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Espoo as an innovation hub in 2020

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Introduction

The City of Espoo has a long tradition of being progressive in city planning. Tapiola became famous in the 1950s as the Garden City; Otaniemi is a global hot spot in information and communications technology; and the Keilaniemi area has been purposefully designed to accommodate the needs of large multinational companies so that their global headquarters can efficiently function in the area.

Espoo has in its strategy decided to continue as a frontrunner in the field of urban planning. This report provides some insights into the work that now is going on in order to achieve a leading position among the world's most attractive regions.

The work described in the following presents how the Espoo innovation strategy is implemented, and how this relates to such concrete activities as the planning and building of the metro line as well as other important investments in the infrastructure.

To deal with the needs of Espoo in the future, research has been

carried out to imagine what could happen over the next ten to twenty years. This has taken place in a project called Eco Urban Living (for more information, see www.eco-urbanliving.com). Ideas and thoughts have been collected from a wide range of participants during a series of workshops, by conducting a number of face-to-face interviews, through web-based questionnaires, and by doing extensive background research on how urban areas are changing and how this may impact the future outlook for Espoo.

The scenario process developed in the context of the Eco Urban Living project had three parallel objectives:

- Engaging a larger group of professionals to discuss, debate, and get engaged in the process of shaping the urban environment of Espoo for the future.
- Generating facts and opinions for the decision making around the infrastructure and related development in Espoo.
- Summarizing the results from the scenario process into a written report that could serve as a means to extend and continue the discussion also outside the small group of professionals that was engaged in building the scenarios.

The report has four chapters. This first chapter presents the starting point of the City of Espoo and its partners under the circumstances of societal transformation and innovation. Chapter two highlights some of the most important mega-trends affecting the future of innovative cities like Espoo. Chapter three outlines four scenarios developed in the project. Chapter four concludes by synthesizing the implications from the scenarios and presents what is needed for the T3-area to be an internationally attractive innovation hub in the future.

1.1 THE VISION OF THE CITY OF ESPOO FOR 2020

The City of Espoo has identified three pillars for its own strategy: being a caring city, actively promoting environmentally friendly solutions, and positioning itself globally as a leading city for innovation. Subsequently the 2020 vision for Espoo is formulated as follows:

> **Espoo is a frontrunner. Espoo is a place where it is good to live, learn, work, and be an entrepreneur.**
>
> Espoo is a city embracing different values and cultures, where an open and encouraging atmosphere prevails. The historical roots of Espoo, its versatile nature, closeness to the sea, enjoyable living areas and good connections form a safe city environment structured by its different centres.
>
> Espoo is a city with shared and individual responsibilities. Espoo provides a good context for the mental and physical well-being of its citizens.
>
> Espoo has high quality services and versatile possibilities for recreation and hobbies.
>
> Espoo as a part of the capital region is globally networked as a competence hub for technology, education, culture, sports, research and innovation.
>
> Espoo is a leader in mitigating climate change.

In line with its strategy and vision Espoo city management has been actively networking with key stakeholders in the city to establish new initiatives that will support the objectives that are stated in the 2020 vision. One of these activities is related to the development of the Otaniemi – Keilaniemi – Tapiola – Suurpelto area as an area that will integrate science, culture, and business to provide an attractive innovation environment for creative individuals and leading companies.

The formation of Aalto University in 2010 was a merger of three universities: Helsinki University of Technology, the Helsinki School

of Economics, and the University of Art and Design. These universities represent three separate competence areas: technology (tekniikka in Finnish), business (talous in Finnish), and art (taide in Finnish). This gave birth to the notion of T3, embodying the three disciplines forming the new innovation university, Aalto. City planners in Espoo realized during spring 2009 that the same three subjects could also be identified as characterizing features in the vicinity of Aalto University.

Otaniemi, the core campus area, represents technology or science (tiede); Keilaniemi, the area where for example Nokia, Kone, Fortum and Neste Oil have their headquarters, represents business (talous); and the Tapiola area, with Espoo Cultural Centre and the Espoo Museum of Modern Art, is the cultural hub of the region (taide). This way the notion of T3 was adopted into the city planning as a unifying term for regional development taking place in this particular area, or in its close vicinity.

As it was recognized that the development of the T3-area would enable Espoo to create a lot of engagement around the thrilling concept of combining science, business, and culture, it was also seen that such discussions often lack the connection with the operational daily matters going on in the city. One such very concrete issue was the expansion of the metro network.

The extension of the metro line, West Metro (Länsimetro in Finnish), from Helsinki to Espoo had been on the table ever since the metro was introduced in the early 1980s. The development of the public transport system from Helsinki to the west had been studied on several occasions. The design process for the metro extension was finally launched in March 2007, and the construction of the West Metro was approved by the Helsinki and Espoo City Councils in May 2008. Construction work began in November 2009, and the objective is for the extended metro line to be open for traffic at the end of 2015.

At this stage the West Metro is planned to run from Ruoholahti through Lauttasaari and the T3 area all the way to Matinkylä.

For the City of Espoo the simultaneous start up of two such significant undertakings, Aalto University and the construction of the West Metro, provides a unique opportunity to take a more holistic perspective on its city planning. Subsequently, discussions were initiated during spring 2009 about the possibility of forming a coalition to develop the T3-area into a global innovation platform, using the large infrastructure development projects as a catalyst.

Very early on in the discussions it was realized that the driver should not be the city itself, but there was a need to get companies to actively support the work.

In October 2008 the City of Espoo launched cooperation with Fortum, the energy company, to enable the wide-scale adoption of electric cars in the city to reduce traffic emissions. Both Fortum and the City of Espoo want to actively mitigate climate change and work towards a low-carbon society. A central goal of the cooperation is thus to pave the way for the transition to environmentally benign motoring.

The City of Espoo wants to be an active promoter of environmental technologies. The cooperation with Fortum was viewed by Espoo city management as a way of providing an opportunity to make the T3-area a demonstration area for electric cars, involving other companies as well.

Subsequently, in June 2010 it was announced that the City of Espoo, Fortum, Nokia, Valmet Automotive and Synocus had agreed to combine their efforts to develop the T3-area into a demonstration area for electric cars. The press release stated that this initiative, Eco Urban Living, would build a better understanding for how new, more eco-conscious requirements have to be taken into consideration in city planning. The collaboration agreement was the first in a series of agreements that the City of Espoo intended to form to create a vivid Living Lab environment to maintain its position as a forward looking eco-conscious city. The Eco Urban Living initiative works closely with Aalto University and VTT, The Technical Research Centre of Finland, to enable the T3-area to become a leading competence center for electric vehicles. The initiative is also expected to speed up the efforts related to the cooperation between Fortum and Espoo.

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When signing the agreement, Marketta Kokkonen, Mayor of Espoo commented: "*The Eco Urban Living initiative is a natural consequence of our strategy to strengthen the T3-area. Our ambition is to increase the attractiveness of the T3-area as a living area and as a vibrant and pleasant urban centre for science, business and culture and to improve the operating environment for the high-tech cluster of expertise in the area*."

The Eco Urban Living initiative is expected to engage citizens, researchers, company representatives and city officials in a multitude of development activities. Consequently, during the second half of 2010 the City of Espoo and Aalto University agreed to work together with RYM Oy, the Strategic Centre for Science, Technology and Innovation for innovations in built environment, to initiate a new joint research programme. This programme aims at developing the T3-area into a regional innovation system with a number of concrete demonstration projects which, collectively, will transform the whole area into a major innovation hub. The orchestration approach that is piloted in Eco Urban Living will be taken as the organizing approach also for collaboration with RYM Oy in order to identify and co-design the individual development initiatives together with all interested stakeholders, such as companies, universities, and governmental representatives.

1.2 AALTO UNIVERSITY AND WEST METRO AS CATALYSTS FOR CHANGE

When Aalto University was established in 2010, the combination of three universities was seen to open up new possibilities for strong multi-disciplinary education and research. The ambitious goal of the new university is to be one of the leading institutions in the world in terms of research and education in its own specialized disciplines. It also aims at providing high-quality research and education and creating an internationally attractive environment for learning and research.

Aalto University will focus its research on major global issues. New research environments often evolve into larger research programs or units through themes that require a cross-disciplinary approach.

Aalto University also represents a new governance model, compared to the way its original three individual universities were organized. Aalto University is a foundation- based university, with an independent board, chaired by Dr. Matti Alahuhta, the CEO of Kone and with Dr. Anne Brunila, Executive Vice President of Fortum as one of the board members. In this respect the board of Aalto University has strong links with the business community in Finland.

The City of Espoo actively supports Aalto University and has, for example, purchased the previous Police Academy property from Senate Properties. This property will be developed to provide accommodation for five hundred students and researchers. This new area called Aalto Village will be developed in close cooperation between the City of Espoo, the Foundation for Student Housing in the Helsinki Region, Aalto University Student Union, and Senate Properties. A key objective is to get the students involved already in the planning and design phase of this new project.

In addition the Ring I road will be put into a tunnel between Tapiola and Otaniemi to improve the connections between these two districts. The current site of the road will be used for housing construction to cater for the needs of the increasing number of students and university faculty. This site will have a total gross floor area of about 150,000 m^2 of which one-third will be reserved for housing and the rest for offices.

The West Metro project in turn is bringing additional construction activities in conjunction with the three metro stations: Keilaniemi, Otaniemi, and Tapiola.

The Keilaniemi area, which originally was developed as an office park, will through the construction of the Keilaniemi metro station also become a residential area. The construction company SRV Group has a planning reservation for a housing area above

The new metro line yields residential construction in Keilaniemi. The four planned housing towers can be seen in the back.

the Karhusaarentie-road. The development is designed so that the Karhusaarentie-road will be covered with a deck. In addition to the apartment houses, a wide green area will be set on the deck. The area includes roughly 50,000 square meters of residential building volume. The plan includes four 27-28 storey buildings with a total of 370 apartments.

As a by-product of the Keilaniemi development project, Espoo will cover the Ring I road to get a better access from Tapiola to Keilaranta waterfront. This will enliven both areas. The project is also expected to bring various services to the waterfront. The service supply will also be widened with shops in the lower floors of the apartment buildings.

The main part of construction activities in the T3-area for the period 2010-2020 will take place in Tapiola. The aim is to increase the gross floor area by 400,000 m^2 in the Tapiola major district. This translates into a population increase of 10,000 people in the area. The

business center will be significantly expanded, and there are plans to build an underground car park for 1,500 cars in connection with the metro excavations.

To strengthen the cultural offerings of Tapiola, the City of Espoo decided in 2009 to share financial responsibility for the old cinema Kino Tapiola, established in 1955, but put into receivership in 2008. Kino Tapiola was renovated, and reopened in August 2010 to co-host the annual film festival Espoo Ciné. This further strengthened the position of Tapiola as a venue for a broad range of cultural services. The construction plans for Tapiola also include the building of a completely new theatre facility in Tapiola.

For the future of the T3-area it is important that the new ideas can be transformed into concrete actions. The goal has to be that the development will engage people, leading to significant innovations that will have a positive impact on the society and improve our future lives.

1.3 SOCIETAL TRANSFORMATION AND INNOVATION

The growth of the industrial society was based on satisfying the basic needs of the individual. As society became wealthier, the demands of its people shifted, but there were still new needs that had to be satisfied. The environment was considered as an abundant pool of physical resources. Lately two drastic shifts have challenged the industrial logic. Firstly, the most affluent nations in general have reached a standard of living where the great majority of their population has their basic needs satisfied, although there still are a large number of nations with growing populations and constant poverty. Secondly, the environment is increasingly becoming a constraint, and the scarcity of critical natural resources is starting to more and more effect the prospects of different nations. In many cases those resource constraints are hitting the poorer nations more severely.

These two simultaneous phenomena, a growing disparity between

nations and increasing environmental problems, are threatening the world order in the long term. How to deal with these issues has not yet been resolved. Political elections during autumn 2010 in Germany, Sweden, and the United States have shown that there is currently a tendency for populist movements to prosper. This seems to imply that we are facing a phase of societal uncertainty. At the moment there is no clear universal vision for how to globally deal with the apparent dilemma of combining growth and sustainability.

"To make the world a better place there are two main strategies. One is to change the behaviour of people, so that we all contribute to diminishing the negative impact we have on the environment. The second is to change the way we deal with the limited resources we have at our disposal. Both these strategies ask for innovations."

To make the world a better place there are two main strategies. One is to change the behaviour of people, so that we all contribute to diminishing the negative impact we have on the environment. The second is to change the way we deal with the limited resources we have at our disposal. Both these strategies ask for innovations, social innovations, technological innovations, and combinations of the two. It is however clear that due to the population growth, and the ambition of developing countries to increase their standard of living,

we need to find technological innovations to tackle the resource constraint problems. These problems, also called grand challenges, are unfortunately normally not addressable through the ingenious invention or influence of one single outstanding entrepreneur. They ask for systemic collaboration involving multiple competences, and will take years or decades before they achieve their full impact in society. Such behaviour is not what the stock market is primarily rewarding. Thus far most of western entrepreneurial talent has been devoted to satisfying individual needs on the highest level of personal consumption. The Vanity Fair 2010 list of the most influential people in the information age is a good example of this.

Vanity Fair puts Mark Zuckerberg of Facebook on top of the 2010 list, with Apple's CEO Steve Jobs as number two. They both represent companies that provide possibilities for the individual to better enjoy information technology for their personal satisfaction. Number three on the list is the triumvirate of Google: Sergey Brin, Larry Page, and Erik Schmidt. Google is somewhat different. Whereas Apple and Facebook are driven by strict business principles, Google has at least in its external communication broadened its view on what its mission is. This has led to some sarcastic comments by competitors, as reported by Vanity Fair in October 2010:

Steve Jobs has characterized Google's motto, "Don't be evil," as bullshit. Jobs reportedly felt betrayed by his erstwhile allies for their muscling in on the lucrative mobile-devices business, which is believed to be the future of computing. Critics predict that Google's Android phones might eclipse the iPhone by 2012. It is war between the two companies now, a surprising shift from not long ago, when Schmidt sat on Apple's board, Brin and Page looked to Jobs as a mentor and role model, and Brin and Jobs would take walks together in the Santa Cruz Mountains.

An interesting question is to what extent the experiences from the information age can, and will, be transferred to benefit the more profound challenges of our planet. Bill Gates has shifted his attention from Microsoft to work through the Gates Foundation. He tries

to address extreme poverty and poor health in developing countries. The Gates Foundation sees its role as making bets on promising solutions that governments and businesses can't afford to make.

In the same way Sergey Brin and Larry Page have started multiple initiatives that go beyond the core business interest of Google. They have worked on a car that can drive itself using video cameras and radar sensors, expected to make vehicles safer and reduce fuel consumption. Brin is also an investor in Tesla Motors, a producer of electric cars. In October 2010 Google invested in the Atlantic Wind Connection project, which plans to use wind turbines 350 miles off the coast of New Jersey and Virginia to bring energy to 1.9 million homes on the east coast of the United States. Google will provide 37.5 percent of the equity of the initial development stage of the project, which is estimated at about $5 billion. Google says that the reason behind such investments is that the company wants to solve really big problems using technology. Energy supply and car safety are such big problems.

As the Atlantic Wind Connection project illustrates, when technology is used to address a particular big problem or grand challenge, one has to deal with physical matters. Where to pilot becomes a key issue. Location matters. A good example of how the insight about the importance of selecting the appropriate locations is the demonstration programme for electric vehicles in China. The Chinese government started with an initial list of thirteen cities in the beginning of 2009. This list was updated to include another seven cities in June 2010. Two months later five more cities were added. By the end of 2010 the demonstration programme spanned altogether 25 cities. At the same time these efforts also attracted resources on a global scale. So, for example, the Argonne National Laboratory of the U.S. Department of Energy hosted a US-China Electric Vehicle and Battery Technology Workshop August 30 – September 1, 2010. In November 2010 the city of Shenzhen hosted the 25th World Electric Vehicle Symposium and Exposition, which is recognized as the premier event for

academic, government and industry professionals involved in electric drive technologies.

In the same way as China is actively promoting demonstration projects, Europe is also seeing support activities from governments trying to keep up with the competition. In October 2009 France launched the "battle of the electric car" as it unveiled plans to invest €1.5 billion on infrastructure for the two million electric and hybrid cars it wants on the road by 2020. Ecology Minister Jean-Louis Borloo, flanked by top executives from French carmakers Renault and PSA Peugeot Citroen, defended the initiative by stating that: "*No player can take the risk alone, but if all the actors take it at the same time, that works*." The aim is to "*make the French energy and car industry a world leader*," and reduce CO2 emissions. - The project covers everything from industrial research, making batteries, producing clean cars and building a nationwide network of battery-charging stations. The scheme is part of President Nicolas Sarkozy's "green plan" for France.

The French state will help build up the battery production sector by contributing €125 million from its strategic investment fund to the overall cost of €625 million for a Renault battery plant at Flins, near Paris. The state will also give Renault a loan of up to €150 million to build an electric car factory, also in Flins. Support will also be made available for other electric carmakers such as Peugeot or Daimler's Smart division. Joint purchases by state authorities and major private companies will see orders for 100,000 electric vehicles by 2015, according to the plan.

Not only national governments, but also individual cities have embarked on this route. London announced in February 2010 that it had secured £17 million funding for UK's largest electric vehicle charge point network. However, in November 2010, Mayor Johnson informed the public that part of the funding previously being promised by the City of London was to be reduced due to the austere times. Still the problem is on the table: London currently suffers from

the worst air quality in Europe and according to the Mayor electric cars "*will deliver considerable benefits to the environment by improving air quality, cutting emissions and reducing noise pollution*."

The City of Espoo has a major advantage compared to London as a demonstration city of electric vehicles as the charging infrastructure largely is in place due to the electricity poles already available to heat the engines of cars during winter time. This advantage also illustrates how geographical and historical factors are making different locations more or less equipped to take the lead as test beds or demonstration areas for new technology addressing grand challenges.

The work carried out relating to the Eco Urban Living project has been looking for alternative ways that the City of Espoo could emerge as a leading platform for innovation in this new phase of global transformation. For that purpose four different scenarios have been built. They will be presented in Chapter 3. But before going into the future that we may face ten years from now, some of the important drivers that need to be considered will be introduced in the next chapter.

2

A world in transition

When Lehman Brothers filed for bankruptcy on September 15th, 2008, the global political and financial system entered a period of uncertainty that had not been witnessed since the 1930s. Two years later one outcome of the financial crisis is that the western world is significantly weakened and China has relatively strengthened its position. This may have come as a surprise for many westerners, but seems to have been well anticipated by the Chinese leaders. An example of this is the way China's Ambassador to Finland, Ms. Ma Keqing reflected on the political and economic situation at the annual meeting of the Sino-Finnish Trade Association on April 3rd, 2009.

In her speech the Ambassador presented the Chinese outlook, including the budget figures predicting that the Chinese economy would grow 8-9 percent during 2009. Considering the gloomy financial situation at that time, many of the participants questioned what the Chinese government would do if the growth targets would not be

reached. A reason for caution was for example the fact that the same week U.S. President Obama had just laid out the framework for how to bail out General Motors from bankruptcy, making available about $30bn of federal assistance to support GM's restructuring plan. Ms. Ma replied in a very determined way that the growth target was to be delivered by the Chinese government. This was not something that was open for discussion; it was a plan that would happen.

At the same time as both the United States and Europe were in a severe recession the Chinese government could use its surplus to mobilize a stimulus package that boosted its economy so that the financial targets were met. When the year 2009 ended the Chinese economy had grown by 8.7 percent.

In November 2010 it was predicted by the Conference Board that the Chinese economy could overtake the US by 2012 using purchasing power parity, which takes into account the cost of living in different countries. At market exchange rates, China's economy is less than 40 per cent of the size of the US. In absolute terms some analysts have predicted that China will become the biggest economy of the world in the early 2020s. China is already now the biggest energy consumer of the world.

For both Chinese and Western leaders the new situation is difficult to deal with. In strict terms China is still a developing country. At the same time China is the second biggest economy, and the fastest growing consumer market in the world. China is also a key player when finding solutions to the two major grand challenges of energy consumption and climate change. Simultaneously the United States is grappling with continuous high rates of unemployment and a large budget deficit, which makes it extremely difficult to address the depressed state of the economy.

For Finland and Espoo this global change is also very visible. In January 2010 President Tuula Teeri of Aalto University and Vice President Jiang Wo of Tongji University signed a Memorandum of Understanding to establish the Aalto Tongji Design Factory in Tongji

University Campus. The City of Espoo organized an Espoo day at the Shanghai World Expo in May 2010. An outcome of the presentations was that Espoo and Shanghai city representatives agreed to evaluate possibilities to enter cooperation in the field of elderly care.

This increased activity resonates well with the already strong involvement in China by leading Finnish companies like Nokia and Kone. To complement this with better possibilities also for the small and medium sized enterprises to enter the Chinese market, the City of Espoo has been an active party contributing to the establishing of the China-Finland Golden Bridge Innovation Center in Otaniemi.

So if the global world order in politics has seen an increased influence from Asia, and especially China, another phenomenon affecting the long term perspectives is the question of sustainability. This notion has for long existed in the strategy vocabulary of businesses. Lately it has also become more visible in the operational field. Water shortages, poor air quality in big cities, and soaring energy consumption have created a rapidly growing market for clean technologies. An area where this has recently become very obvious is the automotive sector.

In the United States the Obama administration has earmarked roughly $5 billion of stimulus funds to help American automakers develop alternative vehicles and to install charging stations in selected cities. The White House predicts that the U.S. will have the capacity to produce 40% of the world's advanced vehicle batteries by 2015. China in turn has pledged roughly $17 billion to the effort of stimulating technology development for new energy vehicles. That total includes funds for R&D and the installation of charging stations as well as subsidies of as much as $8,800 to electric-car buyers in 25 cities. The provincial governments will chip in billions more, offering automakers cheap land, and consumers additional subsidies.

This now seems to develop into a race between the United States and China regarding who will actually control the electric car industry in the future. China is setting an industrial policy to dominate the

industry, whereas the U.S. government is largely depending on the free market to develop and launch the technology.

Global environmental concerns and uncertainty relating to the immediate future in respect of world politics and the economy also affect Finland. The EU membership has forced the Finnish government to accept EU-level decisions taken to protect the Euro as a common currency. In addition to short-term worries Finland also has to deal with its own more long-term problems. A rapidly ageing population, continuous restructuring of traditional strong industries, and difficulties in fostering entrepreneurship and identifying new growth possibilities are some of the key challenges.

The Finnish innovation system is now in a transition period, looking for new ways. The frameworks and tools that successfully supported the rapid growth of the information and communication technology cluster have to be modified to address the new era, where knowledge and services are as important as technology.

This new innovation paradigm has been called Grand Challenge Innovation. It argues that for large scale systemic innovations to take place, there has to be close cooperation between industry, the public sector, and research. The driving force in many of these types of in-

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novation undertakings must in the beginning come from the public sector, because the complexity of putting together a large network of different actors needs a clear customer focus, and often this customer can initially only be found in the public domain. A good example of such an initiative is the introduction of electric cars. For electric cars to take off, changes are needed in the electricity grid, in the transportation planning system and, in addition, a lot of new technologies have to be developed. No single company will be prepared to step in and start its own development part without having some form of guarantee that the market will come. A public sector intervention, e.g. in the form of commitments for either direct procurement of products for use by public organizations, or incentives in the form of tax reliefs or subsidies, will be needed for the necessary collective efforts to be mobilized.

In the case of electric cars it isn't easy to build an electric-car infrastructure. Vehicle makers must work with many different players – from the utilities, which will provide the power and smart-grid networks, to local governments, which will provide public charging stations. Standards must be set. China, as an authoritarian state, is well positioned to help make the electric car a reality. "*China's government is supporting electric-car technology more than any other country on earth*," says Kevin Wale, head of GM China Group[1].

The significant interest for electric vehicles internationally, but also here in Finland, was one of the reasons for the City of Espoo to take the demonstration needs for electric vehicles as the catalyst when implementing its own innovation strategy. However, in the long term it is not enough that the public sector, at local and national level, and the corporate world can agree on collaboration around a new initiative. In the long term the ultimate test will be how the consumers will behave. Consequently innovation activities are becoming increasingly open-ended processes. The notion of open innovation has existed

1 http://tech.fortune.cnn.com/2010/10/19/china-charges-into-electric-cars/

for quite a while, and is more and more practiced through different variants. Living labs, test beds, demonstration projects, prototyping, and design factories are examples of different forms of tools and frameworks which embody this perspective on innovation. This has also been a very strong factor influencing the design of the innovation strategy of the City of Espoo.

Henry Chesbrough, who coined the term open innovation, has stated that companies can build stronger business models if they assess their own capabilities and the context for a co-development partnership. Having worked with Procter & Gamble, he and his colleague Kevin Schwartz have observed that in order to put together a network of external partners it takes 1/2 the time of the first deal to put the second deal in place. The third deal takes 1/3 of the time, and so on. And the subsequent deals are not only faster, they tend to be more successful. But it is also important to notice that you don't get to do the second or third deal unless you have done the first one. Companies pursuing open innovation are subsequently continuously trying to learn how to build better collaborations with others. Establishing collaboration teams with key customers is not easy to do, however, because there are tensions that arise in who owns what Intellectual Property. The best partnerships require both sides to make accommodations in order for the potential from the collaboration to be realized[2].

Open innovation relates both to collaboration between enterprises, but also to active involvement of end users. One company actively involving customers is Apple, which has a high degree of strategic sensitivity built into its internal DNA. This active engagement with customers is not only restricted to internal discussions. The increasing popularity of Apple's Retail Stores, which millions of people visit every week, and the Apple.com website enable Apple to directly reach

2 Chesbrough, Henry, and Schwartz, Kevin (2007). INNOVATING BUSINESS MODELS WITH CO-DEVELOPMENT PARTNERSHIPS. Research Technology Management, Vol. 50, Issue. 1, p 55

more than a hundred million customers around the world in innovative ways. This keeps the outside perspective highly present in Apple, day in and day out.

So three different perspectives should be simultaneously in mind when looking for possibilities for true innovations: the individual customers, the corporations that need to work together to enable the offering sought for by these customers, and the public sector in a supportive role to enable the collaborative innovation process to get started.

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In the following some key observations affecting these core elements of innovation will be presented. We will start by reflecting on politics and economics as factors shaping the room for maneuvering in the public domain; then we will address the issues of technology and grand challenge innovation as the key features provided by the corporate world; and finally we consider social networks and sustainability from the perspective of the individual customer's or citizen's perspective.

2.1 PROVIDING POLITICAL DIRECTION

The aftermath of the financial crisis has created a situation where the political landscape is highly divided. There seems to be consensus that one cause of the crisis was that the growth was not sustainable. In many countries growth was built on debt and speculative bubbles. To address this problem, governments had to enter massive spending programmes. How to exit these programmes divided Europe and the United States in 2010. Germany and the UK have agreed to enforce tough spending curbs. For example Germany will cut €80bn of its fiscal budget over four years. The United States on the other hand announced in October 2010 that it will pump $600bn into the American economy in a new round of quantitative easing.

Another difficult question for the Euro zone members is how to deal with the weakest countries. As Greece was joined by Ireland to seek for assistance, this put further pressure on the other Euro countries, and increased the uncertainty relating to the capacity of the European Union to handle its own internal crisis. The ambitions of Germany to determinedly push for tougher sanctions on countries not living up to their commitments are difficult to put in place, when at the same time the market forces make the government take quick decisions, which basically are telling the opposite.

Currently the European currency union hence finds itself in a situation where it is forced to perform bail outs of member countries against its own regulations. However, many doubt the effectiveness of these aid packages, as they are seen as only postponing problems rather than solving them, and thus severely injuring the possibilities for the revival of the Union in the long term.

Essentially, the present crisis highlights the structural deficiency of the European currency union. Economies of very different magnitude and state of health have been brought together under the same currency, though the system lacks a common financial policy and efficient redistribution of resources. Hence countries with financial

troubles cannot devalue themselves out of the crisis but face deflation and debt crises instead.[3]

There is no going back to the time before the financial crisis; that much is clear to all parties involved. The present crisis will force the Euro Zone to reconsider its structure and working principles. It is equally clear that, based on the measures taken, Europe can either propel itself into greater economic and political significance or oppositely downgrade its own weight globally.[4] There is a need for more tightly coordinated economic policies, with an inbuilt mechanism for solving crises, as well as a European leadership understanding of the importance of tighter collaboration in order to achieve global success.[5] So far no major agreements have however been reached among the member countries and in the meantime the debt crisis continues. It is presently feared that the debt failure of more countries could be the beginning of the end for the currency union,[6] and it has even been suggested that the failure of the EMU might mean the end of the European Union itself.[7]

So far Finland has managed to handle its finances without imminent risk of an excessive debt burden. However, if bail outs of more EMU member countries continue, Finland will risk credit losses if some of the loans are not paid back. This would in time be felt in domestic pensions and public services.[8] Similarly, extensive capital

3 Eurooppa korjaa Irlannin purkalla ja klemmarilla, http://www.talouselama.fi/uutiset/article536197.ece

4 NY Times: Contemplating the Future of the European Union, http://www.nytimes.com/2010/02/14/weekinreview/14alderman.html

5 NY Times: Discussions on the EU's future, http://www.nytimes.com/2005/06/15/world/europe/15iht-voices.html

6 Kolme askelta – ja euro on mennyttä, http://www.taloussanomat.fi/kansantalous/2010/11/14/kolme-askelta--ja-euro-on-mennytta/201015794/12

7 Van Rompuy: Koko EU:n tulevaisuus koetuksella, http://www.taloussanomat.fi/ulkomaat/2010/11/16/van-rompuy-koko-eun-tulevaisuus-koetuksella/201015934/12

8 Talouselämä- Eurosta tuli pakkopaita, http://www.talouselama.fi/paakirjoitus/article393324.ece

"For Finland it is important to be able to divide attention between the urgent issues that have to be handled due to the EU-membership, and the important issues that provide the country with long-term competitiveness. In a situation like this, the role of progressive cities like the City of Espoo becomes important."

flight from EU countries would also injure the Finnish banking system and the economy.

The financial crisis has also affected the domestic political landscape in Finland, as in many other European countries. As European politics has been severely handcuffed by the financial reality, citizens and also national politicians have become increasingly disillusioned with, and more critical towards, the European Union. The notion of "European principles" has suffered a severe blow, with previously agreed regulations and treaties (e.g. the Stability and Growth Pact) being disregarded in the light of financial difficulties. This has promoted the growth of EU- critical, populist political parties in several European countries. Similar dissatisfaction with the economic situation has also stimulated the growth of the Tea Party movement in the United States.

When the financial crisis started, one of the main theses was that the public domain would have to take a stronger regulatory stance towards the financial markets. By the end of 2010 the political maneuverability both in the United States and in Europe is still very limited. It looks like the financial sector is regulating the political domain more instead of vice versa.

From a development perspective this doesn't fare well. As the world is hungry for significant innovations to address the grand challenges, Europe is paralyzed due to its own internal problems. For a nation like Finland it is therefore important to be able to divide attention between the urgent issues that have to be handled due to the EU-membership, and the important issues that provide the country with long-term competitiveness. In a situation like this, the role of progressive cities like the City of Espoo becomes important, as they can complement the role of the national government in providing a political direction for the purpose of innovation policy making.

Anchoring innovation initiatives into broad commitment from companies, universities, research institutes and individual opinion leaders is a way to secure that such emergent strategies would properly work. So out of necessity open innovation then also becomes a tool for policy making. The challenge is how to get the message through in a highly politicized media era, where also media increasingly becomes not a counterweight to politics, but more of an extended arm of biased, often short-term political ambitions. In Finland this is still a minor problem, but in countries like Italy and the United States this is already now greatly affecting the political scenery.

The ultimate truth is that at the same time as the Western countries are suffering from indecisiveness and hangover from previous overconsumption, countries like Brazil, Russia, India and China are pushing ahead.

2.2 ECONOMIC IMPERATIVES

Both Europe and the USA face almost identical problems entering 2011: the slowdown of growth in an otherwise economically precarious situation characterized by varying degrees of unemployment, insecurity and left-over turmoil in the industrial and financial sector. Yet the two central banks, the European Central Bank and the U.S. Federal Reserve, have chosen very different measures to deal with the

problem. ECB, accepting modest growth and inflation levels, have continued with its policy of keeping the main interest rate at 1 % and refrained from further stimulation measures. The U.S. Federal Reserve on the other hand in the end of October announced its plan to purchase up to $600 billion of government bonds through June 2011.

Jean-Claude Trichet, the President of ECB, said that it is not normal for banks to be dependent on central bank funding, but also reported that he has complete trust in the decisions made in the United States and their guarantees that this won't artificially keep down the exchange rate for the dollar.

While the ECB does not engage in stimulation measures, the actions taken to save euro-countries in trouble are taking its toll on Europe. ECB was buying Irish bonds in order to stabilize the banking sector. However, these initial measures were not sufficient and stronger support was needed. After Greece and Ireland, the fear of further spreading instability rocks the Euro Zone and the European Union and strains politics. The question of whether Portugal and Spain are next in line causes insecurity[9].

The question of the stability of the global monetary system is also becoming more pressing as exchange rates have become a key topic for debate. The United States is criticizing China in particular for undervaluing its currency, arguing the China spends enormous amounts of money intervening in the market to keep the Chinese currency undervalued. During the first nine months of 2010 China had a trade surplus of more than $200 billion dollars with the U.S. At the same time the Chinese currency reserves had surpassed $2.6 trillion, more than double any other country.

The perceived problems of the financial system that have been debated in the wake of the financial crisis are centered around the questions of whether the banking sector can play according to its own

9 http://www.economist.com/blogs/charlemagne/2010/11/ireland_and_euro

rules, while governments clean up the mess and bailout, and how to make sure that the economic and financial system works in the interest of the common good. The possibility of making changes or imposing restrictions becomes a highly political matter, as were the bailouts with taxpayer's money[10].

Even if Finland as a small country cannot itself much influence the world economy, it was hit hard by the worldwide recession. Export volumes fell in 2009 by almost a third from their mid-2008 peak, reflecting the dominance of income-sensitive capital goods and exceptional exposure to hard-hit markets such as Russia. The well supervised and prudent financial sector however weathered the crisis fairly well.

When the OECD made its 2010 evaluation of the Finnish economy, the recommendation was that to restore sustainability Finland should show the same resolve as after the 1990s crisis. Finland needs to increase the duration of working lives, contain expenditures, and raise taxes on consumption and property. Fast-growing municipal expenditures need to be restrained, and municipalities should be encouraged to rely more on property taxes and less on income taxes. The municipalities' declining productivity should be enhanced by more ambitious mergers and structural reforms among local governments. Furthermore, the generous unemployment benefit system needs to be trimmed by both tapering and reducing replacement rates. To increase employment among older workers, the 2005 pension reform needs to be complemented by further reforms to improve incentives to work longer, including abolishing the so-called "unemployment pipeline", making disability pensions subject to stricter medical criteria and raising the minimum retirement age to 65[11].

These suggestions by the OECD indicate what is in the pipeline

10 http://www.nytimes.com/2010/11/14/business/economy/14view.html?_r=1

11 http://www.oecd.org/document/36/0,3343,en_2649_33733_44898980_1_1_1_1,00.html

for the near future. The recession catalyzed the need for significant structural reforms. The recent difficulties in Greece and Ireland have further increased the uncertainty and emphasized that the recovery is still quite fragile, even if the Finnish economy is expected to grow by approximately 3% in 2010 and only slightly less in 2011.

The economic context for Finland can thus be expected to remain the same for the next few years. The European Union will be a burden in respect of its internal problems, but at the same time individual countries within the EU will perform quite differently. Countries with strong export orientation, like Finland, Sweden and Germany, will be able to benefit from the Asian-driven growth, whereas countries in Southern Europe will continue to struggle. To what extent the Union and the Euro will stand the pressure from this imbalanced situation remains to be seen.

In the same way as the political agenda will benefit from sound innovation measures initiated through close collaboration between cities, corporations, and research, so will the economy benefit. Only through a strong economy can Finland grow and prosper. Maintaining a strong economy will be guiding the decision making over the coming years.

Fostering a climate of entrepreneurship and seeking for continuous rewards from innovations will be an indispensible part of this strategy.

2.3 MOBILIZING TECHNOLOGIES AND CAPABILITIES

Harvard Professors Pisano and Shih wrote in August 2009 that U.S. companies for decades had been outsourcing manufacturing in the belief that it held no competitive advantage. This they argued was not the case, because today's low-value manufacturing operations hold the seeds of tomorrow's innovative products. What those companies have been ceding is the collective operational capabilities that underpin new product and process development in the industrial sec-

tor. As a result, America has lost not only the ability to develop and manufacture high-tech products like televisions, memory chips, and laptops but also the expertise to produce emerging hot products like the Kindle e-reader, high-end servers, solar panels, and the batteries that will power the next generation of automobiles[12].

Intel ex-CEO Andy Grove had earlier suggested that the US government should consider organizing an industry council – like the World War II Production Board – to get an adequate supply of batteries for U.S. electric cars. He proposed that a government-owned foundry organization should be established to supply the first few million batteries, until the electric car and battery industries reach a critical size. Then this organization could license the manufacturing technology to private companies and go out of business.

For Grove the reason to secure domestic U.S. car battery production was that China and the U.S. will be competing for the same finite supplies of oil and gas in the future. If the U.S. had the ability to use varied sources of energy to power transportation, America would have a competitive advantage, and would also have a degree of resilience in the face of threats[13].

Another approach to the same issue of accessing necessary technologies and capabilities has been taken by Henrik Fisker, who has seen the opportunity to introduce a different business model into the car business. Comparing the car industry to the semiconductor industry he characterizes his company as a "fabless car company". Taking his inspiration from firms such as Apple and Nike, he wants to focus on branding and design, not running factories. To do this he needs a partner that is excellent in manufacturing. He has chosen Valmet Automotive to become his partner. In the cover page story for

12 Pisano, G.P., Shih, W.C. 2009. Restoring American Competitiveness. *Harvard Business Review* 87(7/8): 114-125.

13 Andy Grove on battery power. *Fortune Magazine* 8/2009. p. 46.

Forbes magazine in June 2009 the cooperation with Valmet Automotive was described as follows:[14]

From the beginning Fisker focused on capital efficiency. His company says it can develop a car in two and a half years--half the time it takes a large company--for one-third the $1 billion it costs a traditional carmaker. Fisker avoided some $300 million in capital outlays by handing off manufacturing of the Karma to Valmet Automotive of Finland, which will build the car in the same Finnish factory where it now assembles Porsches. Fisker agreed to pay Valmet around $25 million in advance to help offset tooling and factory costs, plus a fee for every car produced. Fisker says that per-vehicle cost is "very close to what it would cost in your own factory."

What the discussions relating to building future competitiveness in the electric car industry highlight is that the rules for competition are changing, but nobody knows exactly how (the U.S. foundry for battery production was not built by governmental money, at least not yet). One thing, however, is for sure: nobody will become supreme in these new industries based on their own superior technology only. For certain, core technology will be a key asset, but the capabilities to pull together the technologies of others will also be as important.

Risto Kalske of Sitra has noticed that this new way of evaluating the potential of new business ideas has gone unnoticed in Finland. Due to our successful technology past new ideas are still primarily only evaluated based upon their technological superiority. However, lack of in-depth market understanding is a much bigger bottleneck than the scarcity of technical ideas. Many entrepreneurs provide solutions to problems that are not real problems in the market place. Kalske suggests that public funding should increasingly be allocated to initiatives that address relevant market problems, and where the entrepreneurs have an in-depth understanding of both the dynamics

14 Forbes magazine had its cover story about Henrik Fisker in the June 2009 issue (Muller, Joann. The next Detroit).

of the market as well as the strengths and weaknesses of their own business idea.[15]

In the context of the innovation strategy of the City of Espoo, this supports the ambitions to bring together networks of actors, companies, universities and other stakeholders in order to work on demonstration projects that will address significant societal problems. This also asks for the mobilizing of technologies from outside Finland. For example in the development of the testing programme for electric cars in the T3-area, a key element will be to identify necessary complementary technologies that Finnish companies will need to integrate into their solution in order to make the integrated system competitive. The missing technology is increasingly to be found in new places. Twenty years ago North America, Europe and Japan produced almost all of the world's science. They were the aristocrats of technical knowledge, presiding over a centuries-old regime. In 1990 they carried out more than 95% of the world's research and development. By 2007 that figure was 76%. Mobilizing technologies and capabilities from all over the world is increasingly important for large innovation projects to succeed. The mobilizing capability is in itself a competitive advantage. This also provides the City of Espoo and its partners with a differentiating possibility.

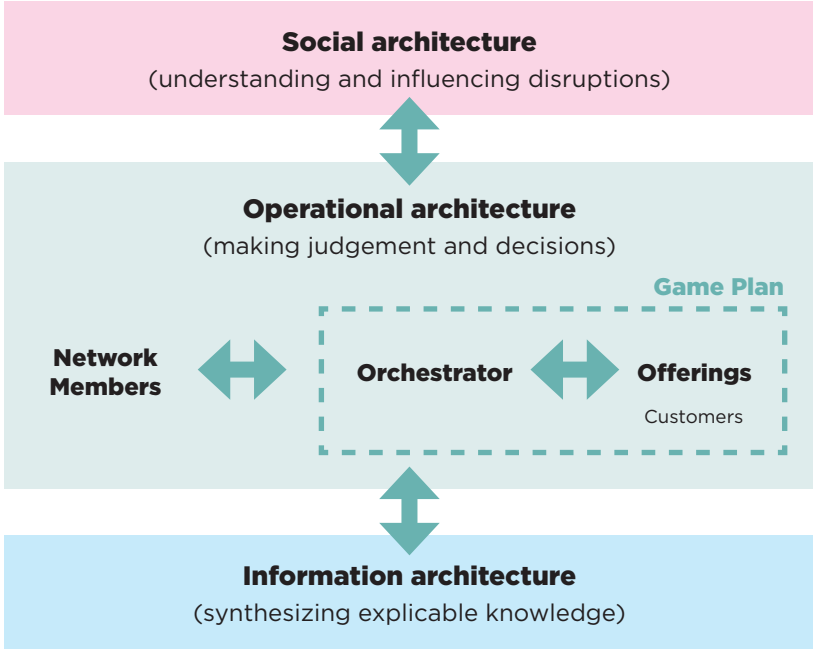
2.4 ADDRESSING GRAND CHALLENGES

Originally the notion of "grand challenges" was a U.S. policy term used in the late 1980s for the mobilizing of the funding for high-performance computing and communications research. Later on the notion was expanded and, for example, the U.S. National Academy of Engineering has identified 14 grand challenges relating to topics

15 Kalske, Risto. Huonoja liikeideoita on turha tukea. Helsingin Sanomat 21.11.2010

such as solar energy, energy from fusion, access to clean water, urban infrastructure etc.

When addressing grand challenge problems, there is a need for close cooperation between the public sector and companies. This means that somebody has to actively bring together the different parties that need to work together to successfully address the problem at hand. This is the function of the orchestrator. The ability of the orchestrating organization to properly establish the orchestration architecture is one of the key success factors of any grand challenge innovation.



A central role of the orchestrator is to provide the integration of different aspects relating to technology, and also to create a shared view on what should be the longer-term objectives of the collaboration.

The orchestration architecture provides a framework for how to discuss such matters. To achieve socially steady progress it is necessary not only to identify the immediate beneficiaries of any innovation or new technology, but also how this innovation may impact the larger social system of which the beneficiaries are members. Therefore, not only do the operational elements have to be evaluated and designed, but it is also as important to evaluate and design the social elements relating to the innovation. Increasingly these aspects, operational matters and social impact, are strongly interlinked through the information and technical architecture relating to the innovation. In line with the reasoning behind the orchestration architecture, Prahalad and Krishnan, when discussing the notion of co-creation, introduced the House of Innovation as a framework for how innovation logic is emerging[16]. They argued that the social architecture must reflect the new competitive imperatives.

The City of Espoo prioritizes environmental and societal issues in its innovation strategy. Such a *sustainability oriented strategy* balances economic growth with social well being. Sustainability oriented societies do their best to ensure that all their people enjoy their rights to education, employment, medical and old-age care, and housing, so as to build a harmonious society. In addition, they also care for the longer term in respect of environmental care and resource consumption. Such a society sees the emergence of grand challenge innovations as a major opportunity, and is actively looking for a position in the frontline to bring discussions relating to these sustainability issues forward on the global agenda.

Increased emphasis on social development and sustainability is a prerequisite for any country in the long term. However, this cannot become the predominant feature of the innovation policy if the

16 Prahalad and Krishnan (2007) talk about the market of one customer and orchestration of global resources.

underlying economic foundation isn't strong enough. Subsequently the Finnish agenda, combining a focus on economic development with ambitious targets for sustainable development, can become a role model. To achieve its targets concrete demonstration undertakings are needed. Cities are the natural actors to make sure that such demonstrations get under way.

When these types of large grand challenge innovations get more political and social attention it also implies an increase in the number of stakeholders involved in collaborative innovation activities. This puts new responsibilities upon the "traditional" innovation actors for the innovation system to be efficient and effective. In the case of the City of Espoo this implies that e.g. the construction activities cannot be looked upon solely as traditional city planning tasks, where individual projects are treated separately. Instead a broader perspective is needed, and technical, environmental and social aspects need to be considered in the decision making.

"When these types of large grand challenge innovations get more political and social attention it also implies an increase in the number of stakeholders involved. In the case of the City of Espoo this implies that the construction activities cannot be looked upon solely as traditional city planning tasks."

Such a change in the approach is also new for many of the companies, who have taken a very cautious position in relation to the city

organization. Afraid of interfering with political decision making they have difficulties to learn how to collaborate with the representatives from the public sector in this new iterative approach.

2.5 SOCIAL NETWORKS AND MOVEMENTS

City representatives not only have to learn how to more actively work with the companies and financiers in order to stay competitive when trying to address grand challenge problems. They also need to devote more and more time to different types of initiatives mobilized by citizens. Such movements can for some political actors be very beneficial, but then at a later stage the tide may turn.

When Barack Obama was elected President of the United States in 2008 he had created a movement which was unprecedented in American presidential elections. Two years later, in November 2010, the democrats were severely defeated. This time as well the explanation for the defeat was that there was a new type of movement which had not existed previously in the political life of the United States: the Tea Party.

What seems to be common to such movements is that they are initiated through individuals who have a strong personal conviction that the case for which they are working is important. Such individuals were traditionally often found in religious movements, but are now increasingly also shaping the future in many other areas of society. However, the dynamics of the birth and growth of movements seem to be universal. Steve Addison has done extensive research on movements and he has found that they share some common features[17]. The key individuals have strong faith in their cause. Subsequently they also expect a high degree of commitment from themselves and from one another. To spread rapidly they actively use pre-existing

17 Steve Addison: Movements that change the world (2009)

networks of relationships. The leaders aim at rapid mobilization and foster new leaders from within. Such leaders are driven by their zeal and devotion to the common cause. And finally they are adaptive in their approach: they learn and adjust as they move on.

Steve Addision makes the following definition of movements:

Movements are informal groupings of people and organizations pursuing a common cause. They are people with an agenda for change. Movements don't have members, but they do have participants. The goals of a movement can be furthered by organizations, but organizations are not the totality of a movement. A movement can have leading figures, but no one person or group controls a movement. Movements are made up of people committed to a common cause. Movements change people and changed people change the world.

The same way as missionaries created movements so have the portal figures of new technology created movements. Linus Torvalds was the first one, and today Linux is an integrated part of the modern architecture of information technology. If Linus Torvalds changed the world in the 1990s, the next decade was definitely the one of Steve Jobs and Apple. Now for this decade many are of the opinion that Facebook's Mark Zuckerberg will overtake Steve Jobs as the role model.

Torvalds, Jobs and Zuckerberg are the superstars of the information age. They have truly changed the world through insightful innovation and skillful mobilization of a movement around their case. Even if they are unique leaders, it is important to recognize that the dynamics relating to their success stories help to explain why some change initiatives and innovation succeed and others fail. The innovation or technology is only part of the success: it is just as important to get the people committed to you and your alternative. Apple doesn't have a better technology than its competitors, but the way the technology is perceived to address the needs of the user is superior.

The notion of social networks has existed for long, and its influence on different forms of development has been studied across politics,

economics, sociology, and religion. Today's discussion has become very preoccupied with the social networks established in the virtual world, with Facebook as the shining star. However, other forms of networks are also gaining in importance. The grand challenge innovation process is for example highly dependent on the social network of the key individuals coming together to work on the problem to be addressed. Here the quality of information exchange has to be very deep relating to those particular questions that have to be answered in order to make the innovation come true.

For a country or a city both these network behaviours are important. The Facebook -type of activities are important as they increasingly form the opinions of individuals, and especially of the younger citizens. The networking between professionals as it is needed for countries and cities to be successful in their innovation activities.

The goal of the City of Espoo is to achieve a nine percent energy-saving target from the 2008 level by the year 2016. These targets cannot be reached without extensive cooperation between the city and external parties. Projects concerning energy efficiency in Espoo are coordinated by engineers and architects that work in cooperation with several networks comprising experts in different fields. In addition to the various sections within the city, energy-efficient solutions are developed in cooperation with, for example, Aalto University, VTT, Fortum, residents and other interest groups. The City of Espoo has eleven energy teams whose job is to facilitate energy efficiency work.

Facilitating the birth of new networks and making sure that these networks will be able to achieve their own targets is quite new for city administrators. It requires that the various sections and departments within the city work in seamless cooperation. The town plan alone is not enough but, for example, the Building Control must have the means to monitor project implementation and bring projects from different networks together. Achieving ambitious sustainability targets will ask for continuous efforts over the years to come in order to constantly improve the efficiency of the society.

2.6 SUSTAINABILITY AND GROWTH

When looking forward and trying to anticipate where the world could be ten years from now, two factors ultimately steer the outcome: climate and people. Climate works as the warning signal of how sustainability plays out in the real world, and growth is needed for the society to maintain its present social order. In practice these two objectives, sustainability and growth, have an in-built conflict. There is a limit to growth. Experts today argue whether this limit already has been achieved, or whether it is possible to accommodate to a situation where there is still room for growth, albeit in a more controlled way.

We face a high degree of volatility and uncertainty. The impacts of climate change are disputed even among scientists. The South-Asian tsunami in December 2004, hurricane Katrina in the United States in August 2005, and the eruptions of the Eyjafjallajökull volcano in Iceland during spring 2010 are all examples of how nature radically can and, for sure also in the future, will influence our daily lives.

In this scenario exercise we have chosen not to speculate about different types of possible natural disasters, as this would mean opening Pandora's box, after which the number of alternatives is unlimited. Having said this, and looking back over the last five years, one can expect that over the coming years there will also again be a number of natural catastrophes that will create problems and disruptions in the daily affairs, affecting smaller or larger geographical areas.

Hence we have to deal with the issue of enabling growth within increasingly constrained conditions. Still, the need for growth is an indispensible feature of the market economy. The basic philosophy of the market economy is that individuals drive the society forward, because they can influence their own life, and have a better tomorrow thanks to the good work done today. As not all individuals start from the same conditions, there has to be some overall mechanism which evens out the effects of some individuals being more gifted than oth-

ers or being born under better conditions. The mechanism adopted in the western world is market capitalism combined with democracy, whereas many Asian countries have combined market capitalism with some form of autocracy. Today very few countries have rejected the market economy, North-Korea being one of them.

The market economy entails that, to govern the complex socio-technical system that today's society is, the market should allocate the resources in the interest of human beings. But it is also recognized, and after the financial crisis even more so, that the market economy cannot function properly without some form of regulation.

The great challenge of the market economy is the amount of inequality that it generates. Even Finland, when evaluated by the OECD in 2010, has become more unequal over the last years, and the OECD recommended the Finnish government to address the "*misuse of the tax system by high income earners*".

The opening up of global trade has increased the exposure of all WTO-members to the impact of this inequality. At the same time the mechanisms by which the market economy addresses and exploits this inequality are brutal. In Finland corporate leaders are more and more loudly putting forward their warnings that Finnish competitiveness is under threat, and that they are very worried about the outlook for Finland as a nation. Work previously done by Finnish engineers is increasingly being performed by engineers in India or China, at a considerably lower cost. This implies pressure on wages and salaries, and a risk for continued high unemployment.

Individuals, who see that the most successful individuals, like corporate managers, continue to increase their salaries when their own prospects are more uncertain, easily get frustrated. This applies not only to Finland but to most Western countries. The only way these people will remain contented is by hoping for a better tomorrow. This requires continuous growth of the nation's economy. But as work increasingly is transferred to cheaper locations, the Western growth prospects are under threat.

How to balance sustainability and growth then ultimately is about what is perceived as fair. The debate about CO2 emissions is a good illustration. The Western world wants countries to commit to their existing absolute levels of emissions on a country by country level. The developing countries want to measure CO2 emissions per capita. What is fair? Who decides the rules?

Balancing sustainability and growth will therefore ultimately boil down to questions about values. What does equality mean? What is the proper unit of analysis? The G20 meeting in Korea in November 2010 was expected to focus on currency exchange disputes between the United States and China. However, this debate was not playing out as the Americans wanted. The U.S. $600 bn stimulus package was generally perceived as a way to lower the exchange rate of the U.S. dollar. This way the U.S criticism towards China protecting its currency was less credible. Europe at the same time suddenly had the Irish problem to deal with, which again was making European countries less credible when accusing China of causing financial instability.

With hindsight, in the nearest future there is a great probability that global factors such as natural disasters and shocks to the political and economic system will shape the daily agenda as it has done over the last ten years. The attack on the World Trade Center in New York on September 11th, or the burst out of the financial crisis are just two examples of events for which it was very difficult to prepare. Here we will not try to identify or guess what next big event will be. Instead we try to deal with those underlying questions that will have to be addressed irrespective of what is the next event that will cause big headlines and become the topic of the day.

3

June 5th, 2020 – a day in innovative Espoo

The scenario process developed in the context of the Eco Urban Living project had three parallel objectives. Firstly it was a way to engage a larger group of professionals to discuss, debate and get engaged in the process of shaping the T3-area (Otanimiemi, Keilaniemi, Tapiola) for the future. This objective was achieved by interviewing a large number of individuals, and posting a questionnaire on the website of the project.

The second objective was to generate facts and opinions for the decision making around the T3-development. Material was gathered and made available for those who participated in the scenario process. Part of those findings has been presented in Chapter 2 of this report.

The third objective was to summarize the results from the scenario process into a written report that could serve as a means to extend and continue the discussion also outside the small group of

professionals that was engaged in the actual scenario making work. This report fulfills the third objective.

A scenario process has a strong social networking effect. From their own perspective many of the individuals retrospectively saw the opportunity to discuss these topics with other professionals as the single most valuable outcome of the scenario process. This means that those who participate in a scenario process automatically develop a common basis for discussion and understanding. This can be beneficial also in the future. When trying to transfer this understanding outside the original scenario-making group, one has to repackage the outcome of the actual work so that it becomes more easily accessible to someone who hasn't participated in the process.

Four work groups independently developed their own scenario during one day. It is clear that quite many observations and suggestions were repeated when the scenario work groups made their presentations. For an outside reader of the final scenario report such repetitions should be avoided in order to make the reading more comprehensible. The findings of the workgroups have to be rewritten in such a way that the basic underlying ideas are still identifiable, but the four scenarios will together form an entity. This is in order to encourage the reader to get more excited about the issues put forward and hopefully more committed to engage him- or herself to bring the development forward.

The work of synthesizing and bringing all the findings from the scenario process together, and balancing the feel of ownership by the individual groups with the ease of accessibility by an external reader, has in this project been done by the Synocus team.

The scenarios should stimulate creativity and discussions. They should be understandable and interesting, provocative but still imaginable, mind boggling but also appealing, and they should be fun to read. To do this there are no absolute rules, but the work has to be based on experience and feelings. Ultimately the reader will judge how well the balancing succeeded. We hope that reading the scenarios will stimulate the discussion to continue.

3.1 REALITY RULES

The Annual Meeting of the China-Finland Golden Bridge Innovation Centre has attracted more participants than usual to Otaniemi on this beautiful June day in 2020. One reason is definitely the keynote speaker: the new Vice Premier of China. He is part of an official delegation visiting Finland, and has been able to schedule a keynote address at the Annual Meeting. His speech is raising great expectations as the Chinese GDP will overtake the American one in three years and thus make China the world's largest economy.

China's annual growth has averaged over 9 % throughout the 2010s, whereas Europe and the United States have had limited growth and a decade of volatility. Nevertheless the Chinese growth hasn't come without pain. The forecasts suggesting that the climate change could be contained have proved to be overly optimistic. No

global climate agreements have been reached, and some countries are already suffering significantly.

Resource constraints drive innovation

China has indeed drastically changed its energy consumption pattern and improved the quality of air, but only without threatening its growth. The measures to tackle environmental problems have come out of necessity. Many Chinese cities are regularly suffering from water shortages, and the quality of air is still poor. The investments in renewable and nuclear energy have been significant, but coal-based energy has been growing as well, albeit carbon capturing has improved a lot. The majority of new cars sold are fully electric, but as the annual car sales has exceeded 30 million cars a year, there are still a lot of new combustion engines entering the roads daily.

Nonetheless China is not the only country becoming increasingly resource constrained. All countries have to seriously address challenges associated with environmental conditions and energy efficiency.

The China-Finland Golden Bridge Innovation Centre has attracted Chinese companies to use Finland as an entry point into Europe. The benign political climate has helped, as well as the continuously good reputation of the Finnish innovation system. The keynote presentation of the Vice Premier offers an interesting perspective to this collaboration. The Vice Premier begins by praising the good political, technological, and economic relationships between China and Finland, and continues by presenting how the Chinese government had evaluated countries in those critical years 2011-2013 when Europe became divided in several ways.

Finland as a reliable political actor

He recalled that it could be seen early on that many countries suffered from weak political leadership. From the Chinese perspective it

is considered a weakness of the Western system that a leader that is awarded the Nobel Prize will two years later suffer a humbling electoral defeat, resulting in recently initiated reforms radically changing. Finland on the other hand has always been regarded as a reliable political actor. The Finnish intentions are well known in advance, and its behaviour is the consequence of a long-term strategy that is forcefully executed, even during turbulent times.

When Finland shifted its innovation policy to not just focus on technology but also support the building of new global ecosystems, it resulted in enhancing the Sino-Finnish ties. The establishment of a rehabilitation hospital and service centre for senior citizens in Shanghai became a symbol for this new form of collaboration. The experiences from this first pilot case have been leveraged to form a Sino-Finnish joint venture that now has operations in more than 30 countries.

The Vice Premier compares this case to similar trials initiated by other countries that approached the Chinese government. In these trials the discussions dragged out and endless legal debates about IPRs and organizational details resulted in poor end results.

In contrast, the Finns and Chinese seem to be able to find a mutual understanding in a very pragmatic way. The collaboration builds trust, which again facilitates overcoming difficulties. This way mutual dependency is incrementally strengthened resulting in strong alliances where the best characteristics of two worlds meet: Chinese cost efficiency and brute innovation force, and outstanding Finnish project management skills combined with proven political sensitivity.

The risk for trade wars

In the Q&A session one of the Finnish executives asks what risks the Chinese government had identified for Finland during the recent years. The reply was that the only thing that worried China was whether Finland would give in to the pressures to use trade restric-

tions as a means to combat local political problems. China is well aware of the difficulties of many western leaders. They have to deal with the consequences of their countries spending too heavily before, during, and after the financial crisis. But the debt burdens and subsequent problems that these countries have created cannot be solved through trade restrictions; as a matter of fact this would only worsen the situation. Fortunately Finland has remained one of the few countries firmly supporting open trade, the Chinese Vice Premier concludes.

The next speaker is the CEO of the Central Chamber of Commerce, who provides a personal reflection on the latest development of Finland in the global context.

The world has become more divided than ever: China and India are the two stars of the global economy whereas the Western world is suffering. The Western governments are unable to address long-term problems with politically popular short-term means. They are challenged with balancing large debts and political opinions swinging all the time as a result of their policies. What was created five, ten and twenty years ago has to be dealt with now. The division in economic terms is only one way in which the world has become polarized. There is also a resource divide. Climate change has speeded up the drought problems in Africa and large parts of Asia. The shortage of water has led to significant riots in Northern Africa, forcing NATO soldiers to take intermediate control and secure international help. In China water technology is now the single most important R&D area in the government budget.

The political situation is chaotic. The Western political system is facing its worst crisis since the Second World War. Politicians should not be the only ones to blame. The individual citizens are equally to be blamed for not accepting that the once achieved standard of living is not sustainable. Frustration with high degrees of unemployment and continuous uncertain economic possibilities have resulted in increasing attacks on minorities, higher crime rates, severe drug and alcohol prob-

lems, and a less tolerant society. The political agenda has become focused on real world topics: water, refugees, constant crises, and upheavals in developing countries. This has also affected Finland and Europe. At the same time it has also forced countries, regions and companies to jointly look for ways to address the key grand challenges.

Financial and social stress

Finland has in this respect suffered less than most other European countries. Indeed, the economic situation is still very constrained due to the debt that piled up in the early 2010s, but the country as such has been able to keep its innovative spirit. As Finland has always been ruled by consensus, political extremes haven't radically influenced the way Finland has moved forward. In many ways it has been good that different opinions have been voiced and frustration has been released, thankfully without severely hurting the long-term agenda for bringing Finland forward. In this respect the political outcomes have been quite predictable over the last 5-10 years: slow but steady progress.

This would not have been achieved without costs. The social security is now considerably weaker than in the early 2000s. Schools are charging fees; imported labour is increasingly employed in elderly care, because the salaries offered are not attracting Finnish labour, even if there still is a high degree of structural unemployment. The society has become preoccupied with how to address the very concrete problems relating to sustainability, and how to be able to use our limited resources in a smarter way. Finland made a good choice in the early 2010s when it was decided the environmental technologies and elderly care should be innovation priorities. Both these areas urgently need new approaches. Another important decision was to strongly encourage global networking. Now Finland has become very skillful in networking and building innovation alliances across the globe.

Innovation focus on energy saving and climate change

For the City of Espoo the results are mixed. The grand plans from ten years back have not fully materialized. The ambition to engage a broad group of stakeholders around common activities to make Espoo a leading innovation platform in the world didn't get all that international recognition hoped for. However, within Finland the efforts taken by Espoo have given the city a relatively better position than most other cities in Finland. This is partly due to the benefits provided to the key companies operating in the city. These companies like Nokia, Kone and Fortum are continuously growing. They are also loyal to Espoo, as they have seen that the work done together with Espoo has provided clear reference value for their international business. The example of the Vice Premier of China paying a visit to the China-Finland Golden Bridge Innovation Center is a case in point.

The Aalto University is in many ways the bright spot of Finland. The decision to concentrate efforts to build one strong competence centre in Finland has paid off, thanks to combining world class research with large demonstration projects relating to critical societal issues, such as energy saving and climate change. There has for instance been lots of technological convergence between electricity grids and communication networks, which again has assisted the significant growth of both Fortum and Nokia Siemens Networks over the last years. The basis for this growth has been the innovations stemming from different experiments and piloting projects in the capital region of Finland during an intensive development phase 2011-2015.

Espoo excels in comprehensive perspectives on city planning. This new competence area generates job opportunities in the city.

2010s – the lost decade

Some observers have called the 2010s the lost decade. In many ways this is true. Globally the 1990s and 2000s were times when the Western world, especially the United States but also a large part of Europe, lived on borrowed money, money that retrospectively could not be paid back by those who used the money. This excess was further reinforced by a financial system that rewarded risk and didn't punish properly when the risks materialized. Consequently Europe and the United States became preoccupied by cleaning up the mess, limiting their room to manoeuver in more strategic areas like climate change, social reforms and addressing global poverty.

Many developing countries in their own self-interest had to address many of these questions to avoid social unrest on its home turf.

Global companies have often become alliance partners with these countries and are now stronger than ever. Nokia, Kone and Metso are examples of Finnish companies which have enjoyed these benefits. Furthermore the City of Espoo has been able to benefit from the networks of these successful Finnish corporations.

City planning new competence area of Espoo

The collaboration between Aalto University and the City of Espoo has resulted in several interesting examples of how to integrate new technology with existing infrastructures. The use of electric mini-shuttle buses as a complement to the West Metro has significantly reduced the use of cars in the whole Espoo area. Moreover the new integrated People Flow concept piloted in the Tapiola and Keilaniemi metro stations has reduced energy consumption and increased user satisfaction with public transport. Last year this People Flow concept was applied as part of the framework for the whole city planning of Espoo.

This comprehensive perspective on city planning has become a new competence area that has additionally generated new jobs into Espoo, partly compensating the decline in employment of the traditional industrial companies. Both Fortum and Nokia Siemens Networks now have large societal planning offices in Espoo that are working closely with the City of Espoo and Aalto University on new sophisticated software solutions to support large scale infrastructure and urban development projects.

The consistency of the city management of Espoo has also been appreciated by the other members of the World Alliance for Low Carbon Cities that was formed in 2011 with Espoo as one of the co-founders. This inter-city cooperation has helped Finnish companies to get an easier access to business opportunities in these cities. Especially in the field of smart grids Finland has been a front runner.

The presentation by the Vice Premier is lively discussed over the

cocktails. Especially the relative performance of Finland is debated. The majority feels that the situation is not as rosy as it might look from the Beijing perspective. Politics is an endless row of compromises due to the continuous high unemployment, reduced social security, and less public money available for the common good. The media is, as always, eager to highlight the immediate problems, and less attention is paid to more long-term questions.

The global divide continues to be a major threat. A worsening in the water situation in Africa could generate large streams of illegal immigration from Africa to Southern Europe. This would further increase the tension among European countries and reduce the possibilities for political agreement on a unified European stance in the important grand challenge issues. For Finland this implies that the pragmatic bilateral policy will continue. In certain areas there is good cooperation with Russia, in others with China, and for some specific technologies there are separate development efforts with individual countries on a case-by-case basis.

Towards a brighter future

Among the participants in the Annual Meeting a positive undertone is still identifiable. Finland has a balanced trade, and the debt level is also under control. The export outlook for the coming years looks promising as the competence areas that Finland has been focusing on such as water, energy, urban planning and elderly care are such where the demand is surging. Well functioning Finnish demonstration sites provides a competitive edge for the Finnish companies active in these areas. The economy of other European countries is also slightly improving, and the overall European atmosphere is gradually getting better.

After a lost decade the future appears brighter.

3.2 ECO-LUXURY

In two weeks time the summer holiday starts at a high school in southern Tapiola, Etelä-Tapiolan lukio. All the exams have been taken, and now in early June the students are devoting their time to creative activities and research projects.

This afternoon there is a reporting session for the second stage of the Global School initiative. Global School is a research programme that was started by Aalto University and five other universities (from Europe, United States and Asia) in 2011, aiming at finding opportunities to improve the conditions for high-school students across the world.

The research originally focused on how the schoolwork could be improved. However it became quickly evident that in order to profoundly understand how to better learn, one had to broaden the scope.

The key question is how and in what context the individual will have the capacity to learn. Only after understanding this is it meaningful to ask how this capacity can be benefited. Etelä-Tapiolan lukio was selected as a pilot school for this research, largely due to its long tradition from multicultural cooperation. It started international projects together with China and Nepal already in 2006.

Today's reporting session presents the findings of what makes students successful. The students have responded to a detailed questionnaire. The responses have identified five areas affecting the well being, and the study results, of the students: (i) a safe and caring home, (ii) smooth and enjoyable transport, (iii) efficient enabling tools, (iv) individualized learning, and (v) an encouraging social environment. This afternoon the theme to be discussed is the topic of smooth and enjoyable transport.

Smooth access

Etelä-Tapiolan lukio has increasingly gathered students from the whole capital region, as students select the high-school based on their particular interest. Subsequently the majority of the students are coming to school by metro, partly because of the convenient location of the school, only five minutes' walk from the metro station.

When the students were asked what makes the metro trip enjoyable the reply was quite surprisingly: the possibility to use the high-school subsidy to buy the morning breakfast from the Nutri-Market food kiosks and food-vending machines. Thanks to the metro, eating is organized around cafeteria type of cabinets there.

The response suggested that many students take their breakfast at the metro station, instead of eating it at home. The Nutri-Market subsidy programme is a programme only supplying healthy food. This has contributed to considerable improvements in student health in Etelä-Tapiolan lukio, which becomes evident from comparing the medical records five years ago, when the Nutri-Market programme

was introduced, to the present ones. Nutri-Market has also strong support from the high school, as an alumnus of Etelä-Tapiolan lukio is one of the founders of this new retailing co-operative. She was already as a high school student strongly arguing for new types of societal initiatives, where the citizens themselves should have a bigger say.

Nutri-Market is a rapidly growing food retailing chain that has focused on two main customer segments: students and senior citizens. The key philosophy is to provide good service for single individuals with demanding tastes. Not surprisingly this value proposition has proven successful for single adults as well, which has spurred growth.

Enjoyable learning platforms

Besides the possibility to easily integrate your breakfast with your metro trip, another advantage of the wireless internet equipped metro is the possibility to do last minute updates into the school database using the Nokia tablets. These tablets have replaced both the books and the traditional laptop computers. The software services are built upon the Ovi Life Tools platform. Some of the services have been developed in another research project sponsored by Nokia, with Etelä-Tapiolan lukio as a piloting partner.

Many of the students come to school by bicycle, or use the combination of bicycle and public transport. The personalized real time traffic Ovi support system has been expanded so that the students can tell their social network which bus he or she intends to catch. Options are offered based on personal needs and expectations.

This way the students are often able to use the bus trip for nice chats and engaging social-learning experiences with friends, or to discuss some school topics. The new fully electrified buses are an attractive option to the metro as they are quiet and enable passengers to admire the view of a still beautiful city.

Bicycling has also become more popular among the knowledge

Flexible planning of travel schedules as well as seamless integration of different transportation modes are key factors in making public transportation smooth and enjoyable.

workers in the T3-area. The Cyclists' Bistro, which is located where Ring I previously was separating Otaniemi and Tapiola, has become a very popular casual restaurant. As the knowledge workers increasingly work from home, and otherwise also have flexible work hours, many of them use the social networking services to set up ad-hoc lunch appointments with their children at Cyclists'. Cyclists' is also sponsoring Aalto research.

Mobility on demand

Furthermore, the Aalto-researcher explains that school results don't seem to be affected by whether students use the metro, or come by bicycle. On the other hand the ability to use the preferred type of transport, flexibly planning the travel schedule using timetable information in real time, makes travelling more comfortable. Seamless integration of various means of transportation using open data platforms have enabled a significant increase in the new use of mixed transportation concepts, called mobility on demand. Those who are

very satisfied with their transport arrangements emphasize the flexibility to choose what transport means to use. Those who consider that the transport is cumbersome highlight the lack of flexibility as one of the main reasons for their dissatisfaction.

Transport is also important for students' leisure time. High school students are for instance actively using the Tapiola Sports Park facilities as a result of convenient metro connections. It is also common that students at the high school take their rental bicycle after school and ride to the Tapiola Golf range nearby in order to hit a couple of buckles of golf balls before going back home by metro.

A strong emphasis on the social sciences is the trademark of Etelä-Tapiolan Lukio, and its students are energetic messengers for greener values and enhanced cultural activity. They arrange plenty of events, many facilitated by the new Espoo theatre and the Espoo Museum of Modern Art. The cultural reputation of Tapiola has also helped to attract more than 5,000 new inhabitants to move into the district since the metro station was opened. The previous label of a Tapiola as "a pensioners' club" has radically changed, and today Tapiola is known as a lively cultural and academic melting pot.

Massclusivity

Local loyalty card with redeemable action points have been established in collaboration with the city and local organizations. People gain points by using local services. Points are redeemable for example for integrated transportation.

The decision to use some of the buildings in the Tapiola centre and in connection with the Sports Park as accommodation for foreign students and researchers has radically increased the influence of foreigners in the daily street life in Tapiola. There has been a genuine ambition of Espoo to be able to fulfill the needs of all its citizens, foreigners included. Companies such as Nokia and Kone have strength-

ened the multicultural atmosphere further by actively recommending Tapiola for foreign workers considering where to live.

Nowadays city planning in Espoo regularly organizes broad participation campaigns for the inhabitants, in order to develop the area in an eco-friendly way. Consequently Tapiola has the highest density of electric vehicles in Finland. In 2019 about 55 % of all new cars registered in Tapiola were either hybrids or pure electric cars, and this has been enabled through requiring charging facilities on the parking places of all new buildings since 2016. An increased level of community activity within Espoo has resulted in support for public, bicycle, and pedestrian transport as well. Many bus stops have for instance plenty of space available for bicycle parking.

These improvements in the service level of public transport have resulted in many families abandoning car ownership. The most advanced car rental arrangements enable you to flexibly change the type of car you use, even on an hourly basis. The related information service is provided as an integrated part of the Ovi platform. The service enables for instance you to rent a car, which would otherwise be idle in a parking lot, for two hours if the current user is in a meeting for the next six hours. By allowing forthis flex-rent feature the renting bill of the primary user will be reduced, and you will find a car for exactly the two hours you need. Both of you have to confirm this spontaneous transaction by text-messaging through the shared service platform. If you will not be able to keep your two-hour slot you will be severely punished, and your name will be publicly reported in the social network. The social pressure from the network has secured that this flexible system at the same time is highly reliable and efficient.

The costs of the electricity consumption will also be fairly divided. The electricity consumption is measured through the control system of the car, which also verifies the driver's digital identity and hence automatically charges the current users electricity account. The accounts are managed by telecom or cable companies depending on

preference, and the service provider will hence pool all your micropayments into a monthly bill connected to your loyalty card.

Self expression

A comparison between the Finnish students to those from the other participating schools reveals that the high degree of service flexibility correlates with the wellbeing of the students. The conscious efforts by the City of Espoo and Etelä-Tapiolan lukio have resulted in a very user friendly service offering. The transport infrastructure in Espoo is the most advanced one out of those six cities that are involved in the Global School project. The researchers call this approach to service development Eco-Luxury.

This notion of Eco-Luxury has become a topic of heated debate at the High School. Some advocate that using the notion of Eco-Luxury is ethical manipulation. They would recommend using Eco-Natural. Others are defending their electric vehicles (electric scooters have also become popular) in front of bicyclists as they feel they get more efficiency out of their 24 hours compared to bicycling. The Aalto-researcher suggests that what counts is that people are able to live ecologically in combination with their own life style. Therefore the notion of Eco-Luxury is not about a single "best way". Instead it is about a pluralistic society offering a broad array of ecologically sustainable alternatives to match the different lifestyles of its citizens. The word luxury is highly subjective; in this context it suggests the ability to choose between different ecologically acceptable solutions in order to maximize utility. This is the most comprehensive meaning of luxury applying not only to transport but to all other aspects of life where services can be provided in different ways. One can finally express his or her identity through ecological choices, having the luxury of personalized solutions with ecological outcomes.

The notion of Eco-Luxury has also started to fascinate urban planners. They have recognized that this service philosophy is highly

cost efficient. Even if it often involves somewhat higher initial investment costs, the life cycle costs are much lower, as the overall satisfaction of the citizens is greatly improved, thus reducing social costs due to bad health, vandalism, and drug consumption to name a few.

The other important implication of the Eco-Luxury approach is that it is a philosophy of continuous improvement. As the services are connected through the social network platform it implies that service supply and demand will adjust much faster than in more traditional service environments: seldom-used bus connections can for instance be withdrawn with a week's notice. Furthermore, citizens are able to provide feedback to city planners through the system. If for example a bus stop has poor bicycle-parking facilities you can immediately post a message in order to gather support for such a facility to be built. On a monthly basis the City of Espoo presents which initiatives have been generated, and the city has committed itself to investing 50,000 € to address issues raised by the citizens through this voluntary feedback process.

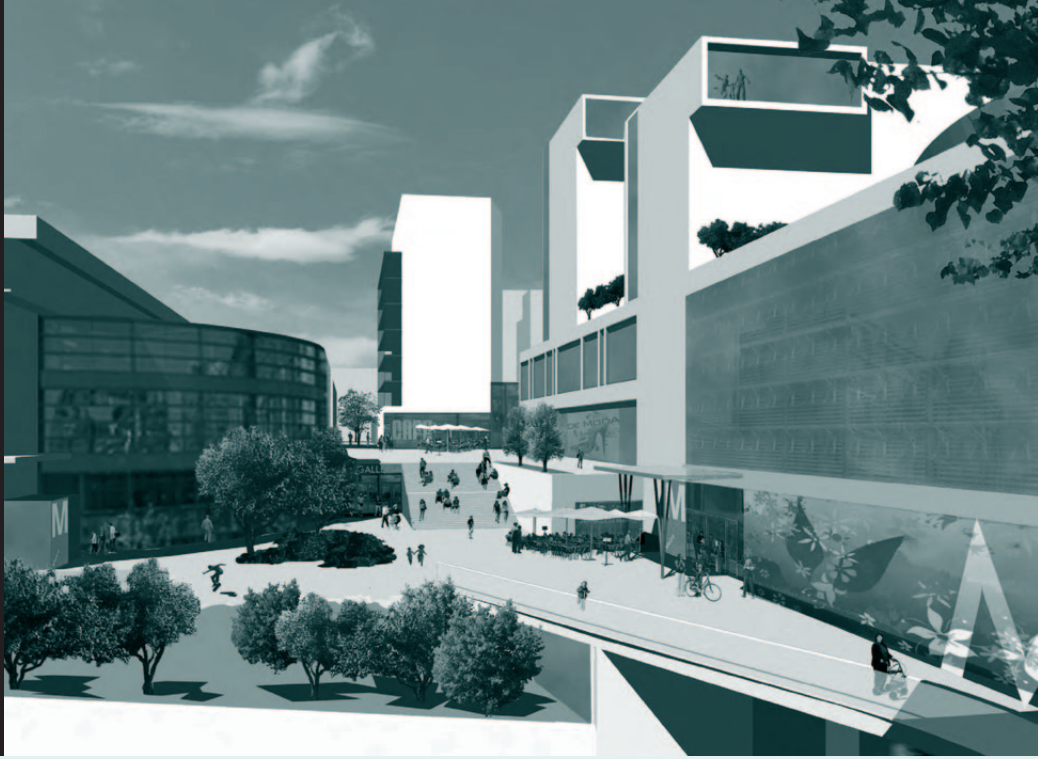
This incentive system has been in use for almost three years now. The most popular topic for improvements has been cycling. Currently 33 bus stops have been equipped with additional parking places for bicycles based on proposals from the citizens.

When the results of the Global School research are compared across the six cities, it is apparent that the highly integrated service infrastructure available in Tapiola has contributed significantly to Finland's good results. The physical transport solutions (metro, bus, cycling, pedestrian) represent one part of this infrastructure. Another is the high level of artificial intelligence built into the software platform developed by Nokia and its partners. The possibility for people to locate their friends and family, and keep track on where they will be over the coming three to four hours has radically improved the efficiency of the society. If you for instance came by bus to work, but you need to get back home quickly, it only takes a few seconds to find out whether somebody living close to you is about to leave from work

at the same time you intend to leave. A couple of more seconds and you and your friend have confirmed the details of when and where to meet. Simultaneously the system registers your collective behaviour, which in turn affects your carbon account. Your carbon account affects your personal tax rate, which is incentivizing low carbon behaviour.

The research presentation has finished, and there is now an opportunity to pose questions. One of the students wonders how the notion of Eco-Luxury has been perceived in the other cities. The reply is that such a discussion has unfortunately not been fruitful in other locations. Because of the missing infrastructure, there is no equivalent for the service flexibility available in Tapiola in any of the five other locations.

The discussion is concluded and then the Aalto-researcher announces a positive surprise to the students: Cyclists' has promised to give the students free eco-luxury points, redeemable for any means of transportation or local food specialties to all the students as a reward for their enthusiasm and collaboration. The students spontaneously break out into a "Hurrah" exclamation.



3.3 GROWTH ENGINE

Mike Flurry is in a hurry. He has been in Espoo for three days, and has just got off the metro at the Tapiola Sports Park station. He will have a final meeting with the city planning representatives of the City of Espoo in order to rate the Sports Park neighborhood for LEED-ND certification.

The LEED (Leadership in Energy and Environmental Design) certification system originating from the United States is now also widely used in Europe. It is a system to define and measure both green buildings and green neighborhoods up to one square kilometre in size. Moreover the LEED certification has established a standard for assessing and rewarding environmentally sound neighborhood development practices.

LEED for Neighborhood Development (LEED-ND) empha-

sizes site selection, design, and construction elements that bring buildings and infrastructure together. LEED-ND doesn't restrict itself to evaluating buildings, but also assesses the location of those buildings, the way they relate to each other, and qualities of the public realm that knit them together. When evaluating whether a neighbourhood is fulfilling the LEED-ND criteria five categories are evaluated, three major ones and two bonus categories: Smart Location and Linkage, Neighborhood Pattern and Design, Green Infrastructure and Buildings, Innovation and Design Process, and Regional bonus credits.

LEED-ND pilot in Espoo

The Sports Park project is a typical project for LEED-ND certification. It represents a mix of uses and intends to provide a broad variety of services for its residents and workers and enable people to drive less and safely walk or bike more.

The Sports Park project has been through LEED-ND's three-stage certification process.

The first stage, ***Conditional Approval of a LEED-ND Plan***, had been submitted by the City of Espoo together with its partners in 2012. It was approved and became eligible to achieve LEED for Neighborhood Development certification.

The second stage, providing the ***Pre-Certified LEED-ND Plan***, was completed in 2015 when 100% of the Sport Parks project's building premises had been fully entitled by the City of Espoo. The plan was approved and subsequently listed as a Pre-Certified LEED for Neighborhood Development Plan on the USGBC website.

Today's meeting is part of the final stage, where the project is evaluated in order to get the ***LEED-ND Certified Neighborhood Development*** status. This final step is now possible as the project has been able to submit documentation for all prerequisites and attempted credits, as the project has been completed.

Espoo – going for Gold

Mike has really enjoyed working on this project. The enthusiasm of the participants was evident right from the start. He felt that the people were not just aiming to get the neighbourhood certified, but were aiming high: for a Gold or Platinum certificate. The aspirations of the LEED programme to not only function as a certification of technically compliance with external requirements, but indeed being a catalyst for a broader and engaging city planning process has been well embraced by this project

The three cornerstones of Espoo's strategy: clean, caring, and innovative, provide a perfect soil for LEED participation. Because of this the Sports Park project has been a great project for LEED. The dedication and professionalism shown by the Finnish participants has been a great asset for the further development of the LEED process.

Some of the objectives of LEED-ND are to improve efficiency in land use, reduce per-capita use of energy and water, and make the neighbourhood less dependent on cars. As the first LEED-ND project in Finland, Sports Park has served as a closely reviewed model for other sustainable development projects across the country. In addition it has become one of the main symbols for the new Tapiola, which has transformed the original ideas behind Tapiola as a Garden City into the new urban requirements. This new image has also received plenty of international recognition and admiration.

Mike considers the strengths of Sports Park according to the LEED criteria. One is definitely its central location, which helps to increase urban density. Furthermore the closeness to schools, sports facilities, Tapiola shopping centre and Aalto campus is a great asset for the Sports Park neighborhood. Another criterion the Sports Park does particularly well on is the way energy efficiency has been achieved. Using the heat from the metro line as an energy source is a perfect example of eco-conscious behavior favored by LEED. The transport arrangements are also good. The whole neighborhood is

built around the metro station, with fully electrified shuttle buses to support handicapped and elderly persons for example visiting the popular ice-hockey, soccer or basketball stadiums to cheer their local teams.

The Sports Park project has also served to educate many construction companies, subcontractors, and suppliers on green building. That knowledge base is now benefiting the whole city and region through a ripple effect. Companies have gained experience meeting the rigorous standards, such as recycling construction waste. It is now widely accepted that it's a competitive advantage in Espoo to be able to deliver a green building project.

Mike enters the meeting room, where the atmosphere seems calm. This is the final meeting of a hectic week. However a slight degree of nervousness can be sensed, as the outcome of today's evaluation may be decisive for the final categorization of the project. The remaining topic to be evaluated is Innovation and Exemplary Performance.

Before going in to the formal evaluation discussions Mike has asked each participant to present a brief personal reflection of the project, looking back on the ten-year development that now has been completed.

Positive collaboration atmosphere

The construction manager opens the presentation. From his perspective the starting point for the Sports Park project was good. In August 2010 Sello Shopping Centre became the first European shopping centre to be awarded a gold-level LEED certificate for ecologically sustainable operations. Sello had collected green points for its excellent public transport connections, green electricity, energy management, water efficiency, and sorting and recycling facilities for merchants and customers, among other things. The success of Sello acted as a strong motivational factor for Espoo City management to pilot for a LEED-ND certification. Therefore the suggestion to use the

Sports Park project as a pilot met with very positive responses. The construction manager concludes that this positive atmosphere combined with the international experiences from ecological construction provided by his company acted as the catalyst for the project to really take on the challenge of making an extraordinary contribution.

Efficient and flexible transportation solutions

The representative from Fortum continues by elaborating on the transportation solutions of Sports Park, which have received a lot of positive feedback. Fortum had already in 2008 signed a cooperation agreement with the City of Espoo to develop the infrastructure needed for recharging electric cars, thus enabling a smooth adoption of an electric car fleet. This original cooperation has intensified over time. The Sports Park is a good example of how to take the requirements of electric vehicles into consideration right from the start when developing a whole neighbourhood. Another significant part of the energy solution has been the testing of solar panels on a large scale in Finnish conditions. As a matter of fact this pilot became a great success encouraging both Espoo and Fortum to intensify their collaboration in solar energy.

A new way of working in city planning in Espoo

The representative of Espoo city planning agrees. She highlights how revolutionary the changes related to energy efficiency and sustainability originally were for the internal processes of Espoo. It was difficult for city planners to accept that they would have to be involved with other parties when making their plans. The traditional way had been that the political system provided the guidelines, but the planning professionals had almost universal authority to make the plans.

Today's very open and interactive process has been the result of the consequent strategy of Espoo to invest in energy efficiency and renewable energy and see this as a key element of planning. For Es-

poo the path towards a low carbon city has to include factors such as the planning of land use, the enabling of different kinds of energy production alternatives, the quality of construction, and transportation planning. The comprehensive transport plan built around West Metro is an integrated part of the low-carbon city planning. Using renewable energy sources, such as geothermal, solar and heat energy from the metro are integral parts of the Sports Park project, resulting in a highly energy-efficient neighbourhood where the quality of life is simultaneously rated high by its inhabitants.

The use of technology has also increasingly enabled city planning based on people's realized behaviour. Real time probe data from mobile phones depicting commuter streams and movements has been analyzed to help design more efficient buildings and city plans. The buildings themselves are also routinely equipped with integrated sensors and management systems that manage the energy use of the construction based on real time people presence and activities.

Buildings are designed based on real time data of people's movements and activities.

Satisfying large corporations to attract skilled professionals

The director of economic development continuous, on an excited note, that the inhabitants are not the only ones satisfied, but the large corporations that this way could influence the planning of a complete neighbourhood have benefitted from the project as well. Many of the large companies had previously been dissatisfied with the quality of life they could provide to their leading professionals. As competition for talent continuous to be severe, it is important for Espoo to be regarded as an attractive location for the large companies located in the city. The planning of the Sports Park area has balanced environmental considerations and the quality of life.

The Sports Park is only a couple of minutes from the Keilaniemi metro station. The development also considered the interest of the large companies having their offices in Keilaniemi. These considerations have paid off. Besides the existing companies being satisfied with the results, the good image of the area has attracted a number of new entrants to set up operations in Espoo. This development has acted as an engine for growth in an otherwise challenging economic climate. Furthermore the development has also right from the beginning been characterized by its focus on sustainability, scalability, and replicability. In this respect the participating companies have been able to rapidly leverage upon the results that have been achieved in the project.

The access to good schools (in Finnish, Swedish, and English) within walking distance is another factor that makes the area attractive, especially for expats. Moreover the area has also extensive sports and recreation facilities, and is known for a tolerant attitude towards different origins, which has further increased its pull among foreigners.

Espoo – competent but humble

Mike listens contented to what they say. This is music for his ears. He cannot help feeling a little bit sad, since this is his last meeting with

these Finns. They are so genuine. They have worked hard to make this project a success story. Right from the beginning it was clear to him that it was a group of very competent, but still very humble people, who even seemed a little bit shy as the project was new for them. Subsequently they have proven to have a very broad and deep understanding of the societal aspects which they have been able to bring together with detailed technical matters, which is also evident in the discussion now going on. When they moved into these concrete discussions their professionalism blossomed. They really knew what they were talking about. They were well educated, and eagerly travelled the world to see and hear what was doable. Then when they came back they were good at applying what they had learnt into their own local conditions.

The final comment comes from the representative of the sports community. Involving him on the core planning team had right from the start been a seed of controversy. Even though the theme of the area is the Sports Park it wasn't obvious that somebody representing this view should be involved. It was however soon realized that the vicinity of the sports stadiums was an important asset for the whole neighbourhood. The different sports clubs and entrepreneurs had then struggled to find a candidate that would suit the majority in order to represent their view in the planning team. In the end they succeeded. Retrospectively this was very good for the project, and the sports perspective provided many useful details that in the final implementation considerably improved the user friendliness of the area. The only thing he wants to add to today's discussion is his satisfaction with the way the whole project has opened the eyes of the political decision makers in Espoo to the benefits of sports activities to the society as a whole. This shift of attitude has for example resulted in an increase of sports activities at school.

Mike makes his final remark to the participants. He didn't know much about Finland when he got this project on behalf of the LEED organization. He did indeed know about Nokia, and was aware of

Finland's role as a neighbour to Russia. He therefore feels that this project has been a very educational and really pleasant experience for him. As he compares this project with similar ones in other countries it is apparent that this particular project has attracted a broader interest than any other similar project he has been involved in. Political decision makers on local and national level, C-level executives from blue-chip companies like Nokia, Kone, Fortum, ABB etc., and the President of Aalto University have given their contribution to this project. This is visible in the final result as well. This is an extraordinary achievement, a landmark contribution of Finland as a source of creativity and innovation. Mike is moved by the sincere atmosphere and concludes that he will genuinely miss this project, the sincerity that has labelled the work, and the discussions throughout the process.

The formal evaluation meeting can begin.

3.4 ACTION DRIVES

Ilpo Korhonen leans backward; once again he is driving back to Uusikaupunki after a series of meetings in Helsinki. The sun is shining and he looks forward to a nice boating weekend in the Finnish archipelago with his family. June is really an enjoyable period when living in Finland!

50,000 fully electrified cars in Finland

Ilpo is in a good mood. The reception and press conference had been very emotional. Ten years earlier, on June 7th, 2010, the Eco Urban Living initiative was launched. It was therefore a great pleasure to celebrate the tenth anniversary and at the same time announce that 50,000 fully electrified cars had been registered in Finland. The happy customer buying car no. 50,000 had received a diploma and

a trip for four persons to the Valmet Automotive plant in Shenzhen, "the new Detroit", the world's leading centre for the production and development of electric vehicles. This would not have been possible without the Eco Urban Living initiative that brought together the key players in the very early phase of the development of electric cars in Finland.

At that time in 2010 many people doubted whether we really faced a disruptive change in the motor industry. But already the following year the volumes started to increase. Support from the government enabled several companies to invest in quite large testing fleets, giving the Finnish electric vehicle industry a real boost. Automotive components, smart grid technology, traffic control, user interfaces and customer experience were all integrated into the comprehensive testing programme, which benefitted a large number of companies, and stimulated growth and internationalization. This also created a lot of research activities involving Aalto University, VTT, Metropolia, Laurea and others. This concentrated effort was also internationally recognized, which further helped to produce good results, both for the companies but also for the research purposes.

Global ecosystems

Valmet Automotive together with Fortum, Nokia and Nokia Siemens Networks took the lead to build a versatile electric vehicle ecosystem. For Nokia this was a new growth opportunity, as small networked producers more and more had invaded Nokia's traditional stronghold in mobile phones. Fortunately Nokia understood that the next big thing was automotive and joined the other leading Finnish companies in this area. It was also central that the Finnish government made its contribution. Thanks to the tax subsidies companies were willing to early on invest in fleets of electric vehicles. Especially in the T3-area this was visible, as more than one hundred EVs were purchased to the area already in 2011. The key was that the whole

area got involved. Many good ideas came from the users, or even from citizens not using electric cars themselves, but suggesting concrete improvements.

A few years later the cost of batteries had already came down so much that the electric cars started to become competitive also without subsidies. But the initial support from the government was extremely important. This has truly been a case where the money invested by the government has neatly paid off! - Not surprisingly the Finnish President today wanted to participate in the celebration. Finland has definitely achieved something that seemed impossible ten years back. It is now a leading force in the rapidly evolving electric car industry.

However, the beginning was not easy. The first half of 2010 was a hard time for Valmet Automotive. Production volumes for Porsche suffered, and the ramp up of the production of new electric vehicles was more difficult than expected. There was also a major shift in thinking. Working with the traditional big car manufacturers like GM and Porsche was totally different from being an innovation partner when taking on the development responsibility for new electric vehicles like the Garia golf car, Think, the first serial-made electric car, and the now legendary Fisker Karma hybrid sports car.

In 2010 the domestic operational challenges were only half of the agenda. At the same time Valmet Automotive was building its own global growth platform. One significant milestone was the launch of the EVA concept vehicle at the Geneva car show in March 2010. This car immediately raised interest worldwide, and became the catalyst bringing Valmet Automotive into the inner circles of the Chinese automotive innovation system.

China leading electric car development

Simultaneously as market researchers in the Western world tried to figure out what the consumer wanted, China was executing: massively experimenting, piloting and demonstrating electric vehicles in

real world surroundings. Ilpo could still remember the report from China in October 2010, which described city by city how the 25 cities were progressing with their EV-demonstration initiatives.

One example of the Chinese determination was the Shanghai World Expo in 2010. According to an agreement between the Shanghai City and Shanghai Automotive Industry Corporation there were over 1,000 new energy vehicles produced for the Expo. These cars did run seven million kilometers during the Expo. A service team of more than 500 people monitored and fed back information about the performance to the researchers and companies participating in the demonstration. Consider that: one person following two cars, day after day! Being there, talking to the people driving the cars, following the data gathering, and checking the cars. No wonder we were left behind early on! The Chinese understood well that the development of new energy vehicles was not only about technology and information: it was equally important to consider the social architecture supporting the implementation of the new technology.

The good news was that the Finns as well understood this early on. Innovation alliances were formed with several Chinese technology leaders. Therefore Valmet Automotive was not the only one company celebrating a successful decade. The CEOs of Nokia and Fortum had also been present, as their businesses as well had greatly benefitted from the development of electric cars. In Finland electric vehicles were not developed separately as a technology project. The ambition has all the time been to develop a comprehensive low-carbon, user friendly, and flexible transportation system. More electric cars, but also more electric buses and bicycles! The West Metro construction in Espoo was here the catalyst.

It all started in Espoo

You can't help getting nostalgic on a day like this. Even though the technology, the international buzz, the interviews for the press and

the participation of the CEO of Valmet Automotive's biggest Chinese shareholder were all significant achievements, there was still another thing that stood out as especially memorable: the fact that the President of Finland had awarded Marketta Kokkonen for her visionary drive during her time as the Mayor of the City of Espoo. Ilpo couldn't agree more.

Ilpo well remembered the first meeting during spring 2010 at Gumböle Manor in Espoo. At this meeting Marketta had shown her determination to make Espoo an international show case for new environmentally friendly technologies. It had all started through her influence: the Eco Urban Living initiative, the support from Tekes, the Finnish government providing the tax relief, and the gradual acceptance by the political decision makers that this industry could become something big in Finland.

Gumböle Manor holds many other memories as well. Ilpo recalled the dinner in September 2010 when the Chinese delegation from Tsinghua University was visiting Finland. Kemira was also represented, and this was the first time Ilpo recognized how similar the strategic thinking of Valmet Automotive and Kemira was.

A successful orchestrated ecosystem

When Ilpo become CEO of Valmet Automotive in 2008 the company had since its foundation in 1968 executed its original business model of automotive contract manufacturing: first for Saab, and then for other OEMs. However, already in 2008 it was clear that the traditional role of contract manufacturers was under threat. The first discussions about the possible impact of electric vehicles were taken in 2007, and now in 2020 Valmet Automotive had definitely cemented its position as a global player in this rapidly growing industry.

Both Valmet Automotive and Kemira have a strong industrial competence, which has been combined with a global network of co-specialized partners to establish a unique orchestrated ecosystem,

wherein operational excellence and path-breaking innovation can take place simultaneously. For Kemira the industrial strength is in water technology, whereas the strength of Valmet Automotive lies in electric vehicles. Cooperation with Kemira had been beneficial for coordinating efforts with leading universities and research institutes around the world. This cooperation also strengthened the visibility of Finland abroad.

The rapid pace of development of both electric vehicles and water technology took the Finnish innovation system by surprise. Initially it looked like the government was only able to produce a stream of new studies, and incapable to show clear commitment to large scale demonstration initiatives. However, in 2011, the combined efforts of Valmet Automotive, Nokia, Nokia Siemens Networks, Fortum and Kone, highly supported by the City of Espoo, Aalto University and VTT convinced the government that electric vehicles could become a significant growth opportunity for Finland. The demonstration initiative was then quickly mobilized and became a benchmark for other similar grand challenge innovation projects. The strong support from the leading individuals in the City of Espoo was enabling the rapid ramp up. The subsequent financial support was then the decisive factor kicking it off.

The Finnish innovation system performs

For Valmet Automotive this has been a great journey. The strong foundation of the Finnish innovation system has brought success and fame for the automotive industry in the same way as it supported the growth of Nokia and the mobile telephony sector in the 1990s. Nowadays Nokia regards the electric car as just another mobile device, but that doesn't matter as long as we are all successful!

On the other hand, comparing the development of Nokia in the 1990s and the way the automotive sector evolved during the 2010s reveals a major difference. Whereas Nokia was based on superior

technology and rapid introduction of continuously improved technological solutions, the automotive success has been based on collaborative efforts. This has required a systemic approach, and simultaneous development in three different areas. Firstly, the development of the technology enabling the cost-efficient production of individual vehicles. Secondly, the gradual introduction of large-scale infrastructural changes in the electricity grid and the automotive control system. Finally, the emergence of new social innovations relating to the way users and consumers are getting used to a higher degree of eco consciousness.

Tradition and location matter – but competence matters even more

As Ilpo takes the road towards Naantali he reflects upon the paradox of locations. At some stage the role of Uusikaupunki was considered in the context of Valmet Automotive becoming a global player. The acquisition of Karmann in late 2010 had triggered a lot of speculation about the future of Valmet Automotive, and also about the future of the jobs in the Uusikaupunki region. As Valmet Automotive had acquired factories in Osnabrück in Germany and Zary in Poland, and the ownership was diversified, many feared that Valmet Automotive would disappear from the Finnish west coast. For Ilpo this has never been an alternative. He was born in Uusikaupunki and appreciates the enormous development potential provided by the long automotive tradition of the region. Valmet Automotive is a network of competence centres, some their own, some shared by key development partners, and some affiliated through different forms of partnerships and projects. Valmet Automotive provides the direction and a sense of urgency for the members of its business ecosystem. The CAN DO attitude is still the single strongest competitive advantage of Valmet Automotive.

The same CAN DO attitude was identifiable in the work done in Espoo. When the new metro line opened in 2015 the whole trans-

portation pattern changed. Fortum and Nokia Siemens Network had developed a very sophisticated traffic management system which enabled people to flexibly combine car and metro when commuting. The parking arrangements in connection with the metro stations were also well planned. Thanks to this, the CO2 emissions of the whole T3-area have significantly declined and traffic jams are now seldom slowing down traffic in the T3-area.

In fact, since 2015 the work on transportation has proceeded even further. Today it is easy for people to use shared cars and electric scooters, and different lease models make new EV alternatives very attractive for the consumer. All this has had a great impact on the infrastructure, and it is now easier than ever to combine different vehicle solutions when commuting. This development has also influenced the mindset of people. The citizens today value the public transportation much higher than just five years back.

As he passes Raisio, Ilpo uses the intelligence system of the car to connect to the camera from his boat ensuring that everything is OK. He also decides to switch on the sauna, as a hot sauna will be refreshing when getting home. Nowadays all cars, new and old, are obligated to have microchips, which make it possible to monitor traffic, speed and emissions. The system is much more intelligent: it can be connected to your personal digital assistant and integrates fully with your own personalized data warehouse. You can choose to expand your area of information gathering and monitoring. The same information then appears both on your dashboard in the car and on your own personal mobile device. So it is always with you, wherever you are. Traffic jams, closest available charging posts, and fastest routes can all be seen in the same format on both systems.

Integrating competences to serve customers

This type of integration of different competences has been one part of the success for the Finnish automotive sector. Having a strong con-

nection to customers and users is the other one. Here Espoo has been an important asset for Valmet Automotive. The rapid buildup of a large test fleet of electric vehicles in the capital region of Finland provided a competitive advantage to Valmet Automotive and its partners. The main difference compared to other demonstration initiatives was how deeply the Espoo case was integrating city planning, consumer values, and systemic changes in order to genuinely make the urban environment more eco friendly. While everybody else talked about it the Finnish strength was in execution. The first GSM phone call was made in Finland, and the same attitude has prevailed. This is also what Ilpo had tried to convey to the press earlier today. The key issue was not technology per se; instead, it was the overall improvement of the possibilities to use electric cars and other forms of eco-friendly transportation such as bicycling and light electric scooters.

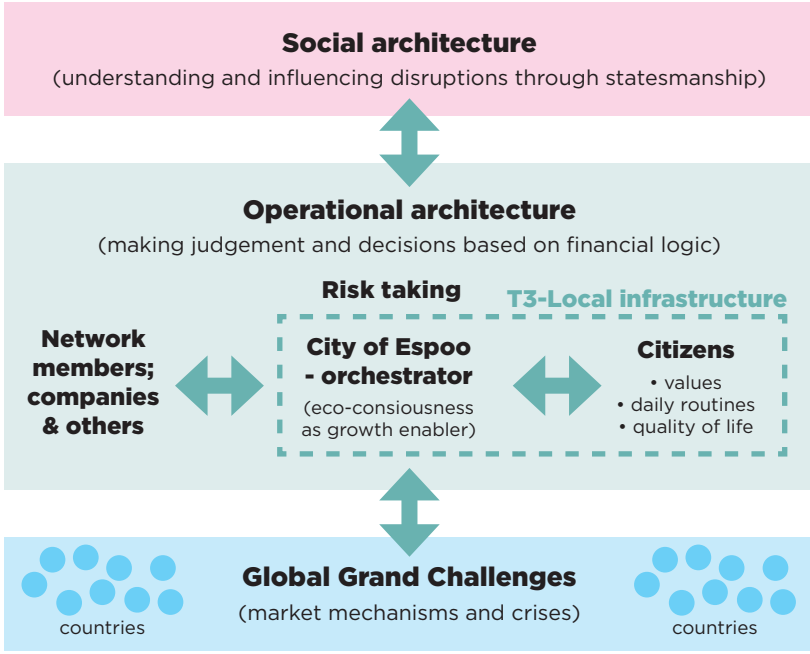
Valmet Automotive has now fully established operations across Europe, Asia, and the United States. What is evident is that the long-term in-depth collaboration between the private and the public sector has given Finland a significant competitive advantage in this new industry. This has resulted in the Espoo region sometimes being called the Ecological Silicon Valley. Finns have always been technology freaks. The same curiosity that was channelled for the benefit of developing mobile phones has now nurtured the experimentation with new applications relating to electric vehicles, also attracting foreign venture capitalists. The users have been very much involved in this success story. Ilpo drives into his garage, Finnish summer, Finnish sauna and world leading Finnish cars. What more can you ask for?

4

Attracting creative people and innovative organizations

Chapter 2, discussing the notion of Grand Challenges, introduced the orchestration framework when analyzing how different aspects have to be simultaneously considered when dealing with complex societal issues. The scenarios presented in Chapter 3 provide a basis to apply the orchestration framework in the context of the City of Espoo and the development for the T3-area in accordance with the figure below. The first scenario, Reality Rules, introduced the volatility and uncertainty originating from the external world and emphasizing the need to consider the impact of grand challenges in any innovation strategy. The second scenario, Eco-Luxury, explained how individuals may change their perceptions as citizens and consumers.

In the Growth Engine -scenario it was described how the City of Espoo can proactively shape the regional development and become the orchestrator of a broader ecosystem. Finally in the scenario Action Drives it was shown that the collaboration between companies and other stakeholders can lead to the emergence of new successful industrial clusters.



When we move from the stage of basic research into piloting, and start to organize large scale demonstration projects addressing grand challenges, cities increasingly have to take the lead. The example of the piloting of electric vehicles shows this to be happening in the United States, in Asia and in Europe. The Eco Urban Living -initiative has proven that this is also possible to do in Finland. In the case

of Espoo the T3-area has by the city been selected to be the area piloting large scale usage of electric cars.

However, as the orchestration architecture illustrates, addressing grand challenges cannot take place in isolation. The market mechanisms and crisis imposed upon the city from the outside world have to be constantly monitored, and the orchestration performed by the city has to continuously adapt and adjust based on these external influences. On the other hand the impact of the alternatives will be judged by the individual citizens. How well the new initiatives will be accepted by them will in turn affect how rapidly innovations will be embraced, and how successful they will be.

4.1 VISIONARY LEADERSHIP AND STATESMANSHIP

As the scenarios have illustrated the innovations have to impact the daily routines and the actual quality of life of the individuals in order to gain acceptance. In this respect providing a better local infrastructure, like for example new transport facilities, better buildings, and more convenient locations of retailing outlets is a prerequisite for the innovations to materialize. But how well will these improvements improve the overall quality of life of the citizens. If all these achievements will be at the expense of increased unemployment, or poorer education, the end result may be that the overall quality of the life of the citizens has decreased.

Starting from the citizen is the basis for the discussion about what the City of Espoo can do to be successful in 2020. This gives the first ingredient for a successful strategy: ***customer centricity***.

The second important factor comes from the external world. The City has to adapt to the factors coming from the outside, the global grand challenges, but also the imperatives caused by the European Union and the Finnish government. We have illustrated with a multitude of examples how political, economic, and ecological factors will interact and continuously pose new requirements on any society.

For Espoo this boils down to the issue of how to deal with an increasingly constrained environment. Subsequently we can identify the second ingredient for a successful strategy as ***sustainability***.

Starting from the customer and considering the external environmental conditions the city has to motivate and engage external parties into joint coherent actions, which in a radical way should improve the living conditions for the citizens and subsequently become replicated and used elsewhere. This implies that the strategy has to be characterized by ***efficiency***. Here efficiency means global efficiency. This is why the role of global corporations as members of the orchestrated network is crucial. In this rapidly changing world, only the large corporations have enough intelligence capacity to support the city in the risky decision-making process regarding the choices that need to be made during the demonstration initiatives.

The three requirements of customer centricity, sustainability, and efficiency represent broad responsibilities that have to characterize the decision making, where the city will act as the enabler and facilitator, but where the resource mobilization is largely based on orchestration. This imposes the final, and many ways most demanding characteristics of the successful strategy: it has to demonstrate ***statesmanship***.

Statesmanship is increasingly becoming a scarcity in today's media world. The paradox is that the more the world seems to be in a need for coherent actions and decisiveness, the more the agenda of key decision makers is filled with short-term tactical activities, and the urgent drives out the important. Subsequently statesmanship fades away, and political short-term maneuvering takes the lead.

Statesmanship will only evolve over time. In the case of the ambitious targets of the T3-area it will start with a collective commitment to the shared vision of Espoo being a front runner. This means that the activities of Espoo have to convince the key members of the ecosystem that they as well can be frontrunners in their own domains by joining forces with Espoo and its partners. Gradually each party will start to better understand how to make the best use of the ecosystem

for ones' own purpose, but also how to secure that the common interests simultaneously are looked after. Only this way will the ecosystem over time display properties of true statesmanship.

To reach its target of becoming one of the most innovative hubs in the world, Espoo has to attract resources and talent from outside the region. By organizing the different demonstration initiatives based on customer centricity, sustainability, efficiency and statesmanship, the city provides conditions for innovation that also appeal to external parties. By using these elements together with the leading companies, Aalto University, VTT, Laurea and other knowledge organizations, Espoo can benefit from the already strong capability base existing in the T3-area. The true test will be to what extent Espoo will be able to attract the attention of the largest companies already present in the area, so that their capabilities can be leveraged upon for a common good. Here efficiency is the decisive factor.

"Building a social architecture that fosters trust and strengthens collaboration becomes one of the most important features of the innovation strategy of Espoo."

The large multinational companies have a multitude of options available when they execute their own strategies. Therefore they expect that any city with whom they cooperate will show a strong commitment to the particular interests that the company has. For Espoo a key requirement is to be able to provide competitive conditions for foreign professionals that will come to the T3-region to take part in the different innovation initiatives. The area where they will live has to offer attractive services, and the general atmosphere when moving

around has to be secure and tolerant. The schools have to be reached conveniently, and international education should be a natural part of the neighbourhood where the expats will live. It is also important that the City of Espoo can socially integrate the foreigners through hobbies and other leisure activities. Whether a professional is a single expert, or somebody bringing his or her family, the need for all individuals to feel welcome and to have an opportunity to have a pleasant stay in Finland will be decisive for how well the companies (or universities, or research institutions) will be able to attract top professionals to come to Finland.

When organizing the demonstration activities the city should also be able to reduce bureaucracy to a minimum when dealing with companies. The paradox is that the more demanding the demonstration initiative, the more it will ask for senior management participation from the companies, which means that accessible time will be reduced, as these executives have so many other things to do as well. In this context the city representatives have to see the corporate partners as key customers. Accessing the capabilities of these large companies becomes the second most important task of the city after improving the quality of life for its citizens. And these two objectives are strongly interlinked!

This implies a shift in mindset in the city decision-making process. City representatives are used to a similar situation where banks were in the 1980s when the financial market was still regulated. Customers were forced to accept whatever conditions the banks presented in order to get loans. Through deregulation things changed. In the public sector the use of land and building permits represent regulated goods provided by cities to the companies. This market is becoming deregulated as well, especially when taking a global perspective. The executives of a global company have to compare how efficiently they can start up a demonstration initiative in India or China with the T3-alternative in Espoo. This is the practical implication of globalization,

which has to be understood by the whole organization comprising the City of Espoo as a municipality.

Finally Espoo also has to provide value added for the companies in respect of international networking. As a large company is looking for rapid scaling up of its demonstration initiative, it means that any leveraging the company can get from the international network of Espoo is valuable. In this case the example of Espoo actively nurturing its relationships with Shanghai, its sister city, is a beneficial asset that can be valuable for companies that Espoo is partnering with. Building a social architecture that fosters trust and strengthens collaboration subsequently becomes one of the most important features of the innovation strategy of Espoo.

4.2 TOWARDS A REGIONAL INNOVATION ECOSYSTEM

The scenario process clearly identified the possibilities for Espoo to initiate a number of initiatives that together would enable the city, and especially the T3-area, to evolve into a leading international innovation hub.

The large volume of upcoming construction activities connected to the West Metro project also provides a natural basis for an innovative approach. In the same way it has become evident that the piloting of electric cars in the T3-area also can be leveraged, and additional companies are interested in joining the next phase of the demonstration project.

Both the management and the political leaders of Espoo have during 2010 shown strong support for the new type of innovation process addressing grand challenges. As the example of electric cars indicate it is also important that the demonstration activities also get supported by the Finnish government. The examples of France, the United States, and China illustrate how massively some countries are investing in this type of innovation activities.

To put the capital region of Finland on the map of the most successful innovation areas in the world in 2020 will ask for strong governmental support, and broad consensus across different stakeholders that this is a matter to be given top priority.

Activities are already going on to mobilize such support. The City of Espoo in collaboration with Aalto University and RYM Oy should result in a significant mobilization of resources to support innovative behaviour in the construction area, using work to be done for the metro in a new creative way.

As the work progresses the rewards will become bigger, but so will the risks increase as well. Therefore it is important that the leading individuals in the T3-area that now have started to jointly define a common agenda will have time and energy to continue the work to make sure that the good start can be used to speed up the development.

The year 2012 is already an interesting intermediate milestone as the capital region then is the World Design Capital. The Finnish innovation system is highly respected in the world, and the formation of Aalto University got a lot of publicity already before the new university was even established. Innovation specialist John Kao wrote in the March 2009 edition of Harvard Business Review that the formation of Aalto University will bring together experts form disparate areas to develop new approaches to common problems, this way driving innovation from cross-disciplinary efforts. To achieve this there is a need for an ecosystem with shared purpose, common managerial culture, and the requisite orchestration skills. The scenarios generated through active participation from leading professionals in Espoo hopefully will further convince Espoo management that the vision can become true, and give indications for how it can be achieved in practice.

Acknowledgements

The writing of this report has been based on the input of very many people. Some have participated through interviews, others in joint workshops. In addition Synocus has had many other activities going on in parallel which have one way or another related to the themes that are covered in this report. Insights from these interactions have influenced the writing as well.

The steering group of the Eco Urban Living initiative, Kari Ruoho, the City of Espoo, Marie Fossum, Fortum, Floris van de Klashorst, Nokia, and Ilpo Korhonen, Valmet Automotive has been actively involved in the project, and their insights have strongly helped when developing the ideas here presented. The project group consisting of Tiina Sekki, Espoo, Maarit Pihlajaniemi, Fortum, Outi Toijala, Nokia, Hans Svensson, Valmet Automotive, have as well actively contributed to the results.

Internally at Synocus Henrik Hultin has been the project manager, and he has carried out most of the interviews with external experts. This information has been carefully studied and analyzed, and has particularly influenced the content of the second chapter. In addition the Synocus team has consisted of Karin Ahlbäck, Peter Kenttä, Aleksi Kärkkäinen, Patrik Laxell, Dan Lei, Malin Lindholm, Teija Virtanen, Ghita Wallin, and Malin Östman. All of them have made

important contributions to both the actual process of engaging interest for the scenario process, but also in the final work of writing the report.

The ambitions to have a report that not just technically transfers what different work groups have suggested means that somebody has had to make the decision of how to combine different inputs into an aggregated whole. This has been my responsibility. This has also meant that many of the fictive events placed in the year 2020 didn't originate from the work of the scenario groups, but were created to communicate the underlying thoughts that have emerged during the process. For these interpretations I take full responsibility. If somebody feels that I here have used the freedom of the artist too broadly I can only apologize. Still I hope that the ideas here presented will help in the shared vision we all have to make Espoo and the T3-area a true global success story.

Helsinki, 22 December 2010

Johan Wallin

June 5th, 2020

How did Aalto Campus in Otaniemi evolve into one of the leading innovation centers in the world? How did the new towers transform Keilaniemi, the home of Nokia, Kone and Fortum, to a vigorous and creative living area? How has Tapiola become renowned all over the world as a pioneer in urban eco-consciousness, starting by being a Living Lab for electric cars? These are some of the questions addressed in the scenarios presenting the evolution of the area of Otaniemi, Keilaniemi and Tapiola (also known as the T3-area) for the coming years.

The scenarios present the City of Espoo as a dynamic and attractive environment both for business and living. *Eco Urban Living* also addresses some of the risks and dangers that are ahead. There are concrete suggestions for measures to be taken by city and government officials, as well as corporate managers, to secure that Espoo and Finland will become winners in a society increasingly concerned about sustainability.

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