SIMB!

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Organisational Development in the E-Mobility Ecosystem

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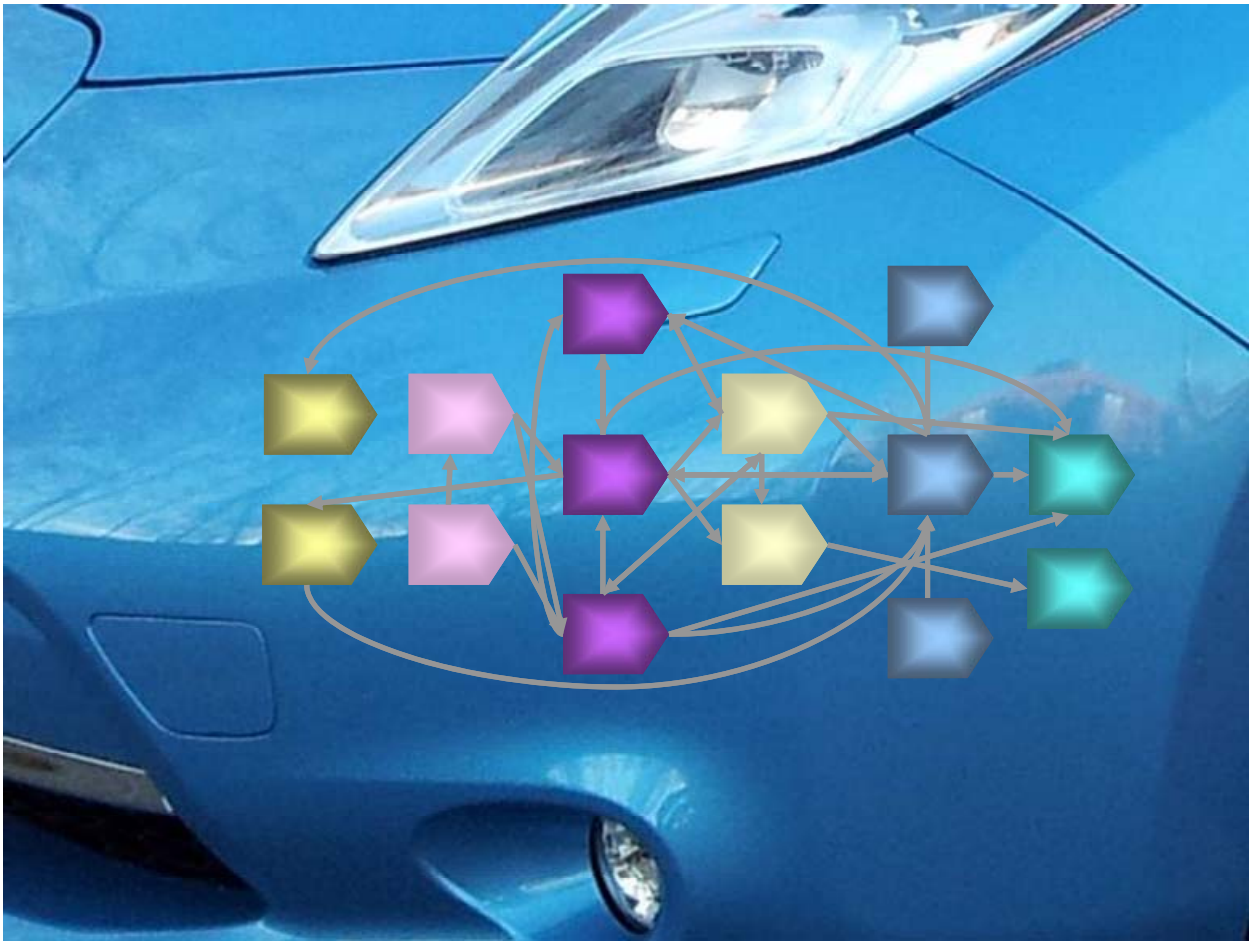

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Version 1

Executive Summary

The aim of this particular report is to prepare SIMBe participants to develop their own organisations towards sustainable e-mobility network collaboration. This aim was fulfilled by describing the current status of the uncertainty within the Finnish e-mobility ecosystem (chapter 4), the current and anticipated development (chapter 5) and managerial guidelines (chapter 7), based on theoretical frameworks for organisational development (section 2.3). An additional chapter (6) elaborates on anticipated e-mobility network collaboration, as suggested by the interviewed persons.

This report complements the final SIMBe report D1.4 Guidelines for Market Entry Business Development, which will describe e-mobility as a phenomenon, scenarios aiming to remove uncertainty along with a road map and finally market entry use cases and business initiation models.

The SIMBe uncertainty assessment through workshops and a query, along with mapping to theoretical backgrounds leads to proposals for 1) activities to manage uncertainty in SIMBe, as well as 2) actions to manage e-mobility uncertainty in Finland. Whereas several activities have been realized in SIMBe, several others need to be realized in later research projects.

E-mobility business development is starting slowly within SIMBe companies. Many role- and value proposition updates are taking place. Regarding network and partnership development the E-Mobility Operator (EMO) is the main development driver and activity. Business model development includes value propositions towards 1) home charging, bidirectional; 2) local smart grids and 3) smart e-mobility with telematics.

The interviewees made several proposals for updates of the generic industrial e-mobility value chain (as of Pirhonen et al 2011): 1) Car Supply Value Chain; 2) EVC System Set-up Value Chain and 3) EVC Operations Value Chain. Also value chain modifications related to electricity were suggested: 1) Modified Start; 2) Extension towards Smart Grid; and 3) E-Mobility Operator (EMO). This report thus proposes an integration into a new Electricity Value Chain.

Concrete managerial guidelines address organisational development under uncertainty, towards new business models. The application of an organisational development canvas is recommended. The following are exemplary management actions under uncertainty: Establish a Finnish e-mobility vision; place e-mobility leaders per company, organisation and (innovation) network; continue building networks, maintain and expand them; continuously ask for feedback on products and services from all stakeholders; be more active than reactive, make mistakes fast and learn from them.

Furthermore, there is a need to build a networked delivery system, which may change the allocation of the division of labour between a firm and network partners. Also, an e-mobility learning system needs to be developed in e-mobility organisations. Last not least the change towards a service culture is to be accelerated. Especially when targeting foreign markets communication skills, cultural awareness and empathy skills as well as problem solving skills need to be revisited. Finally, continuous learning will become a prerequisite for all further activities.

While implementing the organisational development canvas, building networks and being aware of networks is essential. Furthermore, anticipated knowledge exploration, sharing and exploitation need to be described, developed and implemented for each organisation and each business case. In the end, organisational development is more about making business models work, not to develop them.

Summarising the future research and business development needs, there is 1) a need for an agreed ecosystem description (network topology, emergent properties, Finnish and international); 2) the need to tap into collective knowledge (e.g. through a shared intelligence platform); 3) the need for concurrent and continuous improvement of explicated knowledge for the next years and 4) an integrated Finnish vision and mission on e-mobility.

Table of Contents

List of Tables

List of figures

List of acronyms and abbreviations

CS	Charging Services
DSO	Distribution System Operator
EMO	E-Mobility Operator
EV	Electric Vehicle
EVC	EV Charging
Gb	Gigabit
ICE	Internal Combustion Engine
PHEV	Plug-in Hybrid EV
SP	Service Provider
TSO	Transmission System Operator (in Finland: Fingrid)
UAI	Uncertainty Avoidance Index
V2G	Vehicle to Grid

1. Introduction

The overall aim of the Finnish SIMBe project is to significantly accelerate the introduction of sustainable electric mobility in Finland. Within SIMBe's Value Centre work package we have analysed end-user expectations, suggested some first business concepts, including a first industrial e-mobility value chain, and currently we are working on guidelines for market entry business development. The aim of this particular report is to prepare SIMBe participants to develop their own organisations towards sustainable e-mobility network collaboration.

1.1. Target Audience

This document is targeted to executives, managers, e-mobility professionals and researchers who are involved in developing e-mobility from a business point of view.

1.2. Scope

The project SIMBe extends the smart garage model to a concept, which combines mobility, sustainability and electrification of transport, as well as the collaboration of utilities, car manufacturers, component providers, infrastructure providers (e.g. "fuel stations" and car park real estates) and communities. SIMBe is based and depending on technology, but its scope of content are realization concepts.

Electric Vehicles: Battery electric vehicles (Battery EV), and plug-in hybrid electric vehicles (PHEV).

Business Context: Business and collaboration models, including cross-organisational network development and uncertainty management. Development and deployment of these models and concepts.

Research Focus: Organisational development in networks under conditions of uncertainty.

1.3. Objectives

The aim of this particular report is to prepare SIMBe participants to develop their own organisations towards sustainable e-mobility network collaboration. This includes organisation internal aspects as well as, especially inter-organisational aspects. The objective is to describe a starting point, including uncertainties, the anticipated development needs and theoretical frameworks for organisational development.

Detailed Objectives

1. A comprehensive analysis of the industrial environment of e-mobility within the SIMBe consortium: what is certain, what is not?
2. Modelling the e-mobility network collaboration: what is anticipated in short term and mid term?
3. A description of organisational development models which enable adequate, optimised ways of network collaboration
4. Guide the necessary organisational change

Research Questions

1. Which kinds of uncertainties shape the actions of the SIMBe participants? In which (anticipated) context?
2. What kind of organisational network is anticipated by SIMBe participants? How do they develop their own business models, businesses and networks?
3. What kind of generic organisational development model would support SIMBe participants?

2. Theoretical Concepts

As the objectives of this work are related to uncertainty and organisational development within the e-mobility ecosystem, all these three areas need to be theoretically covered.

The first area, **uncertainty**, needs to be defined and put into contexts. Also, theoretical approaches on how to lead and manage uncertainty need to be taken into account.

The next area is the **e-mobility ecosystem** and the business data available about it within the SIMBe project, which will help to compare a new, current status, to an older reference status, as document by Pirhonen et al. (2011). Business ecosystems have been described by Peltoniemi & Vuori (2004).

Last not least **organisational development** needs to be defined, and theories taken into account which will allow to draw guiding conclusions for SIMBe companies for their future development.

The next three sections will each cover one area, respectively. The last section provides a summary of theories.

2.1. Uncertainty

2.1.1. Definitions

The following definitions are based on the author's synthesis of independent reviews of 19 researchers of Aalto University and Åbo Academy of the following main articles in 2009: March & Shapira1987, Weick et al 2005, Olsson 2007, Loch et al 2008, Perminova et al 2008 and Winch & Maytorena 2009.

Related definitions by the author are:

- **Assessment**: prediction by calculation or estimation. Results are probability distributions or indicators (e.g. %, magnitude).
- **Impact**: a **significant change** of the venture or its planned course of action, schedule, deliverables etc.
    - **Negative** impacts lead to e.g. delay, higher costs, worse quality
    - **Positive** impacts lead to e.g. acceleration, cost reduction, better quality
- **Possible future scenario**: a possibility of circumstances, events, outcomes or a sequence of these
- **Venture**: project, enterprise, company, firm or a set of these

Risk

An **identified** possible future scenario that may affect a venture. The **probability** and the **impact** can be either assessed or they are uncertain. **Negative** connotation.

For objectivists, rather a (material) **event**. **Probability** measures the plausibility of propositions (Jaynes 1986). For subjectivists connected to an individual's **perception**. **Probability** corresponds to a 'personal belief' (de Finetti 1974).

Opportunity

An **identified** possible future scenario that may affect a venture. The **probability** and the **impact** can be either assessed or they are uncertain. **Positive** connotation

Uncertainty

The **entirety** of all **unforeseeable** future scenarios (unknown unknowns), that may affect a venture. **Partial** uncertainty means that for a given risk or opportunity, its probability, impact and/or possible cause **cannot be assessed**.

Rationalist view: a (missing) **probability distribution** (Savage, 1954). Behavioural view: **lack of knowledge** (Carnegie School and Keynes, 1921).

Figure 1 displays a map of possible types of uncertainties, depending on the information available, and its degree of trustworthiness (vertical axis) and the possibility to identify uncertainties (horizontal axis). It is inspired by Philip Stephens' article The unwitting wisdom of Rumsfeld's unknowns. Financial Times, 12 December 2003.

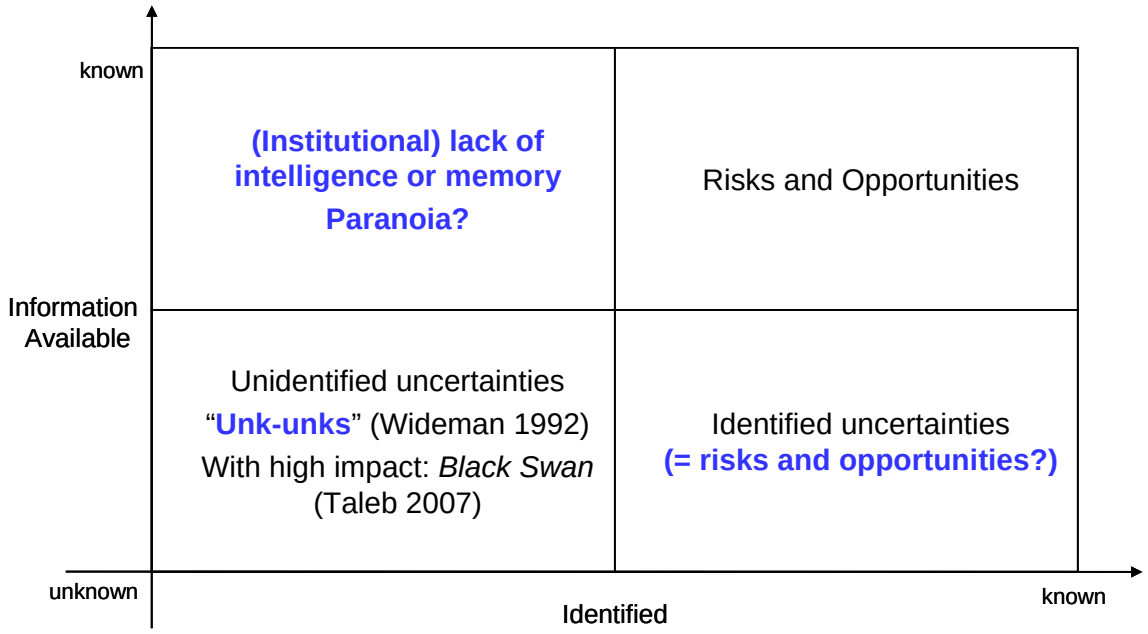

Figure 1: A map of possible types of uncertainties

Risk Management

The ongoing process of **risk** identification, assessment (of probability, impact and likely causes), prioritization and monitoring as well as the planning, execution and monitoring of mitigation (**minimizing** the probability and/or impact) and **contingency** actions (in case the **risk** materializes).

Opportunity Management

The ongoing process of **opportunity** identification, assessment (of probability, impact and likely causes), prioritization, monitoring as well as the planning, execution and monitoring of mitigation (**maximizing** the probability and/or impact) and **exploitation** actions (in case the **opportunity** materializes).

Uncertainty Management

On top of risk and opportunity management, three more action levels:

- The reduction of uncertainty – typically when scoping ventures and for ventures in discovery phases – through **iterative identification of risks and opportunities** and related change of

project (scope) by (trial-and-error and) **reflective learning**, selection of fewer alternatives, sub problem tables and isolation of uncertainties. **"Generating a plausible story".**

- Execution and monitoring of contingency (of risks) and exploitation (of opportunities) actions in a timely and consequential manner, when meeting an **unidentified future scenario**.
- Shaping the venture in such a way that unidentified possible future scenarios can be rather exploited as opportunities than treated as risks. This includes **increased agility, reflectivity** and **flexibility** of the venture management, organization and (human) resources.

2.1.2. Contexts of Uncertainty

Cultural Context: Hofstede's Uncertainty Avoidance Index

Hofstede (2001) has described five indices for measuring different cultures. The Uncertainty Avoidance Index (UAI) is one of them. It addresses a society's tolerance for uncertainty and ambiguity and indicates to what extent a culture programs its members to feel either uncomfortable or comfortable in unstructured situations.

Table 1. Hofstede's (2001) Uncertainty Avoidance Index: the two extremes

Uncertainty accepting cultures	Uncertainty avoiding cultures
• are more tolerant of opinions different from what they are used to • try to have as few rules as possible People are • more phlegmatic and contemplative • **not** expected to express **emotions**	• try to minimize the possibility of such situations by strict laws and rules, safety and security measures People in uncertainty avoiding countries are • also motivated by inner nervous energy • **more emotional**.

A few selected countries are shown in figure 2, illustrating the position of Finland. Note Greece has the highest Uncertainty Avoidance Index. Also note that Asian countries are quite different in UAI.

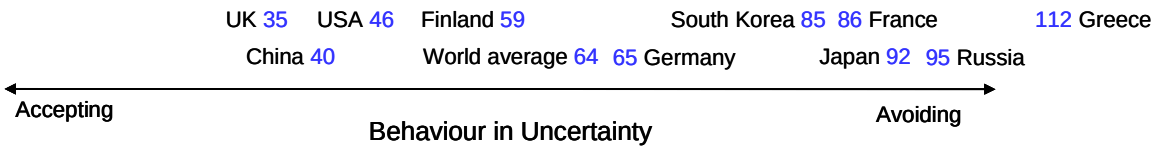

Figure 2: Selected countries' scores of Hofstede's (2001) Uncertainty Avoidance Index

Individual Context: Locus of Control

Individually, people can be distinguished in being rather reactive (locus of control outside of the individual) or rather proactive (locus of control inside of the individual). Table 2 provides a summary.

Table 2. Locus of Control in Individuals (summary of Hong et al 2009 and Mueller & Thomas 2001)

External	Internal
Person perceives the outcome of an event to be **beyond** their **personal control** • **Low** risk taking ability • **High** uncertainty avoidance • **Adaptive** decision making • Focal point for decision making, **centralised** • Coordination by **rules** and authority arrangements • **Collectivistic** cultures e.g. Japan • ***Adapt*** *to the future*	Person perceives the outcome of an event to be **within** their personal **control** through one's own ability, effort or skills • **High** risk taking ability • **Low** uncertainty avoidance • **Innovative** decision making • Dispersed decision making, **decentralised** • Coordination by feedback and **problem solving** • **Individualistic** cultures e.g. USA • ***Shape*** *the future*

Figure 3 provides selected, illustrative examples in professional context.

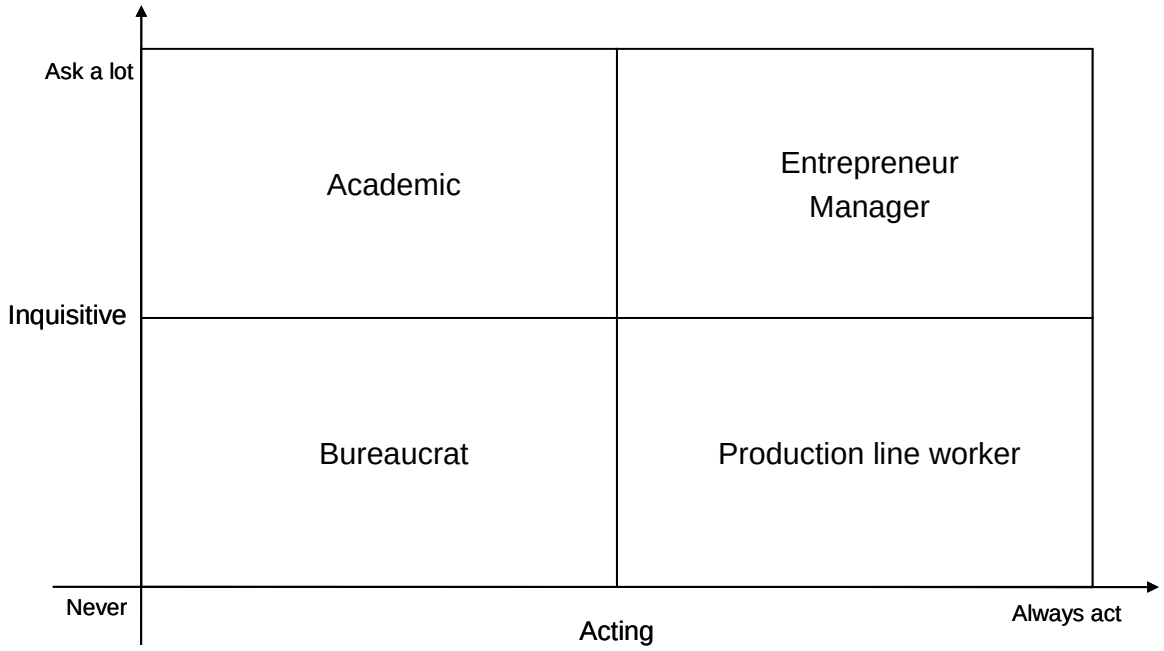

Figure 3: Locus of Control (i.e. reactive or proactive) versus curiosity in professional context

Project Management Context: Reactive vs. Proactive

Depending on culture (national, organisational) and individual traits, as well as on the kind of uncertainty, ventures are managed by different styles. Table 3, taken from Winch (2011), shows various examples. The highlights by the author illustrate styles recommended in SIMBe project deliverables.

Table 3. Management styles – collation and sources by Winch (2011); highlights by the author

Reactive	Proactive*
• Contingency (unallocated provision) • Management by wandering around (Peters and Waterman) • **Retaining flexibility and agility*** (Miller and Lessard 2000) • High reliability organising (Weick et al [2005]) • **Trial and error learning*** (Loch et al [2008]; Starbuck) • Speak truth to power (Grenny et al)	• **Scenario planning** (Royal Dutch Shell) • Front end definition (Miller and Lessard) • The outside view (Flyvbjerg) • Stage-gate processes (Cooper; OGC) • **Cognitive mapping** (Eden and colleagues; Eunice Maytorena) • Soft systems methodology (Checkland, Winter) • Selectionism (Loch et al [2008]) • Safeguarding (Gil) • **Networking and stakeholder** management (Winch) • The successive principle (Lichtenberg) • **Systems dynamics** (Williams [& Metcalf 2008]) • Formal research (Mullins)

*: management style needs organisational development in parallel

An illustrative summary of management principles mapped to locus of control is provided in figure 4. In this context Laakkonen (2012) suggests cultural differences between Finnish and US American entrepreneurs. Whereas Finns work to gain time to spend with their families, Americans want money.

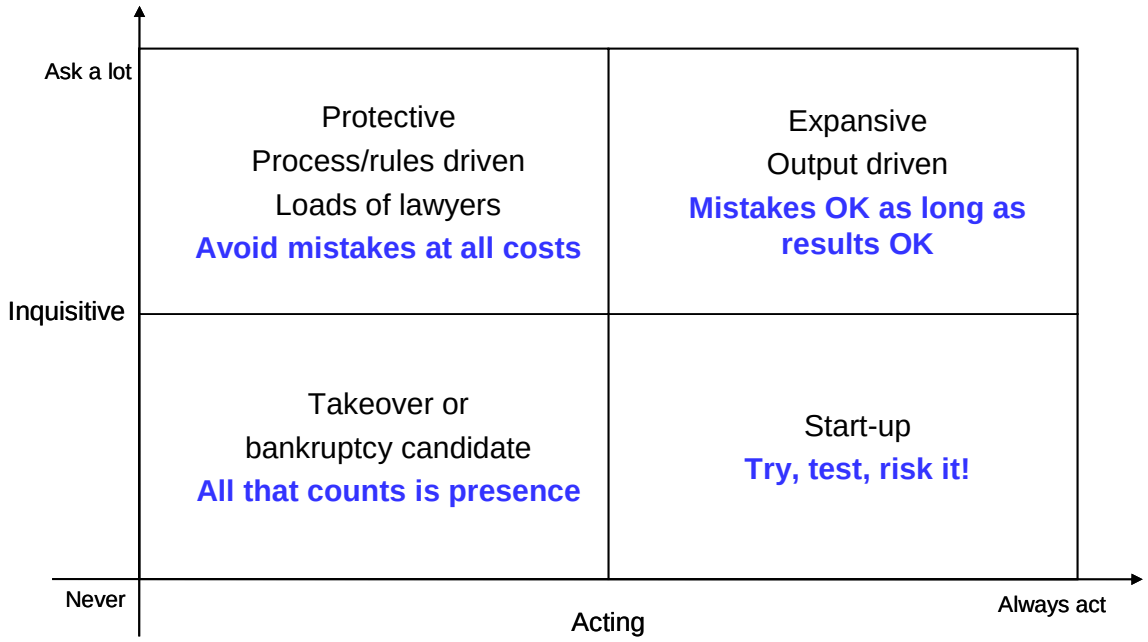

Figure 4: Locus of Control (i.e. reactive or proactive) versus curiosity in business context

2.1.3. Leadership Framework: Sloan's FCF

MIT Sloan (2004) scholars Ancona et al published in 2007 a "4 Capabilities Leadership Framework" (FCF). In figure 5 it is shown rotated by -45°, with comments both from Winch (2011) and the author.

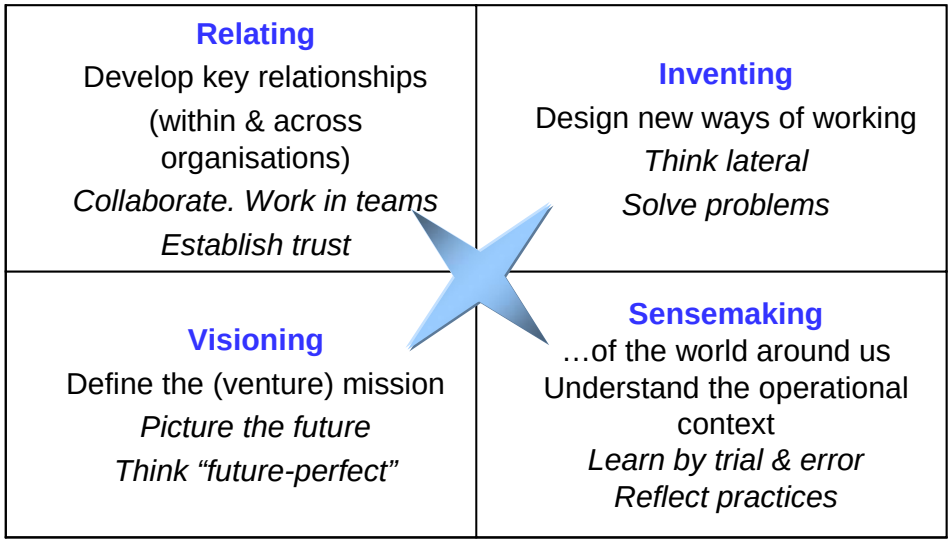

Figure 5: Ancona et al's 2007 "4 Capabilities Leadership Framework", rotated and commented

2.1.4. Managing Uncertainty: An Action Model

For the task of managing uncertainty, one idea could be to integrate the types of uncertainty, as of fig. 1, with the 4 Capabilities Leadership Framework (fig. 5). Thus each capability would address one type of uncertainty. Figure 6 provides this integration, following an unpublished idea of Colin Turner (BP p.l.c.), with additions by the author and Winch (2011).

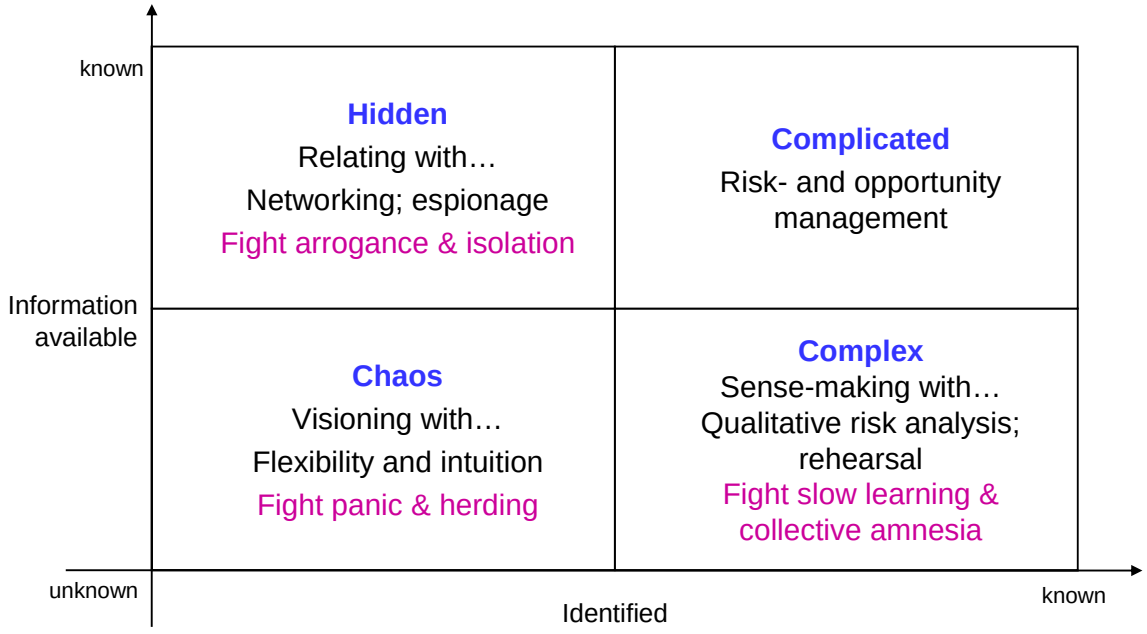

Figure 6: Colin Turner's Action Model, with additions by the author and Winch (2011)

2.2. The E-Mobility Business Ecosystem

This section describes the existing data and its current visualisation by Pirhonen et al (2011). It was used in this work as a reference in the individual company interviews. The term *ecosystem*, as defined by Peltoniemi & Vuori (2004) is used, rather than *network*. A *network* would imply that participants knew each other, and also their roles already. This is only partially true for e-mobility, as will be shown later.

2.2.1. The Business Model Canvas

The Business Model Canvas by Osterwalder and Pigneur (2010) has been in use in the SIMBe project since 2010. Its application in the e-mobility context is best described by Mäkelä & Pirhonen (2011).

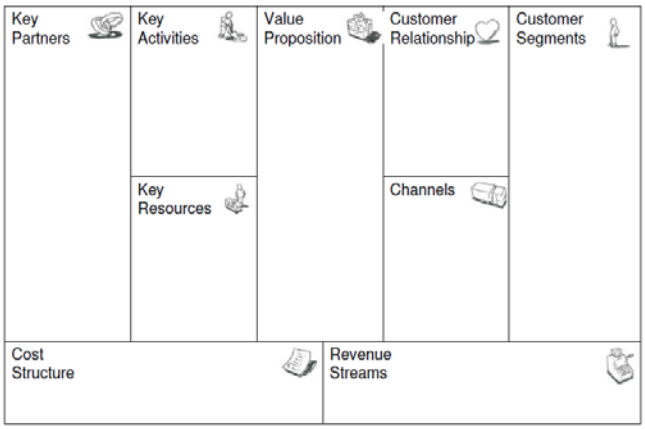

Figure 7: Business Model Canvas by Osterwalder and Pigneur (2010)

2.2.2. E-Mobility Roles and Their Relations

A major outcome of Pirhonen et al (2011) is a provisional map of possible roles that actors in e-mobility may assume. This map also shows anticipated partnerships between the roles.

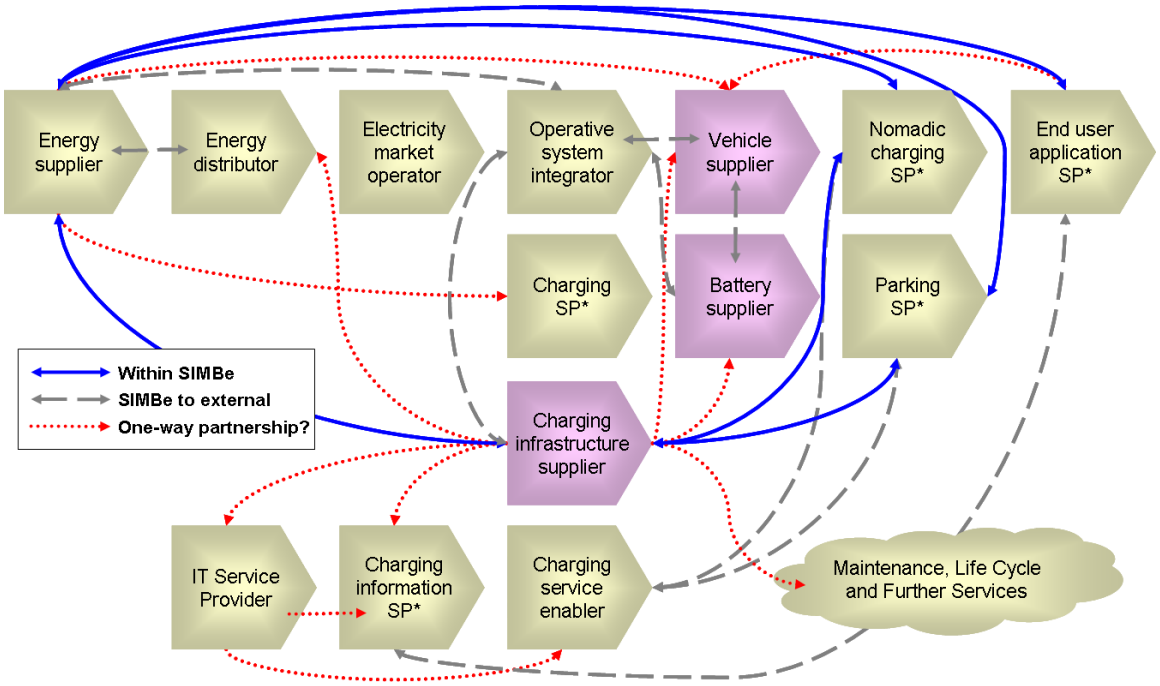

Figure 8: E-Mobility roles and anticipated partnerships as illustrated by Pirhonen et al (2011)

2.2.3. E-Mobility Value Propositions Map

A further major outcome of Pirhonen et al (2011) is a provisional map of value propositions, allocated to possible roles in the e-mobility field.

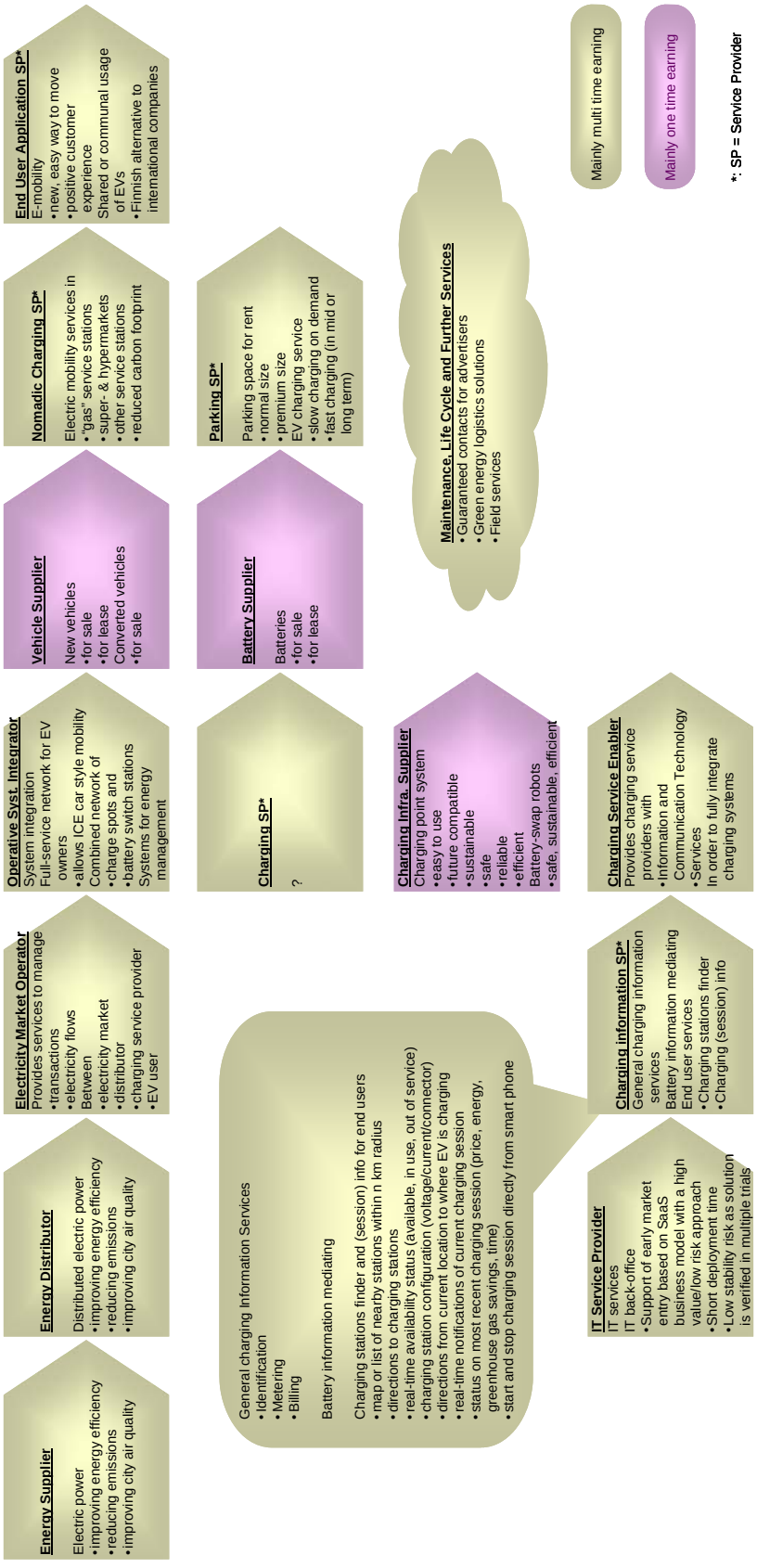

Figure 9. Value Propositions in the e-mobility field as illustrated by Pirhonen et al (2011)

2.3. Organisational Development

2.3.1. Essentials

There are three **essentials** for a company's business model: vision, strategy and o**rganisational development** supporting the vision. According to Itami & Nishino (2010), a **business model** consists of a profit model and a business system, as illustrated by Immonen (2011) in figure 7.

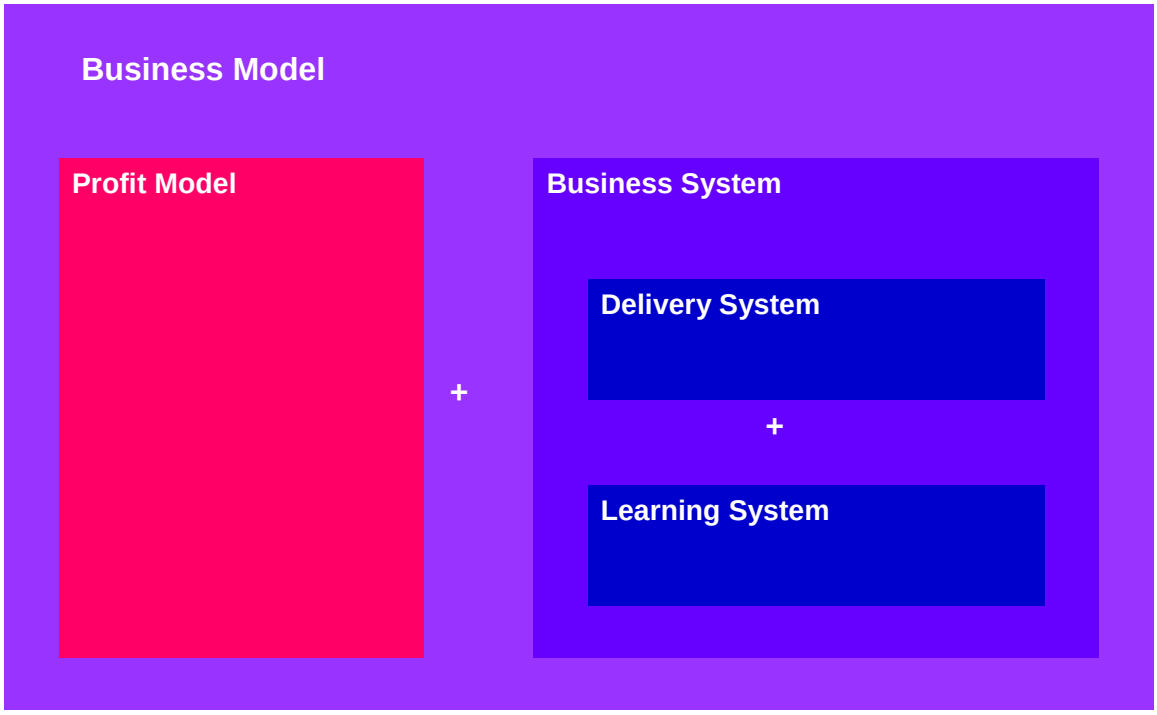

Figure 10: Elements of a business model (Itami and Nishino 2010), illustration by Immonen (2011)

According to Immonen (2011), within the Business System, the **Delivery System** is to deliver the products and service experiences to partners, customers and users. Thus it needs to:-

- allocate the division of labour between the firm and its partners by, e.g., outsourcing, crowd-sourcing, internal procurement or collaboration (alliances)
- organise the in-house working system
- integrate the activities of partners

The **Learning System**, usually a "step-child" in organisations, needs to be emphasized. It needs to:

- Define and re-design the core tasks, roles and responsibilities
- Define, design and implement management practices and leadership supporting the business processes
- Design and implement effective communication and knowledge exchange and sharing practices

Additionally, a **Service Culture** needs to be established. This requires collaboration competences:

- Communication skills
- Cultural awareness and empathy skills
- Problem solving skills
- Willingness for continuous learning

Immonen (2011) concludes that a business system is the company's soul and heart, passion and motivation in action to realise the selected business model. But the business system does not function without the people working for it.

2.3.2. Organisational Development Canvas

Immonen (2012), by combining Osterwalder and Pigneur's (2010) Business Model Canvas and Fritscher and Pigneur's (2010) relations between the nine elements, suggests the use of an *Organisational Development* Canvas. This canvas can be applied per business model, per organisation, or per organisational or value network. In this context, it shall help us in examining which developments are needed, related to what business model element.

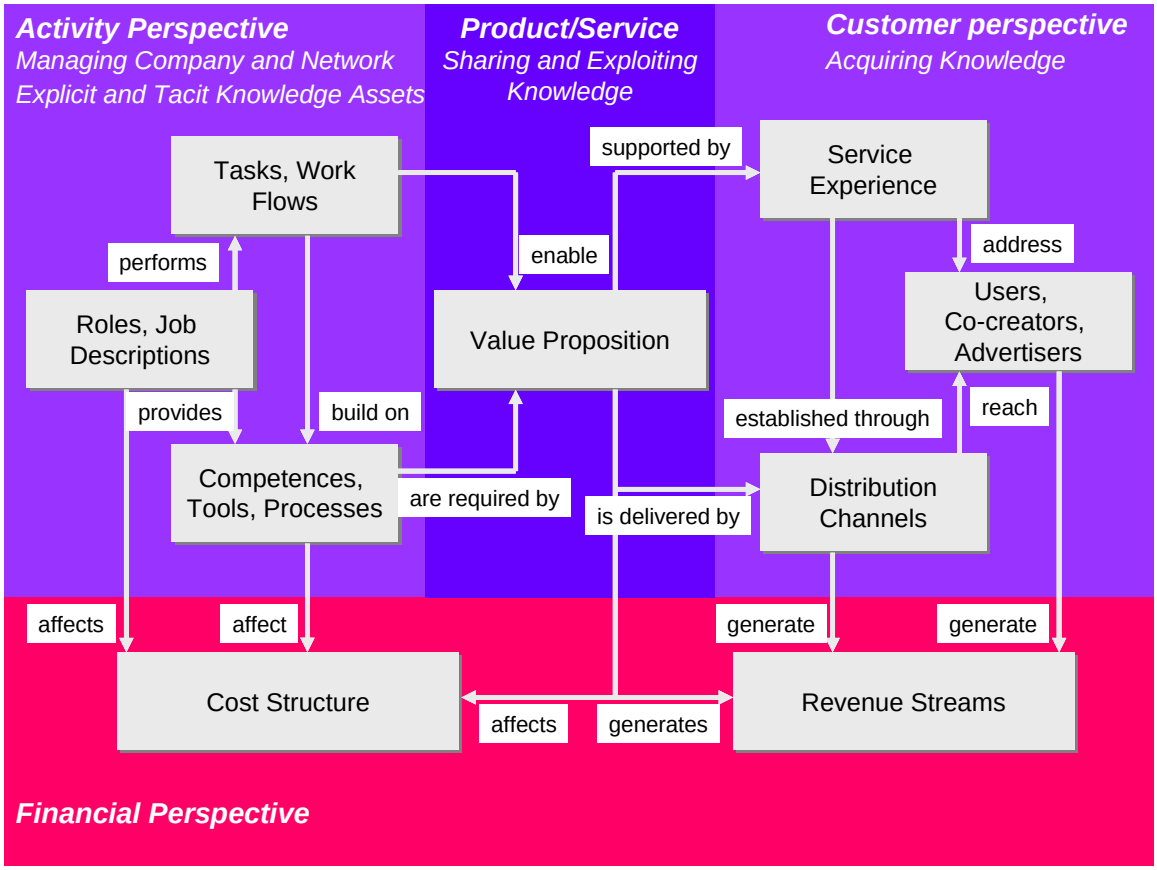

Figure 11: Organisational Development Canvas as suggested by Immonen (2012)

2.4. Summary of Theories and Available Data

The theories described are framing the understanding of uncertainty and approaches on how to lead and manage it. As a context, the available data on the Finnish e-mobility ecosystem and the theory behind it are displayed. Last not least theories on organisational development have been taken into account which will allow to draw guiding conclusions for SIMBe companies for their future development.

Table 4 summarizes theories and data and shall act as supportive theories overview while reading the methodology as presented in the next chapter. Note that individual sources to theories are provided in the sections above, not again in the table.

Table 4. Summary of theories and available data

Uncertainty	E-Mobility Ecosystem	Organisational Development
Definitions • risk, opportunity, uncertainty • management of risk, opportunity, uncertainty Contexts • Cultural: Hofstede's Uncertainty Avoidance Index • Individual: locus of control • Project management: reactive vs. proactive Managing (under) uncertainty • 4 Capabilities Leadership Framework (Sloan's FCF) • An Action Model	The business model canvas • Theory • Application in e-mobility Existing data: e-mobility ecosystem illustrations • E-Mobility roles and anticipated partnerships • Value Propositions in the e-mobility field	Essentials • Business model = profit model + business system • business system = delivery system + learning system Organisational Development Canvas
Various sources, see section 2.1	Main source: Pirhonen et al (2011)	Main source: Immonen (2012)

3. Methodology

This research takes place in the context of e-mobility in Finland. Even as various researchers and companies are active in the field, a comprehensive overview of the e-mobility field does not exist. One may consider e-mobility in Finland as an emerging, dynamic ecosystem. Ecosystem both in a business sense (i.e. a developing, yet incomplete value network) as well in research sense (whereas many technology aspects are understood, the underlying earning opportunities are sketchy, at best).

Still, the methodology needs to be robust enough to describe uncertainties of SIMBe participants, their (value) network building and how they intend to develop their own business models and businesses.

This calls for qualitative, participatory research, manifested in workshops and individual interviews, plus further interpretation and/or mapping of results, *along* existing theory (deductive) or *expanding* existing theory (inductive).

The chosen methodology is based on a five step research approach:

1. Collation and documentation of existing theories and further material for setting up and guiding workshops and interviews – see chapter 2.
2. Uncertainty survey
3. Workshops with SIMBe participants, broken down in four blocks, each with a signal session (introduction of theories), discussion and conclusion:
    - Uncertainty within the e-mobility field
    - Uncertainty management within the e-mobility field
    - Organisational development depending on type of uncertainty
    - Business- and organisational development within the e-mobility field
4. Structured, individual interviews addressing roles in e-mobility, partnerships within the proposed network and business (model) development. These interviews allow selected industrial SIMBe partners to reflect and comment on existing data (figures 8 and 9).
5. Analysis and synthesis: interpretations and mapping of results

Steps 2 and 3 have been performed concurrent. In an additional step, the results have been used to sketch guidelines for organisational development.

Thus the Finnish e-mobility ecosystem will be investigated from two angles – 1) the status of uncertainty in the ecosystem and 2) the organisational development in selected industrial companies. Based on the investigations, the following syntheses can be performed:

6. Based on the current uncertainties, which leadership and management actions should be taken (see chapter 4)?
7. Based on the observed organisational development, how will the e-mobility ecosystem develop in the future (see chapter 5)?
8. Comparing the current uncertainties and the anticipated organisational development, which leadership and management actions are yet missing (as differential analysis, see chapter 7)?

The following two chapters describe the outcomes, as well as analysis and synthesis, clustered into “Uncertainty” and “Business Development”. Chapter 6 contains additional suggestions for e-mobility related value chains. Chapter 7 contains guidelines for organisational development.

4. Uncertainty within the Finnish E-Mobility Ecosystem

Uncertainty was assessed both with a survey and within workshop discussions. In the first two workshops, the definitions as of section 2.1.1 were presented, discussed and exemplified. Following the workshops, a survey was launched.

4.1. Uncertainty Assessment

4.1.1. Uncertainty Assessment Query

SIMBe project participants were asked to answer one or more of the following questions:

1. What is your most pressing problem within e-mobility?
2. Which currently discussed ideas related to e-mobility will never work (e.g. never create a positive business case)?
3. Which is the issue that you feel most uncertain about - where is the biggest uncertainty?
4. Where do you have a feeling that the information available is not enough or not reliable?
5. What phenomenon is dependent on so many variables that its development is truly chaotic?

Six respondents answered: one academic, three persons with industrial/business background, one person working for public authorities and one Master's thesis student with an engineering background. Most of the respondents answered all questions.

In the following the original answers are clustered per question. The order of answers is roughly from concrete to abstract themes, with public transport as a final, rather separate, issue.

4.1.2. Most Pressing Problem within E-Mobility

- Battery
- Battery life time cost
- The availability of e-cars. They are also too expensive and they have a performance problem (range and convenience)
- Forming a functional organisation and collaboration entity for EV business, but it is going forward still.
- Political/Social atmosphere toward EVs
- Helsinki transport and parking policies aim to promote public transport. Though the number of private vehicles is increased, the level of public transport in the city centre has remained at the same high level as in the 1980's.

4.1.3. E-Mobility Ideas That Will Never Work

- Single slow charging spots along the street side in the city centre
- Battery swap stations for autos (private cars) will not create a business case. The infrastructure is too costly, standards are missing and there are safety issues. However, swap stations for mopeds or bicycles may work out.
- Large public charging infrastructure
- Expensive schemes in the value chain
- What is the role of e-buses in use in public transport in the future?

4.1.4. Biggest Uncertainty

- Price development of EV's

- Attractiveness – EVs are expensive, batteries are ageing quickly, there are not enough charging places etc.; who will buy them?
- Customer compliance: can large car manufacturers create a true alternative to ICE powered cars?
- Charging infra - ecosystem/value chain, regulation and standardization
- Jumping to full EV schemes? Maybe intermediate phases such as HEV, PHEV and non-car E-mobility is the way forward?
- Market uncertainty (higher than technology uncertainty)*
- Behaviour of politicians, example: German anti-nuclear policy following the Fukushima accident*
- Political situation and decision making
- In the inner city of Helsinki, there is very limited space for transport. Therefore especially rail transport is increased and developed. Nevertheless bus transport has still a significant role in the region as well as cycling and walking. When the e-mobility is became more common, are the total amount of vehicles increased in Helsinki?

*: Answer from workshop discussion

4.1.5. Information Available Is Not Enough or Not Reliable

- V2Home and V2Grid impacts and opportunities
- Political decision reliability
- Behavioural changes in the EV adaption
- EV is in a hype phase, technical info is most objective; business and markets highly speculative
- The project is mainly concentrated in individual transport. How is the development of (e-) public transport dealt with the project?

4.1.6. Truly Chaotic Phenomena

- Price development of EV's
- EV development itself is in a "colonization" phase, too many designs and technologies to around
- Energy supply mix policies
- Energy politics impacting price of Oil, Carbon, electricity
- The focus of the project is in e-mobility. When planning city one have to concentrate on alternative fuels and technologies of various kinds. What is the role of bio fuels, hydrogen, and ICT based solutions in the future?

4.2. Types of Uncertainties

The uncertainty assessment is more meaningful when the answers are mapped to the various types of uncertainties, as illustrated in figures 1 and 6. Table 5 was created by filling the four quadrants with the slightly abstracted content of the subsections in section 4.1 by the following mapping:

- Complicated – risks and opportunities: *Most Pressing Problem Within E-Mobility* and *E-Mobility Ideas That Will Never Work*
- Complex – identified uncertainties: *Biggest Uncertainty*
- Hidden uncertainty – (institutional) lack of memory or paranoia: *Information Available Is Not Enough Or Not Reliable*
- Chaos – unidentified uncertainties: *Truly Chaotic Phenomena*

Table 5. Types of uncertainties – initial summary and abstraction

Hidden Uncertainties	Complicated Risks & Opportunities
Information is missing or doubtful on: • V2Home and V2Grid impacts and opportunities • Political decision reliability • Behavioural changes in the EV adaption • Business and markets (highly speculative) • Development of electric public transport	Problematic • Batteries and their life time costs • Availability of e-cars • Price and performance of e-cars • EV business development: organisation internal & collaboration (entity) • Political/Social atmosphere toward EVs • Role of e-buses in public transport No business case • Single slow charging spots along the street side in the city centre • Battery swap stations for private cars • Large public charging infrastructure • Expensive schemes in the value chain
Chaos – Unidentified Uncertainties	**Identified Uncertainties (Complexity)**
Truly chaotic phenomena are • EV price development • Too many designs and technologies in combination • Role of ICT based solutions • Role of bio fuels and hydrogen • Energy supply mix policies • Energy politics (impacting price of oil, coal and electricity)	• EV price development • EV attractiveness (price, batteries, charging infrastructure) • Are EVs a true alternative to ICE powered cars? • Charging infrastructure - ecosystem/value chain, regulation and standardization • Battery e-car schemes, without HEV, PHEV and non-car e-mobility phases • Market uncertainty • Behaviour of politicians • Political situation and decision making • Increase of total amount of vehicles (e.g. in cities like Helsinki)

Table 5 is not completely satisfactory as some phenomena (such as politics and price development) have been mentioned in more than one quadrant. In order to resolve these problems, it may help to review the role of the individual respondent as illustrated in figure 3. For instance academics should be more uncertain about markets, whereas managers should be typically more concerned about technological uncertainties than business uncertainties. Additionally, it may help to assess whether respondents expressed uncertainties outside of their typical competence area. This evaluation is obviously delicate, but as roles and typical competences per respondent are known to the author, a second, cautious analysis step makes sense. The outcome is shown in table 6. Note that the table cannot reflect the dynamic nature of uncertainty. This will be discussed later.

Table 6. Types of uncertainties – final analysis

Hidden Uncertainties	Complicated Risks & Opportunities
Technology impacts (mainly on business) • V2Home and V2Grid Market, policies and consumers • Behavioural changes in the EV adaption	Technology • Batteries and their life time costs • Performance of e-cars Business development • Organisational development • Collaboration (incl. entity building) • Availability of adequate human resources (skills, competences) Market, policies and consumers • Availability of e-cars • EV price development • Political/Social atmosphere toward EVs Public transport • Role of e-buses • Development of electric public transport No business case (“red herring”) • Single slow charging spots along the street side in the city centre • Battery swap stations for private cars • Large public charging infrastructure
Chaos – Unidentified Uncertainties	**Identified Uncertainties (Complexity)**
Technology based phenomena • Too many designs and technologies in combination Energy policies based phenomena • Role of bio fuels and hydrogen • Energy supply mix policies • Impact on price of oil, coal and electricity	Business development • Charging infrastructure value network • Battery e-car schemes Market, policies and consumers • EV attractiveness (price, batteries, charging infrastructure) • EVs as alternative to ICE powered cars • Charging infrastructure regulation and standardization • Market uncertainty • Political situation and decision making • Political decision reliability • Increase of total amount of vehicles

4.3. Managing Uncertainty

SIMBe discussion participants reflected on their own leadership styles after being introduced to the theoretical concepts outlined in sections 2.2.-2.4. The following questions were asked to support reflection:

How do you position yourself individually and as an organisation?

- What is your favourite **culture**?
- What is your **context** – in which context is your organisation and your department?
- Where is your locus of control – **internal** or **external**?
- What is your **leadership style**?
- How do you manage uncertainty?

As an example, the SIMBe project itself was analysed:

- Started with active stakeholder management
- Recommends networking and emphasises the SIMBe consortium as an active network
- Provides cognitive maps of, e.g. value offering and networking in Finnish e-mobility
- Regards e-mobility as dynamic system and collaboration as systemic
- Performs scenario planning as a basis for the Finnish e-mobility roadmap
- Tries to make sense of e-cars beyond mobility ("battery on wheels")
- Will establish a vision and mission of Finnish e-mobility

In summary, SIMBe as a project has involved seven ways of uncertainty management and the three main areas of uncertainty: **hidden**, **complex** & **chaos**.

As a concrete outcome of the uncertainty workshops, the following proposal was established (comments in brackets by the author):

- Let's have a "list of worries": uncertainties that exist in the SIMBe consortium (realised, see section 4.1)
- Try to cluster the "worries" in competence areas, e.g. transport, business, power electronics, new energies etc. (realised, see table 6)
- Answer "worries" (next step, out of this document's scope)
- Convert to FAQ and disseminate in order to reduce common fears (next step, out of this document's scope)

4.4. Business- and Organisational Development under Uncertainty

As a general discussion outcome, participants agreed that the current uncertainty is too high for concrete (and operational) business models. A large fleet test is necessary as a first step: the Tekes EVE program needs to work and bring e-cars onto Finnish roads. User profiling may help to focus on target groups. However participants suggested that the largest organisational (and mental) change will be necessary most likely in the public sector.

The following activities were agreed as meaningful next steps:

- Investigate in the "**battery on wheels**" concept: what can one do with an EV beyond mobility?
- User profiling (as practiced in, e.g., magazines) may help to focus on specific target groups
- Investigate how we can profit from the German exit from nuclear power

In this stage we have sufficient data on uncertainties and suggested activities to apply the theories as suggested in figures 3, 5 and 6 to the data as of table 6. Table 7 shows the result of this application, along with the vision as of SIMBe deliverable 1.4.

Table 7. Exemplary actions to manage e-mobility uncertainty in Finland

Relate to Uncover Hidden Uncertainties	Apply Risk- and Opportunity Management
Technology impacts • Collaborate with smart grid experts to investigate technology impacts of V2Home and V2Grid Market, policies and consumers • Intensify networking and stakeholder management: describe possible networks and complete the stakeholder ecosystem • Connect to possible target groups and analyse their behavioural changes in EV adaption	Technology • Solve problems, think lateral (e.g. V2Home and V2Grid) Business development • Think lateral, take examples from other industries (e.g. "Otto" ATMs) • Avoid chasing red herrings
Develop a Vision, Apply Flexibility and Intuition	**Make Sense of the Complex Context**
Establish and promote a vision for Finnish e-mobility, based on shared values. The vision will:- • guide design and engineering work • provide more certainty to politicians in their task to establish and promote energy policies Retain flexibility and agility (Miller and Lessard 2000) while avoiding herding. Apply intuition. Example for vision: *Finland is the leader in home charging and smart grid exporting with a vibrant EV ecosystem*.	Business development • Understand the operational context of e-mobility through dedicated fleet based field studies • Apply trial and error learning based on real-life large scale fleet tests • Map possible value networks Market, policies and consumers • Develop scenarios and plan according to them (see SIMBe deliverable 1.4) • Investigate in the systemic dynamics of e-mobility (see also SIMBe deliverable 1.4) • Investigate in the "battery on wheels" concept: what contexts beyond mobility are possible? • Reflect practices applied between industry and authorities, including private-public relationships • Apply user profiling

5. Business Development within the Finnish E-Mobility Ecosystem

This chapter is based on three structured interviews with industrial participants of the SIMBe project. The interviewees represented:-

- one of the largest energy utilities in Finland,
- a leading global enabler of telecommunications services and
- a business specializing in the development, manufacture and marketing of electrical systems and supplies.

The interviews were planned to consist of three phases, triggered by the following key questions:

1. *Confirm or elaborate on your role(s) in e-mobility, based on figure 9*. This phase was to confirm figure 9 or collate proposals for update
2. *Confirm or elaborate on your (planned) partnerships in e-mobility, based on figure 8.* This phase was to collate proposals for update of figure 8, as well as to investigate collaboration between companies
3. *How will you update your business model, what is changing, based on earlier filled business canvases* (based on figure 7)? This phase was to collate the actual business model developments

Whereas all interviewees answered all the questions, all of them also elaborated on the roles of *other* actors in the e-mobility ecosystem. This was not planned, but turned out to provide important information about how interviewees placed their companies between other actors, and how they feel possible e-mobility value chains could make sense.

One of the interviewees also described the motivation for change through UMTS LTE (Long Term Evolution) technology development: as a major enabler, by 2020 wireless technologies will offer support for up to a thousand times more traffic, Gb/s peak speeds, rock solid, ubiquitous connectivity and millisecond latency for true “local feel”. Thus a quantum leap in mobile services will be possible.

5.1. Role Development in the Current E-Mobility Value Chain

The interviewees pointed out the following developments, with figure 9 providing the reference:

- One actor will stay in the role of Energy Supplier
- One actor will develop from IT Service Provider towards IT Service Provider, Charging Information Service Provider and Charging Services Enabler
- One actor is an EVC components, systems and management software supplier. This includes the poles, their power components and their connectivity (data capability). Currently these roles are allocated to Charging Infrastructure Supplier. This may cause confusion, thus an update of the illustration of the e-mobility ecosystem is required (see chapter 6).

These developments illustrate that when companies outlined their business models, roughly one year ago, without any reference point (figure 9 did not yet exist), not all of them were able to clearly describe their role and their value proposition. Only now, with figure 9 at hands, interviewees had the necessary overview which allowed them to express much more clearly which roles they would like to take on. It would be valuable to investigate the development of all other actors as well.

5.2. Overall Organisational Development Status

5.2.1. Planning Horizon

Based on the interviewees’ statements the short time planning horizon is 2012-2013. The typical mid time planning horizon is about five years from now, with concrete plans extending at a long term maximum into 2020. Beyond the planning horizon are, e.g., massive public EV infrastructure and V2G beyond local applications.

5.2.2. Diversity of Development

Whereas one company does not plan major organisational development efforts, neither internal, nor inter-partner collaborations; another company plans a company internal unit development as well as a major network development, related to a new role (see below). The third company currently anticipates a major restructuring which is not driven by e-mobility.

In the long term the development of a networked role is foreseen, called E-Mobility Operator (EMO), which is to provide neutral services from the utilities' point of view (see next section).

5.3. Network and Partnership Development

In principle partnership development is part of the overall business development (see figure 7). However, it is worthwhile to examine companies' plans in the overall e-mobility network context first. How do they plan to collaborate, based on which ideas or models?

5.3.1. Diversity of Development

Again, also in network and partnership development the diversity is large. Whereas one company does not anticipate any developments, another one anticipates clusters and partnership development according to an extended ecosystem which includes smart traffic and smart grid. The third company, driven by user experience improvement, sets a new top priority on energy utilities cooperation towards the goal of an EMO.

5.3.2. The E-Mobility Operator (EMO) as a Major New Role

According to Jussi Palola of Helsingin Energia, there is a constraint in Finland: no actors are ready or willing to take on the roles of Operative System Integrator, Charging Service Provider and Charging Service Enabler (see figure 9). And there are two main options on how to proceed in developing the e-mobility ecosystem, i.e. the network of industrial players to be involved in e-mobility. The favoured one is to establish an EMO.

As a starting point a (yet fictitious) role E-Mobility Operator (EMO) is defined. It is to combine at least parts of the roles Operative System Integrator, Charging SP, Charging Service Enabler, Nomadic Charging SP and Parking SP, as well as End User Application SP (see figure 9).

Palola's idea is to establish an independent and neutral charging services provider, analogue to the Finnish "Otto" ATM system, which is owned by Finnish banks. For Otto, the service experience of the customer is standardised and exactly the same, independent of the individual customer's bank. Also all customers of all banks may use all Otto ATMs. This is different than for instance in Germany where ATMs are individually owned and the service experience varies. Also fees apply for using a different bank than the customer's own.

The role EMO can be assumed as an m:n matrix: various actors ($A_1 \ldots A_m$) can be co-owners or share holders of the EMO entity, whereas various roles ($R_1 \ldots R_n$, see figure 12 for a first example) can be bundled within EMO. These roles are:

- Charging Services at Real Estates
- Charging Services at Commercial Premises
- Public City Charging Services
- Highway Ultra-fast Charging Services
- Other E-Mobility Services
- Home Charging

Palola suggests that the actors of the following roles would be interested in co-owning the EMO entity: Energy Supplier, Electricity Market Operator, IT Service Provider, Charging Information SP, Nomadic Charging SP and Parking SP, as well as End User Application SP.

5.4. Business Model Development

This section is structured according to the nine key dimensions of a business model canvas as illustrated in figure 7. Dimensions which are not mentioned are not subject to development, according to the interviewees.

5.4.1. Value Proposition Development

Also regarding value propositions, companies have very different development strategies. Whereas one company does not see a change, with the emphasis staying on the provision of charging point systems, another one adds a new focus on customer friendly solutions, leading to the new EMO role's value proposition. The third company plans to extend its value proposition towards the common shared edges of Smart Grid, Smart traffic and e-Mobility value chains:

- **Home charging, bidirectional**: the motivation is 1) safety – the grid is not reliable enough (e.g. in Japan, California, Finland) and 2) the bundling of (renewable) electric power generation and storage/buffering capacity.
- **Local smart grids**: needed due to massive rise of local production of renewables and lack of grid transfer capacity. Especially in Germany and Denmark.
- **Smart e-mobility with telematics**: the SIMBe partner is to provide telematics, in a wider sense, leading to smart traffic (electric and non-electric): manage connectivity with a horizontal approach, including smart grid opportunities. A risk is seen in data privacy problems due to "vehicle monitoring".

5.4.2. Key Activities Development

One company sees marketing and sales more in focus than engineering and manufacturing, another emphasises that customer management will include participation in EMO.

5.4.3. Channels Development

Electric utilities become a new channel for one company.

5.4.4. Customer Segments Development

Car manufacturers, their dealers and importers become a new channel for one company. Private companies as a channel now include work place parking for employees.

5.4.5. Customer Relationship Development

EMO formation and cooperation will become an essential part of the continuous customer relationship.

5.4.6. Cost Structure and Revenue Streams Development

Venture capital for EMO is needed; however some smaller revenues from EMO ownership are anticipated.

6. Suggestions for E-Mobility Related Value Chains

During the interviews that lead to chapter 5, all interviewees also elaborated on the roles of *other* actors in the e-mobility ecosystem. Moreover, they also suggested changes to the industrial e-mobility value chain used as a basis for figures 8 and 9. This was not planned, but turned out to provide important information about how interviewees placed their companies between other actors, and how they feel possible additional or extended e-mobility value chains could make sense.

Most modification proposals (three) were made towards the energy value chain. One proposal relates to an extension of the e-mobility value chain towards (local) smart grid and smart traffic. A new chain suggested is the car supply value chain. Finally, a major suggestion was to divide value chains into supply and set-up (rather one-time earning) and operations (multi-time earning). In the following I provide an overview of the individual suggestions.

Note that in the following I will label the value chain elements "**roles**", not "**actors**". In this way, the chains become more neutral, e.g., **a real actor**, such as Helsingin Energia, **can assume various roles**. Also, **many actors can assume the same role** (leading to competition).

6.1. Electricity Value Chain Changes and Extensions

New roles and modifications for existing roles are summarised in table 8. Note each number stands for one role. The direction of the chains are from 1 (left/top) to n (right/bottom). See figure 9 for comparison.

Table 8. Suggestions for energy value chain changes and extensions

Modification of chain start	Extension towards smart grid*	Inclusion of EMO
1. Energy Supplier 2. Grid Operator (new role; actor in Finland: Fingrid) 3. Electric Market Regulator (new role; actor in Finland: Energy Market Authority) 4. Energy Distributor (value propositions are power availability, reliability of supply and basic power availability) 5. Electricity Market Operator Roles 2 and 3 perform in parallel to roles 1, 4 and 5.	1. Renewable Power Supplier (new; not part of "standard" Energy Supplier) 2. Energy Transmitter (new; between Energy Supplier and Energy Distributor, currently large grid operators?) 3. Energy Aggregator (new; performing demand response, aggregates and sells "Nega"-Watts)**	1. Electricity Supplier (*not Energy*) 2. Electricity Wholesales (new) 3. Electricity Retailer (new) 4. Transmission System Operator (new) 5. Distribution System Operator (new) 6. E-Mobility Operator (new) 7. End Customer (new, see section 5.3.2) Roles 2 and 3 perform in parallel to roles 1, 4 and 5.

*: Sources for further new roles within smart grid value chains: http://www.e-energy.de and http://www.nist.gov/smartgrid

**: In charge of micro-grid and/or virtual power plant in geo-local or interest based communities. For instance air conditioning power peak balancing in Los Angeles. See also www.addressfp7.org

In the following I illustrate the modifications. All figures are designed in such way that the old elements (as of figure 8) are displayed on the lower bottom and the modified chain at the upper right of the figure. Also, terms have been harmonised as far as possible.

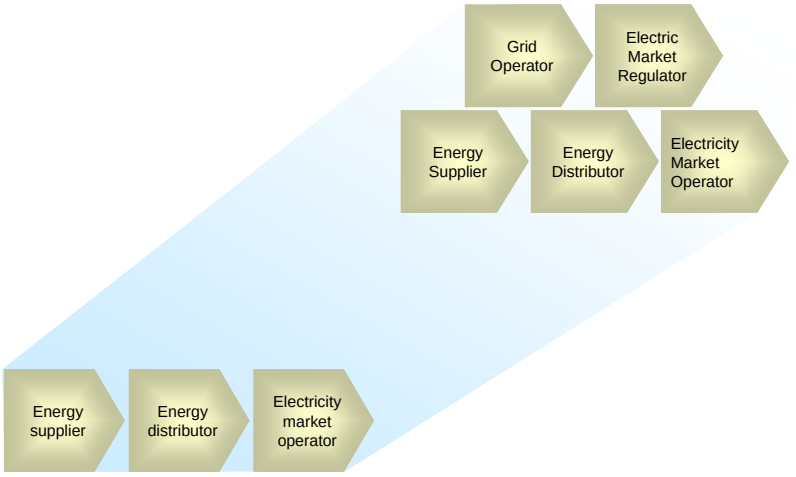

Figure 12: Electricity Value Chain: Modified Start

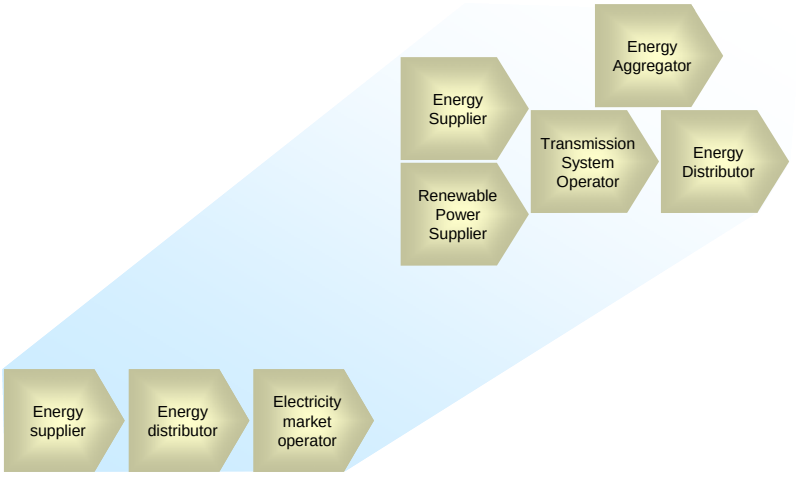

Figure 13: Electricity Value Chain: Extension Towards Smart Grid

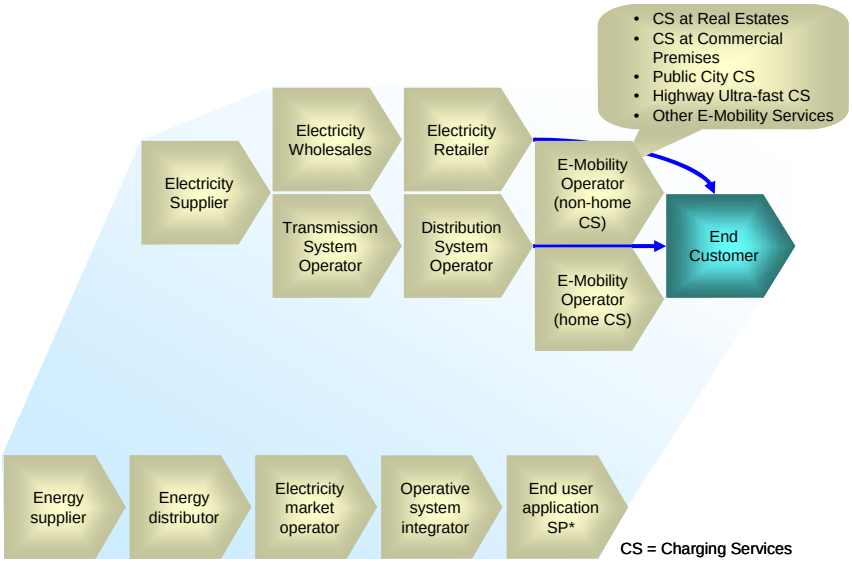

Figure 14: Electricity Value Chain: EMO (adapted from Jussi Palola, unpublished)

6.2. E-Mobility Extension towards Smart Grid and Traffic

The current e-mobility value chain (figure 9) is focused on mobility only and thus does only create limited business opportunities for certain actors. Value is expected to be created at the common shared edges of Smart Grid, Smart traffic and e-Mobility value chains. Thus an extension towards smart traffic and (local) smart grid is needed – a more holistic approach. As a working title, this could be the E-Mobility and Beyond Value Chain. Role updates are needed for End User Application Service Supplier and Electricity Market Operator.

6.3. EV Charging (EVC) Value Chains

The current e-mobility value chain does not separate *set-up* and *operations* of EVC systems. Also, it does not clearly describe the three value chains car, energy and real estate.

Displaying the e-mobility ecosystem (or network) by using three separate value chains, split into the set-up (one time earning) and operational (ongoing earning) parts would be more meaningful. Table 9 shows the proposals for splitting EVC value propositions into two separate chains.

Table 9. EV Charging Value Chains

EVC System Set-Up Value Chain	EVC Operations Value Chain
1. Component Supplier 2. EVC Components and System Supplier (incl. design and engineering) 3. EVC Management Software Provider 4. EVC System Integrator (incl. system functionality, design, interfaces, software and component integration) 5. EVC System Builder and Supplier (incl. purchase, installation, testing, documentation and customer handover) All roles are new. However roles 4 and 5 can be integrated and considered to be the existing role Charging Infrastructure Supplier.	1. Charging Service Enabler 2. IT Services Provider 3. EVC System Operator (new role) 4. E-Mobility Operator (existing role Operative System Integrator, modified) 5. Nomadic Charging SP 6. Parking SP 7. Charging Information SP

The split into set-up and operational chains is of course not limited to EV Charging but valid for many e-mobility areas. More research is needed to investigate thoroughly the concrete instantiations.

The following figures illustrate the EV Charging chains, yet.

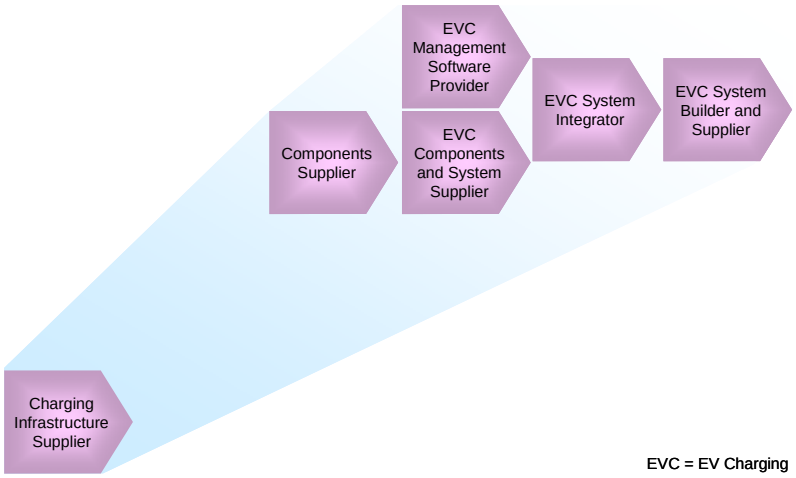

Figure 15: EVC System Set-Up Value Chain

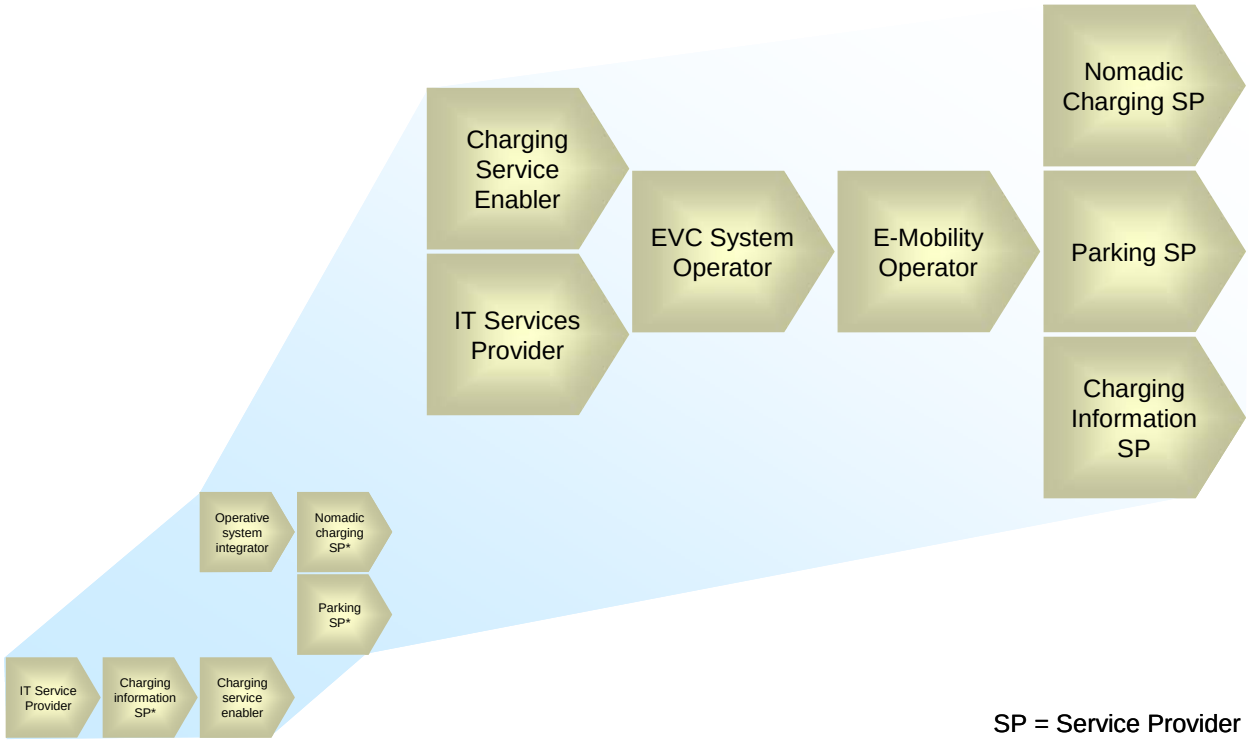

Figure 16: EVC Operations Value Chain

6.4. Car Supply Value Chain

This value chain expands the Vehicle Supplier role into a complete chain. It is a (one-time supply) set-up chain, which does not include operational roles (such as EMO).

The following chain is based on the Nissan model as an example:

1. Battery Supplier
2. Auto Parts Supplier (new)
3. Auto Manufacturer (new)
4. EVC System Supplier (see table 9, role 2)
5. E-Mobility Supplier (new; combination of e-auto and EVC system)

Note that roles 1 and 2 can be understood as running in parallel. Also roles 3 and 4.

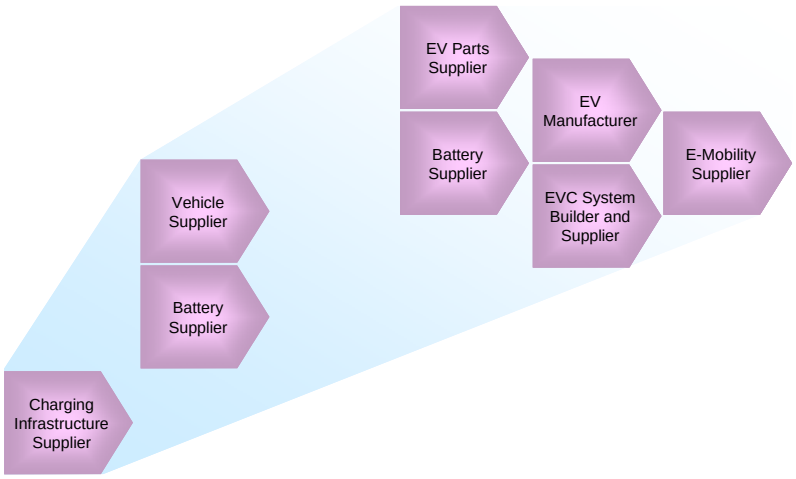

Figure 17*: EV Supply Value Chain*

6.5. Preliminary Analysis

Whereas this chapter 6 was not planned in the beginning of this work, it is useful to make a preliminary synthesis to guide future work on illustrations of value chains, networks and even ecosystems of e-mobility.

The first observation is that within the last year, the provisional map of value propositions (as of figure 9) has changed, and will continue to change.

Second, the split into set-up and operations is logical and reduces complexity. This approach should be completely followed through.

Third, the evolving, more concrete, chains cannot yet be integrated in a consistent way. Still, in figure 19 and 20 I suggest some preliminary, partial integrations.

Fourth, in Giesecke (2012) additional e-mobility stakeholders have been suggested, to complement the purely industrial generic value chain. These should be taken into account in the future, whenever the ecosystem or an e-mobility value chain is illustrated.

The following stakeholders were identified:

- Users
- Government (setting environmental goals)
- Authorities (road infrastructure, taxes)
- Investors
- Insurance companies
- Media companies

Government and authorities can be understood as a new class of roles, which are available to (or only taken by) public actors. Also these roles should be taken into account in future research.

6.6. Preliminary Synthesis

The following figures illustrate two exemplary integration possibilities. They are not meant to be taken as final, but as ideas how future value chains may look like (one set-up, one operational example).

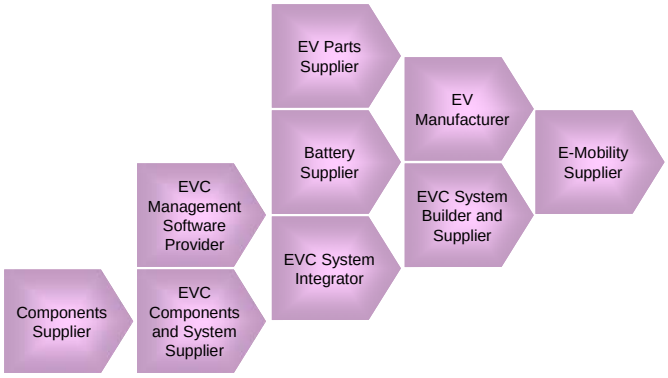

Figure 18*: Extended EV Supply Value Chain*

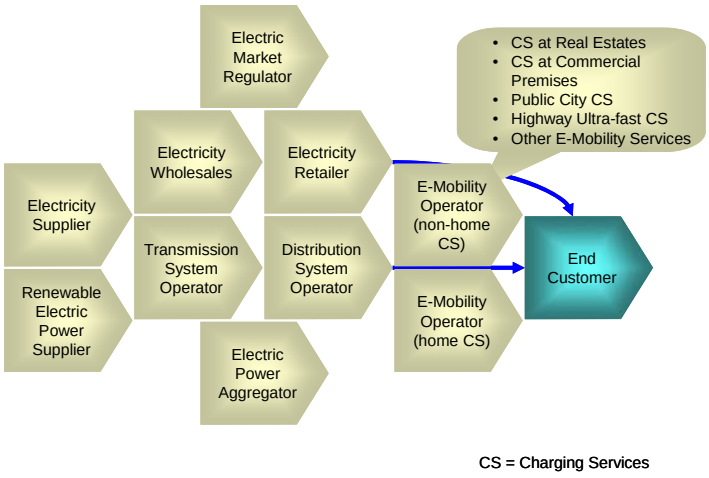

Figure 19*: Electricity Value Chain: Proposal for Integration*

7. Guidelines for Organisational Development

This chapter aims to draw conclusions from the previous sections which are general enough to be applied by most organisations in the Finnish e-mobility ecosystem. These conclusions, based on a generalisation of findings with the help of existing theories (see chapter 2), can be understood as managerial guidelines. The order of sections is from general to specific guidelines.

7.1. Organisational Development Under Uncertainty

In conditions of uncertainty, the development of an organisation is more than ever a leadership task. Thus it makes sense to look into the conceptual frameworks of leadership and organisational development, and compare relevant guidelines. Table 10 lists these.

Table 10. Guidelines for Leadership and Organisational Development Under Uncertainty

Leading in Uncertainty	Organisational Development
Managing uncertainty is a **leadership** task • A good leader knows her/himself **and** the surrounding contexts • This is fully applicable also to management **in** and **of** uncertainty • Contexts of uncertainty can be classified into four areas: **hidden, complicated, complex** & **chaos** • Each context has its own appropriate **leadership approach** • Managing “unk-unks” needs both **proactive** and **reactive** measures	The organisation needs to be developed to cope with uncertainty • **Vision** established • **Leaders** are in place and continuously educated • **Flexibility** understood and integrated in daily business • **Networks** built, maintained and expanded • **Feedback** (also negative) is actively asked and processed • **Mistakes** are **allowed**

When applying table 10 to the interview data, the following recommendations can be deducted specifically for the Finnish e-mobility ecosystem:

1. Establish a reliable and robust, **integrated Finnish vision** of e-mobility
2. Have leaders in place per company, organisation and (innovation) network
3. Continue building networks, maintain and expand them
4. Continuously ask for feedback on your products and services, from all your stakeholders (not only customers)
5. Be more active than reactive, make mistakes fast and learn fast from mistakes

For more specific actions, see table 7 on page 19.

7.2. Organisational Development Towards New Business Models

The current interview data suggest that several companies are in the process of changing their business models, or adding new ones. The new role “EMO” is one of the cases in which several companies will have a joint business model. Taking the elements of a business model into account (see figure 7, page 8), the proposed profit models, as well as the delivery systems remain rather sketchy. So how can companies develop towards new business models if these are yet ill defined? In the context of

organisational development it makes sense to keep the business system flexible, as suggested in table 10. In the context of Finnish e-mobility, the following guidelines can be deducted:

Build a networked delivery system:

1. allocate the division of labour between the firm and network partners. Consider outsourcing, crowd-sourcing, internal procurement or collaboration (alliances)
2. integrate the activities, products and services of (possible) partners

Develop the e-mobility learning system in your organisation:

1. Define, design and implement management practices and leadership supporting the new business processes
2. Design and implement effective communication and knowledge exchange and sharing practices, especially cross-organisational (including firm to firm).

When aiming for collaboration or markets abroad, a comprehensive development of the organisation's **service culture** is to be launched. The following collaboration competences may need an update or (re-) introduction to staff:

- Communication skills
- Cultural awareness and empathy skills
- Problem solving skills
- Willingness for continuous learning – see Ylitalo et al. (2006) for inter-organisational learning collaboration

Special emphasis here is on cultural awareness: the knowledge that other cultures are different also means that our own culture is "normal" only to us – but different, or even alien, to most other cultures.

7.3. Applying The Organisational Development Canvas

The canvas illustrated in figure 11 (page 11) should be regarded as an open tool for e-mobility organisations for planning their development activities and continuously check their implementation. SIMBe companies will recognise Osterwalder and Pigneur's (2010) Business Model Canvas as a means of collating data in structured interviews, thus they should feel comfortable in using such canvas.

A concrete guideline is to start with the value proposition and then continue towards the customer perspective area, followed by describing the revenue stream and cost structure development. Last not least the activity perspective reconfirms the value proposition and adjusts the cost structure. Several iterations may be needed to achieve a balance of all fields.

Note that the organisational development guided by this canvas is not to be confused with the business modelling a such. The emphasis in the Organisational Development Canvas is on making the business model *work*, not to *develop* it.

In the context of Finnish e-mobility, two issues need emphasis: networking and knowledge processes.

1. Networking has implications on all canvas areas, thus building networks and being aware of networks (how do they manifest themselves, how can they be described, how do they work) is essential.

2. Knowledge processes are linked to activity, product/service and customer perspective. Knowledge exploration (acquiring), sharing and exploitation (making use of it) need to be described, developed and implemented for each organisation and each business case.

Organisations may need more supportive research on networking and knowledge processes, which is planned for the Tekes EVE programme eSINi project.

8. Conclusions

In this report the current status of the Finnish e-mobility ecosystem was investigated from two angles: 1) the status of uncertainty in the ecosystem and 2) the organisational development in selected industrial companies. Based on the investigations, syntheses were provided responding to the following questions:

1. Based on the current uncertainties, which leadership and management actions should be taken?
2. Based on the observed organisational development, how will the e-mobility ecosystem develop?
3. Comparing the current uncertainties and the anticipated organisational development, which leadership and management actions are yet missing?

In the following I elaborate on the findings, divided into 1) research and managerial implications and 2) ideas on modelling the e-mobility business ecosystem.

8.1. Implications on Research and Business Development

There are two phenomena which are most prominent in this research: uncertainty and the need for networking. I will elaborate on both in this section.

Regarding **uncertainty**, additionally to the description in chapter 4, but also concluding from chapter 4, I would like to highlight both intelligence gathering and leadership under uncertainty (see section 7.1 and table 7 on page 19). In the context of Finnish e-mobility, intelligence gathering needs to speed up and needs to be better coordinated and structured. The uncertainty status shows that there is an urgent need to tap into collective knowledge. Thus, a shared intelligence platform is needed. It could be fed by research institutes, Tekes, Finpro and companies and set up by, e.g., a technical university or VTT. Research needs to be done on what information is to be collated and what rewards are envisaged. Crowd sourcing may work for a limited time span, most likely in the beginning. Second, there will be a need for concurrent and continuous improvement of explicated knowledge. We need to iterate for next years, both in the individual research disciplines of e-mobility, as well as make the interdisciplinary knowledge converge, so that it starts to make better sense from a scientific and business point of view.

To enable the convergence, we need to establish a reliable and robust, **integrated Finnish vision** and mission of e-mobility. It must be based on shared values and it is the *conditio sine qua non* for a better and deeper description of Finnish core competences and value offerings in e-mobility. This is a true leadership task, which should not be underestimated in effort needed nor impact.

Finally, when analysing the potentials associated with **networking**, there is a need for an agreed business ecosystem description. The reason is that stakeholders need to be able to find each other (even and especially the stakeholders outside of the transport paradigm), identify possible roles in the ecosystem and follow the evolution of the ecosystem. Thus, a network topology (shape and structure) is to be described and in a next (more difficult) step the emergent properties: new attributes of a whole that arise from the interaction and interconnection of the parts (Christakis & Fowler 2009). This description should be on generic level, Finnish level and exemplary international level (one or more countries).

8.2. How to Proceed on Modelling?

In order to speed up, I suggest a parallel, concurrent approach: we should 1) describe, test and implement promising, concrete value chains and 2) describe the extended e-mobility business ecosystem. This would include obviously aspects of smart grid and smart transportation.

For the ecosystem, I suggest the following:

1. Develop and agree visual rules to describe the business ecosystem. Meanings of – at least – the following need to be clarified and agreed upon: colours, links, arrows, shapes and directions
2. Describe and agree on roles for public actors
3. Compare and integrate the “best of both worlds”: Finnish ecosystem to foreign ecosystems and E-Mobility ecosystem to, e.g., smart grid and transport ecosystems
4. Continuously improve (iterations create fast learning)

9. Discussion

9.1. Fulfilment of Objectives

The aim of this particular report was to prepare SIMBe participants to develop their own organisations towards sustainable e-mobility network collaboration. This aim was fulfilled by describing the current status of the uncertainty within the Finnish e-mobility ecosystem (chapter 4), the current and anticipated development (chapter 5) and managerial guidelines (chapter 7), based on theoretical frameworks for organisational development (section 2.3). An additional chapter (6) elaborates on anticipated e-mobility network collaboration (in particular on possible value chains), as suggested by the interviewees. The research questions as stated in section 1.3 have been answered.

9.2. Methodology Performance and Validity of Research

As stated before, a comprehensive overview of the e-mobility field does not exist – neither specifically in Finland, nor for any other country. The research has proven the hypothesis that e-mobility in Finland can be considered as an emerging, dynamic ecosystem. Thus both scientific knowledge and organisations (businesses) are developing.

The workshops and individual interviews performed confirmed the uncertainty within the e-mobility ecosystem, however they also showed that companies try to develop their own organisations, as well as their collaboration and joint business models (e.g. regarding the EMO). The qualitative, participatory research approach allowed to extract meaningful data and stimulated interviewees to elaborate more than planned on anticipated value chains. This is regarded as positive. The data also allowed to deduct concrete managerial guidelines from existing theories. A positive side effect was the confirmation of Immonen's (2012) guidelines for organisational development. Originally developed in the media business field, they proved to be generic enough to be applied to the e-mobility ecosystem.

The methodology allowed to fulfil the report's objectives through answering the research questions (see section 1.3). However, there is continued need for modelling the e-mobility business ecosystem, as outlined in section 8.2.

Concerning validity, in the following I check for description, interpretation and theory, as well as bias, reactivity and finally generalisation.

Description applies to the queries, workshops and interviews performed. Whereas the workshops minutes were validated by attendees and the interview notes validated by interviewees, the queries could not be validated for reasons of privacy protection. All changes or interpretations to the original data have been commented within this report.

Interpretation errors were addressed by making this document available to the SIMBe organisations for more than eight weeks for comments and taking these into account. This may also address bias.

The data gathered can be interpreted in many ways, with the theories presented being one way the author has chosen. The intention was to cover a broad theoretical spectrum, and also to include some novel research. Personal values (and competences) of the author may have played a role in chosen theories. The same applies to bias, which is towards a research view of organisational development and organisational collaboration. The reader should also keep in mind the researcher's interest in knowledge processes. Still, the research angle has been clearly stated, so there should not be a hidden bias.

I tried to avoid reactivity by feedback (see above) and peer reviewing and by collecting rich data through various methods (query, workshop, interviews). The number of interviews is limited to three, but the amount of data per interviewee is rather rich (up to 3 A4 pages of text).

Last not least generalisation is used when making inductions based on the three interviews, however they are augmented by queries and workshops.

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