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Selling 'promiseware' and securing the public good
The dialectics of constructing an information infrastructure for the future city

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Introduction

Technology design is practical work of envisioning and creating alternative futures. This paper stems from a need to conceptualize resources of imagination at play in observed processes of negotiation, argumentation, and decision-making related to the infrastructure emerging with the proliferation of telecommunications networks. In the light of a case study from Finland, I discuss this process as the *dialectics of selling promiseware¹ and securing the public good*. This characterization is motivated by the double role of the broadband networks, which on one hand are the backbone of the extremely high-stake ICT business, both as a transmission medium and a product. On the other hand, access and participation in activities associated with fast internet-connections are gradually starting to create and mark opportunity, membership and marginality in societies like Finland. There are strong advocates among e.g. academics and urban planners, for defining broadband networks, at this relatively early stage, legally and operationally as part of the ‘public good’ in order to secure that the ‘basic infrastructure’ of tomorrow is an inclusive one. There is also another aspect to securing the public good in the current development, and that has to do with the overlap and conflict of the material layers of the cable networks with existing public infrastructures.

The basic tension in the ongoing construction of the future information infrastructure in the Finnish context can be understood to be between market driven development and planned development. But how are these negotiated and constructed in practice? Where do they come from, and who advocates them? Planning ideals, rationales and logics are stratified, changing and contextual. Even the market logic, which can be understood as a fairly simple force, is somehow brought locally to design and decisions, and hence technologies and systems-in-the-making.

¹ By ‘selling promiseware,’ I mean that aspect of these techno-economic activities, which can be understood in terms of inventing and creating needs that fit existing technological innovation pursuits. This has been particularly clear when the question ‘What can we do with the high capacity network?’ has been asked. There are two main types of answers: The first type I call ‘techno-optimistic’: “We can chat on-line 24 hrs with our neighbor.” “We can order a retail product by the push of one button”. These visions are common among technology developers. The emphasis is on making everyday life easier. The other type of answers I call ‘rationalistic’, they are connected to visions of increasing efficiency and control: “We can monitor our water and electricity use more effectively.” “We are automatically in contact with the emergency center.” This is the most commonly used and accepted way of arguing for the need for new services. (See Bazermann 1999, Haug 1982, Pantzar 2000 (in Finnish), Kangasoja 2001 (in Finnish)).

The paper is structured so that I begin by giving some historical background to the situation in Helsinki. Then I introduce some of the theoretical sources that have motivated thinking design in light of the diverse imaginaries at play. After that I present some findings from my case study. I conclude by connecting the envisioned technical solutions to the negotiations of the boundary between the public and private sectors.

The materiality of information infrastructure

An interesting question in the Finnish context is, how is it that building the broadband



networks have become a point of contention, when there is otherwise a practical unanimity concerning all other forms of activities understood as *information society development*²? One articulated reason is the streets. In Helsinki, which I have studied, some of the city fathers and civil servants, particularly in the street department are quite concerned about the broadband networks. Or rather how their building and installation is organized at the moment. Thin optic fibres are covered and bundled together into

cables³. Several of these cables fit inside a tube with diameter of 110 millimetres. Tubes (see pink colour tubes in the picture next page). Tubes are installed in the underground layer of streets or inside other structures, such as channels made for gas pipelines. In these

² The Finnish commitment to information society has been interpreted in terms of a national identity project (Castells and Himanen, 2001).

³ The use of glass fiber, or fiber optic as medium for pulses of light for the purpose of data transmission marked the beginning of the current large scale broadband development. Fiber optic networks have a very high transmission capacity and they are also relatively cheap. Even though existing networks of coaxial cables (e.g. cable TV) and old copper telephone wires are being upgraded to enable faster internet connections (ADSL), billions of kilometers of new fiber-optic networks are being installed, mainly by large telecommunications corporations for their own use, or by companies specialized only in network building and capacity leasing. The diffusion rates of broadband connections are used (see OECD comparisons) as an indicator for a nation's progress in the information society development.

underground tunnels the cables share, or fight over, the limited space with networks of other basic infrastructures such as water, sewage, and electricity⁴.



Why have the cables suddenly become a concern, after all telecommunications networks have been part of similar underground structures for a hundred odd years? The deputy mayor of Helsinki articulated his concern like this:

”Anyone who walks in Helsinki can see that the streets are wide open all too often. There happens to be such legislation in the country, which allows practically everyone to rip the streets open in order to put another cable in the midst of the old ones. There are, who knows how many, of these companies in Helsinki... Urban life is about to turn into a regular hell if we can’t find a way to change this!”

There are deep desires to find a once and for all solution for the problem. However, that has proven to be very difficult, since at this point the ‘society’ seems to have contradicting ways of defining costs, benefits and preferred outcomes. The dilemma was articulated by a representative of the Finnish association of the TCs like this:

“Telecommunication services have become ‘information society services’, and in that way stepped up a ladder in the hierarchy of social policy. The Finnish society, through the government has taken a stand that we need these services, which means we need those cables underground. For the municipalities it is about the streets, for the telecommunication companies is about their business. It is the same person that walks on the street and uses telecommunications services. Costs and benefits cannot be looked from the perspective of one service only.”

⁴ The number of kilometers of cable continues to be in the increase as fast digital services (data, voice, tv) become prevalent in households. In the conceivable future mobile phones and other wireless applications will also continue to require underground transmission networks in addition to radio links.

The tension over the underground space between the municipalities and the telecommunications corporations (TCs) is a fairly recent one, and results in the full scale restructuring of the telecommunications field after the national legislation started to reflect the European Union level de-regulation policies in 1997. Up until five years ago, the field was one of the most stable, consisting of local cooperatives owned by the phone owners of the region. Each of these public teleoperators (PTTs) had a teleoperating monopoly for its area. The field has tuned into a multi-actor setting with fierce competition. In this short period the Finnish markets have seen the appearance and the disappearance of several new international and a few domestic companies⁵. Currently in the Helsinki region, there are approximately ten companies offering phone and internet-services, either delivered via their own cables, or by leased transmission capacity from another TC's network.

Building telecommunications networks is a reactive business, apart from the few global network operators whose competitive advantage are very wide networks, the strategy is to build only on demand. On the other hand in areas of high demand, like downtown Helsinki, several parallel telecommunications networks have been constructed, each with the capacity to handle all of the demand. One street might be opened several times, when each of the TCs install their own networks without co-ordination between other the companies, or with the public works department of the city. This practice has created overcrowding in the underground structures, but more importantly, costs and annoyance to the street users, i.e. tax payers. The civil servants worrying about the street keeping activity, and some of the city fathers worrying about the long term prospects of the described development, have taken ownership in the debate over the meaning of the new infrastructure.

The paper examines this ongoing debate in light of data from a case study conducted during 2000 –2002 on the development of a mixed-use city district called *Arabianranta*. Arabianranta is an area of 85 ha on the Eastern shoreline of Helsinki, ten minutes car ride from downtown. It is the location of one of six major ongoing housing development projects in Helsinki. The planning of the housing project started ten years ago, and the first houses on the land owned by the city (most in the area) have been completed during this summer. By the

⁵ Most of the Finnish markets are still governed by the former cooperatives, which have become corporations and as such are now part of the constantly shifting alliances of the global telecommunications business.

year 2010 Arabianranta will be home for 7000 people, 2000 students and approximately 3000 workers; in other words it will be the size of a small Finnish town. Arabianranta is an old industrial area, with long tradition in art and design, originally ceramics, now increasingly digital and media are represented. The area hosts a cluster of arts and media higher education institutions and hopes to see a booming growth in small and medium size companies in these fields. One component of the Arabianranta project has been that the area is a pilot project in the creation of district wide broadband information infrastructure. Arabianranta will be one of the first fibre-to-home areas this large in Finland, and globally. The study of the Arabianranta development is the empirical research component of my doctoral dissertation work-in-progress⁶.

Conceptualizing diverse imaginaries in design

In her article 'Re-Imagining Land Ownership in Australia' Helen Verran discusses negotiations over a land title between Western pastoralists and Aborigines. She describes a coming together of these two knowledge traditions embedded in very different ways of understanding who/what can act or be known about. Helen Verran calls these ontic/epistemic commitments *imaginaries*⁷ (1998, 239). She writes that imaginaries are pictures and stories, which people tell with their metaphors and causal connections. Imaginaries are not located in minds, but in the concrete practices where all knowing and acting happen. (Ibid, 252).

Verran suggests that a conscious 'working together of disparate imaginaries', or a 're-imagining' is has to take place in order to keep the dominant tradition from translating and thereby overriding the alternative knowledges and ways of knowing to fit its own categories (ibid., 243). Processes of translation in the Latourian sense should not be regarded as happening only in the structures of communications. In discussing how difficult it is for us to

⁶ The data for the research discussed in the paper has been gathered mainly during the years 2000 –2001 by participant observation in four series of joint meetings around of the Arabianranta information infrastructure: A) broadband community network project (15 meetings from August 2000 until the launching of the ArabiaNet on the 11.6.2002), B) local service portal Helsinki Virtual Village-project (18 meetings), C) real estate technology project (10 meetings), D) interaction between the residents and city planners (five meetings), and one researcher initiated intervention seminar. Data consists also of 34 interviews with Arabianranta stakeholders and a large collection of documents, including on-line content of the web based local community portal <http://www.helsinkivirtualvillage.fi>

⁷ Verran notes that she adopted term 'imaginary' from Michele le Doeff 1989, and that she uses it in a way that has similarities to Haraway's (1997) usage of the term 'trope'.

deal with the unintelligible history of confrontations, Foucault warned against reducing reality to discourse by saying that it is a way of ‘avoiding its violent, bloody and deadly character, and reducing it to the pacified and Platonic forms of language and dialogue’ (In Billig & al. 1988, 161).

Verran notes that the presently prevalent practice orientation in science studies takes the locality of knowledge making in contexts constituted by ‘heterogeneous material-symbolic assemblages’ as a starting point. She suggests that now is the time to go beyond the descriptions of these heterogeneous material-symbolic assemblages and take a step towards identifying and engaging in ‘a politics waged over ontic/epistemic imaginaries’ (Verran 1998, 240). Her suggestion as a way forward in the negotiations of the pastoralists and Aborigines is to understand themselves together as an epistemic/ontic community, to commit themselves to at least a partly shared imaginary through which the issue of debate, the land is meaningful (ibid. 252). Although tensions between divergent viewpoints in our studies of technology design are often more subtle, they are not necessarily less significant in their consequences, as Bowker and Star show in unraveling the implications of seemingly innocent classification systems. Conflicts over meaning are at the heart of negotiating and creating new technologies and infrastructures (Bowker & Star 1999, 285).

Judith Gregory examines explicitly the internally contradictory nature of imaginaries in the context of technology design (Gregory, 2000). In her study of an innovation trajectory of an electronic health record system she sought to understand where the imaginative power to launch and sustain such an innovation project comes from and how the persistence of such efforts can be explained. In order to get an analytical grip on the socio-historical, heterogeneous and argumentative dimensions of the forces driving innovation projects, Gregory proposes the intermediary concept of *incomplete utopian project* (ibid., 169–174). In her usage *incompleteness* stands for the open character of the projects, which allows them to accommodate contradictory elements, shape them and be shaped by them. Gregory identified several longstanding desires, and intellectual projects, which had rather independent lives, but which in the innovation process became intertwined in a way that, rather than competing, inter-activated each other.

The shared utopian project links heterogeneous actors engaged in diverse efforts by giving their purposes together coherence and momentum. ... Incompleteness keeps possibilities open and offers hopefulness in the face of difficulties encountered in unprecedented situations so long as possibilities for breakthroughs, change, success are not shut down or precluded. Incompleteness keeps genuine spaces open for the actors and by doing so, allows and encourages actors and allies to keep moving, whether by keeping faith in a plan, by improvising and enlisting new allies and actors, or by inching and lurching ahead towards an interim semblance of completion. (ibid., 176 – 177)

Like Gregory's work suggest, if we view imaginaries are materialized and lived cultures of argument, they must be regarded as dynamic and changing then like the practices they stem from. This is a particular way of understanding the problem of 'multiple perspectives', and very different from the often implicit way of equating perspectives with certain conflicting interests, leaving the formation and transformation of these interests outside the scope of discussion. Reijo Miettinen in his studies of innovation processes (1998, 1999) has taken up the question of where do interests needs and motivations to take part in a particular innovation process come from.

Miettinen uses the framework of cultural historical activity theory (see Engeström, Miettinen, Punamäki 1999 for an overview of the tradition) and conceptualizes the participating organizations as local historically evolving activity systems. The activity theoretical methodology takes a network of local interacting activities, or activity systems, as a starting point and unit of analysis. Activity theoretical methodology is object driven, i.e. researchers follow the evolution and transformation of the object of collaborative work⁸ (Engeström 1987, 1990, Miettinen 1998). Hasu (2001) and Engeström & Escalante (1996) suggest that we can gain understanding of the dynamical and developing nature of technology design, production and implementation by looking at the tensions and contradictions of each of the activity systems involved. Contradictions are manifest in the daily practices as breakdowns, tensions, ruptures and innovations. They call for re-working conceptually and very concretely the objects and motives that sustain the activity, and for re-mediating the activity system by way of improving and inventing new tools.⁹ This collaborative process following Marx's use

⁸ 'Object' has a particular meaning in the activity theory tradition The notion of object signifies both the material instantiations (in space and time), and the ideal layers of more longstanding motivations that drive a particular activity and give it meaning (Ilyenkov 1977).

⁹ See Bertelsen & Bødker 2000 for case studies using activity theory looking at the role of information technology as an object and tool in local activities.

of the category of ‘praxis’ creates both the subjects and the objects in a co-constitutive process.

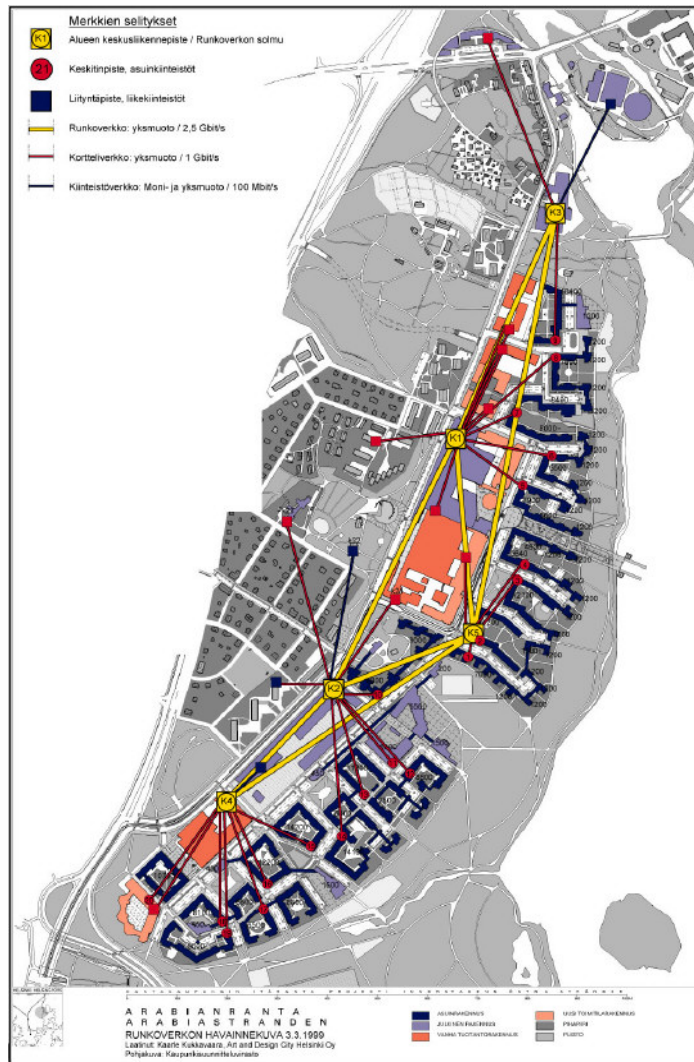
Alternative models for broadband development and case Arabianranta

There are three main alternative models on how the broadband infrastructure should be brought about¹⁰. The first model, market driven development, has the most powerful supporters. It echoes EU level policies, and represents the ‘new orthodoxy’ in Finnish policy level discussion. The basic idea is that the best result comes from free market competition among the telecommunication service providers. The model implies an unarticulated self-regulation of the field, and the role of the public sector is to create favorable conditions for the corporations. The second model, ‘freedom, which comes with an obligation’, is concerned with the question what happens in rural and peripheral areas where it is not feasible for the companies to build networks. The model would solve the problem by applying the universal service obligation principle¹¹ of the telecommunication field also to broadband connections. The third group would like to see the broadband connections as part of basic municipal infrastructure offered to everybody at low cost. This model preserves the public control over the infrastructure, and the role of TCs is to provide the services ‘business as usual’; when and how they are asked to by the municipalities. The model is called the *Stokab*-model, and it comes from Stockholm, Sweden, where the city is a telecommunications service provider itself.

Arabianranta is thus far the only Finnish experiment with the ‘public broadband’ advocated by the third group. Anticipating the effects of the deregulation of the telecommunications field the city of Helsinki hoped to come up with a solution that would minimize the nuisances. Arabianranta, a new city district under construction was selected as a test case. The city council decided in 1997 that the Helsinki Energy Company together with the Public Works Department would design and install a fiber optic broadband cable network to the area. The idea was to make an investment in the infrastructure, and then lease the capacity to all TCs alike at a very affordable price. That way, the city hoped, the competition would move on the level of ‘content’.

¹⁰ The models are generalizations from public discussion in Finland.

¹¹ Universal Services are the set of basic services that must be made available at an affordable price to all users by public or private operators irrespective of the user's geographical location.



Arabianranta has currently a publicly funded metropolitan area network (MAN)¹² consisting of 16 kilometres of fibre. The first parts of the network were completed in 1998. The network will grow as new houses and new streets are built to the area. From the beginning there were considerable difficulties in finding an operating solution for the network. Active network was launched only in June 2002. For years the fibres stood black and unlit underground. How is this possible? Maybe the views of the city and of the TCs were too far from each other, and they got stuck in a stabilized war. Arabianranta was a bridgehead losing it would have implications for future projects.

How to create alignment when interests are genuinely and openly conflicting? Anselm Strauss notes in his seminal book *Negotiations*, that even though social orders are always negotiated orders, everything is not negotiation. There are several alternative modes of action, of which negotiation a particular choice. Some of these are persuading, educating, manipulating, appealing to the rules or to authority, and coercion (1978, 100). When other modes are not an option, negotiation might be the only way in trying to reach a desired, or at least undesirable outcome. As discussed in the earlier part of the paper, the underground space and the practicalities of installing the cables have become the crux of the tension between the city and the TCs.

¹² MAN is a network extending over a city-wide area. MANs are larger than LANs, which usually connect computers in a single building or closely located buildings, but they are smaller than wide area networks (WANs), which can connect users in several countries to a shared network.

A meeting¹³ was called because the city had no instruments of dictating at hand. Meetings involving and hearing stakeholders are normal part of city planning and construction work, but this particular meeting was first of its kind. All of the ten TCs, who operate in the Helsinki area, were invited. Representatives of three of them showed up. The ruling theme of the meeting was the idea of a *shared channel*. With many words the representatives of the city justified the sensibility of a shared underground channel, essentially a concrete trough with empty tubes, in which each of the TCs could place their own cables. The idea of sharing a channel, rather than one single communication network, represents a compromise between the original idea of behind the Arabianranta model and the present day ‘every TC (digs the street) for himself’ –practice. The shared channel structure was an attempt, from the part of the city, to create an expansive vision for the emerging infrastructure that would mediate the paralysing tension. The new vision included new roles and a new the division of labour between the city and the TCs: The Public Works Department would take up the task of constructing the troughs as part of the underground layers of new streets, the city would lease them on non profit basis, and the TCs would start to behave more like public service organisations; make plans, reservations and co-ordinate their activities.

Conclusions

I have presented a story of some of the conflicts, concerns, and alternatives regarding the future information infrastructure. I interpret the ongoing negotiation process as an attempt to construct at least a partly shared object (in activity theoretical terms). Broadly understood the object is a future infrastructure that would integrate the public service and the business aspects and transcend the double binds. The proposal for a shared channel is an example of the kind of technical and organisational solutions that have to be made to materialize these new meanings.

¹³ The meeting was a joint meeting between engineers from the city’s energy company and the street department, and representatives of three different TCs. The meeting took place on the on the 11th December 2000.

What has been discussed here is an ongoing process of what we understand technology design processes to be: a series of closures and stabilizations of human and nonhuman networks (Suchman 2000)¹⁴.

What will happen to the boundaries between the city and the private sector, when the same physical structure is part of two activities? How will the old way of working, as it were on 'opposite ends of the same rope' change? Inter-organizational dialogue, the 'working together of disparate imaginaries' (Verran) is not a simple matter in the case of public and private sectors. This is because the problems are not only a matter of effective collaboration or different communication cultures. Disparities stem from conflicting values and imaginations of ideal worlds. Billig & al. (1988) discuss the nature of ideological dilemmas and note that:

If we have begun to examine dilemmas as ideological, as social situations in which people are pushed and pulled in opposing directions, it is because they are also seen to impose an assessment of conflicting values. The technical problem is perhaps inescapably interwoven with problems concerning the involvement with or 'management' of clients. In this way the characteristics of dilemmas are revealed as fundamentally born out of a culture, which produces more than one possible ideal world, more than one hierarchical arrangement of power, value and interest. In this sense social beings are confronted by and deal with dilemmatic situations as a condition of their humanity. (ibid., 163)

There is a historical change in planning ideals and what is 'orthodox' going on in the background of the story. The Nordic welfare society ideal is fighting for its life even within the public sector. What can be concluded from this discussion in terms of responsibility under uncertainty? I let Billig & al. propose an answer:

Our present dilemmas will reflect our present society. That being so, it becomes entirely feasible to pursue social action to change the basis of society, not in order that dilemmas will be removed *tout court*, but so present dilemmas might be replaced by others. In short, this means seeking to change opinions by changing what people might talk, argue and think about. ... In this sense, one of the goals of social action or social reform is to win a present argument in order to change the agenda or argumentation. (Billig & al. 1988, 148 – 149)

¹⁴ The debate on the different alternative ways to create the broadband infrastructure has not yet reached a closure, but it is an ongoing negotiation in Finland.

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