# Critical Points of Contact

## *-Exploring networked relations in urban mobility and service design*

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***Abstract***
*In contemporary urban societies multiple networks and systems interact, overlap, exist in parallel, converge, conflict etc. creating unforeseen complexity and less transparency. By exploring how layered networks of physical movement, service information, goods delivery, commercial communication etc. are connected (and disconnected) we get a much better understanding of how to design and intervene regardless if we are thinking about public spaces in the city or new systems of service design. The many networks orchestrating and facilitating contemporary everyday life are dependent on the strategic sites where the networks meet and establish contact. Thus we argue for the usefulness of the notion of* Critical Points of Contact *(CPC) to deepen our understanding of the actual life within networks. En route to this notion we draw upon theories within as diverse realms such as interaction design, service design, geography, and mobility studies. After the introduction section we develop the notion of CPC based upon a broad set of disciplines and theories. We illustrate the usefulness of the notion within the field of mobility in the network city and within the field of service design. The article ends with concluding remarks and perspectives for further theoretical as well as empirical work in prolongation of this beginning research effort.*

***Keywords***
Networks, Critical Points of Contact, System Analysis

## Introduction

This article takes point of departure in a cross-disciplinary acknowledgement of the fact that understanding the design of service and infrastructure systems as well as the meaning of everyday life in contemporary society need a new set of concepts and theoretical underpinning. Coming from two different research practices in service design / industrial design and mobility studies / urban design, this article aims to merge into one theoretical set up: 'Critical Points of Contact' (CPC). From research in these separate realms it has become clear that there seems to be missing a framework of analysis that explore how contemporary service systems and technical infrastructure systems carry potentials for human activities that has not yet been exploited. Such unexploited potential in networks is both of a social nature focusing on the capacity to enhance social communities and meaningful interaction, and of commercial and economic nature. Our way into this argument goes by way of using service systems and urban infrastructures (particular in

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terms to everyday travel and transit) as illustrations of CPCs. In contemporary societies multiple networks and systems interact, overlap, exist in parallel, converge, conflict etc. thus creating an unforeseen complexity and a situation of less transparency. By exploring how layered networks of physical movement, service information, goods delivery, commercial communication etc. are connected (and disconnected) we get an understanding of how to design and intervene regardless if we are thinking about public spaces in the city, semiprivate neighbourhoods or private places. In the midst of such increased complexity of the 'network society' (Castells 1996) we claim that certain points, sites and connections are more interesting (or critical) than others. The many networks orchestrating and facilitating contemporary everyday life are dependent on the strategic sites where the networks meet and establish contact. Thus we argue for the usefulness of the notion CPC to deepen our understanding of the actual 'life within networks'. En route to this notion we wish to draw upon theories within as diverse realms such as interaction design, service design, geography, and mobility studies. We propose to illustrate the usefulness of the notion of CPC at the field of service design and to the transit spaces of the contemporary network city.

## Developing the idea of 'Critical Points of Contact'

In this article we explore the potentials of strategic sites. That is to say sites or nodes where different systems meet and either traffic, friction, communication, or exchanges between systems occur. In the 'network society' (Castells 1996) there are multiple points of interaction and meetings between all sorts of networks from technological communication systems like the Internet to the street corner where traffic is being mediated by electric traffic light controls. Most often the multiple visible and invisible networks in contact are not present to the daily user as an issue or concern. The 'Critical Points of Contact' is where the systems become evident – and this happens most conspicuously at failure, breakdowns or systems fallout (Graham 2010; Jensen 2011a). Obviously systems do not have to break down or become dysfunctional for the analyst to notice or make sense of it. Rather, we would argue, the user and the analyst can 'cultivate the gaze' and thus get a deeper understanding of potentials for better design, more interaction opportunities, more efficient ways of mediating different networks systems etc. The idea behind the notion of CPC is therefore to use this concept as an analytical tool pointing at the 'hot spots' or the nodes that are 'critical' in the sense that they make a difference to either the interacting systems or the interacting user. The CPC is a heuristic devise that we seek to develop further and sustain more theoretically. We shall therefore take our defining point of departure in a mix of concepts that all seem to orient themselves towards an analytical understanding of multiple over-layering networks, their connectivity, and the daily user.

## Towards a lexicon of CPC

To start out this conceptual voyage we propose a look into the *'Oxford Advanced Learners Dictionary'* from which we have taken the three central concepts of 'Interface', 'Node' and 'Network'. In the 7$^{th}$ edition of the Dictionary we find the following definitions that will work as a set-out for the following discussion and definition of CPC:

> Interface: 'The point where two subjects, systems, etc. Meet and affect each other'
> Node: 'A point at which two lines or systems meet or cross: a network node'
> Network: 'A complicated system of roads, lines, tubes, nerves, etc. That cross each other and are connected to each other'

From this simple point of departure we now find that a CPC concerns nodes that connect and work as meeting points between systems that makes a difference. Some points of contacts are more interesting than others and this is what makes them 'critical'. The 'critical' dimension to a CPC is more about the perspective we put on it than it is a fixed ontological property. This means that depending on the analytical task at hand (e.g. an explorative ethnographic account for the everyday life in a city or a re-design of a specific service system) what is 'critical' varies. For example if we seek to explore social exclusion and public transportation, ticket prices at the entry point to the system becomes critical. But so do knowledge about how to navigate and operate within the system (this is often seen when senior citizens struggle to make their way through the increasingly complex mobility systems of today). Also the perspective on CPC may vary depending on whether one looks at it from the 'point of view' of a system or from the 'point of view' of an individual user. Seen this way CPC's may work as gateways or switches that becomes 'critical' by referring to a particular value or yardstick as for example risk, volume, economic output, equal access, technical efficiency, density, volume, friction, or strategic importance. Again this may have repercussions for the CPC's ability to function as facilitating exclusion or inclusion, access or in-access. The systems we think of in this connection are socio-technical as well as they are semiotic-communicative systems. Thereby we also immediately engage with the nexus and over-layering of virtual and physical systems and artefacts. Importantly though, CPC's does not have to be either 'low-tech' or 'high- tech'. In fact we would argue that often they work as both.

CPCs are sites of difference. They become critical when the one system changes/influences the conditions of the other as where entities, flows and qualities are *modified* as a consequence of the CPC (e.g. as when I become a passenger by a function of the CPC of the metro station and my economic resources and other capabilities to embark). Or in the words of Scollon *'some actions are more interesting than others. These are 'rubber meets the road' actions where multiple geographies are coupled through the action'* (Scollon 2008: 18). An example is the many new mediated networks and location based services that dissolve the strict separation of the digital and the physical realm (Gordon & Silva 2011; McCullough 2004).

## CPC in urban mobility theory and service design

If we move from the dictionary definitions and sources of conceptual inspiration towards the literature within urban mobility theory and architecture we find further detailing to be done. The CPC is much inspired by the notion of 'networked ecologies', which according to Varnelis is:

> *'...a series of co-dependent systems of environmental mitigation, land-use organization, communication and service delivery ... [being] networked, hyper- complex systems produced by technology, laws, political pressures, disciplinary desires, environmental constraints and a myriad of other pressures, tied together with feedback mechanisms.'* (Varnelis 2008: 15)

This again connects to Easterling's notion of 'network architectures' as sites where *'powerful protocols organize interplay, adjustment and timing among 'ecologies of circuitry''* (Easterling 1999: 1). In accordance with the perspective underpinning CPC infrastructures should therefore be understood as much more than technical systems:

> *'While infrastructure typically conjures associations with physical networks for transportation, communication, or utilities, it also includes the countless shared protocols that format everything*

> *from technical objects to management styles of the spaces of urbanism – defining the world as it is clasped and engaged in the space of everyday life. Infrastructural space is, as the word suggests, customarily regarded as a hidden substrate – the binding medium or current between objects of positive consequence, shape, and law – yet it is also the point of contact and access, the spatial outcropping of underlying laws and logics.'* (Easterling 2011: 10, our emphasis)

Within the part of contemporary urban theory dealing with mobility studies we find more underpinning to the idea of CPC, as for example when Richardson and Jensen speak of mobility within socio-technical systems (Richardson & Jensen 2008). CPC's may host human-human interaction, but are equally as importantly seen as assemblages of human-nonhuman interactions within semiotic as well as material layers of connected or disconnected networks at multiple scales from the very local sidewalk to the global flight corridors (DeLanda 2006; Farias & Bender 2010; Latour 2005). Or they may facilitate nonhuman-nonhuman interaction as when automated systems of for example surveillance and security are 'communicating with each other' without any human agency mediating.

In relation to urban theory focusing on mobility studies we may further see CPC's as sites of modal shift, friction, or speed differentials. The CPC may be a site of physical friction and interaction as well as it may offer a 'surplus of meaning' if we accept the analytical premise that mobility is movement + meaning + power (Cresswell 2006). The discussion about CPC is not just an issue of technical efficiency or cool design. Issues of social justice, accessibility, social exclusion and power lie within this conceptual discussion. As for example when Castells discusses the role of 'switches' in the network society:

> *'Switches connecting the networks (for example, financial flows taking control of media empires that influence political processes) are the privileged instruments of power.'* (Castells 1996: 471)

Moreover, such switches work as CPCs creating complex and over-layering geographies of power that signifies a new urban landscape of networks, sites and flows (Graham & Marvin 2001). The thinking behind applying CPC to urban and mobility studies is based upon a theoretical framing exploring mobility within nested networks of flows within the socio-technical systems that transgresses the traditional notion of a 'urban scale' (Jensen 2006; 2007; 2008; 2009a; 2009b). Seen this way the city is an urban field that host a multiplicity of CPC's in need of careful design if the contemporary urban field is to be an open, inclusive, and inviting one.

When focusing on service design the concept of CPC should refer to the site in which different systems of knowledge and expertise (service provider and customers, technical and inexperienced people) of different kinds (tacit and codified knowledge) are coming in contact and emphasise the opportunities for the utilisation of a service. The literature on service design emphasises the need for a correct planning of those sites that should harness different over-layering forms of knowledge in order to reduce any possible friction and instead control the quality of the interaction, time and sequences of the contact and any other experiential characteristic emerging in a CPC. While part of the literature on service design mentions the relevance of the material evidence of the service (tickets, aircrafts, shop, signs, and environments), a major emphasis is usually given to immaterial components, such as time and quality or intensity of the interaction between over-layering systems. In this perspective the concept of CPC is analogous to Norman's

*Moment of truth* (Normann 2000) or to the notion of *service encounter* (Solomon et al 1985; Sangiorgi 2004) or even to the metaphor of the *customer journey* (Parker & Heapy 2006) often used in studies on interaction design.

***Towards making CPC's operational***

We have focused on developing the conceptual notion of CPC. Needless to say we argue for an empirical application of the concept in order to first of all understand CPCs, and secondly to become able to challenge or re-design these[1]. Here we will shortly illustrate two analytical frames for unpacking the Critical Points of Contact. The first model draws upon field studies conducted into the Metro systems of Copenhagen, London and Paris (Jensen 2008).

The framing aims to explore the actual conditions of production for the mobile life within the socio- technical metro systems and might be thought of in a more operational manner focusing on three analytical dimensions[2]. The three dimensions related to them are:

- the 'technical' (e.g. trains, platforms, ticket systems, functionality, urban logistics, relation to wider city network),

- the 'social' (e.g. user groups, public domains, metro experience, feeling of being 'moved' individually and socially, ways of experiencing power), and

- the 'aesthetic' (e.g. design codes, form, art, commercials/ads, signage, symbols)

A CPC may be understood in relation to the interplay between mobilities, technologies, circulating and stationary objects, people and technology. Opening the framework up towards the notion of CPC would mean to add an analytical layer to the framing and to look for actual connections between systems. In earlier applications of CPC's to urban metros we have used the following list of questions in order for the CPC to become operational:

1. Identify a site of two or more intersecting systems performing as CPC
2. Map technical, social and aesthetic dimensions of the identified CPC
3. Make an analytical judgement of the CPC in terms of a chosen point of view/research question (e.g. technical functionality, social exclusion, economic revenue etc.)
4. Identify a potential for social and economic value that has not been fulfilled by the CPC (e.g. a service not catered for, a user group not included etc.)
5. Make a first tentative proposal for a re-design catering for the identified potential

Clearly there are many ways of dealing with the analysis of a given CPC. Here however we want to emphasize two crucial issues. First of all, the way we engage with the CPC is dependent on the 'point of view'. This obviously does not mean that if we choose to study functionality within the CPC we can skip e.g. social exclusion. But it means that we must foreground and background certain issues and themes to be able to scope our analysis and our proposal for re-design. Secondly, as we are aiming to contribute to an interventionist field of actually making design and not just doing academic theorizing, the research must focus on an 'underused potential' or a 'creative strategy' not yet perceived. So from identifying a site of two or more intersecting

systems, mapping themes of technical, social and aesthetic dimensions the research should be able to assess the CPC in relation to a given (chosen) 'point of view'. The creative moment then leaps in when forcing oneself to see missed opportunities, potentials for social networking, economic value or other issues not produced within the CPC at the moment of analysis. The end goal of challenging the CPC by means of a proposal for re-design adding value to the CPC in accordance with the identified potential is of course an ambitious task. But in terms of using this methodology to create new insights and knowledge about the actual working of designed networks a 100% sustainable or profitable re-design is not necessary for the analysis to fulfil its task. Thus a 'tentative' proposal might suffice to uncover the underpinning design logics and excavate the potentials at the site.

## Urban Mobility Spaces and Critical Points of Contact[3]

From the conceptual discussion and the analytical frameworks we shall here very briefly illustrate some of these points in relation to two cases: a study of metro systems in three European cities and a comparison between two different approaches to healthcare systems.

The first one is the case study of subways/metros in Copenhagen, London and Paris. From this research is seems obvious that we were dealing with CPCs in various levels, scales and networks. From the conclusion of the analysis we get a sense of the over-layering complexity of the metro stations:

> *'...trains, trails, stations, platforms, escalators, metro staff, travellers, signs, commercials, musicians, homeless, police force, tickets, ticket machines, power supplies, news paper stands, coffee shops, customers etc. are assembled into socio- technical systems producing the lived mobility of metro travellers in London, Paris and Copenhagen. The specific assemblage within the socio-technical system is 'what makes metro mobility' by means of sorting, filtering, circulating, and orchestrating mobilities.'* (Jensen 2008: 19)

Seen this way a metro station, depending on the point of view, contains a number of CPC's as it mediates between multiple networks and flows. The metro station itself may be seen as a CPC where the job is to disassemble and re-assemble elements of it.

### *Enter the smooth ride*

The working and design of the Copenhagen metro is both functionally and aesthetically a hallmark of cool and smooth modernism. From the signage on the ground down through the escalators towards to clean and smooth platforms rid of any signs of ornament. The first thing one has to face, as a potential user of the existing metro, is to locate a station. Due to the strict design manual the signage that leads you to the station is very discrete and are at time in danger of 'drowning in the semiotic sea' of the urban signscape. As soon as the station has been located there are two options for entering. Either by the lift, which is the most recognisable imprint of the metro station on the surface space due to its characteristic glass cage sticking up on the surface. Alternatively the route which handles the main flow is via the staircase to the first underground level. At this level the ticket machines and information flyers are located. One buys a ticket from a machine, as there is no staffing of the stations. There are train stewards on some of the trains (that are not operated by humans). The access to the station platform is not regulated by gates or checkpoints that one has to pass after buying a ticket. The Parisian and London Metro systems

cannot say to accommodate the 'smooth ride' to the same extent as the Copenhagen Metro. This is due to an obvious reason; the number of daily passengers clogging the arteries of the systems in both Paris and London are much higher than in Copenhagen. Also the capacity and complexity of the networks are very different making Copenhagen come out as the smaller example. However, there is also another dimension to the lack of 'smooth ride feel' in Paris and London. That has to do with the acceptance of various activities and deliberate design of e.g. shops and newsstands within the London and Parisian Metros. As opposed to the strict design code that reserves the Copenhagen Metro spaces at platforms and gangways for passenger circulation only the metros in London and Paris are full of other types of activities, programs and 'friction'. The Metro Company in Copenhagen prides itself of having invented a clear solution to the urban mobility problem by providing a system for circulation only. However, the Company also claims to have created 'urban spaces'. This must be contested as the sense of public domain is only felt in a minimal sense in the Copenhagen metro. No musicians, homeless, shopkeepers or vendors contributes to making the smooth flow space a venue for social interaction and culture – as would be required to fulfil any minimum definition of 'urban' in general terms. Here the adding of commercial programs and also the (partly) acceptance of musicians and people living in the Metros of London and Paris give rise to a completely different ambience and meaning. Clearly this may also then produce some of the problems with lack of circulation.

### *Toward a new public space?*

The Parisian metro aims at relating three dimensions into its design and planning philosophy. Accordingly a metro station is a people mover focusing on transit, but it is also related to commercial programmes and shopping activities making it a market intervention. Furthermore, a metro station is now recognised to be a public meeting point between different social groups in the city. The last dimension is partly related to a change in philosophy from the RATP (the metro operator) that has recognised that rather than fighting the presence of social groups that 'hang out' (in many metro stations large groups of the city's black population has transformed metro stations into public domains where different civil society activities flurries) in the metro spaces the presence of these groups are considered to be an expression of social richness and diversity. To RATP the 'mobility' dimension is much broader than the 'transport' dimension. The shift in understanding means seeing everyday life mobility as a meaningful and culturally important activity. As such it is related to a broadening of the cultural significance of mobility and different attempts to 'add meaning' to the urban travels by means of e.g. new mobile technologies, interactive facades and other technological experiments. The Parisian experience thus differs from both the one in Copenhagen and London. In the field studies there was not much expression of civil society or street performance activity within the London Underground. It seems that commissioned 'artists' can perform in the *Tube* but only on a strictly regulated and controlled basis. In Paris by comparison, there are many more street musicians.

### *CPC and European Metroscapes*

From these general dimensions of three different metro systems we now move very tentatively towards discussing CPC and applying the framework. Clearly the choice of research question or 'point of view' is needed in order to scope the discussion. From the ethnographic account above the key issue scoped here will be the potential of transit spaces like the metro systems to host different types of interactions and practice than just 'moving people'. Furthermore, the

Copenhagen metro is chosen as the object for re-design as it in many ways represent a more 'clear' system for people movement. Seen this way the metro stations in Copenhagen (and one might choose randomly since they are alike by the generic design code) are CPCs with a potential for creating more experiences, interactions, and services to its users than what is the case today. So they would need to be re- designed to work as 'public domains' where citizens and people in general might gather and interact (which is the case in the two other metro systems). Furthermore, the fixation of 100% flow machine works as a design code mutually excluding the 'unwanted'. There is in other words a 'point of view' related to issues of social exclusion here as well. We will not be able to follow the analysis and re-design proposal to further depth within the scope of this article. But hopefully the discussion of CPC and the case of the Metro systems opens up an understanding of the potential in seeing urban mobility systems and the daily mobility practices as more than instrumental movements from point A to point B. Mobility is culture as well as it is expressions and manifestations of social interactions – or the lack of such (Jensen 2009a; 2009b; 2010). Seeing a metro station as a CPC mediating, producing and re-producing urban everyday life opens up for a critical reassessment of the underlying rationalities and values of their particular designs.

## CPC in service design, public services and localisation

Even though the definition of the physical characteristics of spaces is not critical in service design, the placement of CPC is relevant in relation to its geographical context, because services often involve the direct participation of users, and therefore the activation of codified or tacit knowledge embedded in the local context (social links, skills, experience).

Like urban design, also service design can frame the analysis of CPC within three main dimensions:[4]

- User involvement (passive VS active, assisted VS independent)
- Knowledge transmission (Vertical VS horizontal, codified VS Tacit)
- Distribution of the service system (centralise VS distributed, local VS global)

The application of the context with respect to those dimensions would require the use of tools such as:

- Customer journey (i.e. the description of the user experience when contacting the service)
- Actor mapping (i.e. the definition of actors and their role in the service)
- Service platforms (i.e. the definition of modular unit defining skills and functions in a service)
- Scenarios (i.e. the definition of difference ways of using a services and the different answer a service systems can provide to different use cases)

As in urban design, those tools may provide different descriptions of CPC's, which may emphasise different perspectives. It could be possible to focus on business cases or on users' participation, on technologies as well as on interaction in a CPC.

In this article we will shortly choose a 'point of view' that focuses on the role of users in the system. By comparing two different approaches to healthcare and social services the dualities used to describe the main dimensions of a CPC emerge clearly. In this article we will consider healthcare services related to the treatment of 'social' diseases, such as diabetes, hearth diseases and obesity, together with age-related diseases.

The description of the first approach refers to a generic and consolidated approach to healthcare assistance, which is common to healthcare systems in several European countries. The description of the second approach is instead referring to a specific set of intervention in the public sector that is being developed in UK, as a result of new government policies, based on the principle of citizens' participation in public and social life.

***The consolidated approach to healthcare system in EU***

The majority of the healthcare systems in Europe have some common elements that clearly define a consolidated approach to healthcare services. All those systems are (at least theoretically) prioritising prevention to treatment. Prevention strategies are usually informing people about risk factors, symptoms and good or bad behaviours, often encouraging people to refer to specialists (doctors, dieticians) to get the necessary help. Another common trait of those is their relieving approach. Whether public services are delivered by private or public institutions, their organisation and delivery is often based on the idea of relieving people from a part of their responsibilities about their own health (the basic assumption is that the patient does not have enough resources to deal with his/her own disease; the healthcare system *must* treat the patient). In this framework services that were previously handled within the informal economy of the family or the neighbourhood are now performed by someone else (a service) or something else (a product or a technological infrastructure) (Morelli 2007). The CPC in this context is defined by the points of contacts between patients and the healthcare system: the doctors' consultancies, hospitals. The CPC also includes procedures and routines doctors and patients have to follow. Such procedures are often based on criteria of efficiency, and on clearly defined routines.

***A new approach to healthcare services***

The second approach to the healthcare policies and public intervention is emerging from the combined effort of central government, local authorities, local organisations and innovative design consultancies. The approach is mostly evident in Britain, where the government is actively promoting strategies to improve the quality of public services while providing personalised solutions (United Kingdom Prime Minister Strategy Unit 2007). However this approach is also inspiring innovative healthcare strategies in other countries, such as Denmark, where it is considered to be a viable solution for increasing the quality of life of elderly people, while reducing the costs of public assistance. The aim of this approach is to generate a more sustainable public service system by *activating* citizens and involving them in the definition and solution of their needs. The approach is inspired by the Open Source software movement. This open development model has wide applicability to the public sector and health in particular. The strength of this system is in its capability to activate hidden or uncodified knowledge (e.g. personal preferences, knowledge about routines or details of everyday life) that may be fundamental in the treatment of social disease. (Cottam & Leadbeater 2004; Leadbeater 2008). An example of this approach is the Bolton project for type 2 diabetes patients and the Kent County project to prevent obesity and

chronic diseases. In the Bolton project user experiences has been synthesized on cards, which reported patients sentences describing their everyday experience of their disease. The Kent city council promoted the creation of 'active mobs', i.e. small groups of people who choose an activity (like dog-walking, exercises to relieve back pain etc.) together on a regular basis (Murray, Burns et al. ND). In the Bolton case the CPC is the sum of concrete elements (cards, the doctors' reception) and abstract features (the patients' personal knowledge, the personal links between the doctor and his patient). Whereas in the Kent case the CPC consists in the system of 'touch points' (a website, wellbeing cards) that support social interaction and participation of users.

***User Involvement***

The involvement of users in the two approached are clearly different. The consolidated system does not give too many opportunities to users to use their own knowledge. The CPC is centred on the transmission of well-codified knowledge (the doctors knowledge that is transmitted to the patient through a medical treatment) and on a well-defined distribution of roles: patients are supposed to receive information (in prevention) or medical treatments; their role is mainly passive.

The use of the cards in the Bolton system is instead a way to stimulate users actively. The cards are used to facilitate the discussion between patients and the doctor, thus encouraging patients to talk about their condition, rather than forcing the doctor to ask standard questions about physical symptoms of the disease. In the Kent case active mobs, and the elements designed to support them, are giving users the opportunity to be in control of their own physical condition.

***Vertical or horizontal knowledge transmission***

The common traits of traditional strategies are the 'vertical' transmission of knowledge, from few experts (physicians, dieticians) to citizens. Despite the intrinsic social nature of such diseases, this approach is focusing on functional needs of individuals, excluding any 'horizontal' exchange of knowledge or any forms of mutual support among patients. The organisational structure corresponding to this system is centralised in 'centres of expertise' (hospitals, healthcare centres, doctors).

The new approach is based on the complementarities between vertical and horizontal knowledge exchange that increases citizens participation in public policies. The expected result of this effort is the direct involvement of citizens in the co-creation of health services (Cottam & Leadbeater 2004). Active mobs are a typical example of this approach. The focus of those strategies is on the social components of the healthcare issue, which suggest solutions that are based on wide social interaction between citizens affected by the same symptoms and living in the same area. Such social interaction reduces the direct intervention of experts and public authorities in the management of the disease and increases the opportunities for self-help, direct contact between citizens and direct involvement in decision-making.

***Centralised or distributed systems***

The organisational structure supporting the traditional approach corresponds to a geographical distribution of services that creates 'poles of attraction' (e.g. hospitals, nursing homes) for certain service activities. Such poles of attraction cover wide geographical areas, like regions or

sometimes national territories. The relevance and level of activity of peripheral areas is related to their distance and accessibility to the poles. Such poles of attractions clearly define a CPC between the healthcare system and the citizens. The design of services in such a system privileges clearly defined technical, organisational, and functional parameters.

The new approach instead, requires highly decentralised and localised organisation forms. It proposes an open and widespread service, which emphasises the activities and the social and cultural identity of local neighbourhoods. This new approach exceeds a traditional view of CPC, focusing on its tangible and material nature. The nature of the CPC generated by this approach is very immaterial and very much embedded in the social and cultural context. The traditional local infrastructures that linked citizens to healthcare services (such as the local healthcare centres) are only the functional part of a system of CPC's in which large emphasis is given to social interaction.

## Concluding remarks

From the outset we were interested in looking at the usefulness of CPC as a theoretical framework for understanding the complex ways contemporary networks of communication, service provision, and mobility organise social agent's everyday life experiences. We will now shortly discuss this aspect. CPC offers a good framework to understand the way different systems comes in contact, interact and produce useful services, infrastructures and solutions. A CPC is in fact a privileged observation point that allows for a view of the systems converging and interacting. This framework is quite complex and allows for different perspectives, depending on different 'points of view'. The 'point of view' that considers passengers exclusively as 'people on the move' and frames the layout of metro stations as 'the place of flow' (thus neglecting other aspects that would connect this place to the complex urban environment) has several analogies with a 'point of view' that privilege subjects in healthcare systems as 'passive patients' rather than social subjects. Both of those 'points of view' are consistent with a configuration of CPC based on clearly defined principles and physical characteristics. Such configuration is based on a selected amount of parameters (exclusion of non- pertinent actors, functional parameters, time of fruition of the services, speed of treatment, efficient use of resources). The result can be clearly framed with a set of parameters.

Like the metro systems in London and Paris, which are somehow integrating urban life into specific functional spaces, the healthcare services created with the new approach integrate social and cultural life of neighbourhoods into the functional infrastructure of the healthcare system. On the other hand the analysis of Paris and London Metro stations, as well as the new approach to healthcare strategies illustrated in this article, suggest a framework that is more open to social interactions, thus allowing higher levels of complexity in the definition of the CPC, supporting both vertical (from provider to user) and horizontal (from citizen to citizen) exchange of knowledge. The place is not designed in advance by expert designers or urban planners, because the design principle is to provide a platform for interaction between heterogeneous and sometimes unpredictable socio- technical systems. Special attention should be paid, in this system, to all the tools and strategies to support communication and to capture tacit knowledge (about people residual capabilities, hobbies, preferences, fears, systems of trust).

Our second concern from the very beginning of this article was whether the notion of CPC makes it possible to explore the latent and unseen potentials for creating social interaction and new communities as well as enhance the business opportunities in those networks. Again we will shortly discuss this. The notion of CPC is definitely an approach to interpret and design the interaction between socio-technical systems. However the two approaches outlined in this article suggest different levels of complexity, deriving from the different dimensions involved in the cases illustrated in this article. Functional criteria facilitate analytical judgement of the CPC in terms of a chosen point of view (e.g. technical functionality, social exclusion etc.) and make it possible to plan progressive addition of services and functions within the CPC. The openness of some CPC's, such as Paris and London Metro Stations, as well as open healthcare strategies generates higher level of complexity in mapping and interpreting the various social, technical, and aesthetic dimensions of the CPC. Consequently the re-design of the new CPC according to such an open approach would possibly consist in the definition of a platform for the development of critical elements of the CPC through the interaction and the direct involvement of actors and elements from the different interchanging systems.

Copenhagen metro stations, as well as hospitals and healthcare centres, are urban elements with clearly defined functional characteristics (the metro is a connection space between different flows, the hospital is the place for specialised treatment of diseases) that makes them distinguishable from their surrounding urban space. Some of the examples illustrated in this article, however, may suggest reframing the question by considering how CPC can 'pervade' or 'characterise' or 'enhance' a place rather than occupying it. Paris and London metro stations, as well as the open approach to healthcare services define CPC's that are less separated and distinguishable from their geographical surroundings. The complexity of the city influences the definition of technical, social and aesthetical characteristics of metro stations. Healthcare services possibly suggest a more radical redefinition of a sort of *pervasive* CPC, which does not necessarily define any specific physical place, but still adds a layer of values and significance to a well-defined geographical area (a neighbourhood), through a network of virtual access points.

Needless to say, this was only a first attempt to present a rough outline of a theoretical concept and an operational approach for challenging the design of systems. More conceptual precision and more empirical research is needed to bring this to a sufficient level of research rigor. However, the article has illustrated the beginning contours of a new cross-disciplinary vocabulary and view upon the networked relations in urban mobility and service design.

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[1] This article has a background in the research and teaching conducted at the Department of Architecture, Design and Media Technology at Aalborg University. Here applying theoretical concepts to *understand* and *design* are the main issues.

[2] It is *analytical* since they are not empirically separable but rather assembled in a hybrid socio-technical network.

[3] This section of the article is based upon Jensen (2008). For a fuller account of the Metro case see Jensen 2008 and 2011b.

[4] It is worth stressing that those dimensions refer to the notion of CPC, i.e. to the point of contact between the service and its users. Different dimensions, such as technology and business may prove to be more relevant in the analysis of a service system.