FUTURE PROSPECTS OF SUSTAINABLE DEVELOPMENT: TOWARDS THE YEAR 2030 IN FINLAND

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Tiivistelmä — Referat — Abstract

Towards the year 2030 in Finland, sustainability issues will be dominated by climate change, the worsening state of the Baltic Sea, technological and technical development, globalization, the degradation of ecosystem services and increasing energy consumption. At the decision-making level, setting strategic objectives towards the year 2030 should consist of increasing energy efficiency, halting the reduction of biodiversity and changing consumption habits. Furthermore, promoting public transportation, limiting greenhouse gas emissions, increasing the proportion of renewable energy sources and linking climate policy to all sustainable development policies should be targeted in strategic long-term planning.

This master's thesis research was implemented as a Delphi study, a method commonly used in futures research. In a Delphi study the expertise of a chosen panel is utilized to gather information on a given topic. The research aimed at investigating the experts' views on 1) the most important driving forces – changes and trends – affecting sustainable development towards the year 2030 2) the desirability and probability of different sustainability objectives and 3) recognizing the potential political conflicts brought by these strategies. The Delphi study was carried out during February 2010 – April 2010. It consisted of two rounds. The first round questionnaire was sent 43 experts (response rate 56 %). During the second round the most interesting first round results were completed with qualitative arguments (response rate 50 %). The results were analyzed in the manner that the research issues of most interest were 1) the trends having the most importance towards the year 2030 2) the most desirable strategic objectives with a high probability for political conflicts.

The results indicate a high risk for political conflict especially with the targets on halting the reduction of biodiversity and changing consumption habits. These two objectives were considered difficult to grasp and often overruled by economic interests. Changing the current societal system based on continuous growth and consumption would require profound alterations in economy, society and individual values. The results also indicate that energy is a key issue for the coming decades: setting strategic objectives for replacing fossil fuels should be among the top priorities of the Finnish national government. Also, in addition for climate change being an important trend, the deviation of rankings in importance among the panel indicated a possibility for social and economic trends to have unexpected, sudden effects as we move towards the year 2030. These include global poverty and inequality, changing age structures and the sustainability of the Finnish economy.

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Vuotta 2030 kohti kulkiessa Suomessa kestävän kehityksen ydinkysymyksiä tulevat olemaan ilmastonmuutos, Itämeren tilan huononeminen, teknologinen ja tekninen kehitys, globalisaatio, ekosysteemipalveluiden huonontuminen sekä kasvava energiankulutus. Päätöksenteon tasolla kestävän kehityksen strategisten tavoitteiden tulisi keskittyä energiatehokkuuden kasvattamiseen, monimuotoisuuden vähenemisen pysäyttämiseen sekä kulutustottumisten muuttamiseen. Lisäksi pitkän ajan strategisessa suunnittelussa tulisi tavoitella julkisten liikenneneuvojen käytön edistämistä, kasvihuonepäästöjen vähentämistä, uusiutuvien energiamuotojen osuuden lisäämistä energiantuotannossa sekä ilmastopolitiikan kytkemistä kaikkiin kestävän kehityksen politiikkoihin. Tutkimus toteutettiin tulevaisuudentutkimuksessa suosittua Delfoi-metodia käyttäen. Delfoi-tutkimus perustuu tulevaisuuteen liittyvän informaation keräämiseen asiantuntijajoukolta ja soveltuu erityisesti yhteiskunnalliseen päätöksentekoon liittyvään tutkimukseen. Tutkimuksen tavoitteena oli koota eri alan asiantuntijoiden näkemyksiä 1) tärkeimmistä kestävään kehitykseen lähivuosina vaikuttavista muutosvoimista 2) kestävän kehityksen strategisten tavoitteiden toivottavuudesta ja todennäköisyydestä ja sitä kautta 3) tunnistaa näiden strategioiden mahdollisesti tuomat poliittiset konfliktit. Delfoi-tutkimus toteutettiin helmikuu 2010 – huhtikuu 2010 välisenä aikana. Tutkimus koostui kahdesta erillisestä kierroksesta. Ensimmäisen kierroksen aikana 43 asiantuntijalle lähetettiin kysely (vastausprosentti 56 %), jonka jälkeen toisella kierroksella syvennettiin saatuja tuloksia kvalitatiivisin argumentein (vastausprosentti 50 %). Tutkimuksen kannalta mielenkiintoisimpia aiheita olivat tärkeimmät muutosvoimat sekä ne strategiset tavoitteet, joiden toteutuminen tulevaisuuden kannalta on hyvin toivottavaa, mutta poliittisen konfliktin mahdollisuus on myös suuri. Tulokset viittaavat poliittisen konfliktin todennäköisyyteen monimuotoisuuden vähentämisen ja kulutustottumusten muuttamisen kohdalla. Nämä kaksi tavoitetta koetaan usein vaikeasti ymmärrettäviksi ja ne myös usein jäävät taloudellisten intressien varjoon. Niiden saavuttaminen vaatisi syvällisiä muutoksia olemassa olevaan yhteiskunta – ja talousjärjestelmään sekä ihmisten arvoihin. Tulokset osoittavat myös, että energia tulee seuraavien vuosikymmenien aikana olemaan kestävän kehityksen ydinkysymys: strategisessa suunnittelussa tulisi kiinnittää huomio fossiilisten polttoaineiden korvaamiseen vaihtoehtoisilla energiamuodoilla. Hajonnat asiantuntijoiden antamissa tärkeysarvioinneissa saattaa myös ennakoida sosiaalisten ja taloudellisen trendien, kuten maailmanlaajuisen köyhyyden ja epätasa-arvon, muuttuvien ikärakenteiden että julkisen talouden kestävyyden, aiempaa arvioitua suurempaa vaikutusta yhteiskuntaan.

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1. INTRODUCTION

Sustainable development, a concept well established by the Brundtland commission in the report *Our Common Future* in 1987, captures a message of having economic prosperity combined with human wellbeing and environmental protection. In short, sustainable development strives for something to be sustained in the long term. It seems evident that the concept has an outcome which should appeal to everyone. Yet, problems arise when people in different nations and regions are asked what should be sustained and how it should be sustained. Whilst societies are putting more and more effort into developing more sustainably, it is simultaneously becoming increasingly clear how fully complex this task is. (Jordan, 2008; Volkery et *al*, 2006).

This master's thesis research was conducted as a Delphi study using the expertise of a chosen panel from environmental, socio-cultural and economic backgrounds. The aim was to analyze Finnish sustainability strategies and with the help of the expert panel identify the most important strategic objectives and trends in sustainable development towards the year 2030, particularly focusing on the environmental dimension. The Delphi method is a widely used method in futures studies and has recently been used in examining e.g. future prospects of alternative agro-based bioenergy use in Finland (Rikkonen & Tapio, 2009) as well as future images of meat consumption (Vinnari & Tapio, 2009). The 2009 State of the Future (Glenn *et al*, 2009), a study conducted by the UN Millennium Project, is a prominent example of a large-scale international Delphi study. Sustainable development governance aspects in Finland have not before been examined through a Delphi study. Delphi studies conducted in the field of environment have before mostly concentrated on climate (Wilenius & Tirkkonen, 1997), agriculture (Rikkonen, 2005; Rikkonen *et al*, 2006) as well as projects on energy and transportation.

Finland has been a leading country in promoting sustainable development at the EU and world levels (OECD, 2009). It has also been a forerunner in reporting about sustainable development in the form of indicators (Rosenström, 2007). The

National strategy for Sustainable Development of Finland was published in 2006. The strategy visions a nation that assures, both nationally and globally, wellbeing within the limits of the carrying capacity of nature. The timeline of its specific targets extends until 2030. (Prime Minister's Office, 2006).

Yet, strategies for sustainable development have been debated to be cosmetic and not having any real impact on a country's governance (Meadowcroft, 2007). Recently, more fundamental changes in governance and the whole mindset for sustainable development have been required. The original message in the Brundtland report of a synergy between economic development and environmental conservation has been replaced by a need for trade-offs instead of win-win situations (Adger & Jordan, 2009). Economic growth is no longer seen as a synonym for development, especially in the limits set by the planet's carrying capacity (Kamppinen et *al*, 2002).

Adger & Jordan (2009) argue that humanity is currently underway an exciting transition towards sustainability. Other scholars have created plausible scenarios of the future (Millennium Ecosystem Assessment, 2005) or new approaches to the current global system dominated by the markets (Jackson, 2009). The common opinion seems to be that there are enough resources in the world to address the biggest challenges. However, to date coherence and direction has been lacking. (Glenn et *al*, 2009).

2. OBJECTIVES

This Master's thesis research examines the future prospects of sustainable development, particularly in Finland towards the year 2030. The timeframe is equivalent to that of the timeframe of the current national strategy on sustainable development.

The research aims at collecting the objectives, visions, changes and trends from the prevailing, most important strategy papers on sustainable development in Finland. The strategies to be analyzed will be delimited to the following levels: National (The Ministry of the Environment, Prime Minister's Office, Association of Finnish Local and Regional Authorities), Provincial (Provincial sustainable development strategies) and local (municipal Agenda 21).

Against this background, the specific aims of the research are to:

- o *Explore the probability and desirability of sustainability objectives, particularly of the environmental dimension of sustainable development, stated in the different strategies. The aim is to determine the most crucial ones towards the year 2030.*

- o *Find strategic objectives that have a possibility to cause a political conflict. Special attention will therefore be paid to objectives that are considered important concerning the future, but according to experts difficult or unlikely to achieve.*

- o *Examine the main driving forces – trends and changes affecting sustainable development – mentioned in the sustainability strategies and concluding with the most important ones. The most important trends have a considerable impact in the Finnish sustainable development processes.*

3. THEORETICAL FRAMEWORK

3.1. Theoretical premises in this thesis

The basis of this thesis lies in Finnish sustainability strategies. In addition, the theoretical framework draws its contents from the publications and works of researchers and scientists that have holistically examined the themes in this thesis. In piecing together the behavior and values of people in sustainability issues, I have applied theories from *Theory of Justice* by Rawls (1971) and *Prosperity without growth* by Jackson (2009). Also, the theories and discussions of morality and values by Malaska et *al* (1989) have had an influence. Concerning the philosophical approaches of futures research in general, *Why Futures Studies* by Masini (1993) has provided interesting insight. Strategic objectives and decision-making concerning the future play a central part in this thesis. Decision-making has been analyzed by applying the work of Etzioni (1988). The works of Tukker & Butter (2005) as well as Jordan (2008) form a basis for the transition towards sustainability. Finally, the theoretical premises have been influenced by various political documents and research results.

4. Background

4.1. Futures research

4.1.1. Futures research as a scientific discipline

'The only certain thing about the future is that it is uncertain'. Indeed, the world and the operational environmental in which people act in is constantly changing. Some changes take place visibly in the short-term, whilst others can go unnoticeable over the long term. Mastering these changes requires constant planning and anticipation. Futures research assists societal decision-making by offering long-term frameworks by outlining opportunities and threats caused by different decisions and by offering alternative approaches for solving problems. (Kamppinen et *al*, 2002). As a field of science it rises from the need of people to give purpose to the choices we make today. It aims at inventing and suggesting possible and probable futures. By presenting these alternatives, futures research helps people to make knowledge-based decisions on their future. It utilizes results from other fields of study and based on those draws conclusions on what kind of different possible, probable and desirable states of future lie ahead us. (Igbal & Pipon-Young, 2009).

There are prominent examples of how futures research is applied in today's scientific studies. The Millennium Project facilitated by the United Nations University is an example of a large-scale, ongoing project. It aims at analyzing, explaining and depicting long-term global trends and presenting different possibilities and strategies for the future. Each year the Millennium Project publishes 15 significant global megatrends. Other examples of large-scale futures research in the field of sustainability can be found in the 1970s. Back then, the Club of Rome became the leading discussion forum for dealing with the issues and problematics of humanity. *Limits to Growth,* published by the Club in 1972, commenced an unparalleled global debate. (Meadows et *al*, 1972).

Decision-making, visions and missions are based on values, because without values the future would not have any purpose (Kamppinen et *al*, 2002). Therefore, value discussions are inevitable in futures research and normative aspects have

traditionally been accepted as a part it. It is also important to realize that the future cannot be predicted in the traditional sense of the word, since it is a result of complex web of events - events that we rarely know much about. Additionally, future research emphasizes that the future is not readymade: humanity can with its own actions and decisions affect which path is taken to which scenario. (Igbal & Pipon-Young, 2009).

As stated before, the role of futures research is not merely to forecast possible futures and alternative scenarios. Instead, it is more important to strategically ponder, what we should do for the future to hold the visions we consider desirable, or to prevent threats we consider undesirable. (Kamppinen et *al*, 2002). Another consideration in futures research is how a 'desirable' or 'good' future is defined. Often the prevailing definitions mirror those of the western world and a one-sided conception of development. Critical approaches to future research aim at finding broader answer to this problem by questioning future images as well as taking into account whose future and whose interests are discussed at which point. Finally, a scientific research aspect must be taken into account. In order for future research to be considered as good qualitative research, it must fill these five criteria: it must be scientifically relevant, logical, credible, transparent and significant. (Igbal & Pipon-Young, 2009)

Identifying megatrends or trends is an important part of futures research. Megatrends can be explained as 'streams leading one to a certain direction but against which one can, if working hard, swim against'. A central characteristic of trends is that they are very likely to have an influence for the time being. Trends can also be in conflict with one another. For instance, the decreasing population in Europe and the quickly increasing population in developing nations are quite incompatible trends. Futures research plays an important role in depicting why and in which conditions certain trends will seize to have an influence. (Kamppinen et al, 2002). Malaska (1985) has, however, criticised the use of trends because they paint a too logical picture of the world. In the real world changes are often not that predictable. Research on trends has been made also in Finland. In a study made in 1997, the most influential trends included those of technological development, economic globalization, networking and ecologically sustainable development, among others. (Kamppinen et

al, 2002).

Changes in society and the environment are now happening on a much wider and faster scale than ever before. It can only be argued whether or not humanity is currently underway a turning point towards a new stage of development. Turning points are often characterized with uncertainty and unexpected changes or surprises. Whether or not there is an ongoing transition, futures research and sustainable development are inevitably interlinked. Following the principles of sustainable development requires a long-term approach. For this, futures research offers a comprehensive examination of the challenges brought by sustainable development. (Kamppinen et *al*, 2002).

There are three starting points for futures research. First, the future cannot be predicted. Secondly, the future is not predestined and finally, the future can be affected with policies and choices. In a way the future consists of a bunch of alternatives, of which any is a plausible scenario. However, it is impossible to know which scenario will take place and because of the complex nature of societies, not even all the alternatives might be thought of. Futures research can, however, provide us with enough knowledge to prepare for the unknown. (Malaska, 1985).

4.1.2. The Delphi method as a tool in futures research

The Delphi method, nowadays frequently used in futures research, aims at mapping the road between the present situation and a desirable future state. Several alternative pathways to the desirable future state can exist. Nowadays the Delphi method is particularly used for generating versatile views and ideas of experts to form a basis for planning and decision-making. It is especially suitable for open-ended issues consisting of several possible alternatives. The information gained with the Delphi method is never certain. However, 'no other information is as relevant as information about something that has not happened yet, but could take place'. (Electronic source, read 01.06.2010).

The Delphi method is useful in futures research since it enables the collecting of even contradictory information and forms a general, holistic view of a certain system. The possible outcome of the Delphi process is not necessarily consensus.

However, the process ensures that different facts, arguments, interests and meanings are taken into account in the examination of the research issue. By doing so the method enhances the quality of decision-making concerning the future. Successful futures research leads to conscious and transparent actions concerning the future. (Electronic source, read 01.06.2010).

4.2. The concept of sustainable development

4.2.1. A concept too loose to use?

Various publications, such as the *Report of the World Summit on Sustainable Development* (2002)*,* the Millennium Ecosystem Assessment (2005), and the Global Environmental Outlook 4 report (2007) have acutely expressed that things have got worse, not better, since the publication of the Brundtland report on sustainable development in 1987 (Jordan, 2008). In the Brundtland report*,* sustainable development was defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (Brundtland Commission, 1987). This definition introduced sustainable development to the public in terms of three dimensions: ecological, economic and socio-cultural. The report gave a spark to an explosion of work on development and sustainability and established sustainable development as a component of international development thinking and practice (Sneddon *et al*, 2006).

Our Common Future succeeded in popularising the particular message that there is a possibility to have both economic prosperity and environmental protection at the same time. The host of international meetings convened in the post-Brundtland era, most notably in Rio 1992 and ten years later in Johannesburg, have reaffirmed sustainable development as a global objective of human development. (Jordan, 2008). However, critics have cited the Rio meeting as an unmet vision: it seemed like a sound blueprint for sustainability on paper, but in practice it turned out to be a failure since governments failed to fund and implement it. The World Summit on Sustainable Development in Johannesburg has been described as 'the death of Rio environmentalism', a conference where governments could not even agree to reaffirm the principles of the Rio Summit (Park *et al*, 2008). Also, the core idea of promoting

human wellbeing while simultaneously conserving the natural environment has proven to be highly elusive (Adger & Jordan, 2009). According to Redclift (2005), the simplicity of the Brundtland approach to sustainable development is deceptive, and includes underlying complexities and contradictions. Indeed, the concept of sustainable development is one of complexity: it deals with different temporal and spatial scales with multiple stakeholders (Van Zeijl-Rozema et *al*, 2008).

There are several different approaches to defining sustainable development. First, one can define sustainable development by stating what it specifically seeks to achieve, such as the Millennium Development Goals. Second, the concept can be defined in how it is measured, in other words in the form of indicators. Third, sustainable development can be defined through the values that represent or support it. Finally, it can be defined in practice, including social movements, institutions, science and technology, and 'negotiating the grand compromise'. (Kates *et al*, 2005). Bosselman (2008) suggests that sustainable development is an ideal, like democracy, that we should strive towards. However, what makes sustainable development different from concepts such as democracy is the constant presence of very real ecological constraints to do things (Hukkinen, 2008).

More importantly it is widely accepted today that searching for one precise definition of sustainable development that pleases everyone would not be beneficial, if it even was possible. For starters, there are simply too vast a number of definitions to choose from. Furthermore, precision might take its toll: it has been argued that the coalition for sustainable development would collapse if the concept ever were defined precisely, taking into account its mixture of radical and conservative elements. Also, as Brundtland pointed out in her report, the very act of contesting and debating the meaning of sustainable development plays a hugely important role in governing for sustainable development. As a result, if no centrally determined blueprint for sustainable development will emerge its practicality will necessarily have to emerge out of an interactive process of societal dialogue and reflection. (Jordan, 2008).

Moreover, the definition of sustainable development is not viewed as important as the understanding of how and why it is used by social actors operating in a variety of different governance contexts. Fundamentally, it is a political concept

filled with social aspects. (Jordan, 2008). Adger & Jordan (2009) refer to sustainability as a process of change in the way that society is organised. In a way sustainable development can be perceived as a social movement – people who share a common ideology try together to achieve certain general goals (Kates et *al*, 2005). What the concept does also do is bringing to the table people who normally do not talk to each other (Newman, 2006). Sustainable development is able to serve as a grand compromise between those who are principally concerned with nature and environment, those who value economic development, and those who are dedicated to improving the human condition. This can be viewed as one of its greatest successes. (Kates et *al*, 2005).

The institutionalization of sustainable development since the Brundtland report has been rapid. It is currently a central theme throughout the United Nations and its specialized agencies. (Kates *et al,* 2005). Environmental ministries now exist in almost every state. Literature on environmental and sustainable development governance is vast. The fundamental problem in the Brundtland report was, however, that it did not explain how sustainable development should be achieved, or how governance should be organised in a society so that the sum total of human development becomes more sustainable in the long term. The concept was furthermore explained in the most general terms. Critics argue that the greatest weakness of sustainable development lies in its ambiguous nature. (Jordan, 2008). However, Kates et *al* (2005) argue that the concept draws much of its resonance, power and creativity from this very ambiguity. It is this feature of the concept which has led to its and resilience (Newman, 2006). According to Udo & Jansson (2009), the concept of sustainable development is a 'multidimensional, multidisciplinary, and interdisciplinary problem of significant complexity'. Hukkinen (2008) reminds that however loose the concept, it still appeals to a lot of people.

Initially, one of the objectives of the Rio conference was to explore what the different systems for steering sustainable development might look like. The result is known as Agenda 21, which has been criticised for being more a piece of international soft law than a binding set of international legal obligations. Because it did not constitute a tidy blueprint, the debate about how to govern for sustainable

development continued to run. Also, there are different views on how sustainable development will be implemented. Choosing a suitable governing process is also challenged by the fact that governing processes do not take place in an institutional and political vacuum. They will need to be applied in already existing systems of governance, and targeted at particular steps in the policy-making processes. It will not be easy to make the choice of which governing mode or instrument to adopt, as the existing systems of governance are themselves very deeply implicated in unsustainable patterns of development. (Jordan, 2008).

4.2.2. Sustainability as a societal challenge

On the road towards sustainability, Jackson (2009) suggests that the current financial crisis offers a unique opportunity to address both financial and ecological sustainability. He argues that prosperity built on continual growth must be questioned and alternative visions sought. At the moment there is not yet a credible, socially just, ecologically sustainable scenario of ever-growing incomes for the nine billion people of the world. Jackson offers the 'green stimulus' as a response to the economic crisis. This would include carefully targeted investments towards energy security, low-carbon infrastructures and ecological protection. Multiple benefits follow: resources for household spending and productive investment are freed up by reducing energy and material costs, reliance on imports and exposure to the geopolitics of energy supply is reduced, employment is boosted by the expanding environmental industries sector, progress is gained in reducing global carbon targets, and finally, valuable ecological assets are protected and the quality of our living environment for generations to come is improved.

However, fixing the economy only solves a part of the problem. Another vital part is to change the attitude of the social logic of consumerism. (Jackson, 2009). Indeed, at the heart of sustainable development lie value choices. (Meadowcroft, 2007). Jackson (2009) visions a rising 'alternative hedonism' which introduced sources of identity, creativity and meaning that are located outside the realm of market. The advantages of such an alternative scenario should appeal to everyone. Life satisfaction is enhanced in a less materialistic society. The importance of status

goods is lowered in a more equal society. People's work-life balance is improved in a less growth-driven economy. When investment in public goods is enhanced, it will provide lasting returns to the nation's prosperity.

The debate about the core meaning of sustainable development remains messy, but great social transformations can be expected to be messy. It is messy because it has a lot to do with the fact that sustainability concerns are dealing with the direction of human civilisation. This is very likely to generate discussion. (Jordan, 2008). However, there is no mystery about sustainability – the key questions remains whether individual and collective action can move the world towards a more sustainable future. (Adger & Jordan, 2009). The different perspectives on sustainability raise strong emotions, and these perspectives should somehow be reconciled in a systematic way (Hukkinen, 2008). According to Adger & Jordan (2009), humanity is currently in an exciting stage in the transition to sustainability. However, the environmental labelling of sustainability continues to decrease its political acceptability and public empathy. In order for the idea of sustainable development to be revolutionary and radicalizing, it demands a huge alterations in culture, behaviour and outlook for which almost all citizens are not yet prepared or willing. The next decade will show how well the huge transformations that lie before us will be adjusted to.

5. MATERIALS AND METHODS

5.1. The Delphi method

Nowadays a commonly used method in futures research, the Delphi method did not exist before the 1950s. It was then introduced in the United States in secret research projects on military technology, facilitated by the Rand company. (Kamppinen et *al*, 2002). The Delphi is an especially suitable research tool for generating information for long-range planning in areas where changes in current trends can be expected. The method builds from the judgment of invited experts by conducting successive iterations of a given questionnaire. The aim is to show possible convergence of opinions and to recognize dissent or non-convergence. It examines, evaluates and proposes possible, likely and desirable futures. Particularly for long-range matters (20-30 years) the use of the Delphi method is considered beneficial, as expert opinions are often the only source of available information. (Rikkonen & Tapio, 2009).

As the Delphi method, with the help of experts, usually called panellists, finds information that is not otherwise available (Metsämuuronen, 2002), it has become popular in many disciplines (Igbal & Pipon-Young, 2009). Delphi studies can be divided into conventional Delphi, Policy Delphi and Argument Delphi. The conventional Delphi was the original form of the studies. It aimed at generating a consensus among a group of experts by using iteration and feedback in a given questionnaire. (Kamppinen et *al*, 2002). The conventional Delphi has been widely criticized for focusing too much on consensus seeking and paying too little attention on weak signals. The Policy Delphi, on the other hand, focuses on generating the opposing views on the potential resolutions of a major policy issue. (Rikkonen & Tapio, 2009). The Argument Delphi is a an applied version of the Policy Delphi. It can be used for generating a versatile and realistic view on the problem to be analysed. The idea is to gather a group of experts, whose expertise complete one another's. The Delphi method, no matter which form is used, has three main characteristics: anonymity, iteration and feedback. (Kamppinen et *al*, 2002).

The method is particularly beneficial for investigating turning points that are difficult to define or time. A good Delphi study brings out the weak signals and areas of improvement noticed by the panellists to a wider audience. Also, because of the anonymity of the expert panel, it eliminates the effect of hierarchies of conflicting interests in the research results. (Metsämuuronen, 2002). Using the Delphi method is particularly useful in areas of limited research, since survey instruments and ideas are generated from a knowledgeable participant pool. The method is designed to explore areas where controversy, debate or a lack of clarity exist. Since expert opinions are the main source of information in Delphi studies, it is important to focus more on the quality than the quantity of the panel. A usual number for an Argument Delphi study is about 15-50 panellists. Expertise is not easily defined; it can be based on different issues and be broad horizontal expertise or profound vertical expertise. The main challenge for the person facilitating the Delphi study is to form a group of people with different expertise and views. (Kamppinen et *al*, 2002).

The method is very flexible and can accommodate many variations and applications. It gathers together existing knowledge and pinpoints areas of agreement and/or disagreement. It is economical and enables group communication that otherwise might have been impossible due to geography, time or other constraints. Furthermore, the anonymity between panellists can encourage creativity, honesty and balanced consideration of ideas. There are also drawbacks. As a method, the Delphi suffers from a lack of guidance and agreed standards regarding interpretation and analyses of results, as well as criteria for how panellists should be selected. In addition, it is less efficient as a means of generating or testing new knowledge or theories. Generalizations are limited: another panel may reach different conclusions, and it cannot be concluded that the only or correct issues have been identified. High level of commitment is required from panellists, and drop-out rates are often high. The anonymity of panellists may produce less 'ownership' of ideas and the method assumes panellists are willing or able to elucidate issues individually and respond honestly. (Igbal & Pipon-Young, 2009).

There are certain qualities that from the basis for a successful Delphi study. First, the expert panel must be carefully chosen. Secondly, the anonymity in

argumentation should not eliminate the need for factual arguments. Thirdly, it is crucial to find interesting and sensible phrasing of questions. Fourthly, the a Delphi study should be a structured discussion with continuous and systematic evaluation of arguments given by the panellists. Evaluation should not only be made in the probability of the given research topic, but also on its importance, desirability, threats, prerequisites and obstacles. Fifthly, it is important to gather – in a systematic and user-friendly manner – arguments on the future from various experts in order to use the material to assist decision-making. Finally, the success of a Delphi study is also measured commensurate with its relevance to strategic decision-making. (Kamppinen et *al*, 2002).

Some specific points are good to keep in mind when using the Delphi method as a research too. When using expert opinions and long-range matters, the divergence of opinions becomes wider the farther in the future the estimates are made. Another common characteristics is that experts tend to be pessimistic in the long term and optimistic in the short term. This is because often a possible solution is difficult to think of if the solution is not yet found. A final comment of the Delphi method is that the use of a questionnaire has its own effects on the results, since the questions always reflect the background and the subjective view of the world of the researcher. Also the length of the questions can have an impact on the results. (Kamppinen et *al*, 2002).

5.2. Materials for analysis: Sustainable development strategies

The start up information for a Delphi process can come from various documented strategies in which an organisation or a public sector has listed the key strategic focuses and general guidelines for the future (Rikkonen & Tapio, 2009). The materials that were analyzed to form the Delphi questionnaire in this study were strategic documents for sustainability governance in Finland. The documents were chosen because they cover the strategic objectives in sustainable development country-wide and among the most populated municipalities (Table 2). These documents were analysed to collect sustainable development objectives and possible driving forces affecting sustainability governance– changes and trends – towards the

year 2030. The year 2030 was chosen as the time limit as it is also the target year in the National Strategy for sustainable development. Also, a timeline of 20 years allows the realistic assessment of the strategic objectives.

When gathering sustainability objectives, changes and trends from the sustainability strategies, main focus was given to the environmental component of sustainable development. So to say, the socio-cultural and economic objectives could not be taken into as wide consideration as the ecological ones when forming the questionnaire. This decision was made due to available human resources in the research. It was also a question of practicality; would all the targets been included in the questionnaire, the final questionnaire would have been too long for the busy panellists to devote their time on it. This limitation to focus mainly on the environmental dimension of sustainability was also mentioned in the objectives of the thesis.

All together five strategic papers were analysed. The first one was the National Strategy for Sustainable Development. It is an official document produced by the Prime Minister's Office in cooperation with the Ministry of Environment. It visions to 'assure well-being within the limits of the carrying capacity of nature nationally and globally'. The objective of the strategy is for its key guidelines for sustainable development to form a foundation for government and policy programmes. The timeline for the targets goes beyond current generations as it extends until about 2030. The strategy outlines the most significant development trends and challenges of sustainable development, which include climate change, adaptation to rapid global economic changes and demographic changes. This strategy also acts as the umbrella strategy for the whole nation. (Prime Minister's Office, 2006).

The second document taken into analysis was the government programme for sustainable development (Sustainable development in the new government programme, 2007). This document presents the incorporation of sustainable development objectives in the latest government programme. The programme was accepted in April 2007 and lists several fields where the targets of sustainable development are included.

The third document is a sustainable development strategy published by the Association of Finnish Local and Regional Authorities (AFLRA) in 1998. It is a strategy for "the next several years" but does not indicate a specific target year. The document solely focuses on the ecological dimension of sustainable development as 'environmental problems have, after all, given rise to the whole concept of sustainable development'. This strategic document was chosen for the analysis because the AFLRA acts as an umbrella organisation for the Finnish municipalities. Situated in the capital of Finland, the Headquarters for the Association facilitates the work towards the municipalities.

The fourth document was the strategy and vision of Uusimaa province (Uudenmaan maakuntasuunnitelma, 2006). Uusimaa comprises merely 2,1 percent of the total area in Finland, but a quarter of the Finnish population – approximately 1.4 million people – live in its municipalities. The target year for the strategy is set as 2030. It visions a "internationally competitive metropolitan region". Objectives are mentioned under four different categories, which are housing, industry and know-how, well-being, infrastructure and the environment. As the focus of the research in this thesis is on the ecological dimension of sustainable development, the objectives taken for the analysis were only from the fourth part of the strategy.

The fifth and final document taken into analysis was the Agenda 21 of the City of Helsinki. It was taken into analysis because of the important role of municipalities in sustainability governance. Municipalities can play a significant part in promoting the transition towards sustainable development. In environmental work, municipalities can affect their own operations directly, such as civil engineering and waste-water management. They can also affect the operations of other directly by using the powers granted authorities by law, for instances. Finally, municipalities can affect the operations of others indirectly by promoting environmental awareness in schools and corporate activities. (Association for Finnish Local and Regional Authorities, 1998). Including the Agenda 21 programme of Helsinki in the analysis was important in order to have a municipal representative. As Helsinki has the largest population of all municipalities (add percentage of population), it gives a fair amount of representativeness.

Levels of sustainability strategies

NATIONAL	National Strategy for Sustainable Development
	Sustainable development in the new government programme
REGIONAL	Strategy of the Finnish Local and Regional Authorities
	Strategy and vision of the Uusimaa region
MUNICIPAL	City of Helsinki Agenda 21

Table 2. The analyzed sustainable development strategies representing different levels of governance.

5.3. The Delphi questionnaire

There are variations in how Delphi studies are implemented, but the main characteristics remain (Table 3). In this research, after collecting the strategic objectives and trends from the five sustainability strategies, the most relevant trends and objectives were picked for the questionnaire. The most relevant objectives were considered those that were concrete objectives, not just wording on sustainable development matters. The purpose was also to have as little parallel objectives as possible, although many of the objectives are interlinked. For example, when listing the trends, instead of adding to the questionnaire global economic competition and the new global division of labour, globalisation acted as the umbrella trend for these issues.

Finally, the Delphi questionnaire consisted of three parts. In the first part of the questionnaire the participants were asked to fill in their basic information including age group, gender, institution and field of expertise. The second part of the questionnaire was the actual substance part. This section had three sub-sections: 1) the importance of different trends towards the year 2030 2) the desirability of different sustainability strategies towards the year 2030 3) the probability of different sustainability strategies towards the year 2030. Each subsection in the questionnaire had answering options on a Likert scale from 1 to 5, e.g. 1 not important, 2 quite important, 3 don't know 4 very important 5 extremely important. After filling in these sections, there was still a feedback box for the participants to give comments. The questionnaire as a whole can be found in Appendix 1.

The questionnaire was designed in a manner that it would not take more than 30 minutes to fill it. Before the final version was ready, the questionnaire was made more compact and pre-tested by a small number of colleagues. The questionnaire was designed with the free online server SurveyMonkey. This saved a lot of time in collecting the answers.

1. The research topic is defined, questions for experts are defined
2. Choosing the experts, 'panellists'
   - Who, why? The panellists should be selected for their particular expertise on the chosen topic
3. First Delphi round
   Gathers information from individual experts
4. The researcher gathers the data and submits the results of the first round to the panellists
5. Second Delphi round: specifies the opinions of the first round, experts can change their views
6. The researcher gathers the data again, analyzes them and possibly sends them to the panel once more to specify
7. After a proper amount of Delphi rounds (a point of stability of opinion is reached) the researcher gathers the data and finishes the Delphi iterations
   → **results**

Table 3. Distinctive phases of a Delphi study. (Metsämuuronen, 2002).

5.4. The panellists

Cautiousness is crucial when selecting experts for future orientated research. In order for the experts to be truly representative they should reflect a large pool of opinions, interests and backgrounds. It is never certain that a group of experts with knowledge of one dimension of a complex system comprise a holistic view about the total system (Vinnari, 2007). Indeed, the core of a Delphi study lies in the panellists. Clear inclusion criteria should be applied and outlined as a means of assessing the results and establishing the study's potential relevance to other settings and populations. The number of the panellists differ according to each study. It depends largely on the topic area as well as time and resources at the researcher's disposal. Panels between 10 and 50 are recommended. However, much larger panels than this can also be found in former and ongoing Delphi studies.

It is also the researcher's responsibility to conceptualize and define 'expertise'. The Delphi method may fail to produce interesting results if panellists lack specialist knowledge, qualifications and proven track records in the field. Often a varied panel is considered best in producing a credible questionnaire, and individuals who might provide a minority or differing perspective should be actively recruited to the panel. The recruitment process often happens via letter or e-mail. The process can be broadened through 'snowballing' – asking panellists to forward invitations to other relevant individuals. (Igbal & Pipon-Young, 2009). The first thing to do is to determine whether the research aims to measure the diversity of opinions on a topic or to steer a group towards consensus. This distinction is important in terms of the execution of the Delphi. If the desired outcome of the process is to measure opinions, fewer rounds are generally acceptable. It is also less vital to have a complete dataset, and the panel can be expanded across rounds by inviting more panellists in Round 2. If, however, the research aims at generating consensus, three or more rounds are preferable. The same panel should be retained throughout and in order to determine the impact of group feedback on panellists, high response rates are important. Next, the researcher should decide the number of rounds, draw up a timeframe and construct study materials (emails and calls to participants, consent forms, complete ethics procedures). (Igbal & Pipon-Young, 2009).

In this study, the panellists were chosen after finishing the Delphi questionnaire. A matrix (Table 4; Table 5) was used to comprehensively cover the different areas of expertise in the study. The panellists were experts from the three different dimensions of sustainable development to make sure there would be a holistic approach to the study. Also, the experts were from different sectors of society, including international, administrational, national and municipal expertise. Representatives from various interest groups were also included. In total, 43 number of panellists were pre-selected. They were all contacted personally by phone or e-mail. The panellists were briefly informed about the purpose of the study and guaranteed full anonymity during the research process. After being informed on the phone, they were sent a direct link to the online Delphi questionnaire together with a personalized email. Already during the first two days, ten panellists filled in their replies online. The rest were contacted and reminded.

The panellists came from various backgrounds including the three dimensions of sustainable development. Their field of expertise included economy, international politics, corporate social responsibility, development, water supply and sewerage, environmental governance, sustainable development, biodiversity, labour programmes, municipal economy, environmental policy, participation and industry. The panellists' organisations included universities, municipalities, ministries, interest groups, the AFLRA as well as Centres for Economic Development, Transport and the Environment. The expertise varied during the different Delphi rounds (Table 4; Table 5) as not all the panellists replied to the second round questions. The tables show that more information might have been needed on the economic and socio-cultural fields of expertise. The focus of expertise is on the ecological dimension of sustainable development. This can be considered a good thing, since the focus of the thesis is on the same dimension. However, it might also give a simplified depiction of all the aspects of sustainability governance in Finland. The gender ratio, age group division and education level varied among the panel (Table 6; Table 7; Table 8).

	Ecological	Economic	Socio-cultural
International level	2	1	1
Administration (ministries)	3	2	3
National level (Kuntaliitto e.g.)	4	1	0
Interest groups (NGOs, media, academics)	1	2	0
Municipalities (Uusimaa region)	2	1	1

Table 4. Number of experts covering different areas of expertise during the first delphi round.

	Ecological	Economic	Socio-cultural
International level	2	0	0
Administration (ministries)	1	1	1
National level (Kuntaliitto e.g.)	3	0	0
Interest groups (NGOs, media, academics)	0	1	0
Municipalities (Uusimaa region)	2	1	0

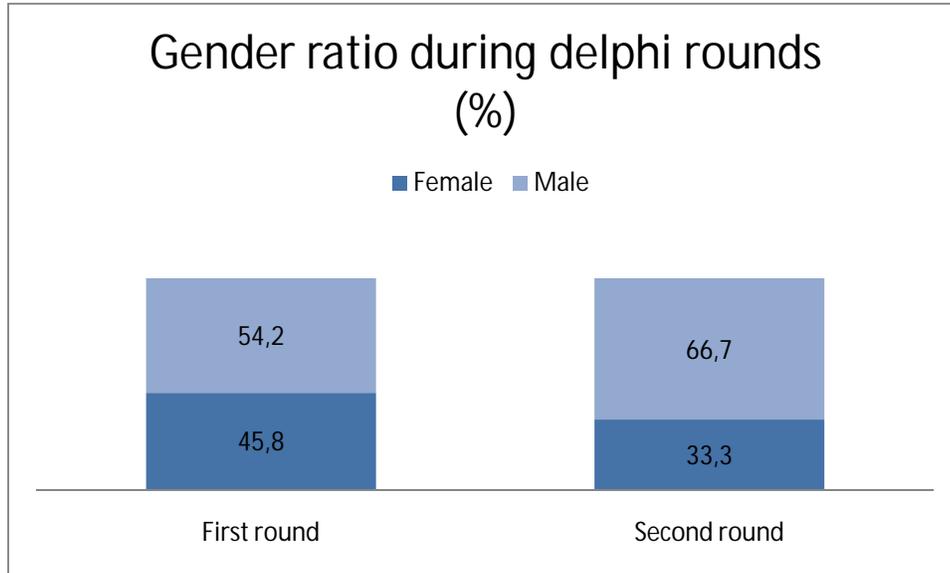Table 5. Number of experts covering different areas of expertise during the second delphi round.

Table 6. During each delphi round, the majority of the panellists consisted of males.
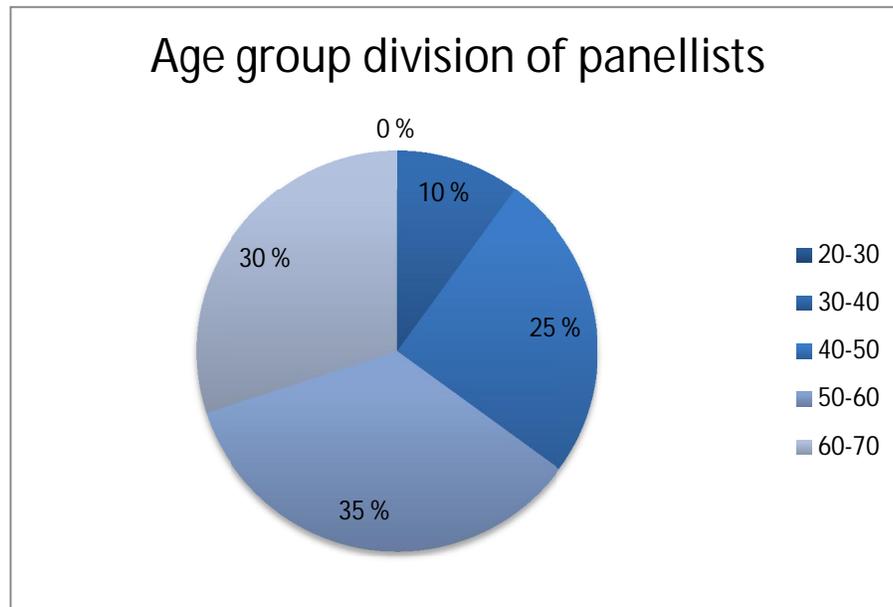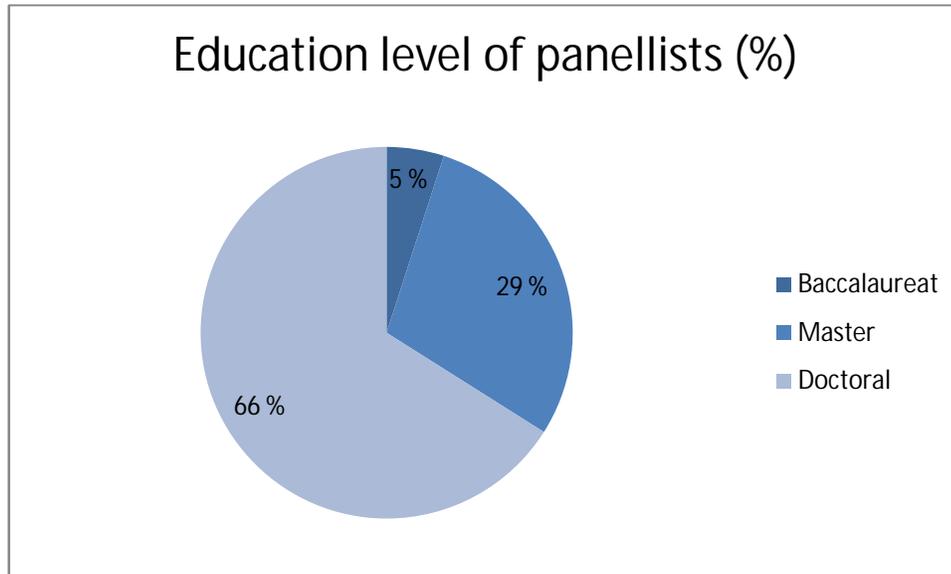

Table 7. Age group division of panellists.

Education level of panellists (%)

- 5 %
- 29 %
- 66 %

■ Baccalaureat
■ Master
■ Doctoral

Table 8. Education level of panellists.

6. RESULTS

6.1. First Delphi round

The empirical data in this study was gathered following the principles of a Policy Delphi and its latter variant Argument Delphi. During the first Delphi round the panellists were asked to rank the importance of driving forces – changes and trends - affecting sustainability governance towards the year 2030 as well as the desirability and probability of different sustainable development strategic objectives. In the results the trends are presented separately whereas the desirability and probability of different sustainability objectives together. The aim was to during the first Delphi round gather quantitative data of the research problems. The response rate of the first Delphi round was 56 %.

6.1.1. Trends

The panellists were asked to rank the importance of each trend on a Likert scale from 1 to 5 (Table 9). Of the total 14 trends that were ranked, the collective mean of importance was 3, 75. The significance of trends that got a mean value below this was considered small (Perälä ym., 2010). The top five most important trends all were ranked in their importance above a mean value of 4,05 (Table 10). Moreover, the mean standard deviation of all rankings was 0, 84. Trends in which the standard deviation of rankings got a value higher than this, the deviation was considered significant. The top five trends with most divergence in their rankings were, apart from technological and technical development, trends which were otherwise not ranked as important (Table 11).

Change/trend	Importance (mean)[1] Mean of all trends: 3,75	Standard deviation[2] Standard deviation of all trends: 0,84
Climate change	4,65	0,57
State of the Baltic sea	4,26	0,62
Technological and technical development	4,14	0,89
Increasing energy	4,09	0,68

consumption		
Sudden global economic changes	4,09	0,87
Sustainability of the Finnish public economy	4,05	0,84
Globalization	4,0	0,69
Degradation of ecosystem services	3,86	0,83
Global poverty and inequality	3,59	1,05
Changing age structure in Finland	3,55	1,01
Global population growth	3,55	1,01
Urbanization	3,27	0,83
Sufficiency of fresh water	2,68	1,04
Decreasing European population	2,68	0,84

[*1]: scale 1-5 [*2]: scale 0-2

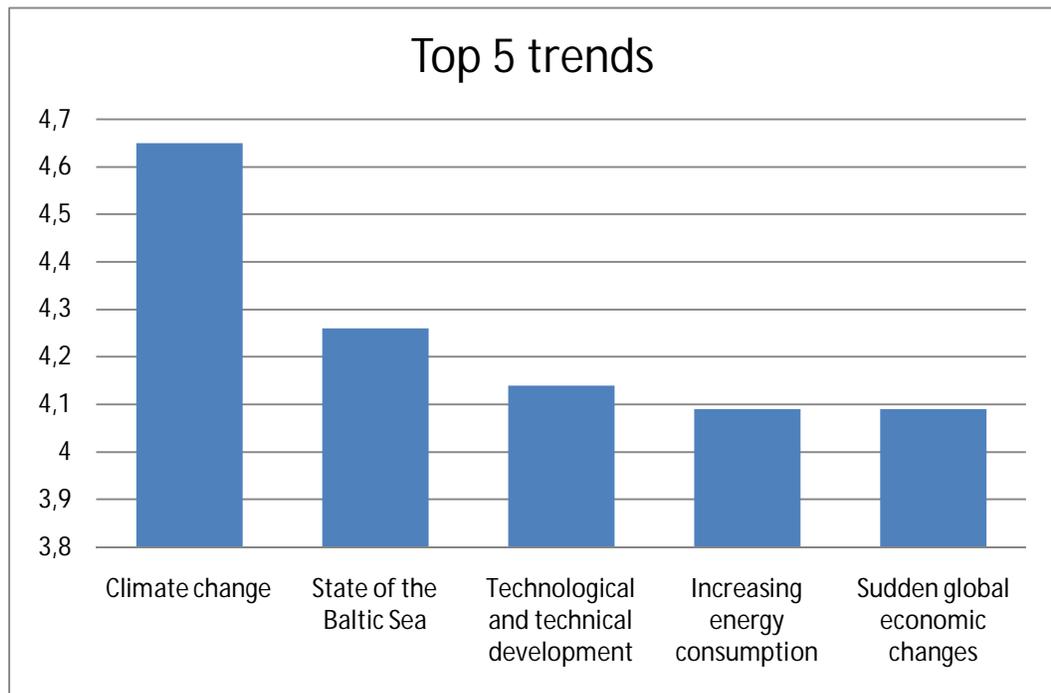Table 9. Results of importance ranking for trends.

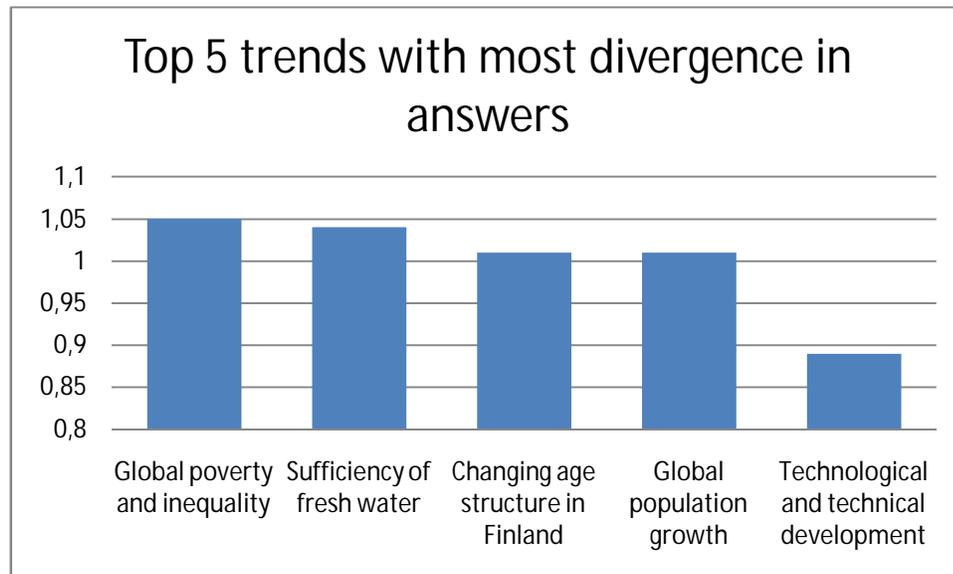Table 10. Top 5 trends according to the mean of the desirability rankings.

Table 11. Top 5 trends with most divergence in answers. The y axis represents the value of the standard deviation in desirability ranking.

6.1.2. Desirability and probability of sustainability objectives

In the second and third part of the first Delphi round questionnaire the panellists were asked to rank on a Likert scale from 1-5 the desirability and probability of different sustainability objectives. In this part of the results, the desirability and probability are presented in the same table (Table 12). The following figures are presented of each strategic objective: 1) the mean of desirability rankings, scale 1-5 2) the standard deviation of desirability rankings, scale 0-2 3) the mean of probability rankings, scale 1-54) the standard deviation of probability rankings, scale 0-2 5) the margin between desirability and probability rankings, scale 0-2. In this table the objectives that are most interesting for the second round have been bolded: these include objectives that are ranked desirable but the margin between desirability and probability indicates a possible political conflict in their implementation.

	Desirability (mean) Collective mean: 4,06	Desirability SD Collective SD: 0,78	Probability (mean) Collective mean: 3,27	Probability SD Collective SD: 0,89	Margin between desirability and probability Collective mean of margins: 0,75
Increasing energy efficiency with 20% by 2020	4,77	0,43	4,0	0,69	0,77
Promoting public transport and environmentally friendly modes of transportation	4,50	0,67	3,68	0,95	0,82
Increasing the utilization of recycled materials as raw material and energy sources	4,41	0,67	3,91	0,81	0,5
Halting the reduction of biodiversity	4,36	0,85	2,27	0,83	2,09
Limiting greenhouse gas emissions	4,36	0,79	3,59	1,09	0,77
Reducing nutrient emissions and the risks of sea transport in order to improve the protection of the Baltic Sea	4,36	0,66	3,63	0,79	0,73
Changing consumption habits	4,36	0,79	2,82	1,05	1,54
Increasing the proportion of renewable sources of energy and biofuels by 25 % from the current level	4,32	0,72	3,55	0,74	0,77
Linking climate policy to all sustainable development policies	4,23	0,96	3,18	1,01	1,05
Reducing the total amount of municipal waste	4,18	0,79	3,27	0,94	0,91
Strengthening research and	4,18	0,64	3,41	1,01	0,77

innovation activity in the natural resource field				
Improving the reconciliation of social and ecological aspects in public decision-making	4,18	0,85	2,91	0,87	1,27
Adapting to the adverse effects of climate change	4,14	0,83	3,23	0,81	0,91
Developing innovative solutions for water and waste management	4,14	0,71	3,86	0,71	0,28
Developing the measurement and evaluation of sustainable development	4,04	0,65	3,32	1,01	0,72
Raising environmental awareness of municipal management	3,95	0,65	3,18	0,86	0,77
Including life span thinking in planning, practices and actions in municipalities	3,91	0,87	2,82	0,87	1,09
Promoting sustainable travel	3,77	0,68	2,95	0,95	0,82
Speeding up the reforms for vehicle taxation aiming at lower emissions from traffic	3,77	1,43	3,64	0,79	0,13
Promoting organic and local production	3,63	0,79	3,14	0,85	0,49
Focusing on land-use planning at the local level as a means of preventing environmental problems	3,5	0,8	2,68	0,87	0,82
Encouraging more municipalities to create local Agenda 21 programs	3,36	0,65	2,82	0,85	0,54
Proceeding to use	3,32	0,99	3,32	1,05	0

biofuels in public transportation					
Promoting the leisure use of conservation areas	3,18	0,73	3,23	1,02	-0,5

Table 12. Results of first delphi round in ranking the desirability and probability of different sustainability objectives.

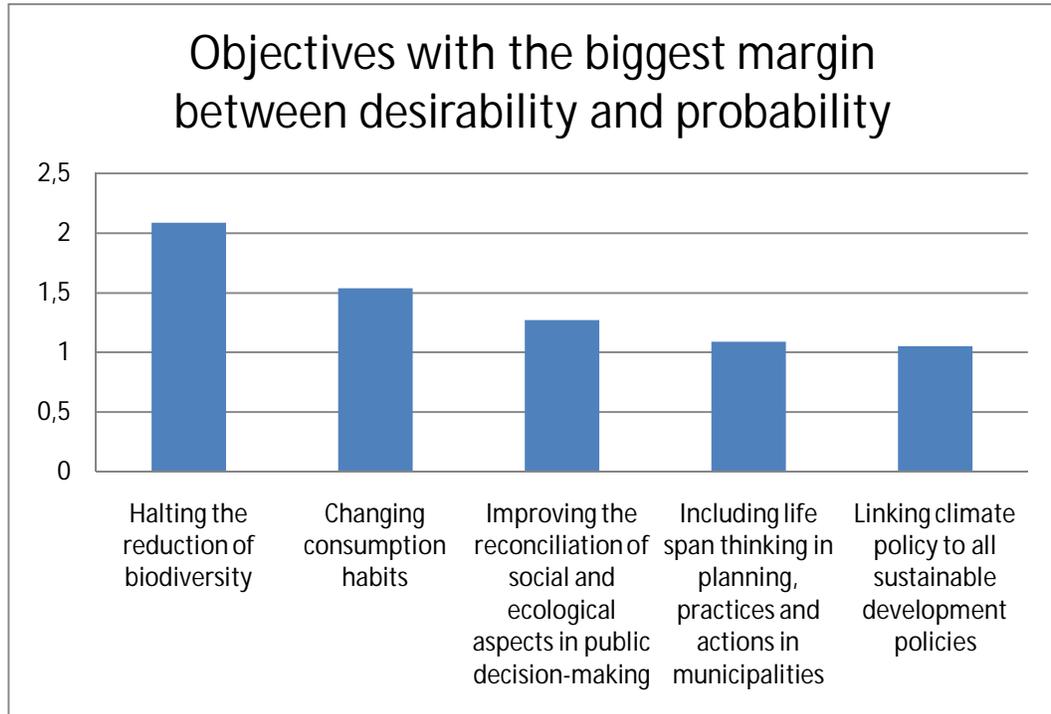## Objectives with the biggest margin between desirability and probability

Table 13. The sustainability objectives with the biggest margin between desirability and probability. The y axis represents the value of the margin between desirability and probability rankings.

6.2. Second Delphi round

The second Delphi round was implemented as a more specified survey (See appendix 2) in which the panellists were asked to comment and expand on the first round results. The panellists received a summary of the first round results. They were asked to comment on the medians of the answers in each section and explain if they were similar to their answers during the first round. The response rate during the second delphi round was 50 %. The principles which were applied for proceeding to the second Delphi round included focusing on 1) the most important trends 2) the most desirable strategic objectives for sustainability governance 3) the trends and objectives which presented the most deviation in rankings, especially those strategic

objectives which had the biggest margin between desirability and probability values 4) gathering more in-depth arguments for the abovementioned research points. The general aim of the second Delphi round was to bring more depth in the research issues and investigate the arguments supporting or opposing the most important issues affecting Finnish sustainability governance towards the year 2030.

6.2.1. Trends

First, the panellists were asked to comment on the results of the trends in general. Although many of them concluded that the results were similar to their own views and rankings during the first delphi round, criticism appeared against many of the rankings. For example, the results were criticized on concentrating too much on trends in Finland, 'as if the outer world wouldn't exist at all'. Indeed, commented by several panellists, social trends such as global poverty, age structures and population will have much more effect on sustainability governance than was generally estimated in the first round results. These effects include immigration and competitiveness and functionality of the industry.

Also, there was criticism about ranking the degradation of ecosystem services too high in priorities, as it was considered quite an abstract concept and was estimated not to have such a profound effect on the sustainability governance in Finland, at least not as major as other trends such as urbanization. It was also commented that economic trends should not have been that high on the list. Although most of the panellists agreed upon climate change being a top trend, there were still comments arguing about the uncertainty related to the uncertainty of its long-term effects. According to one view, climate change was too high in the priorities. Another held the view that climate change as a trend affects everything and therefore its prioritizing is well-grounded.

Furthermore, it was argued that climate change and the need to halt the harmful link between economic growth and the degradation of the environment are trends that effect not only sustainability governance in Finland, but on the international level as well. Its effects are already seen in the preparation of the 2012 Rio+12 conference, which states the green economy and the institutional structure of

sustainable development as its top agenda priorities. Priority has especially been given to the strengthening of the environmental dimension of sustainable development.

The first round results indicated deviation in the rankings for importance. The panellists were asked if according to them some important trends were left out from the top five. Most deviation could be seen in the rankings for sufficiency of fresh water. Several panellists mentioned the importance of this particular trend. Sufficiency of fresh water was considered a significant global trend, although it is not as current in Finland. However, when sufficiency of fresh water is combined with population growth, poverty, inequality and urbanization, the total effects are huge. It was also mentioned that although there are plenty of fresh water resources in Finland, our import products and tourism abroad consume global resources. Also, the privatization of fresh water resources can quickly proceed and lead to additional problems for the poor and developing countries.

Global poverty and inequality was also considered important, as both trends can become threats for sustainable development when connected to climate change and ecosystem services. On a similar note, urbanization was said to be important to recognize, as it happens quickly and with massive power. It is also connected to climate change and ecosystem services. Furthermore, the changing age structure in Finland was mentioned as an important trend. It is bound to the sustainability of the public economy; as the population grows older, more age-related public expenditure is born. To conclude, in this part of the second Delphi round questions, some panellists mentioned the importance of social trends that could not be seen in the first round results.

Based on the results of the first round, the panellists were then asked to name the three most important trends affecting Finnish sustainability governance towards the year 2030. Many of the panellists concluded that naming three most important trends was difficult, because most of the trends are somehow interconnected. In this part of the results, most of the panellists did not rank the top trends on scales 1-3, they merely stated the most important ones. The results have therefore been

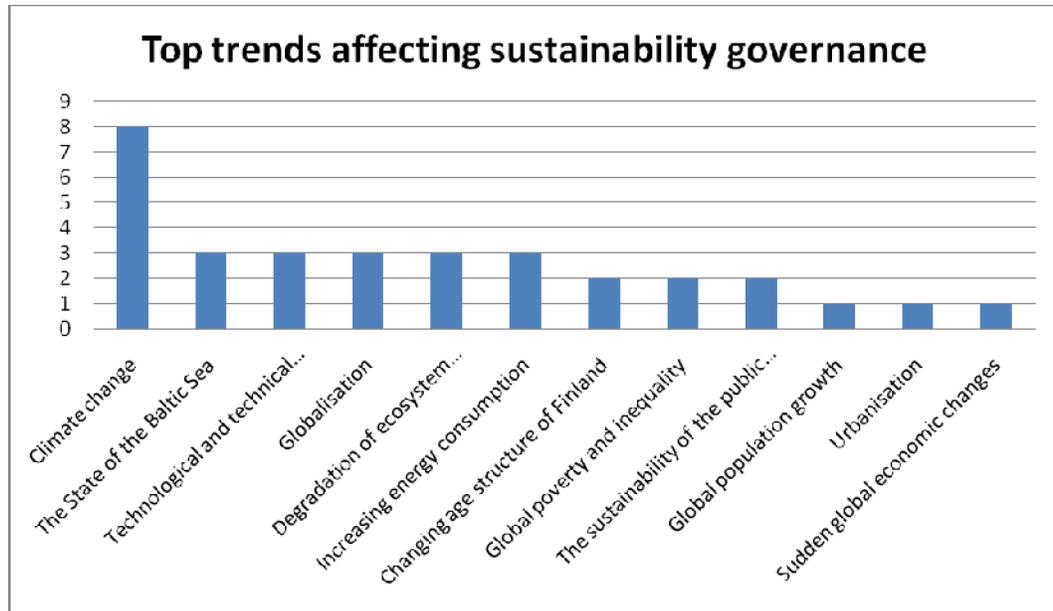## Top trends affecting sustainability governance

Table 14. Bars indicating the views of the panel on top trends affecting sustainability governance. The bars represent the number of panellists considering the trend important.

compiled in the manner of which trends received the most mentions from the panellists. Against this background, climate change was considered the most important trend of all. It was considered significant by a majority of the panellists (Table 14). In addition, several other trends, such as the state of the Baltic Sea, globalization, technological and technical development, degradation of ecosystem services and increasing energy consumption were considered important (Table 14).

The statements for climate change to be prioritized as a top trend were that it is impossible to prevent, and therefore it must adapted to. However, based on the information we have now it is difficult to evaluate the means for adaption. Climate change was also described as a megatrend, the most 'concrete, threatening and largest' trend, already affecting Finnish policy and governance widely, and a trend 'which will alter the preconditions for life on earth'. Climate change, a 'high noon for humanity', is the single biggest obstacle for sustainable

development. Unlike globalisation and the crisis of the international economy, it can cause irreversible damages which remain irretrievable when a certain point is reached.

The worsening state of the Baltic Sea was considered a critical question for Finnish policy and governance. The Baltic Sea was mentioned as a unique marine environment. The prevention of its worsening requires strict actions in all the countries surrounding the Baltic Sea, especially in the field of agriculture. However, there is hope for finding a political and individual willpower for protecting the Baltic Sea.

Globalization, mentioned and described by many panellists, was considered an unstoppable megatrend, which changes population and city structures, consumption habits, communication and information levels of citizens of the world. It was considered unstoppable, as it is 'impossible to steer it and perhaps no one wants it to be steered'. It also enables the logistic transfer of production from one country to another and integrates international financing and product markets. Globalization also strengthens the flows of natural resources, raw material, products and money. Simultaneously harmful environmental effects are strengthening.

Economic trends were also considered important by some panellists although they did not reach the top trends. The panellists reminded that sudden global economic changes have already proved to be significant. They are difficult to predict and control. According to one view, the solutions are now sought in green economies, as capitalism set completely free will have long-lasting harmful effects on well-being and the environment. Also, the sustainability of the public economy on Finland was considered important by one of the panellists, as current political decision-making is too dependent on the short-term fears and beliefs of people.

On the question asked about how the most important trends will be affecting sustainability governance and how it is possible to prepare for them, the panellists had various views. The trends listed were expected to become more and more issues of governance as a whole, not just under the topic of sustainability governance. Also, it was commented that whilst the listed trends need more and more prioritizing but at the same time governance is losing its power, more fundamental prioritizing must be made. Also, non-relevant positions in different sectors of governance have to be let go. In general, the panellists reminded that all trends affect different actors – the state, municipalities, NGOs, companies, individuals - in different ways. Therefore the

challenge lies in creating a model in which governance can take into account all of these actors. However, the key to success lies mostly in individuals and the common opinion of the public.

The panellists concluded that in the future it will become more and more important to utilize the Baltic Sea in a more sustainable manner. There was an estimation of strengthening the Baltic Sea by public private partnerships. Also, ecosystem services were estimated to strengthen as local and multilevel governance will in the future play a more important role. It was considered obvious that in sustainable development governance climate and biodiversity policy will become more and more separate processes. This means that it will become increasingly difficult to facilitate sustainable development in politics. The relatively weak status of the UN Commission for Sustainable Development is an early indication for this. However, according to another point of view, the trends will give more significance to the processes of sustainable development. Changes brought by the trends should be adapted to by strengthening processes and programs which promote the planning of sustainable development in individual countries.

One view was that there is not a lot a small country can do about climate change except participating in international cooperation and agreements. However, technological development, energy consumption and the sustainability of the public economy are issues which a nation like Finland can affect itself. Therefore, 'if sustainable development is defined as well-being that doesn't decrease the possibilities of future generations, technological development is the most relevant trend affecting sustainable development'. Indeed, according to another panellist, Finland will become an even stronger exporter of sustainable technologies and social innovations. Aid and technology transfer should be given to developing nations in order for them to develop sustainable consumption and production models. According to one panellist, economic growth has been given too little attention in the results although it is a central concern of the future.

In the light of ever-decreasing resources for environmental governance, one panellist posed the question: 'what even is sustainability governance in Finland at the moment?'.

6.2.2. Desirability and probability of sustainability objectives

The panellists had several comments on the first round results. The objective of halting the reduction of biodiversity was a hot topic among the panel. According to one of the panellists, this objective was considered too high in the rankings. However, it was also considered a worrying point, since there was a lot of deviation between the ranking of both desirability and probability. This was considered as a sign of a need to discuss the topic much more widely in society. The halting of the reduction of biodiversity was linked together with other environmental objectives, such as the limiting of greenhouse gas emissions and the promotion of renewable energy sources and thought of as important pillars for sustainable development.

When asked about how the results of the rankings of strategic objectives matched the panellists' own answers during the first Delphi round, there were some comments on the rankings about reduction of greenhouse gases and the better reconciliation of social and ecological perspectives into public decision-making. Several panellists thought that the improvement of measuring and evaluating sustainable development should have been much higher on the list: 'How can politics be made, if we don't know why we do it and how the effects are evaluated?' Other objectives that were considered desirable although they were not high on the list were the promotion of organic and local agricultural production as well as life span thinking in the governance of municipalities.

Finally, the panellists were asked to name five most important strategic objectives concerning the future prospects of sustainable development governance in Finland. Similar to the analysis of the trends during the second Delphi round, most of the panellists did not rank the most important objectives on a scale to 1-5. Instead, they merely stated the most important ones according to their personal view. The results have therefore been compiled in the manner of which objectives
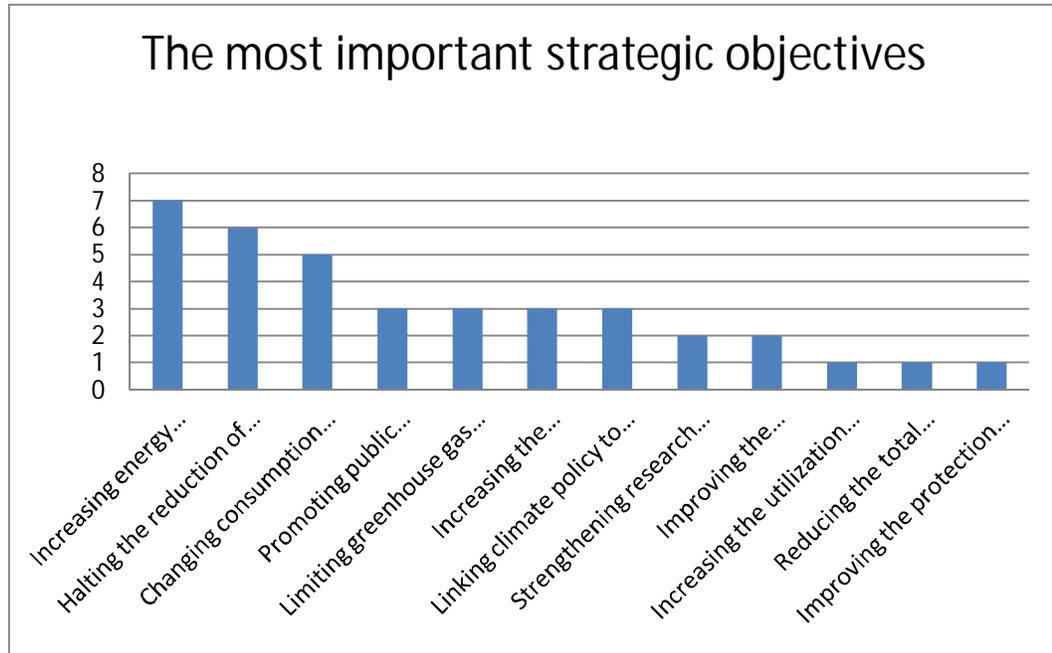
The most important strategic objectives

Table 15. The most important strategic objectives affecting sustainability governance towards the year 2030. The bars indicate the number of panellists that thought of each objective as important.

received the most mentions from the panellists (Table 15). Against this background, the most important strategic objectives are:

- Increasing energy efficiency with 20 % by 2020
- Halting the reduction of biodiversity
- Changing consumption habits

Moreover, the following objectives were also considered important:

- Promoting public transport and environmentally friendly modes of transportation
- Limiting greenhouse gas emissions
- Increasing the proportion of renewable sources of energy and biofuels by 25 % from the current level.
- Linking climate change policy to all sustainable development policies

Increasing energy efficiency was according to the panel considered an objective that would benefit all parties. Biodiversity was considered important because it was seen as an ethical necessity as well as a prerequisite for maintaining the resilience of the planet. Also, plants and animals can act as raw material for medicinal purposes or

other product development. In general, objectives which dealt with the carrying capacity of the nature, were considered important in order to achieve a 'truly sustainable development'.

The first round Delphi results indicated that the margin between desirability and probability for many objectives built a potential ground for political conflict. The panellists were asked to comment on the deviation of the rankings. The panel concluded that most importantly, the objectives are difficult topics intertwining social, economic and ecological aspects. Also, the objectives with small probabilities are most likely objectives which are considered too difficult to have any effect on with political decision-making. For example, altering the consumption habits of people will never be easy. Moreover, economic interests are strong and might affect the probability of achieving any of the ecological objectives. It was furthermore concluded that unfortunately the actions taken by decision-makers are often made in accordance to please everyone. 'People are also always scared of anything new'.

Changing consumption habits was considered an important strategic objective for sustainable development by a majority of the panellists, but still its probability was ranked very low in the first Delphi round. This generated discussion among the panel. According to one view, consumption habits can change in line with attitudes. However, nothing guarantees that new habits will be more sustainable. Also, because consumption is an area of people's autonomy, it is extremely difficult to affect it with policies. However, tax and income policy can provide a solution to affecting the level of consumption. Indeed, according to one point of view, the usage of economic regulation instruments could be more creative, as has already been done in the case of fuel and vehicle taxation.

Another point for discussion and debate was that of biodiversity. The reduction of biodiversity is an abstract process for people as the effects are not seen in everyday life. The reduction should be made more visible, understandable and closer to the everyday practices of people. At the moment the minimum level of protecting biodiversity is guaranteed by law, but the value and importance of biodiversity for the whole ecosystem should be more emphasized. More information is needed for practical solutions, e.g. for a landowner to promote biodiversity on local level. This is

crucial, because biodiversity is likely to decrease as the global population becomes more and more numerous and the usage of bioenergy increases.

One panellist argued that already now, our current consumption and production habits lie on unsustainable ground, constantly exceeding the carrying capacity of nature. The degradation of the Baltic Sea is an example of this. In a system based on continuous growth and increasing consumption it is, however, extremely difficult to hold back the pressure on the environment. A change in this would require profound shifts related to the economy, society and individual values. According to this view, it is difficult to give an example of a societal policy that could achieve this before the environmental damages are already too high.

It was also stated that political objectives should have scientific basis. Too often only one criteria is used for formulating an objective – for example 'getting too excited about biofuels reduces biodiversity and degrades rainforests'. On the one hand, there is also a danger for sustainable development fatigueness among people, as for example climate change is a concerning topic being dealt with in the media all the time. On the other hand, it is likely that citizens are pondering issues in a very serious manner and find practical solutions. Attitudes can quickly change, also towards the positive direction. Among the panel, there was also pessimism: many of the objectives and issues have been spoken of, but the actions taken remain vague.

6.3. Feedback on the questionnaire

In the final part of the Delphi questionnaire the panellists could give feedback on anything; the topics, the form of the questionnaire, etc. One panellist wrote that all of the issues felt important and it was difficult to find separate the issues from one another in the first place, as they are all somehow connected. Another panellist wondered if the objective of 'reconciliation of social and ecological aspects into public decision-making' included health issues as well. This was asked because one main challenge of today and the future will be cross-sectoral governance. For example, the social and health impacts of climate change has not gained much ground in sustainability discussions, although the issue deals with the ability of people to act and live. This is a relevant argument for making climate change less abstract for

people; giving anthropocentric arguments might result in more concrete measures. Another panellist gave the feedback that something could have been asked about the employment and cultural aspect of sustainable development. Another point was that the topics that were dealt with in the questionnaire were too much in the core of sustainable development; there might not be a lot of deviation in the results. There was also a comment that any topics dealing with reducing, promoting, changing, developing or increasing something have two different dimensions: e.g. greenhouse gases can either be simply reduced or reduced sufficiently. This comment supports the need for more measurable sustainability objectives.

7. DISCUSSION

7.1. Validity and reliability of results

In this thesis, I have investigated the future prospects of sustainability governance in Finland. The information gathered is based on Delphi data about experts' views of most important driving forces – changes and trends – affecting sustainability governance as well as the desirability and probability of different strategic objectives concerning sustainable development. It is important to note that the results are not accurate forecasts for the future, but more aimed at explaining the various pieces affecting the puzzle-like research question on sustainability governance. The results merely tell the views of this expert group.

24 experts took part in this Delphi study. This particular group is only one sample in the huge pool of experts that are working in different sustainable development related fields in environmental, economic and socio-cultural disciplines. Had the group consisted of different experts, the results would also have looked different. Also, pondering happenings and turns of events 20 years from today embodies huge difficulties. The future might bring events or surprises beyond everybody's expectation or preparedness.

The response rates during both of the Delphi rounds was around 50 %. It could have been improved by personally visiting the experts and filling the questionnaire with them. This approach could have brought more argumentation concerning the future already during the first round. The fact that the Delphi study in this thesis was completely web-based therefore had an impact on the response rates. This again affects the generalization of the results.

Moreover, this particular study focused on the ecological and environmental aspects of sustainability governance. Against this background, the results do not wholly represent the prospects of sustainability governance. Social and economic issues are of equal importance but due to time limits have not been taken into as wide consideration in the formulation of the Delphi questionnaire. Furthermore, finding experts with extensive, horizontal knowledge on sustainability issues is extremely

difficult. The panel in this study has mainly consisted on experts with profound, vertical knowledge on one of the dimensions of sustainable development. Therefore, all of the abovementioned factors should be taken into account when considering the validity and generalization of the results.

Finally, the Delphi method can be questioned for relying too much on the expertise value of the panellists. One could argue that it is impossible for anyone to be an expert about possible events taking place in the future. How could anyone know about something that has not even happened yet? In defence of the Delphi method, it should not merely be regarded from the objective point of view of natural sciences because it is not designed for such research. It works best for societal research in which the results aim at concrete arguments to form a basis for a new view of the future. The method should not be criticised for creating forecasts that later on are proven incorrect, since forecasting has never been the original objective of the method. Its success should be measured in generating public discussion and acting as a catalyst for creating positive change in the society. (Malaska, 1985).

7.2. Trends

The first part of the Delphi study focused on investigating the most important driving forces – changes and trends – affecting sustainability governance towards the year 2030. All together 14 trends were ranked. The means and standard deviation of each trend ranking was calculated. If the mean had a bigger value than the collective mean of all rankings, the trend was considered significant for the future. Was the value smaller than the collective mean, its significance was not considered important. (Perälä et *al,* 2010*).* After the first round and calculating the means of each trend, the most important ones were climate change, the state of the Baltic Sea, technological and technical development, increasing energy consumption and sudden global economic changes.

The first round results on trends were, however, not unanimous and deviation among the rankings appeared. The highest deviation in rankings appeared almost without exception – excluding sufficiency of fresh water - in the social trends including global poverty and inequality, changing age structure in Finland, global

population growth and technological and technical development. Apart from technological and technical development, all of the trends with the most deviation were the ones that were ranked less important. This gives an indication of polarisation of views among the panel. It might also be a result of having a panel with an emphasized expertise on environmental issues. It is likely for an expert to rank a trend from his or hers own professional field as more important than a trend from another field. This is an important discussion point which goes back to the basics of futures research; it can never fully be objective as it is fundamentally based on values. However, the deviation among answers can also be viewed as an indication of weak signals; perhaps the effects of the abovementioned trends have not been taken into wide consideration but their effects on Finland could still be strong.

A bit unusual in the results is the fact that some of the trends, such as the degradation of ecosystem services weren't considered important by the panellists during the first Delphi round. This trend is frequently dealt with in international publications in the field of sustainable development. The results on the importance of this trend might indicate that for understanding something profoundly, one needs concrete things to measure. For example, the degradation of ecosystem services might be considered an abstract process without concrete examples of its impacts. On the other hand, this should be taken as a warning sign; if some central concepts in sustainable development remain abstract for experts, how will it be possible for the public to grasp them? The results call for better dissemination of information.

During the second Delphi round, the panellists were asked to expand on their views about the importance of trends and naming the most important ones. The problem with analyzing the trends was that although the panellists were on the second round asked to name the most important trends out of the five most important trends according to the first round results, some of them still mentioned trends outside this framework. In other words, some panellists named trends that had already been considered insignificant based on the first round results. Due to this one might have to interpret the results with discount. All in all, during the second round the list of most important trends changed a little. Climate change remained as a megatrend the panel could nearly unanimously agree upon. This is not surprising, as climate change

is recognized as a globally affecting severe phenomenon. It is probably among the 14 trends the one all of the panellists are most familiar with, or at least the trend that has been dealt with the most. Although climate change was viewed as the most important trend, there were not many concrete statements made by the panel on how it in practice will affect Finland and how it could be prepared for.

The worsening state of the Baltic Sea as well as technological and technical development remained important trends according to the panel also during the second Delphi round. Moreover, globalisation, degradation of ecosystem services and increasing energy consumption were mentioned as most important trends during the second round. The differences in answers might depend on the fact that the panellists have actually, with insight, compared their results with the first round summary and after careful thinking provided a second round answer. It is, however, more likely that the answers on the second Delphi round depended on the people who answered the questions in the first place. As the response rate was not 100% on the second Delphi round, the second round panel also had a different composition. It is interesting to see that among the top most important trends, there are similar trends then in a research done in Finland thirteen years ago. In a futures research made in 1997 (Kamppinen et al, 2002) among the megatrends that would have an enormous effect on the Finnish society were globalisation and technological development. The most striking new aspect of the past 10 years or so is the rise of climate change as an indisputable megatrend.

Malaska (1985) has criticised the use of trends since they might depict a too coherent view of the future, although especially sustainability issues are often characterized by surprising events. However, the monitoring of trends can be considered extremely useful in order to keep track about consumption, habits, practices and the state of the environment. Also, trends assist in increasing resilience and preparedness.

7.3. Strategic objectives for sustainable development

The aim of the latter part in the Delphi study was to explore the desirability and probability of different sustainability strategic objectives. In the light of the objectives

of this research, the most important points for discussion are the objectives ranked as desirable towards the year 2030, and among these especially those objectives that indicate a possibility for a political conflict. A political conflict for an issue is likely when the margin between desirability and probability has a bigger value than the overall mean of margins (mean: 0,75). In this part of the thesis, the most important or desirable strategic objectives concerning the panel are discussed individually. 14 out of 24 in total objectives were during the first Delphi round evaluated as desirable. During the second Delphi round three objectives were evaluated as most important and four others as important.

Increasing energy efficiency with 20 % by 2020 was according to the panel considered the most important strategic objective during both Delphi rounds. The low level of deviation in the rankings indicates that the almost the whole panel considers the objective significant. This objective was also considered probable to achieve: although the margin value exceeds the collective mean margin value, it still is lower than in the case of many other objectives. The support for this objective is likely to have base in the societal discussions about energy self-sufficiency and the need for finding alternative energy sources for fossil fuels. Moreover, this objective is one of the few in the Delphi questionnaire with a concrete target set to it, which might also make it more attractive. Also, the results of the importance of trends support the importance of this objective. According to the panel, climate change is the megatrend affecting sustainability governance the most. It seems logical that increasing energy efficiency was then ranked as the most important objective. The qualitative arguments during the second Delphi round supporting this objective were, however, few. This might be because the objective could also be thought of as a self-evident target, a 'must-achieve'.

Promoting public transport and environmentally friendly modes of transportation was during the first Delphi round ranked as the second most important strategic objective. There was, however, a minor potential for political conflict. The ranking of the objective this high could depend on the fact that all the panellists in this research work in the Helsinki metropolitan area. Unfortunately there are not statistics about the panellists' places of origin. However, it does seem logical that

people living in the capital area are in favour of public transportation. Had the panel consisted of experts working and living in more remote areas, the results could have been dramatically different. During the second Delphi round, this objective was no longer considered among the most important strategic objectives.

Increasing the utilization of recycled materials as raw material and energy sources was during the first Delphi round considered the third most desirable strategic objective but on the second Delphi round, only one panellists mentioned it as one of the most important. Perhaps this objective was not considered to have such a profound impact during the next 20 years and was outshadowed by some of other objectives. It might also be the case that the level of utilizing recycled materials is already considered to be on quite a high level in Finland. All in all, the first round results indicate that the panel considered this a very probable objective to achieve.

The objective of halting the reduction of biodiversity and the issues surrounding it can be considered an important finding in the results. The panel, during both Delphi rounds, considered this objective very important concerning the next 20 years. Also the United Nations has declared year 2010 as the year of biodiversity. The point of interest in the results is however the very big margin between the desirability and probability of the objective. The value of the margin (2,09) compared to the collective mean of all margins (0,75) indicates a high probability for political conflict. According to the qualitative statements of the panellists during the second round, this can be considered a point of concern. The value is too big to be labelled as a normal juxtaposition between optimism in desirability and pessimism in probability. The object might again be considered too abstract. The second round arguments support this view: there should be more information about what the practical impacts are, or how the reduction of biodiversity could be dealt with on local level. Also, commitment towards strategic objectives usually strengthens with the development of quantified objectives and targets. In the current sustainability strategies, there are no quantified targets on biodiversity.

Limiting greenhouse gas emissions is according to the panel an important objective in sustainability governance towards the year 2030. If this result is combined with two previous ones; the importance of increasing energy efficiency and

the importance of climate change and increasing energy consumption as trends, one could draw the conclusion that the panel strongly supports the replacement of fossil fuels with other sources of energy during the next 20 years. As the objective of increasing the proportion of renewable sources of energy and biofuels by 25 % was also considered important, the results indicate that the potential solution in energy production in the future lie in renewable sources. These results also support Jackson's (2009) vision of a green stimulus economy. However, nuclear power as a topic wasn't dealt with in the questionnaire and therefore the panel's opinion on it remains unknown.

The objective of reducing nutrient emissions and the risks of sea transport in order to improve the protection of the Baltic Sea was during the first Delphi round ranked quite high in importance, but on the second round it no longer made it to the most important objectives. This can be considered quite surprising, since the worsening state of the Baltic Sea is according to the panel an important trend affecting sustainability governance in the next 20 years. This result shows how difficult the governing of common properties, such as the Baltic Sea, can be. When the main responsibility does not fall for anyone, a binding, joint cooperation among all the countries surrounding the sea would be needed to protect it. This could possibly be a reason for not lifting this objective higher in importance. The panel believed in public-private partnerships in the protection of the Baltic Sea. In the future it might be timely to protect the commons, such as the Baltic Sea, by supporting international agreements among countries for a very small tax.

The information circulating the objective of changing consumption habits was another important finding in the results. Ranked important by the panel during both Delphi rounds, this objective also gives indication for high political conflict. Its achievement is considered highly necessary but there are pessimistic views about how probable this actually is. The issue is extremely difficult since, as stated by one of the panellists, it has to do with people's autonomy. Altering these habits would been new kind of behaviour, both on individual and collective level. Immaterialisation should be promoted in governance since the benefits that could potentially be achieved with it are simply too huge to be looked upon. Including immaterialisation as an essential

objective in environmental policy would open new perspectives to the role of environmental governance in the society. (Kamppinen et *al*, 2002).The results of this Delphi study do however confirm the difficulty of this task. The paradox is, though, that the changing of consumption habits does not concern some distant group of people out there. The demand of changing these habits concerns everyone. As long as the change is required from other people instead of oneself, it will never take place. Therefore it would be important in sustainability governance and governance in general to create the tools and examples for new modes of behavior in consumption. In no other objective than in the case of consumption is the notion of trade-offs more visible to the individual. These trade-offs should start at the household level.

Linking climate policy to all sustainable development policies was considered a desirable objective towards the year 2030. This result is logically built on the result of climate change being evaluated as the most important trend. The results do, however, show potential for political conflict. There are no qualitative arguments on this, but it could be an issue which is dealt with in many of Meadowcrofts' (2007) arguments. Sustainable development and environmental issues tend to be issues of environmental ministries instead of being cross-sectoral objectives. Moreover, sustainable development is still mostly understood as an environmental concern, and therefore linking e.g. climate policy to ministries dealing with economic and social issues will most likely not lead to practical solutions for sustainability. The objectives might be written in the strategies of these ministries, but they would represent the cosmetic type as presented by Meadowcroft (2007).

The final four objectives which were considered important according to the first round Delphi – reducing the total amount of municipal waste; strengthening research and innovation activity in the natural resource field; improving the reconciliation of social and ecological aspects in public decision-making; adapting to the adverse effects of climate change; developing innovative solutions for water and waste management – were during the second Delphi round not considered as important. The panel also mentioned the importance of the measurement of sustainable development. Measuring sustainable development should be rated as

more important because it is crucial for defining and understanding social and environmental phenomena.

The results with the highest probability for political conflict are also those that will at some point force individuals and decision-makers to move away from an assumption of synergy between continuous economic growth and environmental sustainability. Trade-offs have to be accepted as an inescapable part of sustainability governance. The comments of the panellists stating that many of the sustainability objectives mentioned in the questionnaire are somehow interrelated. This is true, and the interconnectedness continues further to the values underlying sustainable development. If there is a shift in thinking, in for example consumption habits, it will positively affect an individual's other aspects of life as well.

Many of the prevailing objectives in society underline short-term success and prosperity based on economic growth. This is probably also why the targets of changing consumption habits and halting the reduction of biodiversity were considered difficult to achieve. Jackson (2009) suggests that the current financial crisis gives an opportunity to seriously engage in reflection. Would it be time to question the vision of prosperity built solely on continual growth? Prosperity is not merely defined through material sustenance. It is also a state of being able to participate meaningfully in the life of society. Particularly in the western society, the core problem is the excessively appreciated symbolic role of material goods in peoples' lives. Because material goods represent social status, identity and feelings, it leads to a situation of 'the iron cage of consumerism'. To be able to change consumption habits, an 'alternative hedonism' is needed. It would introduce sources of identity, creativity and meaning that lie outside the realm of market.

Discussions of an alternative hedonism involves the discussion of values of people. Do we understand sustainability as an intrinsic value, or has it become an umbrella term with no meaning? Malaska et *al* (1989) argue that societies have slowly shifted to a model where social acknowledgment and self-fulfilment have become more and more significant. This underlining of the individual has further lead to the situation where each society and culture have their own values and no universal values exist. From the viewpoint of sustainable development, it is crucial to examine

the common values of human civilisation and find relevant and logical arguments for building them.

7.4. Future prospects and thoughts about sustainability

At this point of the research, returning to premises of futures research is beneficial. First, it is not possible to predict the future. Secondly, the future is not predestined. Finally, with our policies and choices, we can affect future events. Eleonora Masini (1993) provides interesting insight to the meaning of futures research as a scientific discipline. She argues that there are three different philosophical approaches to futures research. The first approach has to do with man's need to grasp the changes happening around him; people define their own meaning in life by understanding the direction towards which the world is heading. The second philosophical approach deals with utopia and different desirable future states. In this approach, future events are fundamentally linked with what humanity wishes to happen. The third approach is a synthesis of the two approaches. It is an approach which acknowledges the fact that actions and decision-making by people, societies and institutions are influences by utopia, social ideals, models, visions as well as empirical information of current and past trends. However, according to this approach, it is possible to have an impact on the future and change the realities. The challenge lies in making the 'right' choices. Therefore, as a field of science futures research deals with the nature of the good society and as one of its major goals it aims at contributing to human betterment. However, the ethical foundations for futures research are often missing, since no one can really know what the standards for moral judgments are. How do we really know which are the good things? (Bell, 2004). Everyone, no matter which conception of sustainable development they support, considers doing the right thing.

According to John Rawls (1971), members of society are self-interested rational persons, motivated to select whatever seems advantageous for themselves. Rawls introduced the concept of the veil of ignorance, which according to him would enable a fair procedure of governing the world. An individual, a member of society, or a high-level representative in decision-making standing behind the veil of ignorance would consistently act according to fair principles. This is because to say

that one is behind a veil of ignorance is to say that one does not know, for example, his sex, race, physical handicaps, generation or social class of parents. However, standing behind the veil of ignorance does not make the person ignorant of the general types of possible situations in which humans find themselves and the general facts about human psychology. As a result, for example, a self-interested rational person would not want to belong to a generation which has been allocated a lower than average quantity of resources. Therefore, for example in the framework of this thesis, applying Rawls' theory of the veil of ignorance would include realistically positioning ourselves 20, 50 or 100 years from now – what kind of world would we want to live in? In an imaginary society, anyone can occupy any position in the society once the veil of ignorance is lifted – therefore the theory encourages to think about the society and in general terms the whole planet from the perspective of all members.

Adger & Jordan (2009) describe this as an exciting stage in the transition to sustainability. It is however again worthwhile asking the ever-debated question: what actually is sustainable development? Too often it is interpreted as a static goal to which humanity should strive towards. This notion does not go hand in hand with the nature of our societies, which strives for constant renewal, changes and development. According to Tukker & Butter (2005), the Cultural Theory can provide insight to how a transition towards a more sustainable society could take place. They argue that no single best approach exists, and it is therefore essential to carefully analyze the system and the transition goals, and then to choose the most appropriate mode of governance. In this theory, there are four different modes: 1) the hierarchist mode, in which the transition takes place via planning 2) the individualist mode, in which the transition is governed via market-based instruments 3) the egalitarian mode, which basically is 'learning by doing, doing by learning' 4) the fatalist mode, which completely refrains from intervention. In the case of this thesis, it is evident that most probably a transition in our society there would be a mixture of elements from all of these modes.

Studies indicate that the highest level of professional behaviour emerges in situations where experts possess genuine concern for the outcomes of their actions

(Hukkinen, 2008). In issues related to sustainable development, the genuine concern might often be lacking, since the effects are not yet – at least in Finland – seen in every-day life. To look beyond generations and start changing the course of actions in the long term would need an example set by high-level governance and political decision-making. In a country like Finland, with a relatively small population, changes could be implemented quickly if needed. In a globalising world, Finland could even set a brave example and act as a forerunner in sustainability governance instead of merely following the minimum level for sustainability governance as stated in the United Nations guidelines.

It is often said that sustainable development brings to the table people who normally wouldn't talk to each other. However, there is also a danger that sustainable development is used as a general umbrella concept for everyone's own agenda. It is also considered an abstract concept, too difficult for an individual to understand or implement. This has to do with the fact that sustainable development is an often mentioned concept, yet it remains weak in mainstream politics. "It is potentially about everything and therefore potentially about nothing". It is also still mostly regarded as an environmental issue (Adger & Jordan, 2009). It should also be noted that sustainable development itself has also become one sort of megatrend that is often used to justify political decisions from all different fields. It is often presented as a pathway to all that is good and desirable in society. However, this does not help a lot in guiding policy-making.

Also, full objectivity or rationality is never guaranteed when making decisions. Etzioni (1998) argues that although people convince and believe to act completely rationally in a logic and empirical manner, it does not exclude the normative base of their decisions. Therefore also in the considerations of the future prospects of sustainable development in Finland, it is crucial to include more normative discussions in mainstream politics. Underlying every political decision is a vision of what kind of world we would like to live in, therefore including a normative aspect. According to Malaska (1989), the emotional aspect is often avoided in public debates and discussions.

The Finnish strategies for sustainable development according to classification

of Meadowcroft (2007) cannot be labeled cosmetic, but they are not either ideal strategies. An ideal strategy would mean being a fully integrated process of strategic decision-making for sustainable development. The comments of the panellists and the results of the study indicate, that sustainability is not an all-encompassing objective of society. OECD (2002) suggests different measures for improving governance for sustainability. For example, the concept needs to be clearly understood by the public, public organisations and across levels of government. However, understanding the concept should not be the issue for any nation anymore. Endless information sources for sustainability exist, and this argument seems more like an excuse than a real constraint. The real challenge, which the OECD also underlines, is the lack of commitment at the highest level to the formulation and implementation of sustainable development objectives. Also, as stated before, the need to increase the number of quantitative sustainability targets remains.

Most importantly, however, it should be realized that sustainable development is not an end station of a journey. It is a process, a constant travel, mainly in the thinking and values of people. Concrete measures will only be taken when there is a change in the way of thinking. For this, futures research can provide insight because it brings forward the views of experts from several fields and gives warning signs about possible events in the future. It is up to the decisions and deeds of today to utilize this information and make a difference. The debate about the core meaning of sustainable development remains messy. However, why would it not be messy? Sustainability concerns fundamentally deal with the future direction of human civilisation and therefore are very likely to generate discussion. (Jordan, 2008).

8. CONCLUSIONS

This research aimed at investigating the prospects of sustainability governance in Finland towards the year 2030. The most important driving forces, changes and trends, affecting sustainability governance as well as the most important strategic sustainability objectives concerning the future were investigated. The study was implemented as a Delphi study, a popular method in futures research. The aim of futures research is not to give accurate forecasts about the future but to generate discussion, assist political decision-making and present alternative desirable and probable views of the future.

Some general conclusions can be drawn from the results. Climate change will continue to affect all aspects of Finnish sustainability governance, being an international megatrend. Moreover, the worsening state of the Baltic Sea, technological and technical development, globalisation, the degradation of ecosystem services and increasing energy consumption are likely to have a large impact on sustainability governance at least during the next 20 years. In addition, the Delphi panel anticipated that that issues such as sufficiency of fresh water, global poverty and inequality and global population growth might have sudden and surprising effects on Finland, although at the moment they are trends and problems merely existing outside its borders.

As for the most important strategic decisions concerning sustainability governance towards the year 2030, focus should be given to increasing energy efficiency, halting the reduction of biodiversity and changing consumption habits. However, in the implementation of these objectives, the results indicate a major possibility for political conflicts, especially in the case of biodiversity and consumption habits. Both objectives are considered quite abstract and deal with the autonomy of people, fundamentally leading to the notion of trade-offs also at the household level.

Futures research was the proper approach for investigating this kind of multilevel and multidisciplinary issue. The Delphi method served the required framework for gathering together experts from various fields, allowing the diversity

of answers within the group and the completing of answers after the first round. It would, however, be interesting to investigate in a similar research, how the results of futures research could be turned into practical solutions.

9. ACKNOWLEDGEMENTS

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11. APPENDICES

Appendix 1: First round Delphi questionnaire

Prospects of sustainability governance in Finland 2030 - A Delphi Study

1. Delfoi-panelistien taustaselvitys

Pyydän teitä ystävällisesti täyttämään tämän taustaselvityksen, jota käytetään vain tilastollisiin tarkoituksiin tutkimukseen aineisto ja menetelmät-osiossa. Osallistujien anonymiteetti tulokset-osiossa taataan

1. Perustiedot

Nimi
Organisaatio

2. Ikähaarukka

- 20-30
- 30-40
- 40-50
- 50-60
- 60-70

3. Koulutustausta

- Tieteellinen jatkotutkinto
- Ylempi korkeakoulututkinto
- Alempi korkeakoulututkinto
- Ylioppilas
- Ei mikään yllämainituista

4. Ammatillinen ala, oma erikoisosaaminen

Next

1. Tässä osiossa sinua pyydetään omaan henkilökohtaiseen tietopohjaasi perustuen arvioimaan, kuinka tärkeitä (asteikolla 1-5) alla luetellut muutosvoimat o\ Suomelle vuotta 2030 kohti kulkiessa kestävän kehityksen tavoitteiden saavuttamisen kannalta.

	1 ei lainkaan tärkeä	2 ei kovin tärkeä	3 jonkin verran tärkeä	4 melko tärkeä	5 erittäin tärkeä
Ilmastonmuutos					
Itämeren tilan huonontuminen					
Ekosysteemipalveluiden huonontuminen(pilaantuminen?)					
Makean veden riittävyys					
Kasvava energiankulutus					
Globalisaatio					
Äkilliset maailmanlaajuiset talousmuutokset					
Suomen julkisen talouden kestävyys					
Maailmanlaajuinen väestönkasvu					
Euroopan laskeva väkiluku					
Suomen muuttuva ikärakenne					
Maailmanlaajuinen köyhyys ja epätasa-arvo					
Teknologinen ja tekninen kehitys					
Kaupungistuminen					

2. Tässä osiossa sinua pyydetään omaan tietopohjaasi ja henkilökohtaiseen mielipiteeseesi perustuen arvioimaan, kuinka toivottavaa (asteikolla 1-5) on, että seuraavat kestävän kehityksen strategiset tavoitteet saavutetaan vuoteen 2030 mennessä.

	1 ei lainkaan toivottavaa	2 ei kovin toivottavaa	3 jonkin verran toivottavaa	4 melko toivottavaa	5 erittäin toivottavaa
Monimuotoisuuden vähenemisen pysäyttäminen	○	○	○	○	○
Uusiutuvien energiamuotojen ja biopolttoaineiden osuuden lisääminen 25 prosentilla nykyisestä tasosta	○	○	○	○	○
Energiatehokkuuden parantaminen 20 prosentilla vuoteen 2020 mennessä	○	○	○	○	○
Ilmastonmuutoksen tuomiin muutoksiin sopeutuminen	○	○	○	○	○
Ilmastopolitiikan kytkeminen kaikkiin kestävän kehityksen politiikan osa-alueisiin	○	○	○	○	○
Kasvihuonepäästöjen rajoittaminen	○	○	○	○	○
Ravinnepäästöjen ja merikuljetuksen riskien vähentäminen Itämerellä	○	○	○	○	○
Luonnonmukaisen ja paikallisen maataloustuotannon edistäminen	○	○	○	○	○
Kulutustottumusten muuttaminen	○	○	○	○	○
Kestävän matkailun edistäminen	○	○		○	○
Suojelualueiden virkistyskäytön edistäminen	○	○	○	○	○
Kierrätettävien materiaalien suurempi hyödyntäminen raaka-aineina ja energialähteinä	○		○	○	○

Innovatiivisten ratkaisujen kehittäminen vesi – ja jätehuoltoon	○	○	○	○	○
Yhdyskuntajätteen kokonaismäärän vähentäminen	○	○	○	○	○
Kestävän kehityksen mittaamisen ja arvioinnin parantaminen	○	○	○	○	○
Tutkimus – ja innovaatiotoiminnan lisääminen luonnonvara-alalla	○	○	○	○	○
Sosiaalisten ja ekologisten näkökulmien parempi sovittaminen julkiseen päätöksentekoon	○	○	○	○	○
Paikallisten Agenda 21-ohjelmien lisääminen	○	○	○	○	○
Kunnallishallinnon ympäristötietouden lisääminen	○	○	○	○	○
Elinkaariajattelun sisällyttäminen kuntasuunnitteluun	○	○	○	○	○
Ympäristöongelmien ehkäisy keskittymällä paikallisen tason maankäyttösuunnitteluun	○	○	○	○	○
Siirtyminen biopolttoaineiden käyttöön julkisissa ajoneuvoissa	○	○		○	○
Ajoneuvojen verouudistuksen nopeuttaminen liikennepäästöjen vähentämiseksi	○	○	○	○	○
Julkisen liikenteen ja ympäristöystävällisten					

3. Tässä osiossa sinua pyydetään omaan tietopohjaasi ja henkilökohtaiseen mielipiteeseesi perustuen arvioimaan, kuinka todennäköistä (asteikolla 1-5) on, et seuraavat kestävän kehityksen strategiset tavoitteet saavutetaan vuoteen 2030 mennessä.

	1 ei lainkaan todennäköistä	2 ei kovin todennäköistä	3 jonkin verran todennäköistä	4 melko todennäköistä	5 erittäin todennäköistä
Monimuotoisuuden vähenemisen pysäyttäminen	○	○	○	○	○
Uusiutuvien energiamuotojen ja biopolttoaineiden osuuden lisääminen 25 prosentilla nykyisestä tasosta	○	○	○	○	○
Energiatehokkuuden parantaminen 20 prosentilla vuoteen 2020 mennessä	○	○	○	○	○
Ilmastonmuutoksen tuomiin muutoksiin sopeutuminen	○	○	○	○	○
Ilmastopolitiikan kytkeminen kaikkiin kestävän kehityksen politiikan osa-alueisiin	○	○	○	○	○
Kasvihuonepäästöjen rajoittaminen	○	○	○	○	○
Ravinnepäästöjen ja merikuljetuksen riskien vähentäminen Itämerellä	○	○	○	○	○
Luonnonmukaisen ja paikallisen maataloustuotannon edistäminen	○	○	○	○	○
Kulutustottumusten muuttaminen	○	○	○	○	○
Kestävän matkailun edistäminen	○	○	○	○	○
Suojelualueiden virkistyskäytön edistäminen	○	○	○	○	○
Kierrätettävien materiaalien suurempi hyödyntäminen raaka-aineina ja energialähteinä	○	○	○	○	○

Innovatiivisten ratkaisujen kehittäminen vesi – ja jätehuoltoon

Yhdyskuntajätteen kokonaismäärän vähentäminen

Kestävän kehityksen mittaamisen ja arvioinnin parantaminen

Tutkimus – ja innovaatiotoiminnan lisääminen luonnonvara-alalla

Sosiaalisten ja ekologisten näkökulmien parempi sovittaminen julkiseen päätöksentekoon

Paikallisten Agenda 21-ohjelmien lisääminen

Kunnallishallinnon ympäristötietouden lisääminen

Elinkaariajattelun sisällyttäminen kuntasuunnitteluun

Ympäristöongelmien ehkäisy keskittymällä paikallisen tason maankäyttösuunnitteluun

Siirtyminen biopolttoaineiden käyttöön julkisissa ajoneuvoissa

Ajoneuvojen verouudistuksen nopeuttaminen liikennepäästöjen vähentämiseksi

Julkisen liikenteen ja ympäristöystävällisten

Appendix 2 : 1st round results summary and 2nd round questions

1. Kestävän kehityksen hallintoon vaikuttavien muutostekijöiden tärkeys vuotta 2030 kohti kulkiessa.

Alla olevaan taulukkoon on listattu muutosvoimat järjestyksessä tärkeimmästä alkaen asiantuntijoiden arvioiden mukaisesti. Tärkeysjärjestys on saatu laskemalla kunkin muutostekijän arvioinnin keskiarvo. Kaikkien muutostekijöiden tärkeysarviointien keskiarvo oli 3,75. Muutostekijän, joka sai tätä pienemmän arvon, merkitys tulevaisuuden kehitykseen tulkittiin pieneksi (Perälä ym., 2010).

Alla olevaan taulukkoon on siten merkitty tummemmalla ne muutostekijät, joiden merkitys tulevaisuuteen arvioitiin paneelissa suureksi. Lisäksi taulukkoon on laskettu keskihajonnat demonstroimaan, miten asiantuntijoiden keskinäiset näkemykset eroavat toisistaan. Kaikkien keskihajontojen keskiarvo oli 0,84. Sitä suuremmat arvot tulkittiin merkittäväksi vastausten hajaantumiseksi.

Tulokset viittaavat siihen, että asiantuntijapaneeli oli varsin yksimielinen tärkeimmiksi muodostuneista muutostekijöistä, vaikka teknologisen ja teknisen kehityksen sekä äkillisten maailmanlaajuisten talousmuutosten vastauksissa olikin hajontaa. Hajonta oli silti suurinta vähemmän tärkeiksi määriteltyjen muutostekijöiden kohdalla.

Muutostekijä	Tärkeyden keskiarvo*[1]	Keskihajonta*[2]
Ilmastonmuutos	4,65	0,57
Itämeren tilan huonontuminen	4,26	0,62
Teknologinen ja tekninen kehitys	4,14	0,89
Kasvava energiankulutus	4,09	0,68
Äkilliset maailmanlaajuiset talousmuutokset	4,09	0,87
Suomen julkisen talouden kestävyys	4,05	0,84
Globalisaatio	4,0	0,69
Ekosysteemipalveluiden huonontuminen	3,86	0,83
Maailmanlaajuinen köyhyys ja epätasa-arvo	3,59	1,05
Suomen muuttuva ikärakenne	3,55	1,01
Maailmanlaajuinen väestönkasvu	3,55	1,01
Kaupungistuminen	3,27	0,83
Makean veden riittävyys	2,68	1,04
Euroopan laskeva väkiluku	2,68	0,84

 ¹: asteikko 1-5 ^{*2}: asteikko 0-2

- *Mitä mieltä sinä olet tuloksista? Vastaavatko ne omia arvioitasi?*

- *Miten mielestäsi tärkeimmäksi karsiutuneet muutosvoimat tulevat vaikuttamaan kestävän kehityksen hallintoon, ja miten niihin voidaan varautua?*

- *Mitkä mielestäsi ovat näistä karsiutuneista muutostekijöistä tärkeimmät (top3)?Miksi?*

- *Ei-tärkeiksi muutostekijöiksi karsiutuneiden joukossa on suurta keskihajontaa, joka viittaa vastausten hajaantumiseen – onko näiden joukossa ratkaisevia muutostekijöitä, jotka mielestäsi ovat tärkeitä tulevaisuuden kannalta?*

2. Kestävän kehityksen strategisten tavoitteiden saavuttamisen toivottavuus ja todennäköisyys vuoteen 2030 mennessä

Kyselyn toisessa osiossa pyydettiin arvioimaan (asteikolla 1-5) Suomen kestävän kehityksen keskeisistä strategioista poimittujen tulevaisuudentavoitteiden toivottavuutta sekä todennäköisyyttä.

Tuloksissa keskeisimpiä tutkittavia ovat ne tavoitteet, joilla on suuri merkitys tulevaisuuden kehitykseen, ja joilla politiikkaristiriitojen todennäköisyys on suuri. Politiikkaristiriidan todennäköisyys on suuri, jos toivottu ja todennäköinen muutos ovat erisuuntaisia. Suunta saadaan selvillä laskemalla toivotun ja todennäköisyyden erotus. Erotus kuvastaa sitä, kuinka kaukana toivottu ja todennäköinen tulevaisuudentavoite on toisistaan. Mitä suurempi erotus, sitä epätodennäköisemmin nykypolitiikalla voidaan vaikuttaa tavoitteen saavuttamiseen. Erimerkkisyys kuvastaa sitä, ettei nykypolitiikalla päästä tavoitetilaan.

Aineistosta on alla olevaan taulukkoon merkitty tummemmalla kaikki ne strategiset tavoitteet, jotka asiantuntijapaneeli arvioi tärkeäksi. Tavoite arvioitiin tärkeäksi, jos sen keskiarvo ylitti kaikkien toivottavuuksien keskiarvon. Lisäksi alleviivattuna on merkitty ne, joiden toivottavan ja todennäköisyyden erotuksen suuruus antaa viitettä siitä, että kyseinen tavoite saattaa aiheuttaa politiikkaristiriitoja. Erotus arvioitiin suureksi, jos se ylitti kaikkien erotusten keskiarvon. Lisäksi taulukosta voi nähdä ne vastaukset, joissa esiintyi eniten hajontaa. Nämä arvot on merkitty hajonta-sarakkeeseen tummemmalla.

Kaikkien strategisten tavoitteiden toivottavuuksien arvioinnin keskiarvo: 4,06
Toivottavuuden keskihajonnan keskiarvo: 0,78
Kaikkien strategisten tavoitteiden todennäköisyyksien arvioinnin keskiarvo: 3,27
Todennäköisyyden keskihajonnan keskiarvo: 0,89
Kaikkien toivottavan ja todennäköisen erotusten keskiarvo: 0,75

	Toivottavuuden keskiarvo	Toivottavuuden keskihajonta	Todennäköisyyden keskiarvo	Todennäköisyyden keskihajonta	Toivottavan ja todennäköisyyden erotus
Energiatehokkuuden parantaminen 20 prosentilla vuoteen 2020 mennessä	4,77	0,43	4,0	0,69	0,77
Julkisen liikenteen ja ympäristöystävällisten kuljetusmuotojen edistäminen	4,50	0,67	3,68	0,95	0,82
Kierrätettävien materiaalien suurempi hyödyntäminen raaka-aineina ja energialähteinä	4,41	0,67	3,91	0,81	0,5
Monimuotoisuuden vähenemisen pysäyttäminen	4,36	0,85	2,27	0,83	2,09
Kasvihuonepäästöjen rajoittaminen	4,36	0,79	3,59	1,09	0,77
Ravinnepäästöjen ja	4,36	0,66	3,63	0,79	0,73

merikuljetuksen riskien vähentäminen Itämerellä					
Kulutustottumusten muuttaminen	4,36	0,79	2,82	1,05	1,54
Uusiutuvien energiamuotojen ja biopolttoaineiden osuuden lisääminen 25 prosentilla nykyisestä tasosta	4,32	0,72	3,55	0,74	0,77
Ilmastopolitiikan kytkeminen kaikkiin kestävän kehityksen politiikan osa-alueisiin	4,23	0,96	3,18	1,01	1,05
Yhdyskuntajätteen kokonaismäärän vähentäminen	4,18	0,79	3,27	0,94	0,91
Tutkimus –ja innovaatiotoiminnan lisääminen luonnonvara-alalla	4,18	0,64	3,41	1,01	0,77
Sosiaalisten ja ekologisten näkökulmien parempi sovittaminen julkiseen päätöksentekoon	4,18	0,85	2,91	0,87	1,27
Ilmastonmuutokseen tuomiin muutoksiin sopeutuminen	4,14	0,83	3,23	0,81	0,91
Innovatiivisten ratkaisujen kehittäminen vesi –ja jätehuoltoon	4,14	0,71	3,86	0,71	0,28
Kestävän kehityksen mittaamisen ja arvioinnin parantaminen	4,04	0,65	3,32	1,01	0,72
Kunnallishallinnon ympäristötietouden lisääminen	3,95	0,65	3,18	0,86	0,77
Elinkaariajattelun sisällyttäminen kuntasuunnitteluun	3,91	0,87	2,82	0,87	1,09
Kestävän matkailun edistäminen	3,77	0,68	2,95	0,95	0,82
Ajoneuvojen verouudistuksen nopeuttaminen liikennepäästöjen vähentämiseksi	3,77	1,43	3,64	0,79	0,13
Luonnonmukaisen ja paikallisen maataloustuotannon edistäminen	3,63	0,79	3,14	0,85	0,49
Ympäristöongelmien ehkäisy keskittymällä paikallisen tason maankäyttösuunnitteluun	3,5	0,8	2,68	0,87	0,82
Paikallisten Agenda 21-ohjelmien lisääminen	3,36	0,65	2,82	0,85	0,54
Siirtyminen biopolttoaineiden käyttöön julkisissa ajoneuvoissa	3,32	0,99	3,32	1,05	0
Suojelualueiden virkistyskäytön edistäminen	3,18	0,73	3,23	1,02	-0,5

- Miten arvioit tuloksia?

- 24 tavoitteesta 14 määriteltiin tulevaisuuden kannalta merkittäviksi. Ovatko nämä tavoitteet samoja, joita itse arvioit toivottaviksi ensimmäisellä delfoi-kierroksella?Jäikö mielestäsi joku ratkaiseva tavoite ulkopuolelle?

- Mitkä näistä tärkeiksi määritellyistä tavoitteista arvioisit 2.kierroksella tulevaisuuden kannalta tärkeimmiksi (top-5)?Miksi?

- Tärkeiksi määritellyistä tavoitteissa yli puolessa vastaukset antavat viitettä mahdollisista politiikkaristiriidoista. Esim. monimuotoisuuden vähentäminen sekä kulutustottumusten muuttaminen koetaan toivottavaksi, mutta hyvinkin epätodennäköiseksi. Mistä luulet tämän johtuvan? Millaisilla toimilla voitaisiin päästä tavoitteisiin?

- Jotakin muuta, mitä?

Appendix 3: Delphi panel

Jukka Uosukainen
Kansainvälisten asioiden johtaja
Ympäristöministeriö

Risto Ranki
Teollisuusneuvos
Valtiovarainministeriö

Päivi Valkama
Ympäristöministeriön budjetista vastuullinen sektorihenkilö
Valtiovarainministeriö

Anne Eriksson
Sosiaali -ja terveysministeriö

Kaisa Pajanen
Helsingin kaupungin ympäristökeskus
Ympäristökasvattaja

Tuula Hämäläinen-Tyynilä
Ympäristönsuojelupäällikkö
Espoon kaupunki

Eila Mäkipää
Valiokuntaneuvos, Sosiaali -ja terveysvaliokunnan sihteeri
Eduskunta

Matti Pohjola
Taloustieteen professori
Helsingin kauppakorkeakoulu

Reijo Tuori
Rahoitusjohtaja
Espoon kaupunki

Hannu Jokiluoma
Valtakunnalliset kehittämisohjelmat
Sosiaali -ja terveysministeriö

Hannele Tanhua
Ylitarkastaja

Sosiaali -ja terveysministeriö

Anna-Kaisa Auvinen
Asiantuntija
Elinkeinoelämän keskusliitto

Kari Puurunen
Kansainvälisen ympäristöpolitiikan yksikkö
Ulkoministeriö

Marketta Virta
Ympäristö -ja luonnonvarat vastuualueen johtaja
Elinkeino-, liikenne -ja ympäristökeskus

Ilpo Kuronen
Luonnonsuojelupäällikkö
Suomen Luonnonsuojeluliitto

Johanna Niemivuo-Lahti
Maa -ja metsätalousministeriö

Mika Honkanen
Neuvotteleva virkamies
Työ -ja elinkeinoministeriö/ Alue -ja paikallisjaosto

Maija Hakanen
Ympäristöpäällikkö
Kuntaliitto

Martti Kallio
Kuntatalousyksikön johtaja
Kuntaliitto

Eeva Furman
Ympäristöpolitiikan tutkimusohjelman tutkimuspäällikkö
Suomen Ympäristökeskus

Vesa Valpasvuo
Ympäristöasiantuntija
Kuntaliitto

Markus Lukin
Ympäristönsuojelu
Helsingin kaupunki

Sauli Rouhinen
Ympäristöneuvos

Ympäristöministeriö

Pekka Jalkanen
Ympäristönsuojeluosaston päällikkö
Ympäristöministeriö