1,096 - approached via interest groups, professional associations - consumer part outsourced 	<ul style="list-style-type: none"> - quantitative study - Wepropol for the questionnaire - Professional analytics for the data analysis 	<ul style="list-style-type: none"> - how do the actors of different parts of the food chain accept the quality attributes of organic food and its production? - are there differences and similarities in different parts of the food chain? - does the food chain part support the opinions? - is there enough information available on the quality of organic food and its production? 	<ul style="list-style-type: none"> - the acceptance of the quality attributes in the different parts of the Finnish food chain - the support of the food chain part for opinions on organic food and its production - the information available on organic food and its production
III Focus group analysis	<ul style="list-style-type: none"> - 12 members for the regional focus group (10 came) and 12 members for the national focus group recruited from the target groups - discussion in focus groups about the topics given - focus group members' vision of the organic food chain in the future (fourfold table) 	<ul style="list-style-type: none"> - qualitative study - the data from video or tape transcribed - the core messages from each statement were coded by the nature of the statement (supportive, doubtful, constructive and critical) - the direct citations were chosen to support the results and to explain the similarities and differences - the members' vision in the fourfold table was analysed by the areas formed by the two axes 	<ul style="list-style-type: none"> - what are the members feelings, beliefs and opinions on arguments presented? - what are the members' visions for the organic food chain activity in the future? 	<ul style="list-style-type: none"> - the agreement of the focus groups for the challenges - unawareness for the meaning of the common community - no idea how to change the imbalance in power - similarities and differences in regions and food chain parts - focus group members' vision on the future community and activity of the organic food chain

3 SUMMARY OF THE BASIC ARTICLES: TOWARDS THE MODEL 2020 GOALS

The articles and their mutual interactions are presented in Figure 4. The major findings of the articles are presented in this section, but more precise findings are to be found in each article. The SFFCM is explained largely when presenting Article IV.

In Article I, *Acceptance of the most common quality attributes of organic food in the Finnish food chain*, the acceptance of *safety, healthiness, ecology and ethicality* were tested among the actors of different parts of the Finnish food chain (agriculture, industry, retail, catering and consumers). The respondents (N=1527) were also asked about the information available on the named organic quality attributes and their food chain part’s support for their opinions. The share of the total positive opinions on organic quality (safety and healthiness of food and ecology and ethicality of production), all attributes included, was highest for *catering* and lowest for *industry*. *Retail* was the most supportive part of the food chain and *community* the least. Community is regarded here as the consumer’s part of the food chain. Information on the organic quality was most available for *industry* and worst for *community*. See Table 2 for major findings and the tables in Appendix 6 for the detailed results.

Table 2. Summary of the results of the survey (Article I).

Attribute	Most positive	Least positive
Positive opinions for safety and healthiness of organic food and ecology and ethicality of its production		
Safety	catering 80%	industry 58%
Healthiness	catering 78%	industry 62%
Ecology	catering 83%, retail and consumers 82%	industry 67%
Ethicality	catering and consumers 87%	agriculture 76%
Support from the food chain part for the positive opinions		
Safety	retail 81%	consumers 48%

Healthiness	retail 81%	consumers 47%
Ecology	retail 78%	consumers 49%
Ethicality	retail 82%	consumers 52%
Information available on safety and healthiness of organic food and ecology and ethicality of its production		
Safety	industry 74%	consumers 52%
Healthiness	industry and agriculture 68%	consumers 52%
Ecology	industry 71%	consumers 52%
Ethicality	agriculture 70%	consumers 53%

In Article II, *The Finnish organic food chain – an Activity theory approach*, the well-accepted quality attributes of organic food and its production (Article I) were placed in the first stage of the SFFCM. The current food chain is described using the AT model, and the major findings are that the requested outcome (government goals) is unattainable because there is no food chain level collaboration, common community or rules, consumers have been left out of the decision-making, the division of power is unequal and the evaluation of the activity is based on quantitative measures. The food chain produces organic food, but not enough, and its development is slow. There are suggestions for improving the situation using CC principles and placing organic quality attributes besides the quantitative measures and gaining strong support for those from the common rules and from the government. The interaction within the food chain and with the consumers leads to increasing market awareness of quality and quantity of the production and product, which is regarded as a sign of healthiness of the market (Daly, Cobb 1989) and will lead to an increased share of organic food and its production.

Article III, *Two main challenges that prevent development of organic food chain at local and national level - an exploratory study in Finland*, tested two major findings of Article II, *no common community* and *unfair share of power* in focus groups. The members were unanimous regarding the first argument except for one consumer, who said that it is not feasible. Many agreed that the consumers have been left out of the food chain and that their opinions could be taken into account better. Lack of cooperation and centralized business prevents the creation of a common food chain level community. Members were sceptical regarding the benefits of such a community, but mentioned the good actions of

Pro Luomu ry that unites the organic stakeholders. All members were unanimous that power is not equally divided; some accused retail chain companies and some were satisfied with the situation. One of the reasons for the unequal share of power was the underdeveloped capability of other stakeholders to control marketing against the marketing power of two retail chain companies which had grown too big. The food safety authorities were criticized for misusing power and for bureaucracy. The national interpretations of the European Union common legislation is that it is working against the food chain.

The collaboration of the food chain has to include authorities as well. In the discussions and with the fourfold table (Figure 5), it was seen that organic production in the Finnish food chain will be diverse, with continuous development according to locality and volume. Clearly 20 (from a total 22) focus group members located activity in the future close to the food chain level that indicates a need of other actors. The diversity of the food chain can be comprehended as small- and medium-sized companies operating on a local and national level as well as large-scale operating companies on national and international markets. Keeping the food chain at the farm level and owning the product up to the consumers helps to avoid extra costs and a large price margin that is visible and becoming a trend in the organic meat producing farms. There is constant development in the food chain. The results of the fourfold table were placed on Hollings' (2001) model of adaptive cycles of economic, ecological and social systems (See Article III).

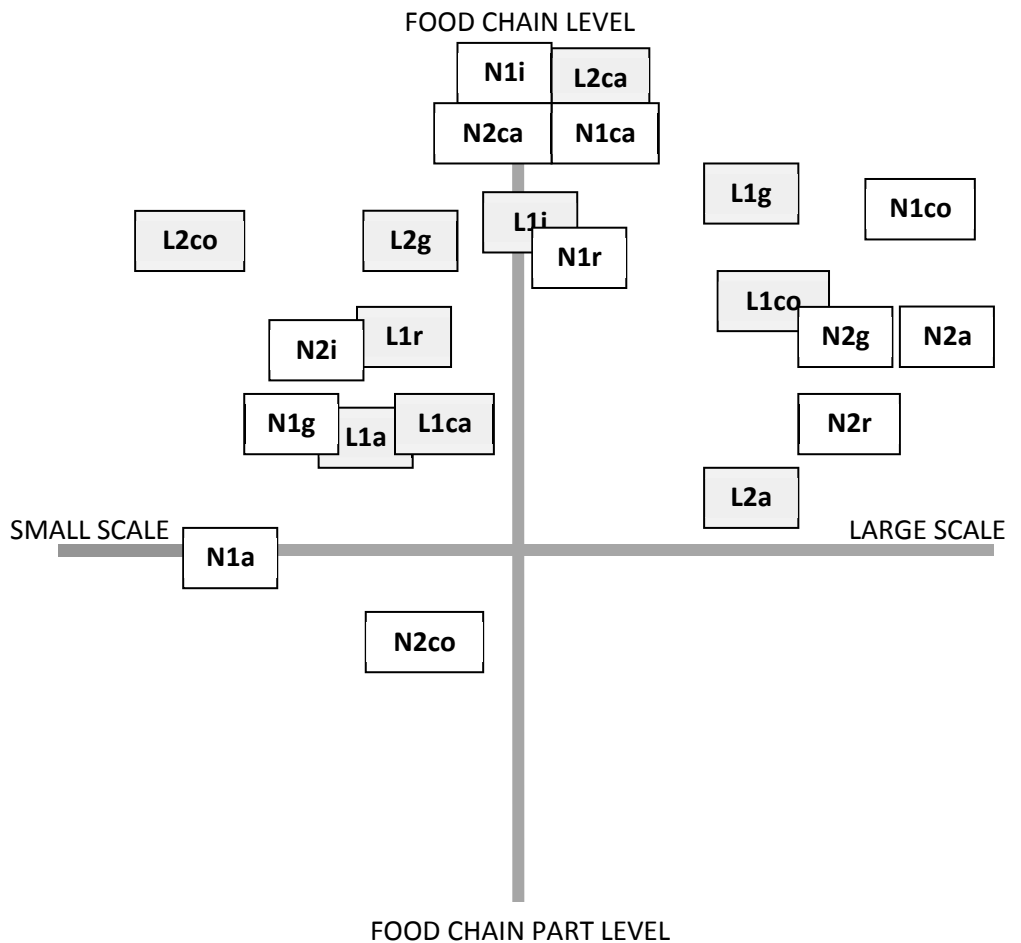


Figure 5. Fourfold table of the focus group discussion indicates the members' vision of the organic food chain activity. Grey boxes are local and white boxes national level actors. The codes are explained in Article III. The activity is mainly on the food chain level and evenly divided among small, medium- and large-scale operations. One farmer and one consumer see the activity on a farm and speciality shop level

Article IV, *Reaching goals for organic food in Finland – which changes should occur in the food chain?* concludes the study of SFFCM and presents the second stage model. The model is based on the fact that transition to organic production takes time and, therefore, the principles of the model simultaneously develop sustainability in the whole food chain and prepare it for organic activity.

The current situation is similar to that presented in Article II, but it has three outcomes: 1) *government goals* for organic food (MMM 2014); 2) *accessibility*

of common good by the activity of SFFCM that could be able to reduce the negative externalities of the current food chain (Section 1.3 and Article IV), and 3) *fair financial profit* for the food chain actors when their customers prioritize their common good services and products providing them with a larger market share. The current activity does not reach the goals set, the actors are not collaborating sufficiently at the food chain level, the consumers are left outside the activity, the power is unfairly divided among the actors, the possibility of interfering in the legislative process is poor, and the tools are based on profit-making processes based on unhealthy competition.

Article IV suggests a model that may lead to the desired outcomes (Figure 6). In the model: 1) the community and co-operation is widened, and actors in the food chain operate at the food chain level with the consumers as co-creators; 2) the division of power is more equally shared among the actors, and different parts of the food chain are enhanced by the alternative marketing channels; 3) the food chain actors have better opportunities to influence the decision-making processes of the legislation and taxation to the benefit of the common good of the food chain, and the government interaction becomes more efficient; 4) the food chain actors modify the tools according to the principles of the ECG and organic production so as to enable creation of sustainable and organic food; 5) tools enable producing, processing, selling, preparing and consuming organic food as well as instruments of collaboration, and 6) the volume of organic produce increases so as to meet the goals set as outcomes of the food chain activity. The larger share of sustainable and organic food production reduces the negative externalities of the food chain, promoting more common good and a bigger market share and profit for those who follow the mutual common good rules. The activity of the food chain and the development of the SFFCM are driven by the food chain actors.

The following actions are needed to ease the transition from the current situation to the SFFCM: 1) improved awareness of ECG and CC principles by a wide range of education, 2) multi- and cross-disciplinary scientific research to provide understanding of the organic food chain phenomenon, 3) science-based information to all actors and authorities, 4) stronger government intervention e.g. with taxation, 5) control of the organic food chain given to a third party, and 6) strengthening the activity of Pro Luomu ry and including consumers in its organic promotion of interests.

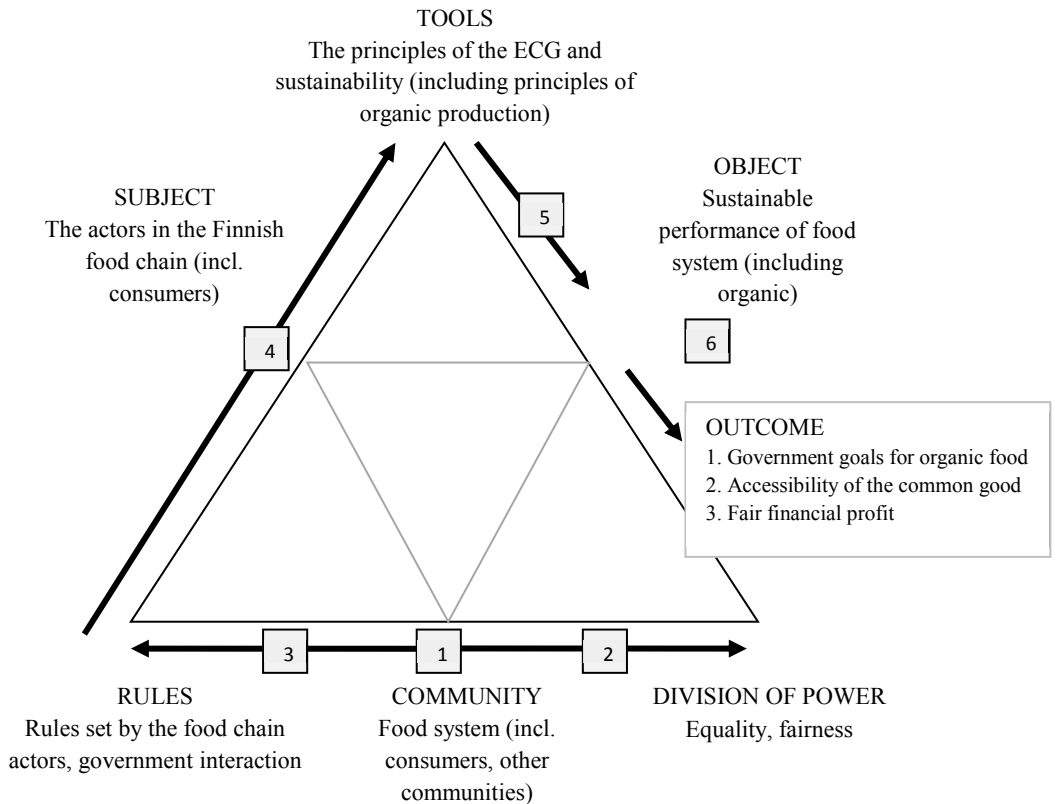


Figure 6. The SFFCM that enables realization of the goals set by the Finnish government for organic production. The model is modified from the activity theory model (Engeström 1987), and it has a strong consumer approach (Grönroos 2011) and the principles to create the common good (ECG 2014). The change from the present model is: 1) the food chain level activity of different parts of the food chain; 2) their willingness to achieve a better division of power; 3) their influence to include their values linked to legislative issues and taxation; 4) using those values when modifying the tools of the food chain; 5) having the right tools to attain the object, and 6) producing a sufficient volume to achieve the expected outcome (Article IV).

4 SYNTHESIS OF THE SUGGESTED FOOD CHAIN MODEL IN FINNISH NATIONAL INNOVATION POLICY

In this section, the results of the fourth and concluding article are synthesized within the framework of the Finnish National Innovation system (NIS) (VN 2008; OKM & TEM 2012; TEM 2015g) (Section 1.8). The reason is 1) to view SFFCM as an active part of innovation systems, 2) to legitimize the research into and innovation of organic food and its production among national spearhead projects with its own organic SHOK, and 3) to present a path of actions to enable change in the food chain model so as to meet the required goals and to fit in with the principles of NIS. *The government's communication of Finland's national innovation strategy to parliament* in 2008 (VN 2008) presents a model for basic key development areas for the innovation strategy. It comprises four basic choices and eight development guidelines or focus points. It covers the areas also presented in the NIS's that followed after it (OKM & TEM 2012; TIN 2014; TEM 2015g). In all NIS's innovation is expected to increase the competitiveness of companies and supportive actions to enhance growth in entrepreneurship and international business.

The NIS activity is now kept among the chosen companies and research institutes, and it aims to be demand- and user-driven (VN 2008), so in theory NIS is unreachable for the citizens. The Nordic welfare system promotes interaction between the citizens and the government (Norden 2013) and that could be included in innovation activity as well. *"In the inception of innovations, skilled people and close-knit innovation communities are crucial. Indeed, innovations are most often the fruit of new combinations of competencies crossing industry and disciplinary boundaries."* (TEM 2015e). The next step of the Nordic welfare state is described as being self-supporting societies with municipality-level governance with highly educated and participatory people (Miettinen 2013). Figure 7 shows the action paths from the current food chain towards SFFCM (that enables reaching the required outcomes, Article IV) and the Finnish NIS (VN 2008). The arrows show the paths of actions needed for the change in the food chain model and for the legitimization of the created SFFCM among the national innovation spearheads and brands. Food chain actors are strongly present in all activities, because SFFCM is a food chain actor driver and based on CC principles that enhance the demand and user orientation and gather innovative individuals, enterprises and communities together.

In addition to the government’s duty to enhance sustainability in the food system, the food chain actors are themselves responsible for creating suitable conditions and activities needed for organic growth and the development of SFFCM. The NIS strategic choices are presented one by one, first in general and then in the SFFCM context, followed by the paths of actions. The actions are summarized in Table 3. The food chain actors and communities are heavily involved in planning, innovations and setting the mutual goals following the CC principles (Grönroos 2011).

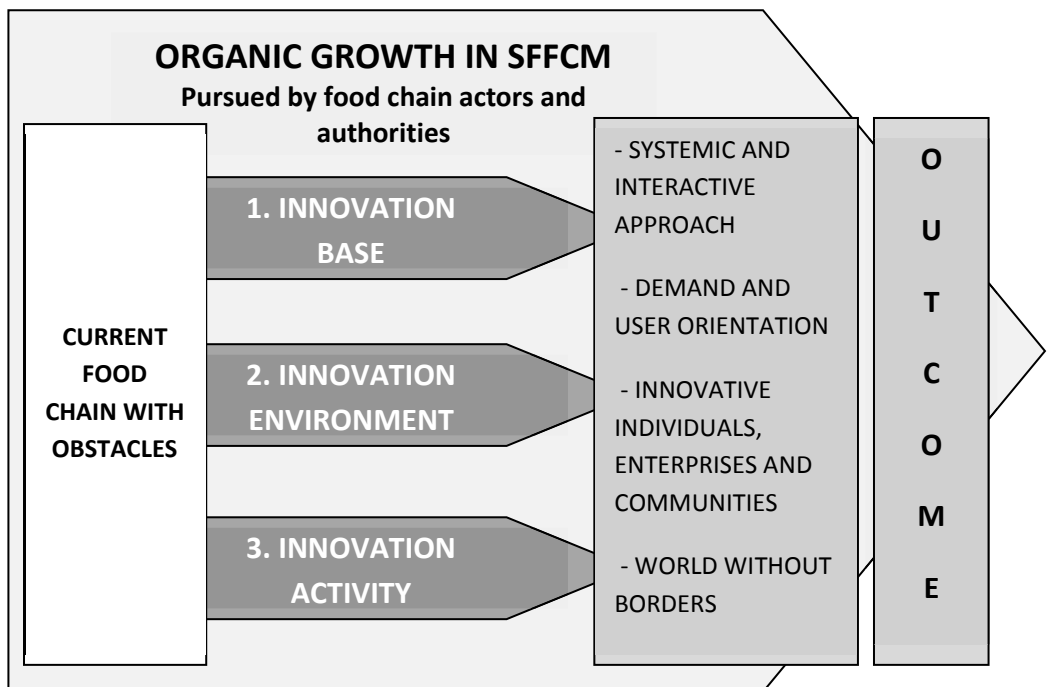


Figure 7. Paths of actions lead to the change from the current food chain model to SFFCM that leads to the requested outcomes by the growth of organic production and markets. They also legitimize and involve SFFCM in NIS basic choices. The activity is food chain actor driven and gathers individuals, enterprises and communities for demand and used orientated innovation.

4.1 Competence base

The success of the Finnish NIS is a result of a strong competence based on the democratic Nordic welfare model (Norden 2013) that secures high quality education and a tradition of life-long learning, providing citizens with high professional qualifications and research for innovation (Miettinen 2013). One's own competency also forms the basis of the capability to receive knowledge and competence generated elsewhere. *“The fact that innovations often arise as new combinations of various competencies crossing disciplinary and industry boundaries only serve to emphasise the importance of an extensive competence base”*. (VN 2008). According to the principles of innovation policy, the education has to be of high quality at each school level to provide qualified students to different industries and research institutes so as to facilitate the innovation process (Miettinen 2013). A strongpoint in the Nordic model is democracy, providing income security, gender equality, a well-organized labour market and public responsibility for social and health tasks (Kautto et al. 1999). It has the same values and targets as the ECG implemented to the SFFCM: fairness, an opportunity to influence the decision making by democracy and a system that provides the common good for all. Scientific research-based information is needed so that the change towards the new *Enabling Welfare State* in Miettinen's book (Miettinen 2013) and towards the SFFCM in this thesis will happen. Continuous R&D efforts are needed to develop practical activities of the organic food chain to better correspond the organic principles and sustainability demands. NIS is based on competitiveness and it comes from the solid competence basis and that has to be further reinforced by strategic choices: innovation activity in a world without frontiers, demand and user orientation, innovative individuals and communities, and a systemic approach (VN 2008). Those four basic choices are implemented in the SFFCM innovation model.

4.2 Basic choices of the Finnish national innovation system

Systemic and interactive approach

Innovation policy must be broad-based and comprehensive so as to enable meeting the global challenges. A systemic approach is needed when implementing a broad-based innovation policy, which promotes the

comprehension of vast integrities such as environmental problems, public service efficiency and regional innovation centre constructions. The focus is on comprehensive renewal of entire systems rather than on partial solutions. Uniform standards facilitate the extensive utilization of innovations and the development efforts aiming at reforms. (VN 2008) A successful innovation policy needs lower sector boundaries, closer collaboration and global networks (VN 2008).

Government and public institutions need to play an active role in engaging in interdependent relationships with private sector enterprises and organizations via collaborative networks (Prahalad et al. 2009). The need for collaboration in the food chain has increased because of the globalization of the markets and quality managerial requirements. Collaboration among the food chain stakeholders is stronger when the actors are highly integrated. Both scholars and actors are needed, in collaboration, to function and organize the markets (Callon, Méadel & Rabeharisoa 2002). An important part of the interaction between the food chain stakeholders is information. It could be improved by outside stakeholders, and their role could be supportive by managing and providing the information (Kottila, Maijala & Rönni 2005).

A systemic approach in the food chain is an approach from field to fork, oriented towards consumer expectations (Kahl et al. 2011). The SFFCM represents an entity that covers the entire food chain and interacts with the national and global food system. The model has a broad-based Organic Matrix (Appendix 2) with a systemic approach to develop and evaluate the sustainability, quality and competitiveness of the activity. The collaboration of the food chain actors forces them to focus on the entire food chain and to understand the interconnection of separate food chain parts solutions. The organic standards (European Commission 2010a) and principles (IFOAM 2016) as well as the principles of ECG (2014) with the support of the Organic Matrix (Appendix 2) form the uniform standards of SFFCM, and the actors have an opportunity to influence the rules and standards (Felber 2015). Strong interaction among the food chain actors is needed in order to accept a fairer division of power and to set mutual targets, rules and tools. The “selling” of the new model takes place on 1) an individual level with communication and marketing campaigns targeting different strategically important audiences, 2) a social-network level by identifying the popular opinion leaders within all areas of society, including government and commercial sectors, 3) on a community level by social norms campaigns and 4) on a regional level improving the availability of products and services that lead people to remove structural barriers to behaviour change (Maibach, RoserRenouf & Leiserowitz 2008).

Demand and user orientation

“Competitive strength is often based on ability to realize the needs of customers, consumers and citizens before competitors do, and to offer corresponding products and services.” (VN 2008). Instead of focusing on the development of new technologies and success measured by investments and outputs, the new broad-based innovation policy focuses on developing products and services that meet the customers’ needs, and on strengthening the user’ and developer’s mutual development work. Shared innovation processes are needed between the users and developers. Finland needs to improve the user-orientation in service innovations. (VN 2008). Demand driven innovation aims at improving market’s innovation-friendliness and it can be influenced with tools like regulation and standardization. User-driven innovation aims at raising the awareness of the market actors of new innovation tools and at creating a social infrastructure. Information and communication technology enable to find out the users’ needs and also engages them into innovation. (TEM 2015b). The action programme for demand and user-driven innovation policy (TEM 2015b) points out the utility of the public sector’s procurement and partnerships as sources for pioneering actions.

SFFCM activity is based on close collaboration of the whole food chain and the customers and consumers are involved in co-creation (Gylden 2012) and in co-innovation (Dogliotti, Garcis & Peluffo 2014). The activity is based on awareness of customers’ and consumer’s needs such as the increasing demand for organic produce (Section 1.4), which benefits are widely promoted (WHO 2011; FAO 2014; European Community 2015; UN 2015b), valued by the consumers and accepted by the Finnish food chain (Article I). Also, the Finnish government set goals for its development (Section 1.5). The whole activity of SFFCM is targeted to produce increasing amount of organically produced food. An adequate volume of organic production enables to reach the government goals (MMM 2014), reduces the negative impacts of the current food chain by the common good it generates. The third outcome of the SFFCM is a fair financial profit for the entrepreneurs (Article IV) that is possible when the customers prioritize their products and services, meeting their common good values.

Innovative individuals, enterprises and communities

“Innovativeness is based on the skills and creativity of individuals. Generating innovations requires a sufficient quantity of information on phenomena, customers, technologies, intellectual property rights, previous solutions and

operating modes.” (VN 2008). Innovation process happens increasingly often in different competence areas, where people with different backgrounds work on the same problem in close teams or more loose working networks. The innovative community is successful, when individuals share their competence and knowledge and when various perspectives and approaches are combined. Instead of being only on a national level, innovation systems can be innovation ecosystems and innovation centres can be locally and regionally fixed, but globally networked. (VN 2008).

The research and innovation council (TIN 2014) advocates specialized business, centres of growth and strong business areas. It is crucial to invest in business areas that enhance the development of the economy and welfare (TEM 2011) and to facilitate smaller firms’ progress in export markets (VM 2015). Global Entrepreneurship Monitor (GEM 2015) evaluated 73 economies to provide a variety of information on different aspects of entrepreneurship. Finland is a competitive and business-friendly country with a well-developed system for entrepreneurship with government policies. Although there is high entrepreneurial potential in Finland and low fear of failure, the entrepreneurial intentions are low. Entrepreneurs’ innovation aspirations have declined and only 13% of early-stage entrepreneurs have a strong international orientation. (Stenholm et al. 2015). The Finnish NIS (TEM 2015g: 2015c) states the need for sustainability by enhancing the bioeconomy and cleantech solutions. The European Union and the Finnish government are leading the food chain towards greater sustainability (Chapter 1.5 and 1.6).

The SFFCM supports local and national level communities having consumers together with entrepreneurs from all parts of the food chain. The findings of article III support the dynamic and diverse food chain with the constant development of company size and location on local, national or international level. ECG values of transparency, solidarity and human dignity enhance the possibilities of participating in activities in a community (Felber 2013) and CC principles enables the co-creation process for the innovations (Alexander et al. 2009). United Nations has sustainable agriculture business principles: “*Business is a critical partner for governments and other stakeholders in designing and delivering effective, scalable and practical solutions to make food systems secure and agriculture sustainable*” (UN 2013). The business principles present six outcomes with factors and actions, and they are partly equal to the principles of ECG (Felber 2015) and SFFCM.

World without borders

“The success of enterprises and regions depends on their ability to position themselves in global networks and, in the role they have selected, to produce

more added value than others.”(VN 2008). Companies, regions or communities that produce added value are taken seriously and are attractive partners for other operators throughout the world.” The national innovation policy can be measured to some extent by the amount of investments, experts and companies entering Finland. Finland’s success in global markets of experts and investments actualizes by constructing a well-known brand based on strategic choices, competence and competitive innovation environment. That needs ability to participate and influence global networks, mobility of experts and attractive innovation environment. (VN 2008).

The current government promises to strengthen Finland’s national competitiveness by improving the conditions of economic life and entrepreneurship, e.g. by renewing the legislation and easing the burden of the bureaucracy (TEM 2015c). Finland’s competitiveness is based on strong expertise, but we need operating models to encourage renewal and transcending of boundaries (OKM & TEM 2012). IMD World Competitiveness Center (IMD 2015) once a year releases a scoreboard ranking countries by their ability to facilitate an environment in which enterprises can generate sustainable value. According to IMD, the competitiveness factors are *government efficiency, economic performance, infrastructure* and *business efficiency*. Those create *sustainable value* that can be measured by *company long-term profitability* and *job-creation*. In perspective 1997 – 2013 Finland’s worst ranking was in 2013 (20th) and the best in 2003 (3rd) (IMD 2013). The ranking in 2015 was again 20 (IMD 2015).

The attractiveness of the SFFCM for the community comes from the ECG principles (ECG 2014) that the food chain, when creating the common good, reduces the negative impacts of the current food chain and for the entrepreneurs by the economic growth by the larger market share created by the customers of mutual common good values. The Finnish food chain is undeveloped in organic food and its production (Section 1.4) and needs strong support to strengthen its position in domestic and possibilities in foreign markets. Organic produce is a notable option, when decreasing the deficient food export (Herlin et al. 2015). The attractiveness of Finland comes partly from the Nordic welfare model (Norden 2013) and can come also from the SFFCM as well. Urbanization leads to the desolation of rural areas. Organic farming practices tend to provide a range of other goods and services in rural economies, like tourism, renewable energy and care farming and farm level food processing and selling. This makes organic farming a noteworthy choice in areas that are not suitable for intensive farming. (TP Organics 2014). *The competitiveness of SFFCM lies in being an alternative food production model that provides common good for all its actors*

and responds to the straightening sustainability demands of the Finnish government and of the European Union as well as the values of the consumers.

4.3 Paths of actions

The following path of actions have been created to change the current food chain model towards SFFCM by helping to remove the obstacles: 1) scarce knowledge of organic food and farming, 2) unbalanced power weakening the collaboration, 3) reduced competitiveness and negative foreign trade balance, and 4) legislation an inadequate influence to reduce the negative externalities (Section 1.9).

Innovation base

The results of Pisa analysis indicate that the education system in Finland is the best in the world (Miettinen 2013). Obviously this results from successful teaching and learning methods and study material. The findings of Article I indicate the poor availability of information on the quality of organic food and its production. If the high-quality education provides qualified professionals and research to enable innovations (Miettinen 2013), the situation is controversial as regards the knowledge of organic food chain-related issues, and that leads to its poor standing in Finnish society. The situation could be corrected with the following actions:

- 1) To include organic studies up to Master's degree level in the curriculum of universities in applicable disciplines, support the cross- and multidisciplinary approach in organic studies and research and ensure adequate organic tuition in applied and vocational studies related to the food chain,
- 2) To provide necessary research-based information to elementary schools and course material suited to all applicable school levels (vocational, applied, university),
- 3) To ensure high quality and internationally active organic research in research institutes, and
- 4) To provide objective information about organic food and its production to Finnish society.

These *competence* related actions increase the knowledge of organic food and production following the Nordic welfare model's principles of education and

research, also fulfilling the lack of research-based information in Finnish society.

Innovation environment

The innovation activity needs a supportive and enabling environment (TIM 2014). One of the current government's strategic programme promises is to cut bureaucracy (VN 2015a). Article III brought up the argument of the controlling authorities' unfair interpretations of European Union regulations. That is supported by the study of an expert committee set up to investigate the legislation and control-related problems of small- and medium-sized companies (MMM 2009). To correct the situation, the committee presented 17 actions, and those most relevant to this chapter are in connection with the overlap of different controls, competence of controllers, availability of interpretation of the legislation, unequal controlling fees and relief for small enterprises. Taxation is also mentioned in the strategic programme of the current government. Taxation is a common guiding tool and can be used to restrict the negative externalities (Pearce, Koundouri 2003; OECD 2011). The money collected can be used for research and development actions (OECD 2011), e.g. environmental taxes such as a nitrogen tax and pesticide tax are used in Denmark because of the negative impact of those products on people and the environment (CFE 2015), and a sugar tax in the United Kingdom because of the harmful effect of sugar on human health (PHE 2015). A typical incentive used in the food chain is subsidies that are used in agriculture to maintain production and reduce negative impacts (European Commission 2014; Niemi et al. 2014). The following actions are needed to correct the situation:

- 1) To nominate a committee with representatives from the government and each part of the food chain, e.g. their interest and expert groups, to discuss the legislative and controlling issues and the interpretation of the legislation, so as to enable a positive collaboration and secure the competitiveness of Finnish organic produce
- 2) To set national environmental taxes for pesticides and nitrogen fertilizers in agriculture
- 3) To execute a national organic school meals programme for comprehensive school children. The programme would be financed by the income from the nitrogen tax

4) To reduce VAT on certified organic products and cover the difference with the income from the pesticide tax (The calculations for the taxation are presented in Table 3.)

These *power relations, policy* and *infrastructure*-related actions aim to guide the food chain towards government goals and simultaneously to greater sustainability and the common good by giving common rules and legislative frames to the activity.

Innovation activity

The competitiveness and productivity of the national economy is dependent on a broad-based and efficient innovation by diverse actors in society and a common innovation policy (VN 2008). The well-being of a society ensures that individuals and communities are capable of innovation (Miettinen 2013). In the ECG, the policy to ensure the well-being of society is the ECG Matrix (Appendix 1.) (Felber 2015). Articles II and IV indicate the importance of a common food chain level community, and ProLuomu (The Finnish Organic Food Association) was mentioned in the focus group discussions. It is possible to include organic research and innovation in several existing SHOK areas (energy, environment, health and well-being), but, being a multifunctional, holistic and diverse system with several disciplinary approaches, many of its important principles would be neglected and, therefore, it needs its own SHOK-like research and innovation society. Finland has to specialize in the production of organic goods in the foreign markets (VN 2008) and, with a desirable brand, Finnish organic food could stimulate demand on global markets (Foreign Ministry 2008). The following actions are needed to correct the situation:

1. To get the food chain actors organized on the food chain level and to co-innovate with the consumers so as to enable the organic growth and access to NIS
2. To develop further and adapt the organic Matrix to give guidelines for greater sustainability and larger volumes of production
3. To strengthen the activity of the Finnish Organic Food Association, Pro Luomu and its representativeness in all parts of the food chain (including consumers) so that it becomes a mutual forum for all food chain actors that operate with organic produce
- 4) To found an organic consortium, similar to SHOK, where research, development and business are united to form an organic innovation oasis

5) To support organic entrepreneurship in all possible ways, and promote Finnish organic produce abroad as part of Team Finland activities (Team Finland 2015)

These *power relations*, *technology* and *investments*-related actions aim to balance the power among the food chain actors by CC-driven collaboration, strengthen the competitiveness of the Finnish food chain by organic innovation and open possibilities to correct the negative foreign trade balance.

Table 3. The actions needed to implement the SFFCM into the NIS in Finland. The table shows also the outcome of the actions and the actors responsible to execute the action

1. Innovation base			
	Action	Outcome	Actors responsible
1.1	To include organic studies up to Master degree level in the curriculum of universities in applicable disciplines, support the cross- and multidisciplinary approach in organic studies and research and ensure adequate organic tuition in applied and vocational studies related to the food chain.	Sufficient understanding of organic food chain and a basis for further studies. Multidisciplinary approach to implement organic research in connecting disciplines.	Universities, Universities of Applied Sciences, Vocational Schools, Ministry of education, Finnish National Board of Education
1.2	To provide necessary research-based information to elementary schools and course material suited for all applicable school levels (vocational, applied, university)	Sufficient understanding of organic food chain as part of the national education.	Research institutes, Universities, food chain actors, Ministry of Agriculture, Ministry of Environment, Evira
1.3	To ensure high standard and internationally active organic research in research institutes	Promotes the innovation base and attractiveness of Finland	Research institutes, Universities, Government
1.4	To provide objective information about organic food and its production to Finnish society	Awareness of the food chain externalities	Ministry of Agriculture, Evira, Research institutes, Universities and associations
2. Innovation environment			
	Action	Outcome	Actors responsible
2.1	To nominate a committee with representatives of the government and of each part of the food chain , e.g. their interest and expert groups, to discuss the legislative and controlling issues and the interpretation of the legislation to enable a positive collaboration and to secure the competitiveness of Finnish organic produce	Enabling collaboration between the legislative and controlling authorities and food chain actors for the benefit of the development of the industry	Ministry of Agriculture

2.2	Create environmental taxes for pesticides and nitrogen fertilizer used in agriculture - import of nitrogen 51 823 tonnes in 2012 (FAO 2013a) and a suggested nitrogen tax 0.3 €/kg - import of pesticides worth 76.5 M € in 2012 (FAO 2013b) and a suggested pesticide tax of 12%	Reduce the negative impact of agriculture on the environment and humans. National income to be transferred to organic school meal programme and a reduction in organic food VAT	Parliament, government
2.3	Execute a special organic school meals programme for comprehensive school children and finance it by the nitrogen taxation - 546 065 comprehensive school students in Finland (Tilastokeskus 2015), 190 school meals served per year with an average ingredient price of 0.75 €. National subsidy 0.15 € per meal is equal to the income from a nitrogen tax	An example of a healthy and sustainable diet for children providing healthier workers and tax payers in the future. By skilful procurement, brings benefits to the national organic food chain with a positive impact to the environment	EkoCentria, Ministry of Agriculture, The Finnish National Board of Education, Association of Finnish Local and Regional Authorities
2.4	Reduce the VAT on certified organic products and finance it by pesticide taxation - The value of organic market in Finland was in 2014 worth 225 M € (Pro Luomu ry 2015). The VAT for food is 14%. A decrease of VAT on certified organic food from 14% to 10% is covered by the income from the pesticide tax	The market share increases for organic products and the bigger volume enables the development of the food chain for the benefit of the welfare of humans and environment	Parliament, government, interest organizations (MTK, ETL, PTY), major actors of the food chain
3. Innovation activity			
	Action	Outcome	Actors responsible
3.1	To get the food chain actors organized on a food chain level and to co-innovate with the consumers, to as enable the organic growth and access to NIS	Cooperation enables setting of common goals and innovation activity and those ease the access to NIS	Food chain actors, ProLuomu ry
3.2	To develop further and adapt the organic Matrix to give guidelines for greater sustainability and bigger volumes of the production	The quality of the production and products is standardized and the increasing volumes enable reaching to the requested goals	Food chain actors, interest organizations, Evira
3.3	To strengthen the activity of the Finnish Organic Food Association (Pro Luomu) and its representation in all parts of the food chain (including consumers) to become a mutual forum for all food chain stakeholders that operate with organic produce	Common forum enables the change to SFFCM that produces organic innovations, volume and quality	ProLuomu ry, Food chain actors, interest organizations
3.4	To found an organic consortium, similar to SHOK, where research, development and business are united to form an organic innovation oasis	Innovation activity is beneficial and efficient with the key actors uniting their knowledge and forces	Ministry of Empowerment and the Economy, Universities, food chain actors, investors

3.5	To support organic entrepreneurship in all possible ways and promote the Finnish organic produce abroad as part of Team Finland activities (Team Finland 2015)	Diverse enterprises have a mutual starting point for profitable business in local, national and international markets	Ministry of Empowerment and the Economy, food chain actors, interest organizations
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The principles of organic food and its production (European Commission 2010a; IFOAM 2016), with a positive impact on the welfare of humans and environment (Section 1.3) and the principles of ECG (Felber 2015) and CC (Payne, Storbacka & Frow 2008) are united into the activity of SFFCM that can be implemented into the strategic goals of the 2016 government (TEM 2015c): 1) to improve health and well-being, 2) to improve competence and employment, 3) to renew education and knowledge systems, 4) to enhance the bio-economy and cleantech, 5) to change procedures, e.g. by reducing bureaucracy and regulations. The current government's themes of strategic research for 2016 are also favourable to organic research and innovation: 1) knowledge and changing working life, 2) health and change of lifestyle, 3) overall security in the globalized environment, and 4) the dynamics of urbanization (VN 2015b). Despite the fact that the government goals and themes are suited to the research and innovation of the organic food chain, it has not gained its own status among the research topics and national funding of NIS taken seriously.

When the dominant food regime is challenged by creating a public space for food knowledge, production and consumption according to the alternative rules – such as SFFCM – the actors redefine their identity and modify their socio-technical environment together, and by interaction with the consumers, the cognitive barriers can be changed (Brunori, Rossi & Malandrin 2011). When the new technological regime grows out of the old regime, the activity is connected with the availability of new technologies, skills and management systems, changes in the regulatory framework and new ideas (Rip & Kemp 1998). This change happens in the food chain context by de-localization from the conventional model and by re-localization to an alternative model: 1) on a farm level, from declining farm prices and bulk input suppliers to finding strategies to capture value-added and to found a new producer association, 2) on a processing and retailing level, from untransparent and unstandardized but traceable systems to local and regional processing and retail systems, 3) on a society level, from a highly bureaucratic public and private regulation to regional development and local authority facilitation in a new network and infrastructure building, and 4) on a consumer level, from a disincentive to understanding food origins to

consumer knowledge of place, production and product (Sonnino & Marsden 2006). Transition to a new system and adopting e.g. new farming styles needs radical changes to skills, knowledge, organizational patterns and communication practices, and in addition to that, good collaboration is needed with other food chain actors (Brunori, Rossi & Malandrin 2011) and the co-evolution of the new model requires also the involvement of consumers (Rip & Kemp 1998). The reports and research results cited in this thesis show how organic food and its production are expressed as an important part of the local, national and global future. Finland cannot disregard organic research and innovation as part of its national research and innovation politics.

5 DISCUSSION OF THE MAJOR FINDINGS OF THE THESIS

This thesis represents the results of a research process that took place between 2010 and 2015. It also represents a development process that resulted in the SFFCM, with its two different development stages. The focus grew wider and deeper when CC and ECG were introduced in work contributing to the concluding article. The survey (Article I) and the focus group analysis (Article III) provided information for the SFFCM, but can be treated separately as independent studies. This discussion focuses on some of the key findings of this thesis, and also the SFFCM and the actions suggested in the synthesis. More detailed discussions are presented separately in each article. Articles II and IV are discussed together with the SFFCM. The key findings cover 1) the importance and the availability of the information about food system and its externalities; 2) the diversity of the Finnish food chain; 3) incentives to support organic growth, 4) the government's role in the development of organic food and its production in the food chain, and 5) the potential of the SFFCM to respond to the motives behind the government goals and solve the major problems found in the activity of the current food chain. At the end of this chapter, there is a SWOT-analysis (Houben et al. 1999) of SFFCM and a self-critical reflection of the research process by the author.

This thesis focuses on organic goals set by the Finnish government. The goals were set in collaboration with the industry (MMM 2014). Figure 2 showing the share of agricultural land. The 20% share of organic from the agricultural area and 20 % share of ingredients used in school and day care centre meals in 2020 seems almost poetic, and is not properly reasoned in the "Organic 20/2020" programme. The most crucial question is: has the programme been launched to show the sustainable actions of the Finnish government, or is the government willing with all possible actions to encourage reaching the goals it has set? The motives though are well explained (Section 1.7). There are also other European Union countries that have set 20% goals (Section 1.5).

This dissertation discusses four obstacles (Section 1.9.) that prevent the current Finnish food chain from reaching the government organic goals. These obstacles appear to originate from a specific kind of contradiction between an expected outcome and the current activity system of the food chain. Yet, a more fundamental core contradiction arises from this whole dissertation. It is a contradiction between the structure and functioning of the globalizing (neo-liberal) capitalist trajectory, with its associated emerging limitations, and the

ecological degradation and reduced resilience of the planetary system that sustains life as we know it. Global capitalism, by increasing inequality, impacts on human well-being by weakening participatory democracy and the Nordic welfare state principles. SFFCM, with its strong ECG principles, tries to mitigate the negative effects of global capitalism, but, rather than opposing it totally, SFFCM aims at resolving creatively the contradiction between capitalist production and sustainability issues. A participatory analysis of the contradictions in local and national contexts is a starting point for sketching such solutions for the future (Pereira-Querol, Seppänen & Virkkunen, 2014).

Importance of information about the externalities of the current food chain

The Nordic welfare model (Norden 2013) provides well-educated people to work in business and research (Kautto et al. 1999; Miettinen 2013), which has led to the development of the innovation society (Kautto et al. 1999; Miettinen 2013; Norden 2013,). Transparency and availability of information are important contributors to Nordic values (Norden 2013). Information plays a major role in decision-making processes (Aertsens et al. 2011; Cameron 2011). According to Article I, 56% of the respondents did not feel they received sufficient information from their own part of the food chain about the safety and healthiness of organic food and ecology, and the ethicality of its production. In Denmark, where the consumption of organic products is among the highest in the European Community (Willer & Lernoud 2015), the authorities inform their national media continuously about food safety issues such as pesticide residues (DVFA 2014a). With an immediate response from the media's "*Pesticide residues in half of Danish fruits*" (Nielsen 2014; Ritzau 2014), the authorities started a campaign: "*This way you'll get less pesticide residues in your food*", promoting the organic food alternative (DVFA 2014b). In Finland, Evira is one of the authorities responsible for informing citizens on food safety. They provide newsletters to those who have subscribed and publish official documents, such as reports on pesticide residues in food (Evira 2012b) and reports on animal protection (Evira 2014), on the web. The information seldom reaches the average citizen via the media however. The action plan aims at correcting this situation by suggesting the development of organic education and research and an improved information policy by the authorities.

Diverse food chain

The fourfold table in Article III provided an understanding of a diverse food system that is in a process of continuous flux, and provides numerous options. Besides the local and national food chains, including all parts of the food chain

that provide food locally, nationally and internationally, an additional procedure was presented: a food chain possessed by the farmer, enabling close communication with consumers and increased profit (Article III). The procedure is becoming more common among organic cattle farmers (Bosgård 2015; Gårdskulla 2015; Koskis 2015,) and organic sheep farmers (Bovik 2015; Laakspohja 2015). A similar type of development is found on a much larger scale, uniting groups of farmers, e.g. in Germany with Ecoland, which was founded in 1988 in the Hohenlohe region and has grown into a community of 1,450 farmers (460 in organic production). Its purpose is to develop environmental, economic and social benefits for the region. Ecoland processes and sells part of the production and for the remainder it guarantees purchasing and marketing and market-price-plus premiums (Bühler 2013). Organic Valley is a cooperative of 1,834 North American and Canadian farmers that are united in similar interests: organic production, promotion of nutritious and wholesome food, producer-based pricing, sustainability, mutual dependency of human beings, animals, soil and global life. The cooperative owns the food chain up to the consumers (Farmers Coop 2014).

The competitiveness of farm level operations comes from experience in conjunction with the visits, but additional customer satisfaction comes from particularly good service and an intimate local store atmosphere (Mellin, Spiller & Zühlendorf 2007). A similar kind of situation occurs with the small organic specialty shops that have to increase the already high level of customer service systematically and make visible their function as a local supplier when big supermarkets are currently offering increasing amounts of organic food (Runge, Cornehl & Häring 2008). Besides the attractiveness of a company's products, services, trademarks and brands, company reputation plays a major role in its competitiveness (Davies et al. 2003). Big retail companies are needed to upscale the small volumes to the national and international level. For example, after the large retailers entered the markets, the Australian organic beef market farm-gate price increased from M\$32 to M\$60 (between 2000 and 2005) and when earlier only two thirds was sold as organic, now all the produce is sold on the organic market (Wynen 2006). Good examples linking farmers and small- and medium-sized processors to chefs and consumers are the Best of Province (ProAgria 2015) and the Genuine Tastes of Finland web portals (MMM 2015). Those could be used more widely to increase the availability of specialty goods and also maintain the vitality of small- and medium-sized enterprises.

Diversity and adjustment are needed in the organic food chain in order to satisfy the continuously changing needs of the consumers and other food chain actors (Aschemann et al. 2007; Wier, Millock & Rosenkvist 2005). It is

recommended to maintain a certain level of diversity because diversity promotes innovation (Smith 2002) and adaptive resilience of a system (Holling 2001). The research and innovation council (TIM 2014) claims that growth is created by diversification, and that is supported by Finland's National Programme (VM 2015) and the Europe 2020 Strategy (European Commission 2010b): *“Diversification of industry, in particular by improving the business environment to strengthen investment in Finland and further facilitating smaller firms' progress into export markets.”*. The current Finnish government is continuing the organic and local food government programmes and promoting the use of Finnish ingredients in public procurement (VN 2015a).

Increasing the organic volume in the food chain

Organic incentives are presented in the synthesis: an organic school meal programme with a €0.15 support per meal for daily school meals, a decrease in VAT on certified organic food from the current 14% to 10%, and a priority for enterprises acting according to the Organic Matrix for public procurement. Finland offers free meals from nursery to upper secondary education on every school day (OPH 2015), and the use of healthy ingredients such as milk (Mavi 2015) and fruits (Euroopan parlamentti 2008) are partly sponsored by the European Union. The authorities admit the positive externalities of organic food and its production (Sections 1.4 – 1.7), but its volumes are not developing in Finland as they are in several other European Union countries (Willer & Lernoud 2015) despite the positive attitudes to organic food and its production (Article I). Consumers claim that they would purchase more if the prices were lower (Saarnivaara 2015; Heikkilä 2013).

The legislation for organic production (European Commission 2010a) obliges traceability and recognition of organic produce, so lower VAT for organic produce is technically feasible and would lead to greater sustainability. The legislation for public procurement (European Union 2014) allows the prioritization of organic food and the public procurement guidelines (European Commission 2007: 2008a) promote the use of organic food. Finland was seventh in the 2009 GPP comparison report: 29% of the respondents of public catering units procured organic food occasionally, when the same figure in Denmark was 81% and in Sweden 57% (PricewaterhouseCoopers 2009). With the organic school meal programme and the positivity of catering professionals towards organic food (Article I), the increase in consumption of organic food in public kitchens is, according to the ECG, mainly a legislative issue. The incentives are financed by the environmental taxation explained in section 4. The current government program claims: *“Taxation will be developed so that entrepreneurship, ownership and investment are more profitable than at present.*

The taxation structure supports Finland's competitiveness and the key objectives set by the Government.”(VN 2015a).

The SFFCM supports the idea of having a more sustainable food chain that leads to an improved self-sufficiency in food systems (Herlin et al. 2015; Halberg et al. 2005). The change in food systems towards greater sustainability happens in conjunction with a change in human diets. There are different dietary patterns that guide consumers towards more sustainable, safer and healthier diets. Examples of sustainable regional diets are the Mediterranean diet (De Lorenzo et al. 2010; Burlingame & Derlini 2011), the Baltic Sea region diet (Beras 2013) and the New Nordic Food diet (Ny Nordisk Mat 2015). A common idea behind those diets is to use local, seasonal produce with a reduced amount of meat. By changing the diet, it is possible to increase regional and national self-sufficiency (Koikkalainen et al. 2011) and have a positive impact on food security and sovereignty at a global level (UN 2010: 2012; UN Global Compact 2013). The organic diet is also promoted by the French doctors' organization (ASEF 2012) and by the American Academy of Pediatrics (Forman & Silverstain 2012) for food safety reasons.

The change from the present model to a more sustainable one begins within the community. The majority in the community has to share similar kinds of values that help set mutual goals. That is reflected in ECG principles (Felber 2015; ECG 2014) in theory and in communities such as Organic Valley (Farmers Coop 2014) and Ecoland (Bühler 2013), and projects like BERAS (Beras 2015). Better sharing of power with adequate financial profit for all food chain actors is possible only by sharing values and by understanding the benefits of cooperation (Felber 2015), in this case by having a common food chain level community, either at a local or national level (Article III). As discussed in section 4, the development of a business sector like organic food production, needs financial support from the private and public sectors for research and innovation to create business initiatives and promote entrepreneurship. Supply chain (like food chain) innovation often requires costly investments (Bello, Lohtia & Sangtani 2004). Tekes (2014) finances Finnish innovation and carried out a case study to ascertain the impacts on well-being and the environment of some of the innovations it financed. For example, a large-scale dairy company, Valio (Valio 2015), received financial support through the SymBio program for research and development of lactose-free milk. The health benefits are directed at a population group with specific dietary limitations (lactose intolerance), and impacts are on an international scale, covering northern Europe. A small firm, Liqum (2015), created a water monitoring system and received financial support through the water programme.

Government's role

The Finnish government seeks to address Finland's decreasing lower ranking on the World Competitiveness index (IMD 2013: 2015) by renewing legislation and cutting bureaucracy (VN 2015a). It is the rigid bureaucracy that disables or weakens entrepreneurial activity in Finland (VN 2015a), and especially in the organic food sector (MMM 2014). The current government (VN 2015a) reformed the administration to enhance productivity and encourage greater flexibility. In Article III, it is suggested that the control exercised by civil servants regarding the interpretation of European Union legislation in Finland does not support development of the Finnish food chain. After the growth of public interest in organic production, the rules have changed, and their effects are registered not only at the farm level, but also within the controlling authorities, which increases the bureaucracy and uncertainty among the producers regarding legislation and its interpretation (Vogl, Kilcher & Schmidt 2005). According to the committee that investigated the problems of small- and medium-sized food sector enterprises with respect to legislation and control, the most crucial topics were those connected with a lack of customer orientation and unequal treatment by controlling officers, superimposed control and reports, and the entrepreneurs' unawareness of changes in legislation and the civil servants' interpretation of the legislation (MMM 2009). The Finnish administrative law (VN 434/2003 2003) and the European Union legislation (EC 882/2004 2004) guarantee equal and appropriate treatment by civil servants.

Italy provides a good example of a fruitful collaboration between the organic food chain actors and national authorities. The public sector promotes information, co-finances projects, education and research, allocates resources and recognizes the organic entrepreneurs at local, regional, national and European Union level for the benefit of the companies, as well as rural development, biodiversity and cultural heritage (Santucci & Antonelli 2004). Another good example of fruitful interaction of government to the benefit of organic food and its farming is provided by Denmark. The Danish government, after serious pressure from the political parties because of environmental scandals in the 1990s, participated in building the organic food chain in all aspects, including collaboration with the stakeholders, so as to allow Denmark to reach a superior position in the organic market (Holm-Ingeman 2006).

It is important to realise that the organic food system has been institutionalized in recent decades. Control and regulations exist to secure the authenticity of the organic production, but they simultaneously weaken the development and innovation potential of the organic food system and exist also for political reasons. The SFFSM finds it important to combine the legislation and organic principles.

Feasibility of SFFCM

Section 1.7 shows the motives behind the government goals. The current goal for 2020 was set for fulfilling the need of products, the production of or production methods which are *not harmful to the environment or to the welfare and health of humans, plants and animals* (MMM 2014). Previous goals have similar reasons related to the welfare of nature, animals and humans as well as to the availability of reasonably priced food. Country brand delegation combines organics with nature and purity and the possibility of exporting organic produce (Rauhala 2015). The SFFCM aims at making it easier to reach the government goals. Those setting the government goals have linked organic production and food with quality attributes such as environmentally friendly, good for humans and good for animals. Their assumption is that, when reaching the goals, the production and food will have a positive impact on environment, humans and animals. The impacts of the current food chain and organic food chain are discussed in Chapter 1.3.

Article III discusses two main challenges and obstacles that prevent the development of the organic food chain in Finland: the unequal share of power and the weak collaboration on the food chain level. The local focus group expressed a stronger co-operation among the food chain actors, and the discussion revealed that the only actors accused of abusing their market power were the retail chain companies; others seemed to cooperate in good understanding. In the national focus group, the food chain level collaboration was seen as weak and the power was felt to be among the large-scale operators, both food industry and retail. That is one of the principles of SFFCM, that when the actors cooperate on the food chain level and know each other, the division of power can with good reason become fairer. The starting point of creating SFFCM is to get the food chain actors together with the consumers to set mutual goals and to give effect to the mutual rules. The policy instruments for overcoming barriers to farmers adopting a more sustainable farming system (Reganold & Wachter 2016) struggle with the same challenges as this thesis: e.g. 1) ensuring open and competitive markets (division of power); 2) use of agro-environmental incentives, the increased costs of scarce resources and public investment in agro ecological research (rules, tools, government interaction, ECG); 3) farmer engagement in research and development (community, CC); and 4) increased transparency throughout the food chain (ECG).

The further development and implementation of SFFCM in the spirit of CC follows the four broad areas of action that are used for operating sustainable food and agriculture (FAO 2014): 1) evidence, as co-constructed knowledge, build capacity and indicators; 2) dialogue when creating inclusive platforms,

harmonizing metrics and procedures; 3) tools such as guidance, regulations and standards; and 4) practice change, with growing awareness, innovation networks, efficient markets. The SFFCM is based on the assumption that reaching 2020 goals will create common good and reduce the negative externalities of the current food chain. A critical analysis has to be made of the real pros and cons of such an achieved target. The SFFCM is analysed with SWOT (Houben et al. 1999) later in this chapter.

The SFFCM is a theoretical, model incorporating the elements of ECG, CC and AT theories, which are all tested elsewhere separately in different contexts and with various degrees of success: the ECG movement has supporters from enterprises and municipalities, and CC has been adapted for various branches of industry. AT was used as a method to identify elements in the current food chain and to visualize the SFFCM. It is not very likely that Finnish society will accept the model immediately and in its current form. It has yet to be tested at municipality level and could be implemented gradually. ECG (2014) has good results in making changes in the municipalities. The Finnish Constitution guarantees local self-government, and that gives the community residents the right to elect their decision-making authorities, who make e.g. financial decisions and levy taxes (Local Finland 2016). That municipality model supports the SFFCM in giving the actors the possibility to influence the decision-making process. However, the SFFCM is a theoretical model that, with the good reasons given, can be expected to lead to the desired outcomes. The outcomes become potential by adopting the actions suggested in this synthesis. They are interconnected in the SFFCM, but will make the food chain more sustainable when used either separately or together. Although SFFCM is a vision based on reports and theoretical principles, “*A major strategy in the creation of sustainable economies is the establishment of alternative market institutions...*” (DuPuis & Gillon 2009).

Analyzing the strengths, weaknesses, opportunities and threats of SFFCM

SWOT-analysis is a good tool to analyze the performance of an enterprise and to name its internal and external forces (Houben et al. 1999). The analysis is most often presented in a fourfold table with internal actions: strengths and weaknesses and external actions: opportunities and threats (Dealtry 1992; Markovska 2009). Strengths and opportunities are positive and weaknesses and threats are negative actions (Markovska et al. 2009) that are divided by internal and external actions and, on the other hand, positive and negative actions. The analysis makes it possible to build on strengths, eliminate weaknesses, exploit opportunities and mitigate the effect of threats (Dealtry 1992). The Suggested

Finnish Food Chain Model (SFFCM) is placed in a SWOT model (Figure 8) and analyzed following Nikolaou & Evangelinos (2010) by answering the following questions:

1. What are the strengths of the suggested Finnish food chain model?

The suggested outcome of the activity model is attaining government goals, accessibility of the common good and a fairer financial share to all food chain actors. By using organic and ECG principles the model would reduce the negative externalities of the food chain. CC and ECG would involve all actors in collaboration, enhance demand and the user approach and maintain the diversity of the food chain with different marketing channels. If successful, the increased production and processing of the organic produce meets the needs of the domestic market, but also enables export to improve the declining national competitiveness.

2. What are the weaknesses of the suggested Finnish food chain model?

The model was created on information provided by research (Articles I and III) and literature. It is a theoretical application, based on practical surveys and observations embedded in a combination of three integrated theories. The model has not been tested. However, its three theories are constantly used in research and various applications in enterprises and communities with proven positive results, which provide a strong experimental background to implementation of the theories. The model assumes that food chain actors start to collaborate on the food chain level, enabling them to set mutual targets and adopt ECG and organic principles, and benefit from a fairer division of power. What if the actors do not want to collaborate? The model stays on the food chain level, but also has food system level elements with its suggested actions, such as those related to government interaction. The model does not take into account the organic food import.

3. What are the opportunities of the suggested Finnish food chain model?

According to all statistics (Chapter 1.4), the organic food chain is developing globally and also in Finland. The farmers' and especially small size enterprises' need alternative marketing channels to oppose the widening price margin. The growing organic food import increases the need for collaboration among food chain actors (Article III). SFFCM supports small-scale enterprises and enhances the diversity of food chains. The negative externalities of the current food chain (Section 1.3) force the governments to adopt stricter legislation, and that is

leading to the more sustainable solutions that are partly found in organic principles. The best possible way to deal with the possible crises that have effects on the safety and availability of food is to maintain the self-sustainability of the food chain. SFFCM enhances food security with its diverse structure and the vitality of local and national food production.

4. What are the threats of the suggested Finnish food chain model?

The food markets are becoming more and more globalized and centralized (Felber 2013), creating a widening price margin (Niemi, Jansik & Huan-Niemi 2011). That does not enable fair and fruitful collaboration among food chain actors, when some actors are unknown or possibly disregard the needs of the other actors. Consumers change their values (Hemmerling, Hamm & Spiller 2015), and an economic depression can change the consumption pattern completely. Finnish organic produces, being normally more expensive, could be replaced by the cheaper imported or conventional ones.

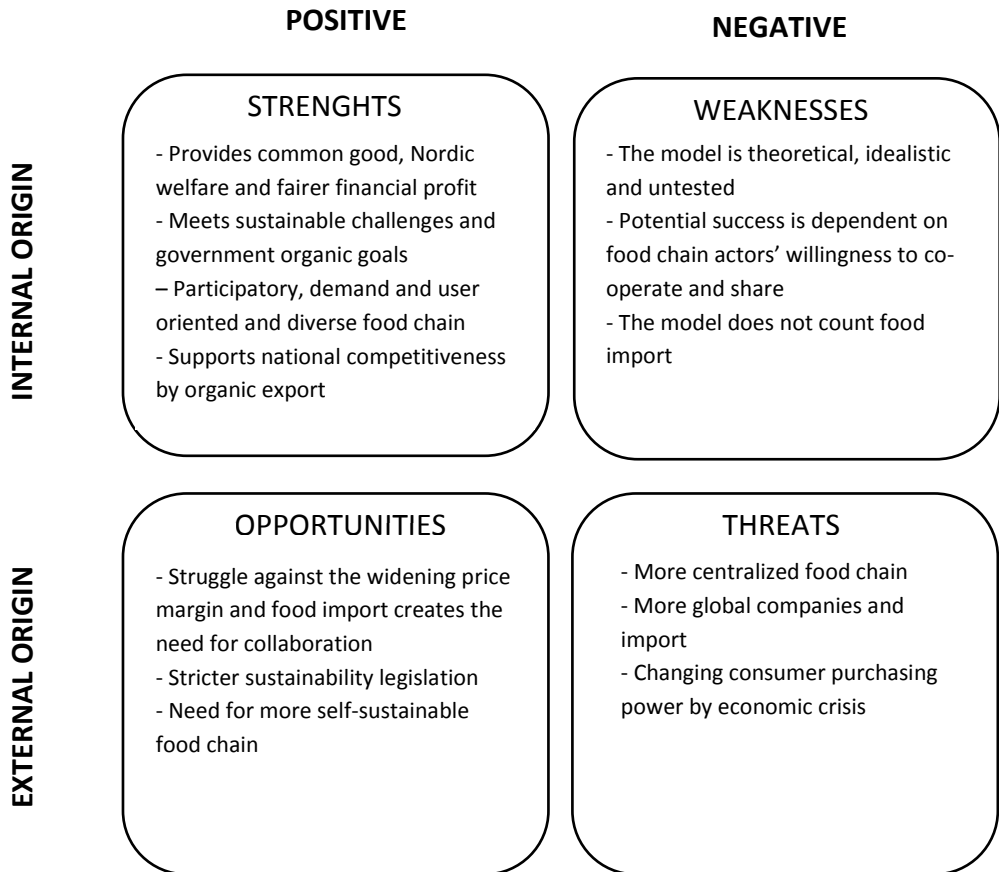


Figure 8. The SWOT-analysis of the Suggested Finnish Food Chain Model divided into internal, external, positive and negative dimensions and focusing on strengths, weaknesses, opportunities and threats of the suggested model.

The SWOT analysis leads to policy recommendations (Nikolaou & Evangelinos 2010). The action plan presented in the synthesis of this dissertation provides tools to strengthen the SFFCM to defend against those negative actions. The model has to be adopted first locally with suitable parts, because the local food chain was in Article III found to be more cooperative than the national level one. The stronger position of Pro Luomu ry and sufficient government-provided research-based information on food chain externalities would help the food chain actors to make decisions leading to greater sustainability and the further development of the organic food chain. The information given as well as the

food chain actors' willingness to collaborate are crucial for maintaining the local level food chain and the diverse marketing channels to fight against the growing price margin and also foreign food imports. Finnish society plays a key role by providing information, enabling research and tuition, supporting organic entrepreneurship, promoting the organic produce abroad, providing fairer controls and setting more effective environmental taxes. However, those actions are not fruitful unless Finnish (organic) food chain actors are collaborating on the food chain level, setting mutual goals, influencing the decision-making processes and fairer division of power and understanding the principals for providing the common good.

The strengths of the SFFCM may help resolve the contradictions behind the obstacles in the current food chain model with the achievement of the government organic goals (outcome of the activity) presented in Chapter 1.9 and discussed further with the path of actions in Section 4.3.

Validity and research quality criteria

This thesis has a multidisciplinary approach to the research object, *organic food and its production in the Finnish food chain*, which is needed to understand the complex entities of a food chain. Therefore, it is difficult to place this research under one discipline: the work started in the Faculty of Agriculture and Forestry and was concluded in the Faculty of Behavioural Sciences. The change of faculty became necessary when the AT was chosen to provide the model to the SFFCM.

In the evaluation of systemic research, Alrøe and Kristensen (2002) suggest focusing on relevance and the reflexive objectivity of the research. This research was carried out on one hand for the Finnish government to prove, in theory, that their organic goals are attainable with the suggested path of actions, and on the other hand for the Finnish food chain as an encouragement to strengthen their organic activity for the common good. Reflexive objectivity means the researchers need to have two approaches to the research object. In this case from inside the food chain activity, sharing the values, needs and feelings of the food chain actors, as well as from outside the food chain as an independent observer and researcher. This double perspective as reflexive objectivity is also embedded in the use of the activity system model (Engeström, Miettinen 1999; Seppänen, 2016, in press).

An important part for the inside view of the food chain came from the author's long career in the hospitality industry, and also from his work at MTK¹¹

¹¹ Union of Agricultural Producers and Forest Owners

constantly visiting farms and food processing enterprises. The studies in food economics and the organic food chain gave him a good comprehension of the activity. The more profound and inside understanding came through the interviews with the food chain actors (Section 1.4) and the focus group discussions (Article III). Also, the Survey (Article I) provided information on the acceptance of organic quality in different parts of the food chain. AT provided the method and the model for SFFCM. The outside approach to the Finnish food chain came from the creation of the SFFCM based on CC and ECG and the related literature and by connecting it to the innovation system (Miettinen 2013). The information from the empirical parts supplemented the model and it reached its present form (Article IV). The quality of the research process was peer reviewed through the articles accepted: the Survey (Article I), first stage of the SFFCM (Article II), focus group analysis (Article III) and the second stage of the SFFCM (Article IV).

The author and the organic food chain

The author of this thesis is currently working with organic research at the Finnish Organic Research Institute. He is in constant contact with other researchers and the latest study results on organic food and its production. He is known for his earlier career as a chef and his statements related to food quality, Finnish food as well as organic food and its production. Knowing the “inside” view of the research object well, the Finnish food chain enabled him to understand the challenges as well as the potential that the actors could contribute to SFFCM. This research received financial support from the Ministry of Agriculture and Forests for its first year to cover salary and travel expenses. After that, the research was carried out in the author’s working and free time. The author has also collaborated with civil servants of different ministries on various governments funded projects.

The first manuscript discussed the superiority of quality attributes of organic food and its production, presenting reviews of consumer attitudes on organic food and reviews on externalities of the current food chain. The author’s aim was to show the positive influences of the organic production method. The Survey was included to test the acceptance of the review results. With the hypothesis that “organic is superior”, it became impossible to obtain research funds. In 2014, the Finnish government launched its organic goals (MMM 2014). At that time the author had decided to broaden the focus of his research and it was understandable to take the newly set goals into consideration. AT offered a workable model for analysing the current activity of the Finnish food chain as well as setting the government goals as given outcomes, and in its design

the new model was based on empirical studies, related literature and theories. During the research process, the AT provided a tool to build up critical and objective understanding of the activity of the Finnish food chain and the interactions between actors deepened tremendously. It was also the tool for the author to enhance the discussion of the organic alternative to provide the common good aspect to the Finnish food chain and its legitimacy in Finnish society.

6 CONCLUSIONS

This thesis is based on key published articles, theories, empirical studies and the author's own experiences and vision. The purpose of this thesis was to develop a model that could help solving the problems associated with changing the Finnish food chain to fulfil the requirements of the consumers and reach government targets for extended organic production. One result was the suggestion of including organic food among the strategic spearheads of the national innovation system with its own SHOK-type consortium.

The thesis comprises four empirical components, presented in individual articles that connect, and a conclusion is reached in the fourth article, where the suggested model for the Finnish food chain is presented. The survey carried out among the Finnish food chain actors resulted in widespread acceptance of the elements of *safety*, *healthiness*, *ecology* and *ethicality*, albeit with some differences between the parts of the food chain: the highest level of acceptance was in catering and the lowest in agriculture. The most substantial support for the four requirements was retail availability for the respondents, and the least support was registered in the Finnish consumer community. The availability of information concerning the four issues was found best in industry and worst among consumers.

The focus groups supported the claim that the food chain actors do not have a common food chain level community, and that power is unevenly distributed among the actors of the food chain. They also suggested that in the future the organic food chain will include diverse marketing channels and become more apparent at local and national levels.

The major finding was that the suggested improved model for the Finnish food chain could enable the goals set for organic food and its production to be reached. It was built as the Organic Matrix, a simple categorisation that needs to be developed further in collaboration with representatives of all parts of the food chain and authorities. The suggested model is theoretical, combining several theoretical approaches proved to have been individually successful in current business activities. It is improbable while materialism and egocentricity are so prevalent that the proposed system could be taken up at the national level, but a gradual change towards the greater common good and organic goals could be possible by following the action plan proposed in the synthesis presented here. The organic food chain is in a constant development process, which is why the suggested model can also act as an interphase for the next even more sustainable model.

The suggested model enables an improvement in the sustainability of the ecosystem services on which human life is crucially dependent. It also accepts consumers that we all are participating in the development of our food chain in a democratic and participatory way. The urgent need of objectivized knowledge on food chain-related phenomena raises the importance of the dissemination of scientific results to deepen the democratic potential for participating in the food chain.

The clear recommendation that can be made from the synthesis and the associated action plan is that *the organic food chain is an innovation in itself, and therefore, it is worthy of having its own SHOK-like consortium and a position among the strategic priorities in the Finnish national innovation system.*

The work embodied in this thesis has identified several topics for further research. For instance, the organic school meals project has potential to contribute several positive inputs to the community, and the financial input from the government engenders municipality-level cooperation. The system is ready to be developed further and tested in a pilot municipality. It is also important to analyse the contradictions in the food chain activity in greater detail than in this dissertation. The most daring proposal is in connection with taxation, by taking funds from those activities generating negative externalities and investing them in those creating positive ones. With sufficient political support, precise calculations could be made to compare such a system with environmental taxes imposed in other countries. Government support and collaboration are urgently needed so as to ensure that the government's own goals for organic food and its production are realistic and can be reached. Because the resilience of our planet is decreasing rapidly, the effect of small actions counts for little; the entire food chain has to be comprehensively and radically redeveloped.

CONTRIBUTIONS

The following persons have contributed in this thesis

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APPENDIX

Appendix 1. ECG Matrix (ECG 2013) to evaluate and score the company or municipality activity. The maximum scores are presented in the table

VALUE STAKEHOLDER	Human dignity	Cooperation and Solidarity	Ecological Sustainability	Social Justice	Democratic Co-determination and Transparency
A) Suppliers	A1: Ethical Supply Management Active examination of the risks of purchased goods and services, consideration of the social and ecological aspects of suppliers and service partners 90				
B) Investors	B1: Ethical Financial Management Consideration of social and ecological aspects when choosing financial services; common good oriented investments and financing 30				
C) Employees, including business owners	C1: Workplace quality and affirmative action Employee-oriented organizational culture and structure, fair employment and payment policies, workplace health and safety, work life balance, flexible work hours, equal opportunity and diversity 90	C2: Just distribution of labors Reduction of overtime, eliminating unpaid overtime, reduction of total working hours, contribution to the reduction of unemployment 50	C3: Promotion of environmentally friendly behavior of employees Active promotion of sustainable lifestyles of employees (mobility, nutrition), training and awareness-raising activities, sustainable organizational culture 30	C4: Just income distribution Low income disparity within a company, compliance with minimum and maximum wages 60	C5: Corporate democracy and transparency Comprehensive transparency within the company, election of managers by employees, democratic decision making on fundamental strategic issues, transfer of property to employees 90
D) Customers / Products / Services / Business Partners	D1: Ethical customer relations Ethical business relations with customers, customer orientation and co-determination, joint product development, high quality service, high product transparency 50	D2: Cooperation with businesses in same field Transfer to know-how, personnel, contracts and interest-free loans to other business in the same field, participation in cooperative marketing activities and crisis management 70	D3: Ecological design of products and services Offering of ecologically superior products/services; awareness raising programmes, consideration of ecological aspects when choosing customer target groups 90	D4: Socially oriented design of products and services Information, products and services for disadvantaged groups, support for value-oriented market structures 30	D5: Raising social and ecological standards Exemplary business behavior, development of higher standards with businesses in the same field, lobbying 30
E) Social Environment: Region, electorate, future generations, civil society, fellow human beings, animals and plants	E1: Value and social impact of products and services Products and services fulfill basic human needs and serve humankind, society of the environment	E2: Contribution to the local community Mutual support and cooperation through financial resources, services, products, logistics, time, know-how,	E3: Reduction of environmental impact Reduction of environmental effects towards sustainable level, resources, energy, climate, emissions, waste etc.	E4: Investing profits for the Common Good Reducing or eliminating dividend payments to extern, payouts to employees, increasing equity, social-	E5: Social transparency and co-determination Common good and sustainability reports, participation in decision-making by local stakeholders and NGO's

	90	knowledge, contacts, influence 40	70	ecological investments 60	30
Negative criteria	Violation of ILO norms (International labor standards) / human rights -200 Products detrimental to human dignity and human rights (e.g. landmines, nuclear power, GMO's) -200 Outsourcing to or cooperation with companies which violate human dignity -150	Hostile takeover -200 Blocking patents -100 Dumping prices -200	Massive environmental pollution -200 Gross violation of environmental standards -200 Planned obsolescence (short lifespan of products) -100	Unequal pay for women and men -200 Job cuts or moving jobs overseas despite having made a profit -150 Subsidiaries in tax havens -200 Equity yield rate > 10% -200	Non-disclosure of subsidiaries -100 Prohibition of works council -150 Non-disclosure of payments to lobbyists -200 Excessive income inequality within a business -150

Appendix 2. Organic Matrix (Article IV) created from the ECG Matrix (ECG 2013) presented in Appendix 1. The Matrix has been modified to better fit to the SFFCM by adding the principles of organic food and its production

VALUE	Social			Technology	Economy	Ecology		Policy
	Safety	Healthiness	Ethicality	Technology	Economy	Ecology	Ethicality	Policy
Agriculture	- no residues - no GMO - efficient HACCP - no phytotoxins	- production of nutritious ingredients	- workplace quality	- resource efficiency - zero waste	- competitiveness	- minimization of environmental impact - use of renewable energy - maintaining of biodiversity	- wellbeing of production animals	- external impacts managed
Industry	- no synthetic additives - no irradiation - no GMO - efficient HACCP	- use of soft processing technology to save the nutrients	- ethical procurement - fair share of profit - workplace quality	- resource efficiency - zero waste	- competitiveness	- minimization of environmental impact - use of renewable energy - recycling	- wellbeing of production animals	- external impacts managed
Retail	- information of the origin of food - efficient HACCP	- offering healthy choices	- ethical procurement - fair share of profit - workplace quality	- resource efficiency - zero waste	- competitiveness	- minimization of environmental impact - use of renewable energy - recycling		- external impacts managed
Catering	- information of the origin of food - efficient HACCP	- offering healthy choices	- ethical procurement - fair share of profit - workplace quality	- resource efficiency - zero waste	- competitiveness	- minimization of environmental impact - use of renewable energy - recycling		- external impacts managed
Community (government institutions and offices)	- efficient risk based control - objective communication research and tuition	- objective communication research and tuition	- ethical public procurement - fair control - global sovereignty - objective communication research and tuition	- resource efficiency - zero waste	- competitiveness	- objective communication, research and tuition		communication, taxation, legislation, subsidy system, public procurement, control and consulting

Appendix 3. Questionnaire of the survey for demographic information to the actors of the food chain (Article 1). Environmental and sub environmental questions were not for the consumers.

Environmental questions	
A	What is your environment in the Finnish food chain?
1.	Agriculture
1.1	What is your main production area?
	Milk / meat / grain / potato and vegetables / poultry / egg / fruits and berries / natural products / other
1.2.	What is your production method?
	Conventional / organic
2.	Food industry
2.1.	What is the size of the company where you work?
	Small, less than 10 employees, medium size, 10 – 100 employees, big, more than 100 employees
2.2	What is the main product of the company?
	Bakery, mill / dairy / meat / convenience food / beverages / vegetables, fruits and berries / other
2.3.	Does the company produce organic products? Yes / no
3.	Retail
3.1.	What is your position?
	Director, foreman / employee
3.2.	Is the company (shop) independent or does it belong to a retail chain?
	Independent / retail chain
3.3.	Does the company sell organic products? Yes / no
4.	Catering
4.1.	What is the type of business?
	Private, separate restaurant / private, chain restaurant Public, communal level / public national level / other
4.2.	What is your position?
	Kitchen supervisor / cook / service supervisor / waiter / other
4.3.	Does the catering company (unit) use organic ingredients Yes / no
Demographic questions	
1.	Sex: male / female
2.	Age: 20 or under 20 / 21 – 30 / 31 – 40 / 41 – 50 / 51 – 60 / over 61 years old
3.	Size of household: 1 / 2 / 3 / 4 or more persons
4.	Province: Southern Finland / Western Finland / Oulu / Lapland / Eastern Finland / Åland
5.	Location: city / suburb / countryside
6.	Annual income of the household: less than 24.000€ / 24.000€ - 48.000€ / 48.000€ - 72.000€ / 72.000€ - 96.000€ / over 96.000€

Appendix 4. The demographic description of the respondents of the different parts of the Finnish food chain (Article I)

Group	Factor	All N=1527 %	Agriculture N=136 %	Industry N=50 %	Retail N=87 %	Catering N=158 %	Consumers N=1096 %
Sex	Female	52,5	42,6	42,0	48,3	56,3	54,0
	Male	47,5	57,3	58,0	51,7	43,7	46,0
Age	< or 20	5,0	0,7	0,0	0,0	0,0	7,5
	21 – 30	13,0	7,3	6,0	5,8	5,1	15,9
	31 – 40	22,0	16,9	16,0	37,9	21,5	21,7
	41 – 50	26,0	35,3	34,0	31,0	37,3	22,0
	51 – 60	23,0	27,9	36,0	20,7	29,8	21,4
	> 61	10,0	11,8	8,0	4,6	6,3	11,5
Household	1 mbr	16,2	6,6	12,0	13,8	12,7	18,3
	2 mbrs	39,3	35,3	30,0	37,9	39,9	40,2
	3 mbrs	17,0	22,8	22,0	13,8	13,3	16,8
	=4 or >4	27,6	35,3	36,0	34,5	34,2	24,7
Province	Southern Finland	41,0	26,5	50,0	55,2	46,2	41,1
	Western Finland	34,5	46,3	30,0	27,6	32,3	35,3
	Oulu	9,0	6,6	6,0	4,6	7,6	10,3
	Lapland	3,5	3,7	2,0	1,2	1,3	3,2
	Eastern Finland	11,0	16,9	12,0	11,5	12,7	10,1
Location	City	68,6	14,7	72,0	80,5	70,9	73,8
	Suburb	13,4	5,2	6,0	10,3	12,7	15,2
	Rural	18,0	80,2	22,0	9,2	16,5	11,0
Annual income	< 24000 €	14,0	8,1	6,0	2,3	5,7	17,8
	24000-48000 €	29,1	43,4	10,0	16,1	29,8	29,6
	48000-72000 €	25,9	32,4	18,0	19,5	23,4	26,8
	72000-96000 €	15,5	10,3	14,0	20,7	25,3	15,0
	>96000 €	14,5	5,9	52,0	41,4	15,8	10,8

Appendix 5. The questions of the survey (Article 1) to the actors of the Finnish food chain

Group	Question	Answer options
Safety	In my opinion organic food is safer than conventional food	I agree / I disagree
	My environment supports my opinion	I agree / I disagree
	I get enough information about the safety of organic food	I agree / I disagree
Healthiness	In my opinion organic food is healthier than conventional food	I agree / I disagree
	My environment supports my opinion	I agree / I disagree
	I get enough information about the healthiness of organic food	I agree / I disagree
Ecology	In my opinion organic production is more ecological than conventional	I agree / I disagree
	My environment supports my opinion	I agree / I disagree
	I get enough information about the ecology of organic production	I agree / I disagree
Ethicality	In my opinion organic production is more ethical than conventional	I agree / I disagree
	My environment supports my opinion	I agree / I disagree
	I get enough information about the ethicality of organic production	I agree / I disagree

Table of information available on quality attributes safety, healthiness, ecology and ethicality (Article I) among the actors of the Finnish food chain

Question	All	Agriculture		Industry		Retail		Catering		Consumers	
	N=1527	%	N=136	%	N=50	%	N=87	%	N=158	%	N=1096
Information, safety											
:agree	55,9	68,4	93	74	37	60,9	53	61,4	97	52,4	574
:disagree	44,07	31,6	43	26	13	1	34	38,6	61	47,6	522
Information, healthiness											
:agree	55,88	68,1	92	68	34	67,4	58	60,9	95	52,2	572
:disagree	44,12	31,9	43	32	16	32,6	28	39,1	61	47,8	524
Information ecology											
:agree	55	69,1	94	70,8	34	65,5	57	60	93	52,4	574
:disagree	44	30,9	42	29,2	14	34,5	30	40	62	47,6	522
Information, ethicality											
:agree	56,7	70,37	95	68,75	33	69,77	60	58,06	90	53,25	581
:disagree	43,3	29,63	40	31,25	15	30,23	26	41,94	65	46,75	510
<div style="display: flex; justify-content: space-between; width: 100%;"> p<0,01 p≤0,05 </div>											

ORIGINAL ARTICLES