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Palvelu korvaa tilan (PATI)

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Palvelu korvaa tilan (PATI)

Final report 2017
Aalto University
Tampere University of Technology (TUT)

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Executive summary

This document summarizes the results of a three-year PATI (Palvelu korvaa tilan) project. The project was a joint collaboration effort between industrial partners ISS Palvelut Oy, Senaati kiinteistöt Oy, and Telia Company Oyj and research institutions Aalto University and Tampere University of Technology. The project was financed through Business Finland research funding tool.

PATI project concentrated on two research streams:

1. understanding the mobile worker
2. understanding the service provision

In the first stream, PATI research team concentrated in understanding the knowledge worker better. As a result, extended user profiles and waste points of mobile work were identified. The user experience and its measurement were studied as well.

In the second research stream, new research clusters were identified as well as new business models for a smart digital workplace service.
As a main result, WorkCoach service concept has been developed during the project. The aim of the new service is to improve employee wellbeing, productivity, and overall workplace experience by providing targeted on-demand services.

This document is composed by following human-centred design process. Main results are shortly introduced in the chapters and links to academic readings are provided after.

Collaboration between service providers

Palvelu korvaa tilan (PATI) project has started due to the need of understanding workplace requirements better. The growth of mobile employees, new types of offices occupying the markets and constant digitalization inspired the following service providers to gather at one table and discuss how they can serve the changing needs of their customers better.

PATI industrial partners:

Senate Properties (Senaatti kiinsteistöt Oy) is the work environment partner of the Finnish government. Through collaboratively designing new work environments and offering a package of complementary services, Senate Properties helps Finnish government to work smarter (Senate Properties, 2018).

ISS is a global facility services provider helping their customers to concentrate on their core business and offering services ranging from single service delivery to integrated facility services (ISS Global, 2018).

Telia Company empowers people, companies, and societies stay connected by acting as a hub in the digital ecosystem. Through digitalization and enabling better access to resources, Telia aims for sustainable economic growth (Telia Company, 2018).

PATI research team:

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Business Finland (previously Tekes) funded this joint project throughout January 2015 - March 2018.

PATI – Palvelu korvaa tilan or WaaS – Workplace-as-a-Service

In the world where everything becomes "as-a-Service", we start a discussion with the question "how would then Workplace-as-a-Service would look like?". In PATI project we try to develop a workplace service innovation which does not only help with physical space improvements but enable employees work smarter and time-and-place independently.

"as-a-Service" terminology is mostly familiar from IT sector and "Software-as-a-Service" or SaaS cloud computing models. Nowadays, "as-a-Service" model does not apply only in the IT sector but has been extended to almost any industry. Although there are no concrete definitions for "as-a-Service" term, some model features can be generalized to any "as-a-Service" idea (e.g. Xin and Levina 2008; Keller and Rexford 2010; TechTarget Network n.d.; Technopedia n.d.):

• Shared infrastructure and resources

Resources and costs for having a service can be shared among many users while infrastructure (thus, maintenance as well) is owned by a service provider. This offers lower costs and less capital expenditure for users. Business processes are also integrated in the system. The system is simple and very standardized, allowing easy "plug-ins" for multiple service providers.

• On-demand services

Instead of purchasing the service (or space, in PATI case), service can be ordered and used only when there is an actual need for it. The pricing of services is flexible and often usage-based, thus, many times also cheaper.

• Accessible services

"as-a-Service" models are associated with an easy access to new and rapidly developing technologies, as well as are usually device-and-location independent. This means that service is available anytime and anywhere. Due to this, smaller businesses (users) are also able to access the service and service providers react to market development faster.

These features were driving our work when looking for more concrete solutions which enable productive but time-and-place independent work for employees.

Developing user-centric services

When developing services, we need to think about service design. Here, we define service design as the activity of planning service components in order to improve the interaction between service providers and their customers.

Defining digital services are many times seen as synonymous to technology or IT-related costs. More broadly it can be understood as a holistic business development mind-set and organizational culture more than a punch of concrete digital activities (Digital Transformation). Even though there might still be some differences in defining the actual contents of the digital services or going digital, almost every company have address it as important in their strategies. Being online – providing digital services – and also measuring comes easier, when companies are able to collect customer data easier than through many traditional channels. In addition to collect data, it is important to analyse it and utilize it effectively to get the most rid of it.

Nowadays services need to be easily available, easy-to-use – and they need to be desirable. When designing user experience, there is a need to think what the value for the customer is when s/he is using the service or product. With analysing the service usage, the designer is also capable of understanding the way how user thinks and feels (Mager & Sung 2011; Miettinen & Valtonen, 2012).

To add more strategic approach to service design, the process includes visualizing service ecologies and stakeholder maps. The process covers the actual service experience, but also service design covers the full customer journey, including the experiences before and after the service encounters (Mager & Sung, 2011; Reason et al. 2016).

This was the starting point, when creating a new service in PATI-project as well. Service design and lean service creation, meaning a continuous service creation, including design thinking, customer development, agile development and lean manufacturing, provided us a good approach to understand the business needs as well as seeing the business through the customer's' eyes as well (Reason et al. 2016; Ries 2011).

A study called *digital transformation*, names key capabilities to a successful digital transformation. We believe that some of factors need to be taken into consideration when designing user-centric services. For example, agile digital development, modern way of working, innovation & co-creation, value realization, customer data leverage, and a digital challenger mindset are the things we kept in our minds when we started to concept the new service for PATI companies. Digitalization also underlies the meaning of measuring the value customer perceived.

We created a concept for a digital service, which needs to implement, and then iterate according to the user feedback, develop and launch to gain a success in the market. Concept is a necessary to provide a clear picture of *how to do business in the FUTURE*. Service design helped us to figure out, how to it in a customer-driven way. Going digital can sometimes show up as a more complex challenge than it should. The process of shifting services to be delivered in new digital channels can cause mess, uncertainty and confusion – and it is not only a shift of channel but a shift of a mind-set and different way of doing business. (Reason et al.; Digital Transformation)

User-centric design is not a strictly linear process, but it can be divided into three phases: *inspiration, ideation and implementation* (Figure 1). In PATI we ideated multiple different concepts which were tested with different groups before deciding the contents and features of the first version of the PATI service. We wanted to help to ensure that digital initiatives achieve two things: value to customers, and more direct interaction between the customers and services. Concept is a necessity to provide a clear picture of *how to do business in the FUTURE* and in a customer-driven way.

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" We wanted to help to ensure that digital initiatives achieve two things: value to customers, and more direct interaction between the customers and services. "

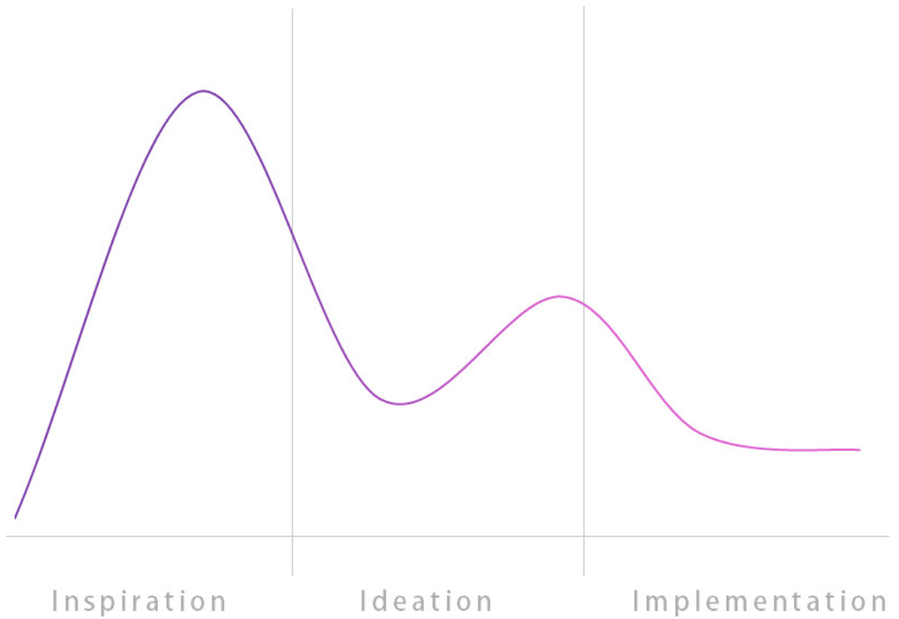


Figure 1. Human-centric design process (adapted from Ideo.org)

Rethinking workplace

Markets are changing rapidly, digitalization is in every company's agenda, and companies are eagerly following megatrends like these three:

1 TECHNOLOGY: automation, robotizing, artificial intelligence and digital platforms

2 GLOBAL INTERDEPENDENCE: the rapid development of technology and globalization

3 HEALTH, WELLNESS AND WELLBEING: The balance of mind, body & soul in both private and occupational life. (Sitra 2016 & 2017)

In order to succeed in global markets, knowledge work is considered as the key. Knowledge work is defined as the creation, distribution, or application of knowledge by highly skilled, autonomous workers using tools and theoretical concepts to produce complex, intangible and tangible results. The product of a knowledge worker is typically intangible: knowledge is the addition of meaning, context, and relationships to data or information. Often knowledge workers work from afar and in multiple workplaces in addition to the main office (e.g., at a customer site, at home, hotels, travelling). This makes their working contexts dynamically changing and complex. Knowledge work is usually in practice not an individual task, but is performed in collaboration with others (teams or networks) on complex tasks, which they cannot perform alone (Nenonen et al. 2009). In daily terms, I-work is shifting towards *We-work*.

Smart Working is the term used to refer to the new ways of working made possible by advances in technology and made essential by economic, environmental and social pressures. Smart Working is a business-focused approach to flexible working that delivers more efficiency and effectiveness in work organisation, service delivery, and organisational agility, as well as benefits for working people. Key features are management by results, a trust-based culture, high levels of autonomy, flexibility in time and location, new tools and work environments, reduced reliance on physical resources, and openness to continuing change.

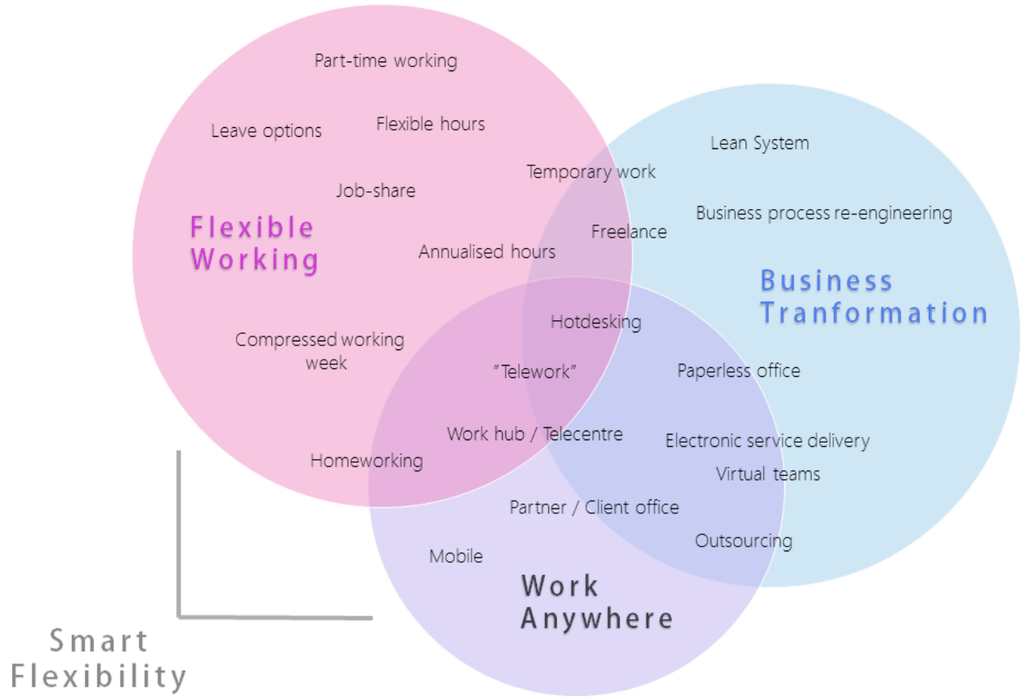


Figure 2. Smart Flexibility. Adaptef from Lake (2013)

Flexible work arrangements are becoming mainstream with around half one employees having offered flexible options all around western countries (Eurofond 2017). By 2017, there were over 13 000 coworking spaces and over 1.1 million people working in coworking spaces worldwide (Statista 2018). Interviews and workshops help by PATI team identified the same trends in changing knowledge worker's behaviour.

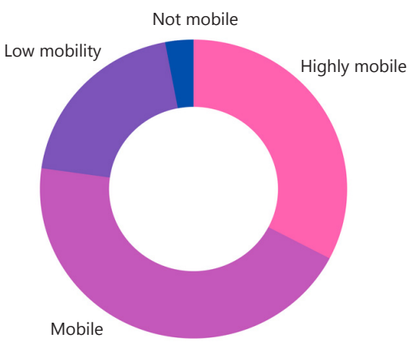


Figure 3. Employee mobility. PATI, 2016

For example, more than 60% of workshop respondents claimed that they are mobile or highly mobile and 30% of them would prefer even higher mobility levels reasoning their choice by higher possibility to choose where and when to work and be able to cooperate with others better (Figure 3).

Increasing need to support mobility of work in the office and beyond, as well as dematerialize resources used for work and promote virtual collaboration, lead to the transformation of workplace. According to Dewulf et al. (2000), three changes affect the workplace: change in locations, spatial design, and ways of using the space. Facilitating the freedom of choice to where, when, with whom and how to work is essential in modern workplace design (Rytkönen et al. 2016). Workplace has changed from linking local organisation to a global community, from serving individuals and organisations to creating a community of individuals together with external service providers and partners, and from integrating places within the building to creating heterogenous urban spaces of flows (Figure 4).

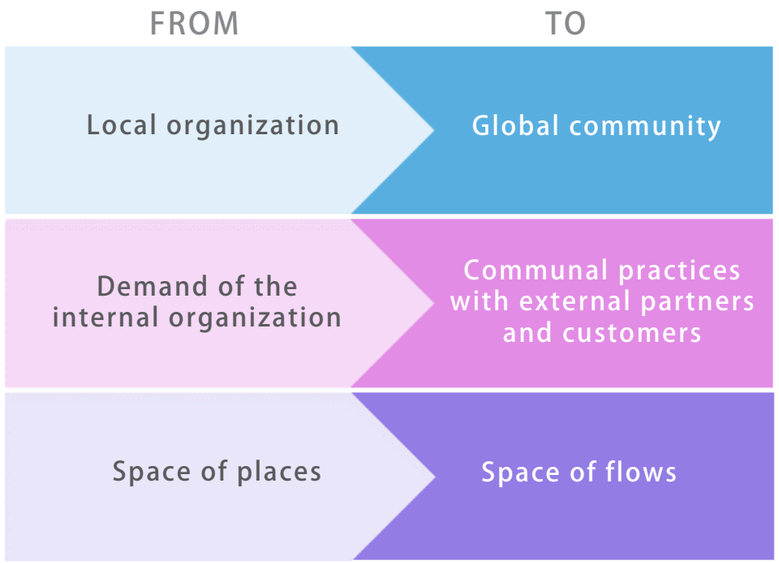


Figure 4. Workplace transformation (adapted from Rytkönen et al. 2016)

PATI publications

Jylhä T., Vuolle M., Nenonen S., Virtaneva M. (2015) Towards business potential of workplace services in Finland. *Procedia Economics and Finance* Vol. 21 Pp. 518–523

People no longer work as they worked 15 years ago. One of the major changes, as Laing (2013) stated, is that the employee no longer has to go to work, but information technology brings the work to the employee. Due to the independency of work from time and place, employees are working in a new way in multiple locations. For service providers, this offers a new business field. Thus, the paper focuses on this new business opportunity.

The aim of the paper is to identify the business potential to build up and elaborate the workplace service business. Interviews with national workplace service providers and international workplace experts were conducted in order to get practical insight on the topic. Based on the interviews, two development steps are required to utilise the new business opportunity: (1) the transaction-oriented way to provide workplace services should be substituted by new business models, and (2) the workplace service should be re-thought and re-designed as a service that is not solely dependent on physical space. Based on the new business model and service, a new business opportunity could be harnessed

Nenonen, S., Lindahl, G. (2016), Nordic workplace concept development from office as a city to city as an office", *Journal of Facilities Management*, Vol. 15 Issue: 3, pp.302-316

The purpose of this paper is to describe, discuss and analyse forerunner cases from three different decades in workplace concept development in Sweden and Finland and discuss the transformation over time to better facilitate management of office development and disseminate Nordic experiences.

The reflecting paper is discussing the development of workplace concepts. It is based on case studies collected from 1980s to the new millennium. The reflection is based on the perspective of Nordic culture. The characteristics of the Nordic culture used in the paper are low power distance and individualism. The evolution from "office as a city" to "city as an office" has taken place in both countries and Nordic cultural values have provided fruitful platform for them. However, the layer of organizational culture in the studied workplaces also has an impact on the development and implication of the concepts.

The dilemma of management when designing workspaces for the changing world is in that individuals increasingly choose where to work, when, with whom and how. Facilitating that freedom of choice is a balancing act in modern workspace design where people is a scarcer resource than space. It requires an active management that sees their facilities as a part of their system not as a costly box top put it in. Easy access seems to be the key to the workspace of the future when decision power shifts from organizations to individuals. Simultaneously, individuals need to take more and more responsibility and action to get their job done: the cases illustrate how this has been done and that the integration and interaction between office concepts and office work will need to be on business agendas.

Nenonen, S., van Wezel, R. and Berkouwer, E. "Library - a Place for Connected Learning and Coworking." In *24th Annual European Real Estate Society Conference. ERES: Conference*. Delft, Netherlands, 2017.

The future of work and place is a shift towards an urban scale (Laing 2013). Coworking spaces are an example of the novel use of urban spaces that at best can support the revitalisation of city districts. Coworking spaces are places where self-employed persons engaged in creative and information-intensive fields can rent or use a shared workspace together with others who share the same values. The goal of this research is to understand how the library can respond to the requirements of connected learning and coworking. The transformation of libraries from the brick-and-mortar public library to the digital library include also the enhancement of libraries as environments for coworking and informal social learning. Libraries can respond to a nomadic way of working by supporting individual users with a choice of places and settings in which interactive and solo work can happen.

This research presents the best practices of libraries as hubs that attract and support interest-driven and socially embedded learning and co-working experiences. It is providing perspectives to the actual definition of a library, which states that library is a collection of resources in a variety of formats that is (1) organized by information professionals or other experts who (2) provide convenient physical, digital, bibliographic, or intellectual access and (3) offer targeted services and programs (4) with the mission of educating, informing, or entertaining a variety of audiences (5) and the goal of stimulating individual learning and advancing society as a whole. We propose that the human resources of connected learners and co-workers might be one of the very important element of the library of future.

The paper reports findings from observations as well as interviews with users and managers of different types of local, community-led libraries from Finland and The Netherlands. The findings reveal social, spatial and technological interventions that these spaces apply to nourish a culture of connected learning and coworking. The discussion suggests a set a framework to profile transformation of future libraries.

Petrulaitiene, V., Jylhä T., (2015), Perceived value of workplace concepts. *Journal of Corporate Real Estate,* Vol. 17 Iss: 4, pp.260 – 281

This paper aims to focus on the value of workplace concepts. The aim is twofold. First, the development of expected value into actual perceived value of workplace concept is studied together with the methods adopted to realise such value. After this, the perceived value of concepts is analysed in more detail to supplement the literature.

The identified relationship is analysed qualitatively through six Finnish case organisations. The data were collected both through interviews and observations and analysed through coding.
The actual perceived value of the workplace concepts was richer than the expected value before the workplace implementation. The direction from cost- to business- workplace strategies was noticed. Active employee involvement and orientation towards their needs, as well as also the activity-based offices with unassigned workspaces and more meeting areas, were the main tools and methods used to perceive the value.

More organisations develop their own workplace concepts. For practitioners, this paper offers the insight on what was expected, provides the workplace concept development results and practical insights into realizing such value from the organisational perspective.

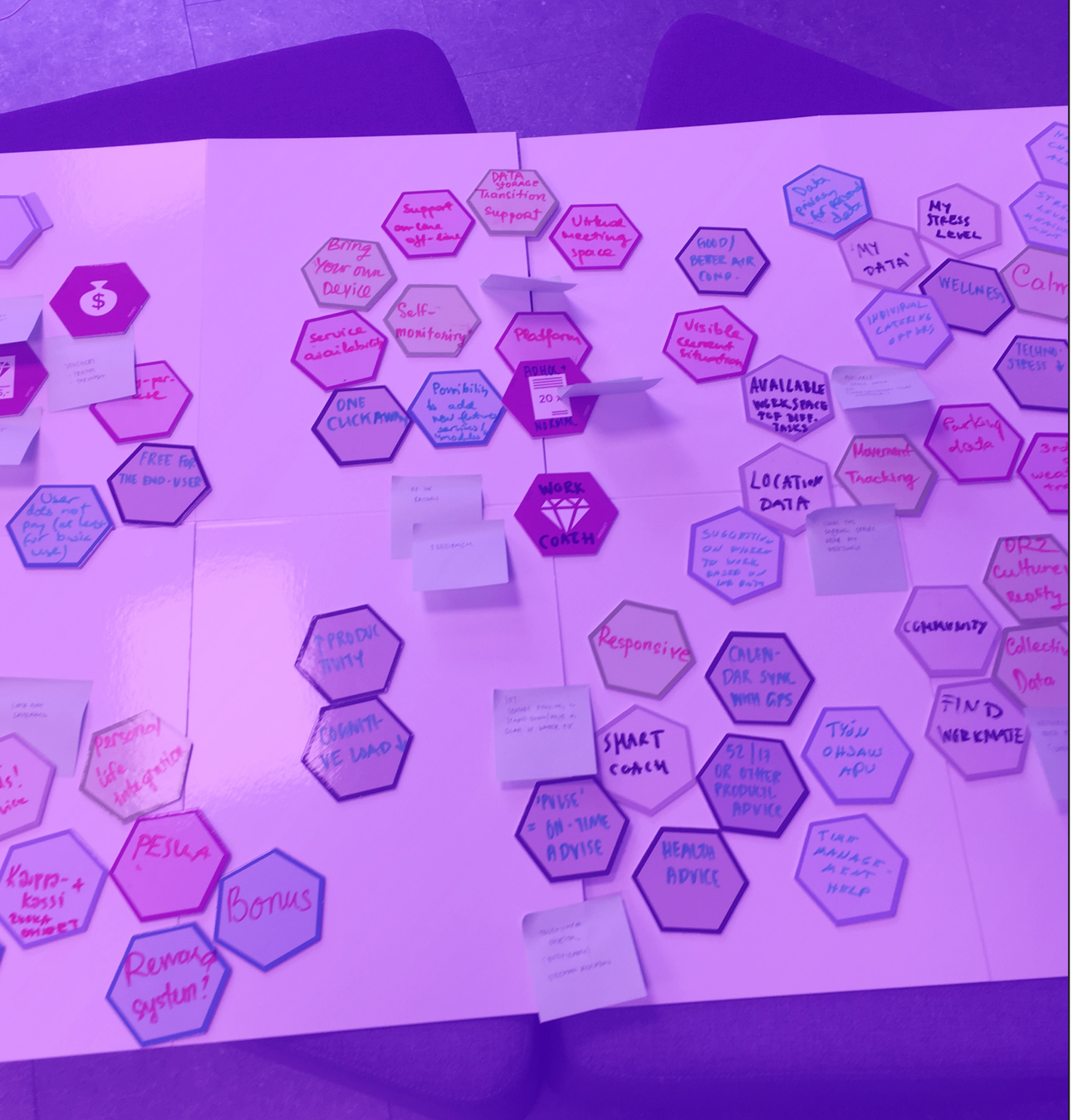
The value of this paper lies in the relationship between the expected value from the workplace concept and the actual perceived value of the concept, along with tools and methods to perceive it.

Rytkönen, E, Petrulaitiene, V & Nenonen, S 2016, The Evolving Modern Workspace - From Organizational Offering to Serving Communities of Individuals: Facilities management research and practice. Does FM contribute to happiness in Nordic Countries? in PA Jensen (ed.), *Proceedings of CFM's Second Nordic Conference: Facilities Management Research and Practice: Does FM contribute to happiness in Nordic countries?.,* 5.1, Lyngby, pp. 90-103, Nordic Facilities Management Conference, Lyngby, Denmark, 29-30 August.

Organizations, cities, nations and continents compete over talented knowledge workers who create the backbone of competitiveness of modern societies in the first world. These talents have an increasing freedom to decide where, with whom, when and how to work. At the same time, organizations are struggling in facilitating the increasingly heterogeneous manners of working. Increasing flexibility in terms of space, time and contracts affects the supply of workspaces. Cubicles have evolved to open plan, open plan to activity-based, activity-based to city as an office and city as an office to smart flexibility in working. However, change resistance in organizations is the other side of coin. For the end users, workplace changes are mainly emotional and experiential whereas organizations tend to manage the changes from a mainly technical point of view.

To understand the evolution of modern workspace, this study looks at five typological diagrams in workspace evolution from The New Office through to the Hybrid workspace, through to Space to Work, through to Workspace in 2013, through to Shared facilities, and finally Workspace in 2020. The aim is to understand evolution of the workspace discourse by exploring selected diagrams, reflect upon the evolution of organizational ways of working and potential ways forward.

The results imply that the discourse has shifted from local towards global focus, from space of places towards space of flows and from the demands of the internal organization towards those of communal practices with external partners and customers. It can be interpreted, that the theory of spatial transformation has thus taken place in practice. Future research should be conducted on the demand of different types of spaces and collaboration practices.



INSPIRATIONAL planning phase: Analysis, framework, conceptualising

During *inspirational planning* phase, we wanted to understand what people want when it comes to office spaces, co-working, individual working, and working communities. In the very beginning of the process our challenge was to design a new service for supporting mobile knowledge workers. The starting point was to figure out if the traditional services, often produced to support physical spaces, would need new kind of services to support workers in digital channels and to support their wellbeing to ease continuously increasing cognitive load. The service needs to serve three different kind of companies - Senaatti, Telia, and ISS. The key question was that *"what kind of intelligent services replace the physical space?"* To figure it out, we benchmarked international services and service providers, observed end-users and company employees' lives, heard their desires and hopes, and tried to answer to this challenge to create something people feel good about, don't gain more (techno) stress and are more than happy to use.

The analysis of over 1000 services related to workplace continued throughout the time of the project and has developed from four categories related to space, community, technology, and logistics to a workplace service map (Figure 5).

There is a clear direction of the change going on in the workplace service sector:

- Platform economy has stepped into space market.
- Peer-to-peer transportation solutions become connected to public transportation and move to "Mobility-as-a-Service" models.
- Productivity is recognised as highly connected with wellbeing, thus wellbeing issues are addressed at workplace as well.

> *" (--) our challenge was to design a new service for supporting mobile knowledge workers. "*

Figure 5. Service categorization

Understanding the knowledge worker

According to Bell (2000), employees are either the key to success or cause failure. Thus, we need to serve the employees well to ensure the success of organisation. In order to develop workplace - physical environment and services, we need a deeper understanding of its users (Rantala 2017).

Job crafting

Flexible ways of working and job crafting skills are important in modern work and in modern offices. So-called activity-based offices are increasing in number – in activity-based offices the employee no longer has their own desk, but uses multiple spaces in the office instead. The idea in the background is that the employee chooses the work space according to the task at hand and own personal preferences. This is similar to the idea of job crafting, in which the worker actively shapes the boundaries of work tasks, relationships and cognitive aspects of work. For example, in activity-based offices, there are work spaces with different social interaction: the open work area has constant bustle of co-workers passing by and talking on their phones. This provides good opportunities for spontaneous meetings, while sometimes the background noise may be disturbing. On the contrary, the focus rooms are quiet spaces with minimised disruptions. Thus, the employees can affect their social interaction at the office (i.e. craft their social boundaries of work) by changing the location in the office area.

Job crafting means proactive work-related behaviour, in which the worker shapes (crafts) the dimensions of work tasks, social relations at work and the ways how one sees their work (cognitive) (Wrzesniewski & Dutton 2001). Job crafting can be seen as a mindset – work and work roles consist of certain elements or "building blocks", and there are multiple ways to conduct work. Thus, there is always some room to improve work according to own needs. By changing the building blocks of work, one can create more inspiring events at work. Job crafting is an opposite to reactive ways of working, but it is proactive, being curious about work… shaping work so that it does not consume one's resources. (Harju et al 2015)

In practice: innovative everyday work, self-directed shaping of work, using one's skills better, investing in high-quality interactions and improving the meanings one gives to their work (Harju et al. 2015). Thus, it is necessary that it is the employee themselves who is the active party making the changes. The employee knows best the contents of their work and notices, how it can be changed (Demerouti & Bakker 2013). Job crafting doesn't have to take place in big,

can be achieved by small, daily changes. Theoretically, job crafting is about affecting the resources and demanding features of work. By crafting, the employee seeks new resources (energising and motivating features of work that help to accomplish work tasks), new challenges and decreases too demanding aspects of work. (Petrou et al. 2012) By crafting a job, one can strengthen and build sense of control and self-image at work. Besides, it helps to satisfy the basic need of relatedness to other people. (Wrzesniewski & Dutton 2001) Research has shown that job crafting is positively related to work performance (Tims et al. 2013). Besides this, it is also related to job satisfaction and commitment (Ghitulescu 2006, Petrou et al. 2012 ; Wrzesniewski et al. 2010)

PATI research team concentrated on getting to know knowledge workers further. First, we looked at the standard work day of an individual with the goal of recognizing the most wasteful points of their work. Then we try to identify patterns that can help structuring knowledge workers based on their digital intelligence or psychological needs.

Waste points of mobile knowledge worker

Unnecessary (non-value adding) activities and tasks were identified in PATI workshops in 2015 and analysed in PATI 1st year report and Master's thesis of Pakarinen (2016). According to Hines (2011), less than 10% of tasks are value-adding in physical flow environment and less than 5% in information flow environment. PATI identified following waste points in knowledge workers' day (Figure 6):

1. Checkin replyin and sorting emails
2. Attending too many meetings
3. Separation of face-to-face and virtual comunication
4. Interruption by others from doing the priority task
5. Lack of concentration and dedicated time for specific tasks
6. Trying to reach necessary people
7. Intensive conversations in open office
8. Managing new technologies/ softwares

Figure 6. Waste points in a typical workday

Digital profiles

In her thesis, Rantala (2017) aims at understanding the behaviour and information-retrieval methods of knowledge workers from a digital perspective. She looks into how employees use technology and digital services at their work and what digital experience they might hold. The research resulted in creation of four (4) digital profiles based on their ability to use digital tools, work mobility, problem solving, use of social media, and technostress (Figure 7).

Digital employee profiling might be used by organisations as an auxiliary tool for successful IT strategy development. Different IT services might be targeted to different employee profiles. Moreover, it helps for internal communication purposes or work planning (Rantala 2017).

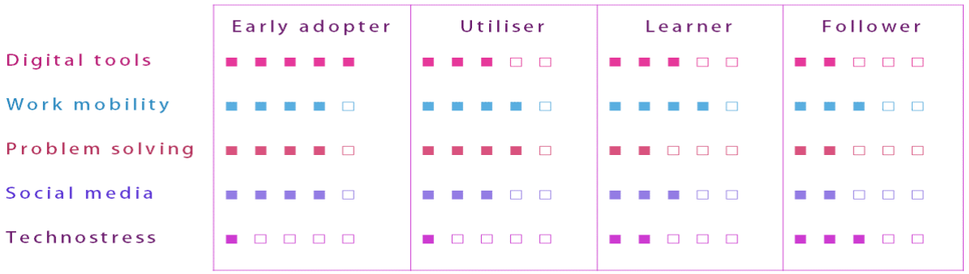


Figure 7. Digital profiles (adapted from Rantala 2017)

Social profiles

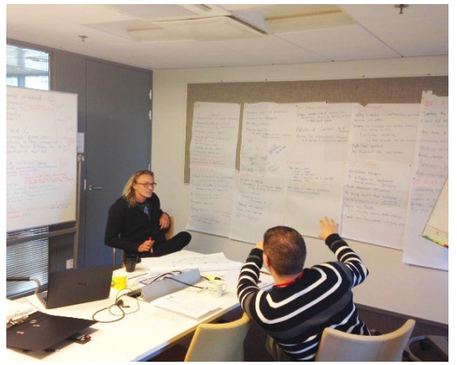
The environment that satisfies psychological needs leads to “optimal development and well-being”, thus, more productive employees (Deci and Ryan 2000). Dau (2017) investigates what drives individuals towards mobile work elsewhere. Her thesis concentrates on workplace in social, physical, and virtual contexts where autonomy, relatedness and competence can be supported (Dau 2017). Based on that, six employee profiles are determined (Table 1).

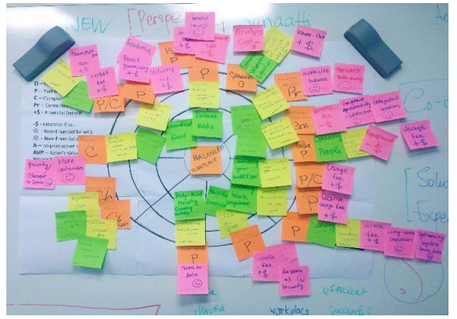
In her study, Dau (2017) suggests that the need for autonomy can only be satisfied through the social dimension of work. The need of relatedness can be satisfied by having a space for communication or being able to communicate and belong to a community through digital networks. However, the competence need is always present in the working context through all three dimensions - social, physical, and virtual.

Inspirational planning phase involves a lot of hands-on work, especially close with users and customers. We started the process with cardboard and scissors or post-its and a big blank paper. We created visualized prototypes with pen and paper and furthermore with digital tools such as InVision. After creating the first concept ideas, we gathered feedback from the users. We tested them in several workshops with company representatives, collected feedback from service video-mock-ups with the end-users, worked with the data in research workshops. The concept and researchers’ lines of thought have been multiple times adjusted during the process.

	Engager	Free-goer	Self– governer	Passivier	Team-builder	Task-doer
The third places	Coworking spaces	Coworking spaces Coffee shops	Coffee shops	Coworking spaces	Coworking spaces	Coffee shops
The key need satisfied when practicing nwow	Relatedness	Competence	Autonomy	—	Competence	Competence
The dimension of nwow satisfy the key needs	Physical = Social	Physical	Social (Organisational management)	—	Physical = Virtual	Physical
Other potential needs can be addressed (further)	Competence	Relatedness (The third place)	Relatedness (Organisation)	Relatedness (The third place)	Competence (Organisation) Relatedness (the third place)	Competence (Individual productivity)
Dimension	Social (The third place)	Social (The third place)	Virtual	Social (The third place)	Social (The third place)	Virtual

Table 1. Social profiles in detail (adapted from Dau 2017).





PATI publications

Dau, K. (2017). *The individual drivers of the New Way of Working in Finland and Vietnam.* Master's thesis. Aalto University School of Engineering, Department of Built Environment

This study investigated The New Way of Working from individual perspective based on three basic psychological needs; autonomy, relatedness, competence of self-determination theory. The New Way of Working is a combination of social, physical and virtual dimension. This study emphasised the people role in NWoW by positioning them as a separate dimension and approached from motivation theories. By satisfying three basic psychological needs, the essential nutriments for psychological wellbeing and growth, people can be motivated to perform better work activities. The study builds the connection of the workplace context to the motivation of people by identifying the basic needs that drive individuals to implement The New Way of Working socially, physically, or virtually.

The research design is exploratory qualitative and undertaken at 17 third places, which were coffee shops and coworking spaces within a period of four week collecting data. 27 semi-structured interviews were conducted, 15 in Vietnam and 12 in Finland. Content analysis and user profiling were used to analyse and interpret the collected data.

The findings demonstrate diverse individual drivers of The New Way of Working in Finland and Vietnam. Based on a set of various factors including nationality, age group, psychological climate, authority or job characteristics, an individual would create an environment through social, physical or virtual dimension, in which their psychological need can be supported. Six individual profiles of The New Way of Working based on three basic psychological needs were identified in this research: engagers are driven by the feeling of being related; self-governors want to feel autonomous while free-goers, team-builders, and task-doers only concentrate to fulfil their competence need. In contrast, passiviers are not driven to implement The New Way of Working to satisfy their basic psychological needs. In practice, this study proposes a framework of the user profiles based on psychological needs, from which organisations can understand the motivation of workers to implement suitable The New Way of Working practices.

Pakarinen, T. (2016). *Monipaikkaisesti työskentelevien tietotyöläisten käyttäjäpalvelutarpeet.* Master's thesis. Aalto University School of Engineering, Department of Built Environment.

The aim of this thesis was to study the needs of multilocational knowledge workers in terms of real estate user services. The aim was to identify service elements which are needed by knowledge workers and to observe weak signals of hidden needs.

In this thesis, ten experts from fields of real estate and user services were interviewed. In addition, two workshops were arranged, in which experts from a wide sector in real estate fields participated. Research methods used in this thesis were partly structured interviews and thematic workshops.

Based on this thesis, the service needs are mainly related to space, ways of working and technology. In all these categories, concrete needs specific for each category were found. However, a need for training and guidance was observed in all the categories. It can be concluded that training and guidance are among the most important aspects which should be taken into account when developing new user services supporting multilocational knowledge work.

A challenge for the future is to create service packages based on these needs in a way that would best support multilocational knowledge workers. In addition, the significance of training and guidance in the use of existing services and new ways of working and collaborating requires more research in the future.

Rantala, M. (2017). *Tietotyöntekijän digitaaliset profiilit.* Master's thesis. Tampere University of Technology, Faculty of Business and Built Environment

Digitalisation has become an important part of knowledge work and changed organizations' operations rapidly. Due to the high usage of digital technologies among knowledge workers it is needed to study their behavioural patterns in more detail and aim to understand digitalisation from the user's perspective. Digital profiling can respond to this need and offer valuable information about different demands, attitudes and goals related to technology use.

This study examined the digital profiles that can be found among knowledge workers and looked at the effects of age, gender and work experience. Moreover, the study described the identifying methods and possible use of the profiles in the organizations. The research was conducted as an electrical survey that resulted in quantitative and qualitative material. The survey was answered by knowledge workers from different departments in different organizations.

Four different digital profiles were found based on the material: the early adopter, the exploiter, the learner and the bystander. The early adopters are very interested in digitalisation and they follow the latest technology trends eagerly. Mobile work is a major part of their work days. The exploiters in turn use digital technologies in their work only when they add real value to the working. They can use technology quite well and solve problems independently however they are not that eager about it. The learners are really interested in digital technology but they cannot use it as well as they would like to. This can arise from the lack of time or guidance and very conservative organizational structures which is why the learners need common guidelines and support in their technology use. The last profile is the bystanders, who are not interested in new technologies and rather rely on old methods that they are familiar with. They are also the ones who suffer technostress the most compared to the other profiles.

The usage of digital profiles in the organizations can be diverse. By means of profiling information about the employees' technology needs, wellbeing and the ways of communication can be gathered easily. Profiling also helps the designers to target digital services to certain user groups and be assured about the real demands and effective use.

Nenonen, S, Rahtola, R & Kojo, I 2016, Third places and user preferences – affordances in the cities. in PA Jensen (ed.), P*roceedings of CFM's Second Nordic Conference: Facilities Management Research and Practice*, 29-30 AUGUST 2016, Denmark. pp. 17-25, NORDIC FACILITIES MANAGEMENT CONFERENCE, 1 January.

This paper aims to identify the user requirements for third places by investigating the mobile workers in cafeterias as a traditional place to work within the city.

The whole city can be seen as an office. The places where knowledge work is conducted are scattered to multiple spaces from traditional offices and business park complexes, to hubs, co-working spaces and home offices. The third place as a place between home and work is in transformation to diverse service offers for different user segments.

Data is gathered by survey (n=78) from the individuals who use cafeterias as places to work in capital area, Finland. Additionally the thematic interviews were conducted with a sample of 8 interviewees.

The integrative model of requirements of third places was developed based on analyzed data. The results indicate that the user needs are connected to the accessibility, social activities, cozy facilities and well-being. The results shed light to transformation of traditional space segments and their development in the city. The paper discusses how transformation in the work life widens the concept of workplace to the city as an office and provides user-centric data both to the practice of co-working service provision and design.

IDEATION:
Detailed design and evaluation

During the previous, *inspirational planning* phase, we received a lot of information and data from different sources. We started to go through the materials, and captured the ideas to post-it's and PowerPoint slides paying attention to every team members' stories and learnings.

Service attributes

First, we identified service attributes that are required by the users and customer organisations. Smart service components arrived from literature, market reviews, interviews, and workshops with industry professionals and knowledge workers.

• Service should be scalable

Current literature and market trends are affecting the business logic and service creation. The phenomenon behind lies in the grounds of service-dominant logic, sharing economy, and value co-creation. The focus is shifting towards platform economy logic where services are based on the accessibility of resources (PATI, 2016).

In digital service creation, that means that services should be quite simple and standardised so it would be easy to "plug-in" to platforms and created bigger solutions (xxx).

• Service should be co-created

According to service-dominant logic, value from services and goods comes not from the exchange between customer and company but is created together. In order to gain competitive advantage, each company tries, on the one hand, to create an ecosystem where all functions and processes are connected and, on the other hand, to attract the best external players as partners.

A co-creation strategy is often used to reach the goal. Gouillart (2014) identifies five processes to be used in combination in order for co-creation strategy to work: community; platform; interac-tions; experience-based; economic value. Design thinking and co-creative transforma¬tion are commonly used tools to co-create value (Gouillart 2014).

• Service should be user-oriented

The most important measurement of service success has become user experience and user satisfaction which is partly related to increased role of the end-user and higher freedom of choice. Different role of the user emphasises the need for changes in the business logic. Provided service should become a "personal service for someone" (Petrulaitiene 2016).

• Service should be digital

Technological development has created new customer needs. To fulfil those, we need to develop new kind of services, offering solutions to the new demands in service fields such as customer service procedure and many other user services (Vähä ym. 2009). Nevertheless, current digital systems are usually the bottleneck of the business development (Aalto 2015). In PATI case, three improvement-needed categories were highlighted: connectivity, lack of education, and not utilizing big data.

• Service should be easily-reachable and transparent

Information inside the company should be easily accessible to anyone. If information between departments or service developers are not shared, "islands" are created (Modig 2014). To avoid these "islands", reorganizing units from production-based to customer value-based was expressed as a considerable solution for case companies.

• Service should be personalized

A possibility to choose suitable level (e.g. high-end or satisfactory services) for oneself increases user satisfaction and can improve cost balance for the organisation. Adjusting service levels to customer and end-user requirements was one of the intensively discussed topics during the interviews. Moreover, a possibility to have all needed services in the package is a major benefit for users if they can be packaged based on end-users' requirements (Petrulaitiene 2016).

> *" The most important measurement of service success has become user experience and user satisfaction (--). "*

Unmet customer needs

Next, we used multiple tools to analyse gathered data and identify unmet customer needs. Flexible work and self-management connection helped to identify two main needs that require attention: employee (1) wellbeing and (2) productivity (Figure 8). Although employee wellbeing and productivity are visible needs from organisational perspective, from office space perspective these are often considered secondary aims and often as a consequence of good physical environment. Identified needs can be served with the help of various sensor technologies to observe not only physical space but work and employee itself. From the analysis of work activities and other related data, our designed service can help with providing suggestions to improved wellbeing and productivity and should be targeted towards workplace and/or HR management in the organisation.

Based on the *inspirational planning* phase and previously identified needs and service attributes, PATI service should be:

- A functional, appropriate space for mobile knowledge workers
- A nice and motivational feeling towards the working day - planning, execution and reversion
- Connecting with user's other applications (health, wellbeing, sports, and sleep trackers), calendar, GPS etc.
- Produce useful information concerning user's working habits, space usage and user experiences
- Celebrating with the user, when he/she has been able to make (small) changes towards the "better life"
- Encouraging to utilize different spaces (home, office, co-working spaces, meeting rooms, gym etc)
- Collect and connect other metrics like air condition, lighting, or humidity.

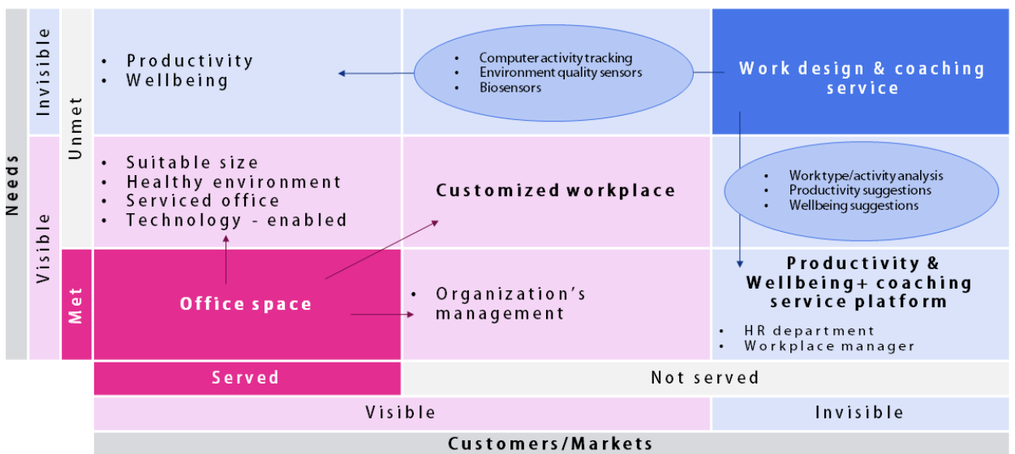


Figure 8. Innovation matrix and unmet workplace needs

New service concept - WorkCoach

During these two phases, we gained a lot of information, data, knowledge and opinions, which were structured into a concept called WorkCoach. Journey maps, mock-ups, storyboards, and other tools were used to create the first version of the concept.

WorkCoach supervises and comprehensively guides end-users and company employees to work effectively, productively, and increasing their wellbeing at work and at home. Service, or its platform, combines physical space, technology, real estate services, and occupational wellbeing in a smart way.

WorkCoach connects building level and user level data into intelligent learning platform to serve the end-user and provide productive and balanced workplace (Figure 9.).

Minimum viable product (MVP) was created in order for PATI companies to be able to test our hypotheses fast and see if the concept is worth building further (Figures 10,11,12). MVP also allows to collect as much information about the users as possible and learn if core features are sufficient.

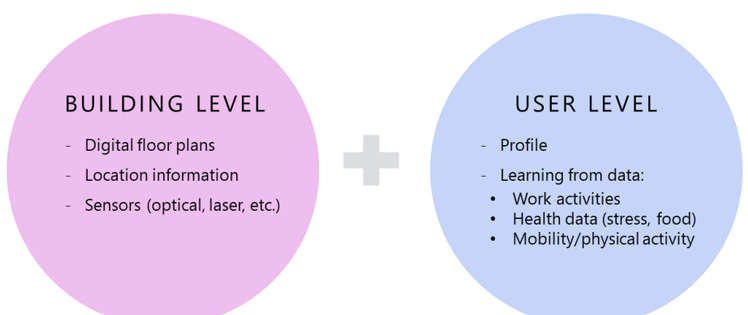


Figure 9. WorkCoach concept

In order to implement WorkCoach concept, three steps were identified. First step concentrates on physical space mapping and location information (Figure 10). With the help of various sensors and space description, users can find work spaces, colleagues, or additional spaces based on their needs. Users of the platform also act as sensors providing information to customer organisations and service providers with instant service orders. This step requires service providers (e.g. outsourced FM service providers) to react quickly and provide on-demand based services.

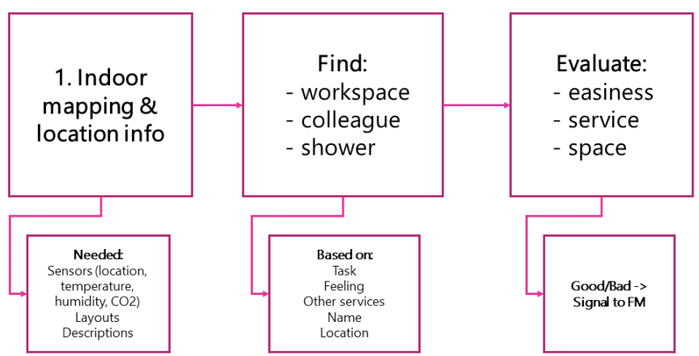


Figure 10. WorkCoach – minimum viable product. Step 1.

Step 2 (Figure 11) concentrates on learning more about platform users. First, employees are profiled based on earlier discussed profiling possibilities (digital profiling, social profiling and mobility profiling). It also acts as a platform for HR services to receive employee information and react quickly regarding their workload or productivity.

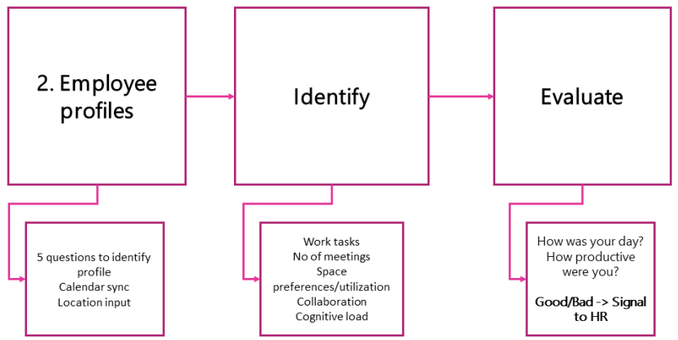


Figure 11. WorkCoach – minimum viable product. Step 2.

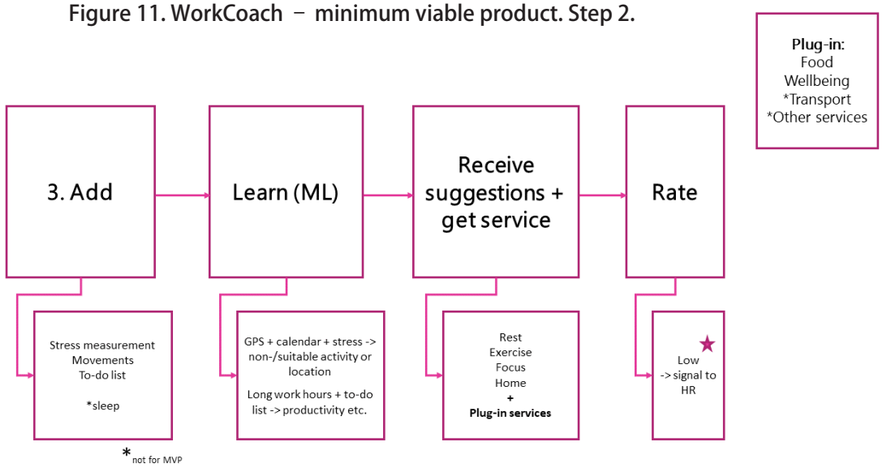
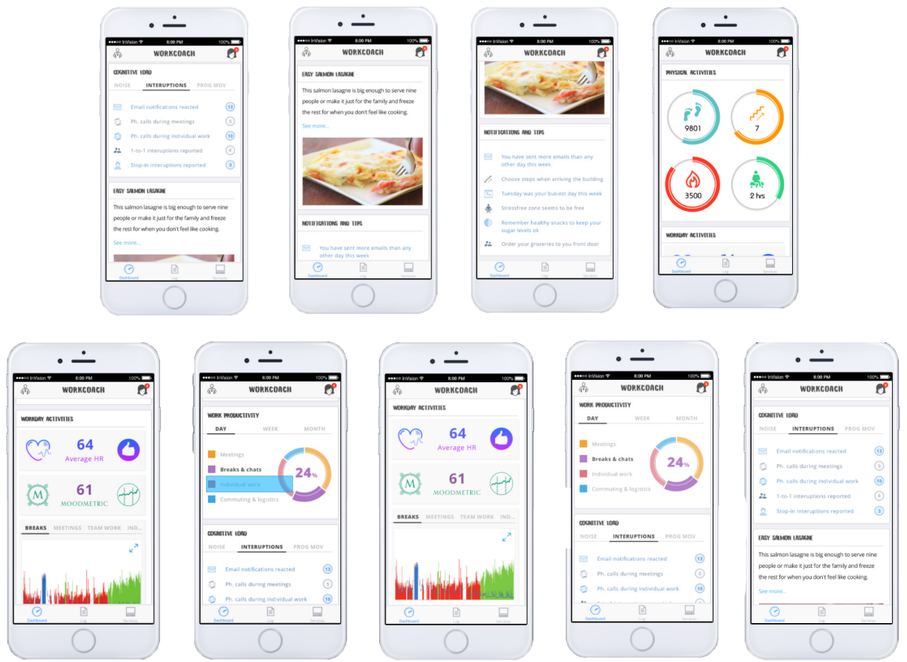


Figure 12. WorkCoach – minimum viable product. Step 3.

In the third step (Figure 12), additional personal information is integrated into the platform. By connecting other shared employee data with profiles, platform learns about the user further to provide better suggestions and services. Here, external service providers are also added. Services can be ordered through the platform and usually paid by the customer organisation. Users can rate platform suggestions and services where low ratings send a signal to HR requiring their attention.



Snapshots from the InVision demo

Extensive literature and empirical analysis on business modelling was performed in order to find the most suitable model for a new service concept. While Chesbrough (2010) has identified that business model innovation in general can be aided through mapping, experimentation, effectuation, and organizational leadership, only few studies exist on how to change from product based business models to service business models. Product-Service System (PSS) literature was used as a core for business model change. The main factors from the literature include:

- Value proposition. Adrodegari et al (2016) suggest that value should be created and captured throughout the whole product life cycle and providing solutions to customers becomes dependent on the extension of service components in the total offerings of the company's services portfolio.

- Responsibility throughout the product lifecycle. Beuren et al (2013) encourage companies change to system thinking and extend their responsibility throughout the product lifecycle. Companies should ask what value is created when the service is used (Adrodegari et al. 2016). The emphasis on the usage of the service means that the financial timescales become longer (Mont et al. 2006), increasing the information requirements on product usage (Neff et al. 2014).

- Financial resources, good information management, and usage of ICT become the key resources (Adrodegari et al. 2016).

- Responsibility for the functioning of customers' operations (Spring and Araujo 2013). To avoid negative revenue flows, specific agreements on rights and liabilities of each party and inclusion of risk prevention in the pricing schemes are crucial (Adrodegari et al. 2016).

- Cooperation with other companies (Baines et al. 2009). This demands longer and/or strategic level coordination and greater need for information exchange between partners (Adrodegari et al. 2016).

- Cooperation with consumer. It is fundamental to the success of a service-oriented business model, where early involvement aims to achieve better solutions to meet the specific consumer demand (Beuren et al. 2013). To respond to customer needs, a shift from transactional to interactive relationships is required (Wind 2006).

Empirical analysis of various real estate service providers helped identifying these changes existing in the market:

• End-user orientation and value co-creation with the user. End-user involvement is noticeable in the selection of services in organisation's value offering. Also, constant feedback collection and service portfolio adjustment based on it.

• Partnering (instead of outsourcing) with service providers and adding new partners. For example, in some cases we notice that although the negotiations are done between the space operator and service provider, the actual contracts are signed between the end-user and service provider.

• Flexibility increase in agreements and payments. Space rental and service agreements have become noticeably shorter, varying from 1 month to few years. Increased flexibility brings more risks to service providers so they have to go "an extra mile" to keep their customers happy and wanting to stay.

As a result, we developed a service ontology to show evolving value offerings (Figure 13). They have gone from basic space and FM service offering towards adding services related to community such as networking events, expert consulting, and education of companies/user. The

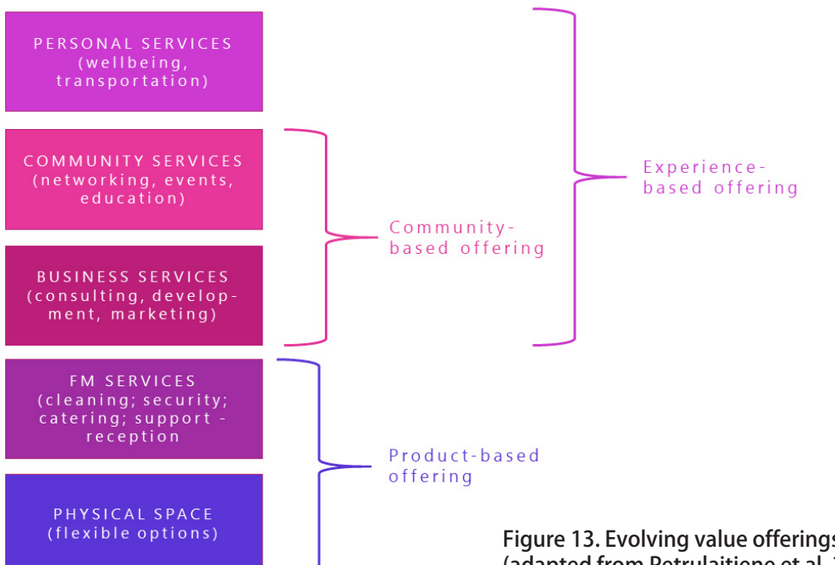


Figure 13. Evolving value offerings (adapted from Petrulaitiene et al. 2017)

most advanced value propositions offer services related to personal experience such as personalised events (for hobbies and self-development), wellbeing (e.g. jogging peer groups, personal trainer/dietologist consultations) and even transportation (free use of bikes, electric cars). These result-based business model elements are found more commonly in coworking spaces where they promote the spirit of workplace. The way services are chosen and bought is noticeably changing from using traditional SLAs towards creating a network of service providers to deliver the services.

For WorkCoach mock-up business model development, we went through a list of 55 different models. Based on previously discussed information, we eliminated not suitable ones and analysed 10 of them. The three most suitable models were discussed with company representatives and *From push to pull* –model was chosen. *From push to pull* -model means that the changes are coming from the customer side which pulls companies to change and provide services based on their requirements. Company or service responds to new customer needs quickly and easily. This business model emphasizes decentralizing and adding flexibility to company processes and highlights customer orientation. The money streams usually are based on actual use (pay per use) of service. The business model in use is not exhaustive, but makes a good ground for the service and its measurements.

Figure 14 provides a visual view into conceptual WorkCoach business model. WorkCoach acts as a platform which communicates with service users, service providers, and customer organisations. Users of the WorkCoach provide their data (see in chapter New service concept) and for that they receive demanded services and recommendations how to improve their well-being and productivity. From received feedback and data, the platform learns about its users to improve recommendations and service delivery. WorkCoach platform allows service providers to plug-in easily. Service providers benefit from gained access to new customers and for that they pay an agreed percentage from the invoiced amount to the platform provider. Customer organisations benefit from the platform in multiple ways. First, they gain analytical insights from space usage and their employees. Second, they gain an access to a wider pool of services without having separate agreements made. Third, they pay only for the services that were used by their employees, thus, saving money from providing other types of beneficiary services.

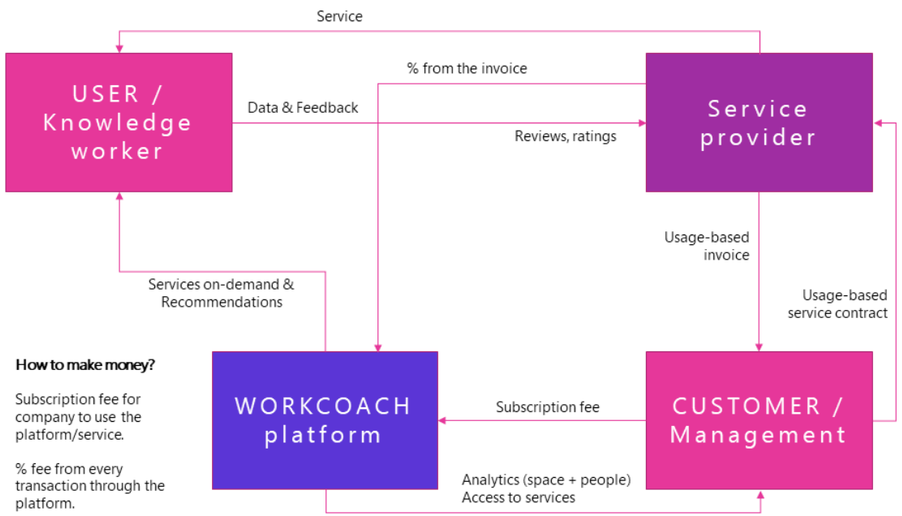


Figure 14. Visualized WorkCoach business model

PATI publications

Rytkönen, E., Petrulaitiene, V., Nenonen, S., Jylhä, T. & Vuolle, M. (2015), Serving mobile workers at university campuses access to success. in J Sundbo, L Fuglsang, F Sørensen & N Balsby (eds), *The 25th Annual RESER Conference, 10-12 September 2015*, Copenhagen, Denmark. Roskilde University, Roskilde University, pp. 643-653

University campus management organizations are challenged by digitalization, decreasing public funding, and low utilization rates of physical premises. In the network of increasingly complex service offerings, taking underutilized operand resources into more efficient uses is a strategy applied by novel service providers such as Hoffice, Uber and Liquidspace.

Hence, this paper explores such services as potential solutions for supporting mobile knowledge workers of university communities and beyond. As a result, a set of service clusters is drawn to help academics and practitioners understand services on offer and their potential implications for the university campus management organisations.

Petrulaitiene, V., Rytkönen, E., Nenonen, S. & Jylhä, T. (2015), Service concepts from future - weak signals from different branches. in J Sundbo, L Fuglsang, F Sørensen & N Balsby (eds), *The 25th Annual RESER Conference, 10-12 September 2015,* Copenhagen, Denmark. Roskilde University, Roskilde University, pp. 155-168.

In order for facilities management (FM) to proactively support organisations and distinguish their service requirements a deep understanding of future is needed. This paper introduces five branch-specific (retail, senior housing, industry, wellness and well-being, and knowledge work) scenarios in order to predict future challenges for FM.

The results suggest that FM should consider: (1) FM in virtual worlds; (2) responsibility, wellbeing and sustainability factors as business drivers; (3) new ways of conducting daily activities, which require new ways of supporting clients; and (4) mixed and multi-use space segments in order to act proactively. These findings might be useful for FM service providers in Nordics and globally.

Petrulaitiene, V., Rytkönen, E. & Nenonen, S. (2016), How can FM service providers improve their service delivery through value co-creation? in P Anker Jensen (ed.), Facilities management research and practice: does FM contribute to happiness in Nordic countries?: *CFM Second Nordic Conference 29-30 August 2016.* Technical University of Denmark, pp. 79-88, Lyngby, Denmark, 29-30 August.

The value created in the network of users, customers, and service providers will be the competitive advantage of businesses in the future. Facility management (FM) organisations, in order to be innovative and stay competitive, need to understand the evolution of business logic and apply it in practice. Hence, the aim of this paper is to study value co-creation opportunities for FM by analysing various service businesses and identifying the key points for successful service development in FM sector.

First, the literature on value co-creation and added value of FM is studied. After this, available services for knowledge worker are analysed by using Business Model Canvas in order to identify the evolution of business. Interviews with practitioners in FM-service provision supplement the previous knowledge from the analysis of services.

As a result, the ways to co-create value are listed. Empirical results are validated by applying them into value co-creation concept based on the literature. Identified ways to cocreate value help practitioners to understand new business logic and pinpoint opportunities for FM to exploit it. This paper contributes to the academic discussion by introducing the phenomenon of value co-creation in FM research.

Petrulaitiene, V., Rytkönen, E., Nenonen, S., Jylhä, T. (2017) "Towards responsive workplaces – identifying service paths for time- and place-independent work", J*ournal of Corporate Real Estate*, Vol. 19 Issue: 3, pp.144-156

The need to understand work processes and end-users has become an issue in corporate real estate and workplace management. Flexible work practices and technological advancement allow end-users to move outside the building boundaries. This influences workplace management to become more service oriented and demand-driven, and better serve the needs of end-users. For that, this paper aims to investigate the ways in which new workplace services support the knowledge creation processes of mobile workers.

This study is exploratory and follows a multiple-case study strategy. Literature is reviewed on workplace and knowledge theories, and the market analysis consists of data from 57 firms that offer services to support the mobile knowledge worker.

Workplace services were categorized into three new groups that support knowledge creation processes for the mobile knowledge worker in various work environments. The analysis indicated that new services are driven by technological development and community formation around the physical or virtual place.

The proposed service groups can be examined as new business opportunities by workplace service providers, and the results suggest that the CRE managers should re-think their service portfolios, boost their collaboration with the service providers and invest in building a community.

This paper categorizes workplace services from a mobile knowledge worker perspective and follows a service-oriented approach to workplace management

Petrulaitiene, V., Pässilä, P., Nenonen, S., Jylhä, T., Junnila, S. (2018) From walls to experience - servitization of workplaces, *Facilities* (ERES 2017 Conference in Delft)

New ways of working challenge workplace management: increasing mobility and diminishing organizational boundaries require re-evaluation of both workplace design and service delivery. However, structures and processes of workplace management are still traditional and managers, together with outsourced facility service providers, often do not succeed at fulfilling the needs of mobile employees.

The abovementioned changes stimulate discussions in many areas in both industry and academy. Nevertheless, workplace literature from business perspective seems to be scarce. In this paper, the focus is on workplace service offering for mobile knowledge workers. We explore how workplace is commercialized through servitization. To answer this, we identify value offering elements that are used in office business market to deliver workplace as a service.

This study follows multiple case study methodology including 5 case studies. Primary data was collected through interviews with workplace service providers. Secondary data included observations and publicly available data. We took business model design approach in order to study selected business offerings.
The results indicate that physical space is no longer the central offering in the office business; instead, it acts as a component on which the service portfolio is built.

Academically, research contributes to the workplace management studies by providing a business perspective to a topic previously approached with a more technical and psychological point of view. This study can also support service providers and customer organisations in their quest to make service provision more flexible and experience-oriented.

Rytkönen E. (2015). University campuses in spatial transformation - a business model typology of case Aalto University. *Facilities,* Vol. 33 Issue: 13/14, pp.794-818

The purpose of this paper is to examine the impacts of spatial transformation in the Network Society on facilities management principles in the context of an interdisciplinary university campus. This study reports a holistic case study with eight embedded units in one interdisciplinary university campus in Finland through a business model approach.

The findings propose that spatial development projects should be examined holistically on three facilitation layers, namely, social, physical and virtual, through five business model lenses of Offering, Customers, Revenue Streams, Resources, and Cost Structure. Based on the findings, four main business model types can be identified and distinguished mainly in terms of collaborating with different partners and supporting a different core task of the university.

The cases are highly context-dependent, and their business models are ever evolving, which is why the dynamics of the development processes should be studied in more detail. The types of business models differ fundamentally, which is why their evaluation criteria could be tailored accordingly.

The results suggest that the spatial transformation requires multiple supporting processes and principles, expanding the roles of the campus managers: finding a balance between localization and globalization, and individualism and communalism; collaborating with internal and external parties; identifying potential grass root spatial development projects to be supported; and engaging users in their expertise. The strengthening impact of social facilitation is capable of opening new business opportunities.

This study indicates that the spatial transformation is happening in practice and offers guidelines for dynamically reacting to it from the facilities management perspective.

IMPLEMENTATION

Implementation phase in design process usually means, that the solution – minimum viable product – is brought to life and market and tested with the users. We have brought to life first suggestions of a MVP pilot service, and some suggestions how to implement it, improve it, and refine the business model to answer the market needs.

Roadmap to implementation

The following roadmap bases on the concept we have created and tested, and it gives grounds for implementing the service or parts of it within the PATI companies. The roadmap includes a timeline, assignments, and milestones as well suggested responsibilities for completing those.

As a critical success factor, we suggest the companies to define the key elements in the roadmap to evaluate project succession. In addition to keeping the milestones, it is important to hear and learn what the customers say, and iterate the service along the way. Measurements of service success are introduced in the following chapters.

This does not mean, that the service would be ready – on the contrary – it needs to be iterated and developed further after launching and gathering the first real life user feedback. We truly hope that this service can be brought to life and it brings value to all of our PATI companies and their customers as well.

Table 2. Roadmap to implementing WorkCoach solution

	Sensors (step 1) - Indoor navigation and mapping - Activity-based work - Desk usage sensors + meeting room sensors	Functions flow (step 2) - People profiling - Indoor location tracking solution - Calendar integration	Productivity & wellbeing flow (step 3) - Health and activity data integration - Open platform for integrating other services
	Spring/summer 2018	Autumn/Winter 2018	Spring/Summer 2019
Business targets	Better space utilization & change solution Meeting room promotion & pricing	Digital service improvement People integration	Improved employee experience and productivity Cost savings on occupational health
Company specific changes/needs:			
Telia	Provision of sensors & data analytics	System integrations + data collection and analytics	Data collection & analytics, process automation
ISS	Extra services & demand-based contracting	On-demand service delivery	On-demand service delivery
Senaatti	Space utilization & change services	Space utilization & employee profiles	Workplace experience. "Middle-man" role for creating service eco-system
KPI's	Utilization rates	Usage Feedback Service requests	NPS Reduced sick leaves and health costs Improved employee satisfaction Higher smart WOW rating
Challenges	New purchasing/selling processes (on-demand, SLAs) Organisational support Talent gap for platform development and data analytics Platform development	New purchasing processes Profile development Implementing EU regulations Creating interest in service	Same as in step 2 + Lack of interest from the users Lack of information utilization Mismatch between service suggestions & company culture/ environment. Learning from the data
Tacking challenges	Collaboration with partners for platform and operations development Active inside marketing	Collaboration with partners Outside consultants for EU regulations Active inside marketing	Not starting before preconditions are met: suitable spaces, list of services & management approval Having dedicated personal to use the collected data
Service features	Dashboards (online, screens in the place)	Self-evaluation & feedback	Wellbeing on-demand
Service features for companies	Visitors People in the location When (most popular hours) and where Physical space quality (cleanliness, air quality, etc.)	Space usage Common activities Most "popular" people Learning about people's profiles & preferences	Learning from the user Demand-based services
Service features for end users	Usage (free/empty) Popular hours Air quality (CO2, temp, humidity)	Faster service Feedback & suggestions based on profiles	Personalized suggestions Recommendations for activities & wellbeing
Revenue logic	Fee for meeting room usage Demand-based FM services	Free for end-users Levelled pricing Subscription fee based on no. of users for customer organisation	Free platform usage for end-users Subscription fee for customer organisation Usage-based invoicing from service providers to customer organisations % fee from every transaction through platform

Introduction to measuring of a new service

Measurement can provide understanding on the success of a new service and its provision. Quantitative information can at best crystallize information and support the interpretation of factors affecting the success of service business. Typically the development of performance measurement is seen as a process including the phases of design, implementation, and use and update.

Design phase should be started by asking why. What are the information needs for which measurement should be developed? Measures do not have any value as such but they should be linked to clearly defined purposes. Typical purposes include trend monitoring, reporting, strategy implementation and identification of development objects. Measurement can also be used in forecasting, preparing pricing or demonstrating the benefits of new services.

The purpose of measurement is closely related to the second important question: what is to be measured? The object of measurement is not the same as the method or formula for obtaining the measurement result. Before the design of measures, the relevant measurement objects and their inter-connections should be identified. Figure 13 illustrates the various perspectives to the broad measurement object, namely performance and it also guides the presentation of the measurement perspectives in this section.

Efficiency is related to the utilization of inputs and doing things right (Drucker, 1963; Tangen, 2005). Productivity, in turn, examines the output of a production process including quantity and quality of products and services (Sink, 1983). Quality can relate both to the output and to the transformation of inputs into outputs (process quality) (cf. Grönroos and Ojasalo, 2004). Effectiveness relates to outcomes and benefits which are examined in relation to the organization's objectives and customer needs (Tangen, 2005). Outcomes are partly the results of outputs but may be also affected by other factors (e.g. customer's own business decisions) (Fletcher and Snee, 1985). Effectiveness should be high when an organization is pursuing the correct objectives in an efficient manner (cf. Drucker, 1963). Costs are affected by the quantity and prices of inputs used. Revenue is the result of both the quantity and prices of products and services sold. Revenue is dependent on both outputs and outcomes from operations. Profitability is related to the relationship between revenue and costs. Finally, performance is a broad concept which includes all the sub-concepts of the figure.

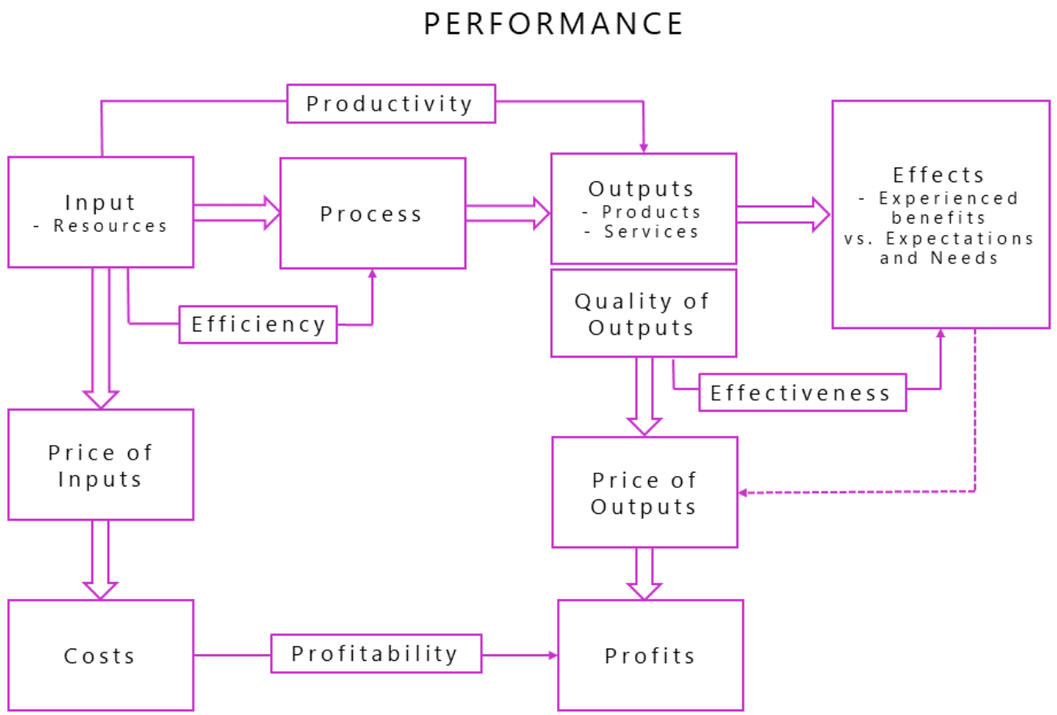


Figure 15. Different aspects of performance (Jääskeläinen, 2010)

The implementation phase of measurement includes the modification work related to information systems and other tasks, which are needed in automated data gathering. New measures often require instructions, training and communication in order to be adopted. The actual use phase of measurement includes data gathering, interpretation and utilization in the purpose defined in the design phase. A common way of using performance measurement is to identify deviations or differences in comparison to targets or previous points of time. Measurement can be implemented at different frequencies varying from almost continuous monitoring to periodical reporting. Sometimes measurement is also implemented as a one-off study. This is the case for instance when the success of a new model, product or service is demonstrated in comparison to previous ones. Finally, it is essential to continuously consider the possible needs for updating the measurement due to e.g. changes in the working environment or the service provided.

> *" Finally, it is essential to continuously consider the possible needs for updating the measurement (--). "*

The purpose of this section is to concentrate on design phase of the measurement of services. Many different approaches to the measurement of services could have be applied. *In this section, the emphasis is in the measurement supporting the launch of new services.* Especially, the benefits of new services for the customer are taken under scrutiny. These benefits could be examined at the levels of individual consumers, customer employees and the customer company. This section concentrates to the benefits for the customer company. The intension is not to provide an all- set of measures but to illustrate different perspectives to measurement in the chosen setting and provide some examples of measures. The perspectives covered in this section include: measurement of service process, measurement of service benefit and measurement of long-term value (see Table 3).

MEASUREMENT APPROACH	EXAMPLES OF MEASUREMENT MODELS OR METRICS	REFERENCES
CUSTOMER AS AN EMPLOYEE AND AN END-USER OF WORK ENVIRONMENT Objective and subjective measurement of work environment and work models, workplace effectiveness and knowledge work performance	Employee turnover, employee complaints, well-being, individual and group productivity, cost and time savings Employee satisfaction and productivity related to work environments, e.g., Leesman Index, SmartWoW and WODI	Rice, 2002; Laihonen et al., 2012; Vicher, 2006 Appel-Meulenbrock et al. 2015; Palvalin et al, 2015; Maarleved et al, 2009; de Been & Beijer, 2014
CUSTOMER AS A TECHNOLOGY USER User experience and technology evaluation models for measuring virtual and mobile work environment	User experience and context of use Technologt Acceptance Model Task-Technology Fit	Hassenzahl & Tractinsky, 2006 Gebauer et al., 2010; Jumisko-Pyykkö & Vainio, 2010; Davis, 1989; Venkatesh & Davis, 2000; Goodhue & Thompson, 1995; Kim, 2008; Yuan et al., 2010
CUSTOMER AS CONSUMER Custoemer experience, customer journey and value	Net Promoter Score, NPS Customer Effort Score, CES Customer Satisfaction, CSAT Service experience, EXQ Value in experience, VALEX Kano model	Reichheld, 2003 Dixon et al., 2010 Morgan & Rego, 2006 Klaus & Maklan, 2012 Helkkula et al. 2012 Kano, 1991
CUSTOMER AS AN ORGANISATION Multi-dimensional preformance measurement system and KPIs	FM Value Map Balanced Scorecard Value creation function	Jensen et al. 2012; Kaplan & Norton, 1996; Sarasoja, 2012 Walter et al. 2001

Table 3. Perspectives to measurement in new service provision

Measurement of service process

Much of the data available to service measurement relates to service process. The purpose of this measurement is to understand the fluency of operative service processes when they are provided to a customer. This information is necessary in improving efficiency of service provision and in improving the process quality experienced by a customer. From the viewpoint of supplier the measurement typically supports the identification of deviances in service provision. This information aids in maintaining service levels and in identifying operative targets for development. Customer can use this information in its use of service for example in planning the right timing of service usage for optimal resource allocations. In addition to these purposes, the measurement of service process provides information which can be used in measuring service benefit and long-term value.

Table 4 illustrates the measurement applied in the service process perspective. It is notable that many of the measurement objects relate to the use of resources, i.e. efficiency. In the service process measurement, the frequency of measurement is typically high and data gathering is almost real-time. Data gathering is done both by customer and service provider and there needs to be clear division of responsibilities between the two parties.

Table 4. Examples of service process measures

Measurement object	Example measures/data	Example of data source
Utilization rates	m^2 in use/ Total m^2 of premises Efficient production hours/ theoretical max. capacity of service-related technology	ERP system
Service process lead time	Appropriate temporal unit	ERP system
Provider's response time	Appropriate temporal unit	ERP system
Unit costs	Costs/service transaction	ERP system
Actions and behaviour of employees using the service	Movements and spatial information Time used with different devices and applications (log data, screen time) Employees linked to working periods and premises (e.g. employees linked to meeting invitations)	Sensors
State of mind of employees using the service: cognitive and affective	Excitement/ Stress level Activity applications and measures Work Coach	Sensors
Physical space characteristics	Circumstantial information (e.g. noise level)	Sensors
Process quality	Number of reclaims Quality costs	Supplier's CRM
Customer experience	Net promoter score Real time customer experience measures in different premises and events	Digital feedback solutions

Measurement of service benefits

Service benefit measurement relates to the benefits of the new service during the first delivery for the customer (Table 5). From the viewpoint of customer, the measurement provides understanding on the fulfilment of its demands. At best, it already links to the concrete benefits in the customer business such as cost savings. From the viewpoint of supplier, this information supports sales efforts by transforming service promises into numerical form. The information can also be used to demonstrate the fulfilment of targets defined in service level agreements. It is also useful in finding ways to improve the service and designing new additional services..

The measurement captures especially the aspects of output, productivity and profitability but includes also the short-term effectiveness of the new service. Typically, this measurement continues until the first agreement period ends and the customer considers the possible continual of using the new service. This type of measurement can be used before the implementation of the service (anticipating and planning of potential benefits) or during its usage linked to individual sub-components of the new service. Typically, the measurement has clearly defined periods for reporting.

Table 5. Examples of service benefit measures

MEASUREMENT OBJECT	EXAMPLE MEASURES	EXAMPLE OF DATA SOURCES
Output quality (functional quality)	Service level descriptions in SLA agreements	Agreements
Project success	Completion rate of defined (performance) goals	Project documentation
Customer satisfaction	Survey average (1-5) Net promoter score (NPS)	Survey
Immediate cost savings to the customer	E.g. costs of premises	Customer's ERP system
Increased revenue for the supplier	Added purchases by the customer or through the obtained customer reference, customer retention	Supplier's CRM

Measurement of long term value

This perspective provides information, which is useful in demonstrating value for the customer during a longer period of service usage (Table 6). This means that the examination period is often from 2 to 5 years. From the viewpoint of customer, this measurement provides a better understanding on the service benefits and investment feasibility during the life cycle of the service usage, which is also useful in rationalizing the continual of service purchasing. From the supplier perspective, this measurement gives information which can be used in justifying premium pricing of provided service and supporting the sales of additional services. It can also be useful in developing the service and creating new service offerings. For both customer and supplier, the provided information can be useful in making gain-sharing agreements where the payments are directly linked to customer's business performance.

The objects of measurement typically relate to outcomes, effectiveness and profitability. For example, measures can demonstrate long-term economic results of the customer, such as increased revenue, cost savings or balance sheet effects. As a difference to immediate benefits, customer value measures also demonstrate the add-on (indirect) benefits to immediate adoption of the new service. The measurement is typically carried out through before-after settings demonstrating the changes to customer's business and work environment. Hence, measurement can be carried out as a one-off study.

Table 6. Examples of measures for long-term value

MEASUREMENT OBJECT	EXAMPLE MEASURES	EXAMPLE OF DATA SOURCES
Impacts of changes in the work practices and use of premises	SmartWow-survey and its specific sections Customer's employee welfare Customer's employer image	Survey
Technology evaluation models for measuring virtual work environment	Technology Acceptance Model, Task-Technology Fit	Specific study platform
Financial benefits for the customer	Revenue increase Decrease of alternative costs (premises, employee absences, administrative and transaction costs)	Customer's ERP
Changes in the customer business	New customs Customer segment-specific measures	Customer's ERP, CRM
Sustainability	Decreased carbon footprint from travelling, premises etc.	Specific reporting platform

PATI publications

Horstia, J., Vasell, T., Nenonen, S. and Helander, N. (2017) Ways to measure user experience in co-working places. In: *Research Papers for EUROFM´S 16th Research Symposium. EFMC 2017.* 25-28.4.2017, Madrid, Spain EuroFM and Centre for Facilities Management: Polyteknisk Forlag .pp. 158-169.

The amount of coworking places, which allow diverse users to rent offices and infrastructure on a monthly, weekly, daily or even hourly basis, is growing increasingly. These spaces tend to foster an interactive, stimulatingly interdisciplinary and pleasant atmosphere, and in this way potentially influence positively on our mood, well-being, motivation and productivity. Such an atmosphere and the corresponding user experience are, however, a sum of several elements – such as technical conditions of the environment, physical appearance and social collaboration and communication possibilities.

The aim of this paper is to describe a holistic way to measure the user experience of a coworking place through a case study. The investigated co-working space is called a living laboratory for new ways of working and well-being. It is located in the capital area of Finland and opened in 2016. The question answered in the paper is "How to integrate different methods and data sources to measure user experience of a co-working place?"

The results are presented in the form a Customer Journey Map, which is a visual interpretationof the overall experience with a service over time and across channels. This paper contributes to workplace development by presenting an integrative approach to combine data about performance of technical system, the building and the individual users. The integrative measurement technique provides a tool for facilities managers to combine the hard and soft data connected to user experience of a co-working place.

Vasell, T., Vuolle, M., Petrulaitiene, V., Nenonen, S., Jylhä, T. Identifying and measuring customer value – case multi-locational worker. In Nielsen, S. B., & Jensen, P. A. (Eds.) (2016). *Research papers for EuroFM's 15th research symposium at EFMC2016.* Kgs. Lyngby: Polyteknisk Boghandel og Forlag, pp. 143-150

This paper presents measurements approaches by reviewing models and frameworks that can be utilised in identifying and measuring customer value in the context of multi-locational work.

Multi-locational, mobile workers utilise various spaces, tools and services during their workdays. Constantly changing needs and working environment challenge service providers to provide new physical, social and virtual working environments and service to attract and engage customer. Companies also need tools for measuring the created customer value.
The study is based on a literature review about customer value in multi-locational work conducted.

The four identified measurement approaches that define the roles of the customer are 1) customer as an employee and the end-user of physical work environment, 2) customer as the technology user in virtual work environment, 3) customer as a consumer and 4) customer as an organisation. Although the focus was on multi-locational working, it was noticed that the same methods and tools can be utilised in both single-location work context as in the multiple-location working environment. This might indicate that there is a need to develop tools more precisely for the multi-locational working.

This paper tried to understand how value is created for customers and present measurement approaches that can be utilised in identifying and measuring customer value in the context of multi-locational work.

Three-level thinking

Technological evolution made it possible to transfer things, places, and people into digital world and connect them into a network of everything. Built environment is able to adapt to our needs and this changes how we, as humans, interact with it. Here we follow IBM's building evolution model (Escherich 2016) from automated to smart and to cognitive buildings and introduce another, human, level to make workplace as a service in a way that improves employee wellbeing and productivity (Figure 16).

Through PATI project, we aimed at understanding how our physical environment, namely offices, can serve their users better to improve their wellbeing and productivity as well as provide on-demand services. Understanding the knowledge worker and its needs can help to improve space usage as well as operations of various departments in the organisation.

Figure 16. Three-level thinking

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