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Editor:
Tuuli Jylhä

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PREFACE ■

EuroFM Research Symposium has a very special meaning to me: The EuroFM Research Symposium was my first research conference to attend and to present a co-authored scientific paper. This happened in EFM 2008 in Manchester. It was also one of my first contacts to the other FM researchers and EuroFM community and I still remember the ability of the EuroFM to bring people together. Therefore, I was very pleased and honoured when the EuroFM board asked me to chair the 19th EuroFM Research Symposium. Thank you for this great opportunity!

Although the spring has been abnormal, intensive and halting due to the COVID-19 crisis, we have succeeded to deliver this conference proceedings including 11 papers. This year the papers include research, technical and educational papers. 70% of the submitted abstracts were developed into and finally accepted as part of the conference proceedings. All papers were double-blind peer reviewed and follow standard research paper outline.

I would like to sincerely thank all the authors, the members of the scientific committee and the best paper award committee, and the EuroFM board for their contributions and support in the process of publishing a high-quality proceedings and making the related event come true. It has been a great experience to work together with you! The process has required quick changes and responses from the members and I am grateful for the flexibility and commitment that have been provided along the way.

Due to the COVID-19 pandemic, the Research Symposium 2020 is organised online (3-4 June 2020). Although it is a lost opportunity not to meet face-to-face, the online edition provides us a new way to share ideas and discuss findings with the wider EuroFM audience. Let us be inspired to further explore the digital collaboration and new traditions to network. Meanwhile, I hope you enjoy reading the proceedings!

Dr. Tuuli Jylhä

Chair of the EuroFM Research Symposium Organising Committee
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Creating a Holistic Corporate Real Estate Comprehension

Torben Bernhold¹ and Niklas Wiesweg²

Citation:

Bernhold, T., Wiesweg, N. (2020) Creating a Holistic Corporate Real Estate Comprehension, In the Proceedings of the 19th EuroFM Research Symposium, EFMIC 2020, 3-4 June 2020, online conference.

ABSTRACT

Background and aim - In practice, the concepts of (Corporate) Real Estate Management (C/REM) and Facility Management (FM) have in Germany increasingly been separated or encompasses different meanings in reality; the latter is in practice often wrongly equated with Facility Services. The question therefore arises as to what they have in common, what the differences are, and the perspective intended in each case.

Methods / Methodology - The numerous definitions of CREM and FM were examined, reduced to their core elements, and transferred to a Delphi Study to create a consensus between both and one language regarding the terms in real estate Market.

Results - The participants see no significant differences between CREM and FM at the most of the articulated core elements of Real Estate Management; only in some elements – and this is corresponding to the forehanded equation between Facility Management and Facility Services – there are expected differences. At its core, the separation of disciplines seems to be more general and practical than theoretical. Context factors for the coordination of REM seem to be the heterogeneity of the real estate portfolio, the real estate ownership rate and the company size. Dynamics in the core business and the degree of internationalization also seem to influence the procedural scope of the function.

Practical or social implications - Better understanding of the terms Corporate Real Estate Management and Facility Management leads to a clearer language framework in the German market and therefore to a better use of real estate to support core business objectives.

Type of paper – Research paper.

KEYWORDS

Corporate Real Estate Management, Facility Management, Definition.

INTRODUCTION

It seems that the concepts of Corporate Real Estate Management and Facility Management are in practice frequently separated: Facility Management is often equated with Facility Services and is further divided into hard and soft services, but its real purpose should be “improving the quality of life of people and the productivity of the core business” (ISO, 2017). On the other hand, Corporate Real Estate Management is said to be more focussed on the strategical alignment of the real estate strategy along the corporate business objectives. (Haynes, 2012; McDonagh and Nichols, 2009; O’mara, 1999; Roulac, 2001; Nourse and Roulac, 1993; Heyward, 2011; Appel-Meulenbroek et al., 2010; Scheffer et al., 2006; Singer et al., 2007). Although both disciplines have the transformation of the resource “real estate” in mind and are trying to support the core business they are not equal? In many works the attempt is made again and again to work out the similarities and differences as well as the intersections between both areas (Kämpf-Dern, 2009; Kämpf-Dern & Pfnür, 2014; Van der Voordt, 2017). This circumstance leads not only to numerous coordination difficulties and interfaces, but above all to misallocations of resources, as different institutions, for example, deal with similar issues and service providers and clients do not use the same language framework. Moreover, it makes it difficult to take a holistic view of things in the area of optimizing the use of real estate to support core business objectives. The question therefore arises as to what they have in common and what their differences are, and the perspective intended in each case.

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LITERATURE STUDY

As mentioned above, the concepts of Corporate Real Estate Management and Facility Management have increasingly been separated. Furthermore, in the real estate market are several expressions with different or the same meaning in comparison of practise and theory. Especially in the German market is Facility Management often understood as Facility Services, with a technical focus on hard services (Redlein, 2020, p. 12-14). A literature research is done to elaborate characteristics that apply to both concepts, with the transformation of the resource “real estate” in mind and without a direct link to and naming of one of the concepts. These characteristics are used in the later processed questionnaire to identify the similarities and differences between the concepts of Corporate Real Estate Management and Facility Management.

Various definitions and authors (ISO, 2017; Glatte, 2014; Kämpf-Dern, 2009; Pfnür, 2011; Redlein, 2020; Teichmann, 2009; Van der Voordt, 2017) aim at a conscious differentiation of the two concepts. Van der Voordt claims, that “Dissimilarities consider the focus on facilities and services (FM) versus that on buildings and real-estate portfolios (CREM), as well as a shorter time frame and high flexibility of facilities (FM) versus a long life cycle and rather static buildings (CREM)” (Van der Voordt, 2017) but although pleads for a stronger connection between the two disciplines in the future. KÄMPF-DERN (Kämpf-Dern, 2009) for example describes the Facility Management as an “operational management of real estate related processes”³, with which she means the provided facility services. On the other hand, GLATTE (Glatte, 2014, p. 6) understands the Facility Management as a management discipline, which includes the Real Estate-Asset Management, Real Estate Property Management and Facility Services. REDLEIN (Redlein, 2020, p. 14) addresses a similar dispute at the beginning, as examined here: “There are many management terms around Real Estate, but quite often, a common understanding is missing”. In addition, he points out, that only Facility Management “[...] includes the user’s perspective. All other disciplines of CREM are owner- and investor-oriented”. If, however, both “disciplines” have developed in different ways, but in many cases address similar topics, the question arises as to the fundamental differences between these two areas. A pure focus on Facility Management is more object-oriented and CREM more portfolio-oriented does not appear to be a sufficient foundation from the authors’ perspective, especially since this accentuation does not appear to be free of overlaps in terms of tasks. PFNÜR (Pfnür, 2011) developed a much more holistic approach: He pointed several core elements out (see Table 1), that are suitable for the concepts of Corporate Real Estate Management as well as for the concepts of Facility Management and did not imply a conscious differentiation. These core elements of PFNÜR were chosen for the questionnaire because of the implied, deliberate separation of the disciplines and the lack of uniformity of the other definitions.

Table 1 CREM core elements (Pfnür, 2011, p. 165) (translated from German).

The Core Elements of Corporate Real Estate Management
The development and implementation of an active strategy based on the corporate strategy
The creation of transparency of the real estate costs and benefits by setting up a real estate information system
The establishment of rules of the game for establishing a service provider relationship between the real estate function and users based on partnership
The professionalisation of real estate management tasks by bundling responsibility and competence
The definition and management of real estate business processes and market-oriented make-or-buy decisions

These core elements include certain business processes. By assigning the core elements to the disciplines, CREM and FM, by the participants, the business processes can also be assigned. Which answers the first part of the raised research guided questions. This clarification also leads to the similarities and differences, by comparing the given answers.

³ Translated from German

The second point of interest are the context factors, that influence the coordination of Real Estate Management. On this topic groundwork was done by HARTMANN (Hartmann, 2011) and his results can be used for the questionnaire and in a second step be verified at the end.

RESEARCH METHODOLOGY AND/OR METHODS

Within the overall study, a mixed method approach is used, with a focus on qualitative methods. The whole study is subdivided into two parts: The first one addresses the mentioned separation between the concepts of Corporate Real Estate Management and Facility Management, focusing on the research guided question “Which business processes can be assigned to CREM and FM, where do similarities and differences exist, and how and where should a hierarchical positioning in the company (corporate) take place”. In the second part, a case study with problem-oriented interviews within the framework of data collection and subsequent qualitative content analysis was carried out with the aim of generating and reviewing a standardized process framework for real estate management. This paper focusses in the following on the first part (for the research process see Figure 1).

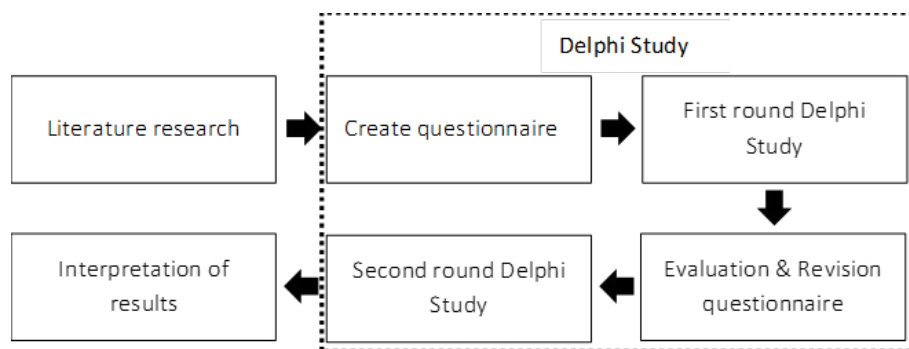


Figure 1 Research process

The first part uses the Delphi Study as the main research method. A Delphi Study is a method to achieve consensus between different stakeholders regarding to the objectives of an evaluation (Geist, 2010). In particular there are at least two rounds of interviews done, with the same subjects, to create one corresponding opinion. In this project is a two round Delphi Study used. The first questionnaire refers to two topics; (1.1) The core elements of CREM and FM (see Table 1 and Table 2) and (1.2) the context factors (see Table 3). At the beginning a literature research was done, its result formed the basis for the first topic. The goal was the elaboration of numerous definitions of Corporate Real Estate Management and Facility Management and the identification of context factors, which can influence the coordination of Real Estate Management. The given answers on (1.1) and (1.2) lead to an interpretation⁴, which can be summarized to a type of statement, which is used in the second questionnaire: (2.1) the derived statements of the core elements. Finally, the evaluation and revision step take up the results of the first questionnaire and focusses on the same topics, but with a different view. At the end all findings were discussed and interpreted.

DELPHI STUDY

The Delphi Study was carried out with corresponding experts. The main objective was to establish a uniform understanding between CREM and FM with regard to the objectives as mentioned in Table 1 and with regard to the process regulation framework in the real estate context against the background of the different context factors according to HARTMANN (Hartmann, 2011).

At first a fully standardized questionnaire was created and submitted via an online questionnaire portal. The basis was the output of the literature. Regarding the raised questions at the beginning, the questionnaire focusses on the core elements, to identify whether the concepts of Real Estate Management and Facility Management are the same, and on context factors for the coordination difficulties. The questionnaire was answered in the first round by eleven Corporate Real Estate professionals (n = 11). After that the completed questionnaires are evaluated and the results are used to revise the questionnaire. In the second round of questioning the participating subjects (n = 8) are additionally informed about the opinions and positions of all the others. This offers the possibility to

⁴ Presented on page 11

reconsider and, if necessary, change the answer, given in the first round by providing a higher point of view. This leads to a clarification and standardisation of misunderstandings and contradictory statements (Linstone & Turoff, 1975). The core of the considerations was the creation of a consensus regarding the similarities and differences between the disciplines of Corporate Real Estate Management and Facility Management.

RESULTS

First Round

During the first Delphi round, the uniform language framework in the use of the terms CREM and FM was the main focus of the considerations. An essential summary of the participants' assessments (N=11) can be found in Table 2. All in all, a substantial agreement was found, regarding to the core elements (as shown in Table 1), with regard to the terminology of CREM as well as that of FM.

A greater difference in the perception of differentiation between CREM and FM seems to exist particularly in the area of "establishing rules of the game for building a partnership-based service provider relationship between the real estate function and users". In this question only 54% of the participants assign this core element to CREM, but more than 91% of the participants locate this core element primarily in FM.

Gradual differences can still be seen in the elements of "development and implementation of a strategy based on the corporate strategy" and "definition and management of real estate business processes and market-oriented make-or-buy decisions". While the former element tends to be assigned more to CREM (90% of the participants predominantly or fully agreed on this question), make-or-buy decisions are more linguistically located in FM.

Table 2 Results of the assignment of core elements to CREM and FM (first Delphi round).

The Core Elements of Corporate Real Estate Management	More* CREM in %	More* FM in %
The development and implementation of an active strategy based on the corporate strategy.	90%	72%
The creation of transparency of the real estate costs and benefits by setting up a real estate information system.	100%	90%
The establishment of rules of the game for establishing a service provider relationship between the real estate function and users based on partnership.	54%	91%
The professionalisation of real estate management tasks by bundling responsibility and competence.	91%	90%
The definition and management of real estate business processes and market-oriented make-or-buy decisions.	72%	90%

More = Sum of the participants' answers of "mostly agree" and "fully agree" with N = 11

It can already be seen from this presentation that CREM and FM are inseparably interwoven and that a precise "mathematical" differentiation and thus separation between these areas does not seem opportune. Particularly against the background of these results, it appears doubtful on the whole to regard CREM and FM as separate disciplines, whereby a look at practice- at least for Germany- already formulates a clear linguistic separation and above all leads to different institutions and associations, trade fairs and norms and standards. This aspect was addressed in the second part of the Delphi Study, where the practical form of the term was the main focus of the considerations.

In addition to the general description of the core elements of CREM/FM, the Delphi Study also aimed to answer the question of which essential process domains/process categories must be included in such a framework and which context factors (Hartmann, 2011) could be decisive for this. Context factors can be described as those factors that determine the concrete form of a CREM unit in an entrepreneur.

HARTMANN differentiates these into company and real estate specific context factors (Hartmann, 2011). At this point, it seems intuitively understandable that the scope of tasks and services in terms of processes is determined, for example, by the heterogeneity of the real estate portfolio. The main results can be seen in Table 3.

Table 3 Evaluation of the process-related scope of performance of a CREM/FM unit in relation to the context factors (first Delphi round).

The Core Elements of Corporate Real Estate Management	Context factor	Predominant approval	Predominant refusal
To what extent do you believe that the size of the company (measured by turnover, number of employees, market coverage) has an influence on the process-related scope of services of corporate real estate management?	Company specific	72%	28%
To what extent do you believe that the dynamics within the core business (i.e. the frequently changing environmental situation for the core business) have an influence on the process-related scope of services of corporate real estate management?	Company specific	63%	37%
To what extent do you believe that the degree of internationalization of a company has an influence on the procedural scope of services of corporate real estate management?	Company specific	54%	46%
To what extent do you agree that the portfolio size of a company (measured by assets under management) has an influence on the process-related scope of services of corporate real estate management?	Real Estate specific	36%	64%
To what extent do you agree that the heterogeneity of the company (measured by the number of utilisation functions, e.g. retail, office, logistics) has an influence on the process-related scope of services of corporate real estate management?	Real Estate specific	82%	18%
To what extent do you believe that the real estate ownership ratio of a company has an influence on the procedural scope of corporate real estate management?	Real Estate specific	82%	18%

Predominant = Sum of the participants' answers of "mostly agree" and "fully agree" with N = 11

HARTMANN (Hartmann, 2011) showed that the real estate ownership ratio of a company has a great impact on the strategic orientation and planning aspects for a real estate department. This view was confirmed by the participants of the Delphi Study. 82% of all participants believes that the real estate ownership rate is one of the context factors for the coordination of Real Estate Management. The same percentage of all participants agrees that the heterogeneity of the real estate portfolio (measured by the number of utilisation functions, e.g. retail, office, logistics) influences the procedural scope and therefore the professionalization of Corporate Real Estate Management. Nearly three-quarter (72%) of all participants confirms HARTMANN's view of the effect of the size of the company (measured by turnover, number of employees, market coverage). Dynamics in the core business (i.e. the frequently changing environmental situation for the core business) and the degree of internationalization also seem to play a role, but not as big as the first mentioned, regarding the procedural scope of the function.

Second Round

In the second Delphi round, the main results of the first round were processed and made available to the participants again in a question-specific manner; the aim of the Delphi Study was to achieve a certain consensus with regard to the terminology and the procedural scope of a CREM/FM. The focus

of the second study part was the “pointed” location of the terms CREM and FM. The main results can be seen in Table 4.

Table 4 Concrete understanding of the terms in practice (second Delphi round; translated from German).

Aspect	Predominant approval	Predominant refusal
The separation between corporate real estate management (CREM) and facility management (FM) is more theoretical than practical.	87%	13%
The differentiation has established itself in practice almost independently, since facility management is usually equated with facility services.	62%	38%
The separation is intentional and deliberate, as CREM integrates strategic issues of strategy derivation (alignment) and determination to a much greater extent and FM is primarily focused on the implementation of these strategies.	37%	63%
In essence, CREM refers to the entire life cycle and FM is actually aimed at the property operating phase.	24%	76%
CREM usually addresses the corporate function that is responsible for real estate on behalf of the company as a whole; FM, on the other hand, is therefore more of a local expression (e.g. at the locations) according to CREM specifications.	37%	63%

Predominant = Sum of the participants' answers of “mostly agree” and “fully agree” with N = 8

Regardless of the lower number of participants in the second Delphi round, a relatively clear picture emerges - at least regarding to the first round. Accordingly, the participants in the predominant area (87%) see a separation in CREM and in FM - as two disciplines, as it were - as a theoretical construction rather than a practical one. Moreover, at least about 62% also seem to agree that Facility Management is often equated with the term facility services in common parlance. In this context - at least the interviews also conducted in a problem-oriented manner show this - there seems to be a connection between the terminology (CREM and FM) and the organisational maturity of corporate real estate management. The higher the degree of maturity, the more likely it is that CREM and FM is understood as an inseparable unit. The lower the degree of maturity of the organization, the more it becomes apparent that FM often takes on a very operational form in the form of facility services and the coordination and control of services.

The question of linguistic separation appears to be fundamental for the design of a holistic regulatory framework in Corporate Real Estate Management. Regulatory frameworks (Becker & Meise, 2012) create a process-related image of reality and arrange the processes in a specific structure (e.g. management, core and support processes). For the question of the completeness of the procedural representation of reality (in relation to Real Estate Management), the definition of the terms used in this case appears decisive. In this respect, GLATTE proposes a separation of the CREM into a narrower and a broader interpretation of the term. From this perspective, portfolio, asset and property management is to be assigned to the narrow CREM concept (strategic and tactical perspective) and in a broad interpretation of the term CREM also includes the activities of building management and facility services (operational) as such (Glatte, 2014, p. 6). From this perspective, facility management comprises all processes of asset, property and building management, including facility services. The main differentiating feature between CREM and FM is the consideration and inclusion of portfolio management processes, which are not addressed by the more object-oriented facility management. It seems less plausible in the future to speak of a separation of the areas, but rather of an addition with the aim of coordinating and fulfilling all processes in the life cycle around the resource “real estate” in order to meet the core business requirements.

In view of the existing definitions - especially those of TEICHMANN (Teichmann, 2009, pp. 57) and KÄMPF-DERN (Kämpf-Dern, 2009)- and with reference to the available studies from the Delphi Study, the following terminology would be appropriate.

Table 5 Definitional combination between CREM and FM.

			Definition
CREM	Portfolio Management		Portfolio Management (PoM) is the strategic management of pooled real estate holdings (portfolios) geared towards achieving core business objectives, where the mutual influence of the assets and thus the composition of the real estate holdings has an impact on the achievement of the overall objectives
	Facility Management	Asset Management	Asset management (AM) is the strategic property management of a property portfolio in the interest of the investor or user during the management phase and at the interfaces to the conception/procurement and exploitation phase
		Property Management	Property Management (PM) is the investment-oriented, operative management of real estate properties during the management phase and at the interfaces to the conception/procurement and exploitation phase
		Building management	Building management is use-oriented, operative management of real estate-related processes in the interest of the user or for the purposeful securing of the use under consideration, analysis and optimization of all cost-relevant processes around a building, another structural object or a service provided in the company, which does not belong to the core business
		Real Estate Services	Real Estate Services are a bundle of property-related services in the life cycle according to the specifications of the corresponding management level

DISCUSSION AND/OR CONCLUSIONS

The results ultimately lead to the core of the discussion regarding the similarities and differences. It could be shown at this point that many terms and core elements can be in both “disciplines” and that a purely schematic separation or equation of the term Facility Management with that of Facility Services would have been far too short. Furthermore, it could be shown- and this is in line with the basic expectations of CREM- that more strategic and tactical components and elements are attributed to this term. FM, on the other hand, is often considered to have a strong focus on tactical and operational issues. Irrespective of this, it is clear that the terms must not be described as two disciplines that are to be regarded separately from each other; rather- and here especially with reference to the organizational maturity and professionalism of a property management system- these terms and associated processes must be mapped in a uniform process regulation framework. This will then provide the opportunity for a holistic perspective and optimization of the processes surrounding the resource “real estate”. In the word of VAN DER VOORDT “Due to the many similarities in FM and CREM, it may be expected that the distinction between FM and CREM may fade in the future, and FM/CREM may converge into a united discipline that will increasingly be integrated with IT, HR and finance in shared service centres to support flexible working and attract the most qualified among an increasing cultural mixed workforce” (Van der Voordt, 2017).

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How Can the Real Estate Sector Transition to Circular Economy? Approaches for Real Estate Management

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ABSTRACT

Background and aim: Circular Economy (CE) has gained a lot of interest both in the public sphere and scientific discussion in recent years. However, there is a need for conceptual clarity and theoretical refinement of CE in the built environment context. The aim of this study is to conceptualize CE specifically for the real estate sector.

Methods/Methodology: The paper employs a qualitative research approach. Concept development is based on a literature review and a review of existing real estate management approaches.

Results: Many management approaches complying to the circular economy principles already exist, although they are not necessarily viewed as such. Approaches to promote circularity include preserving and adapting existing buildings, shared use of space, and circular business models.

Originality: The study contributes to the emerging body of knowledge of CE in the built environment, which has to date mainly focused on recycling building materials, and design practices for new construction. This paper develops CE theory on existing buildings, and the real estate management practice.

Practical implications: The framework gives real estate practitioners a selection of potential approaches to employ in their management work. The presented four approaches to promote circularity may be utilized simultaneously, consecutively, or separately as part of the overall real estate management.

Type of paper: Research paper.

KEYWORDS

adaptation, circularity, modularity, multifunctionality, sharing

INTRODUCTION

The real estate and construction sector is a major contributor to climate change, and a key consumer of global resources (Krausmann et al., 2017). A significant amount of embodied energy, material, as well as economic capital is tied to vacant and underused buildings. Simultaneously, new construction with significant construction phase emissions and resource use takes place. Circular Economy (CE), the idea of keeping resources in use indefinitely, has become increasingly relevant in popular as well as academic discourse. CE in the built environment is still a nascent research field, with the pioneering scientific papers published only a few years ago (e.g. Pomponi & Mancaster 2017; Leising et al. 2018; Ness & Xing 2017). Perhaps the most commonly used CE framework, the Re-generate, Share, Optimize, Loop, Virtualize, Exchange (RESOLVE) framework by the Elle McArthur foundation, has been adapted to the built environment by Arup in 2016. However, there is a further need for conceptual clarity and theoretical refinement of CE in the built environment.

The CE policy and research to date has mostly focused on either the design and construction of new buildings in a way that facilitates circularity in the future, or on the salvaging and recycling of building materials. The New European Action Plan for CE published March 2020 lists measures for the RECI sector, all focused on new construction (EC, 2020). A Nordic report likewise focuses solely on measures directed at new construction (Høibye & Sand, 2018). Even outside the field of built environment, CE policy measures have received criticism for focusing too much on the recycling of materials, rather than supporting reuse (Ranta et al., 2018). This recycling focused approach goes against the well-known basic waste hierarchy of first reducing, then reusing, and only as a last resort, recycling. In the real estate and construction sector, a key problem with focusing on new construction is that the building stock in developed nations renews itself slowly.

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Ness & Xing (2017) emphasize shared space use as a way toward CE in the built environment. Sharing is an effective way to reduce the excess use of space, and has even been identified as the most influential CE approach in the context of buildings (Arup 2016). From a climate impact perspective, sharing is the most beneficial, when applied to items with a high carbon intensity, such as buildings (Ala-Mantila et al. 2016). A Swedish study found that, the climate change impact saving potential from sharing of office space could be from 50 to 75% (Swedish Environmental Institute, 2019). Forecasts predict a 30% share of flexible co-working by 2030 (Cushman & Wakefield, 2018). However, completely flexible, pay-per-use solutions, are still a niche. The recent Covid-19 outbreak has shown how quick the adaptation to a new normal can be. This rapid development will likely further reduce the demand for traditional, long-term lease agreements.

In order to fully transition to CE, much more focus should also be placed on maximizing the functional use of buildings, and avoiding functional obsolescence of the existing building stock. Functional obsolescence can be remedied with building adaptation, often referred to as adaptive reuse (Langston, 2008). Buildings are often adapted due to changing technological, organizational, or aesthetic priorities, at 5 to 25-year intervals. It has been argued that, adaptive reuse is inherently sustainable (Bullen, 2007; Wilkinson et al., 2014). Adaptive reuse has been identified as an important circular strategy (Sanchez & Haas, 2018a, 2018b).

This paper focuses on circular approaches for the management of the existing building stock, challenging the prevailing, new construction focused, CE policy and practice. The aim is to conceptualize CE specifically for the real estate sector. Concept development is based on a literature review and a review of existing real estate management approaches. The approaches are analysed against a previously developed, focused framework of CE in the real estate sector (Kyrö, 2020), as well as against two required paradigm shifts, described in the following.

Bocken et al. (2014) identify several sustainable business model archetypes, with related paradigm shifts, including “Deliver functionality rather than ownership”. Ritala et al. (2018) further detail that, this shift is both about transitioning from ownership to use, and transitioning toward service-based business models. Shared spaces embody the paradigm shift of promoting access over ownership, and has been studied in the facility management context by e.g. Brinkø and Nielsen 2017, Nielsen and Brinkø 2018, and Sankari 2020. Service-based business models are also referred to as product-service systems (Tukker, 2015). Product-service systems combine tangible products (such as, a building) with intangible services (such as, facility services). This paradigm shift has been studied in the real estate context by e.g. Petrulaitiene et al. (2018) who focus on the workplace service offering. The two paradigm shifts will in this paper be referred to a “access over ownership”, and “service-based business.”

The paper is structured, as follows. The next section reviews extant literature on circular economy within built environment. After that, the paper presents a practice review of real-life cases. The cases are analysed against the findings of the literature review. The last section concludes the paper with a discussion, conclusions, and a suggestion for future research.

LITERATURE REVIEW

First, a review of current literature is conducted in order to identify key elements relevant to circular economy in the context of existing buildings. The literature review process is detailed in Kyrö (2020), and described only briefly here. The review utilized Scopus database searches using different combinations of the following search terms: ‘Circular economy’ or ‘Circularity’, with either ‘Buildings’, ‘Built environment’, or ‘Real estate’ in either the Abstract, Title, or Keywords. After screening the results for language, publication type, and relevance to the research field, 78 articles were included in the review. By far the most popular source title was the Journal of Cleaner Production with 16 out of the 78 articles. The articles were mostly published in either journals from the environmental sciences, or the built environment. It is worth noting that only one journal focusing on real estate, Emerald’s Facilities, was among the source titles, with only one article.

Although research on CE, particularly in the RECI context is nascent, there has been a clear rise in the number of scientific articles from 2016 (Kyrö 2020). A key contribution from Pomponi & Moncaster,

(2017) define a building to align with circularity when “*designed, planned, built, operated, maintained, and deconstructed in a manner consistent with circular economy principles*”. In their extensive review, Pomponi & Moncaster (2017) divide the research on the ‘micro’ (building materials), ‘meso’ (buildings), and ‘macro’ (city) scales, and note the lack of focus on the meso, i.e. the individual building, scale. This was confirmed by Kyrö (2020) showing that a significant body of research discusses the use of salvaged materials in new construction, the micro scale (e.g. Akanbi et al., 2018; Ghisellini et al., 2018; Huang et al., 2018; Nußholz et al., 2019), or the cities and urban metabolism, the macro scale (e.g. Oezdemir et al., 2017; Ortlepp et al., 2018; Stephan & Athanassiadis, 2018). Only 14 out of the 78 articles addressed the individual building, the meso scale, and were included in the final review (Kyrö, 2020). Even studies focusing on the individual buildings scale view buildings as material banks, and discuss cradle-to-cradle design practices (e.g. Eberhardt et al., 2019; Fregonara et al., 2017; Geldermans et al., 2019; Leising et al., 2018; Pomponi & Moncaster, 2017) an insufficient number of quantitative studies exist to confirm the potential (positive). Moreover, some articles viewed circular economy simply as an extension to life-cycle assessments (Hossain & Ng, 2018; Ghani et al., 2012; Nuñez-Cacho et al., 2018).

Although not as widely discussed in existing circular economy literature, adaptive reuse has been identified as an important circular strategy (Sanchez & Haas, 2018a, 2018b). Ness and Xin (2017) include reuse and adaptation, as well as managing existing assets to their extended useful life in their approaches to circularity on the scale of existing buildings. Ness & Xing (2017) further emphasize shared space uses and co-location synergies as a way toward circular economy in the built environment. Pomponi and Mancaster (2017) include technology as a sixth dimension of circular economy, and discuss the connection between circular and sharing economies. The facility level industrial symbiosis (facility-IS) concept, as presented by Mulrow, Derrible, Ashton, & Chopra (2017) includes the element of sharing. Facility-IS entails the sharing of material, knowledge, and services such as meeting rooms or cafeterias, between co-located businesses within a single facility (Mulrow et al. 2017).

Pomponi & Mancaster (2017) generally discuss the economic dimension of circular economy, which would entail establishing new types of value creation for businesses. One example of rethinking the business, replaceable parts as a service, was presented by Ness & Xing (2017) the pursuit of sustainable buildings is dominated by a focus on carbon neutrality and green, often overlooking resource consumption and its contribution to greenhouse gas emissions and planetary degradation. Accordingly, this article seeks to highlight the importance of a resource-efficient built environment, which enables required functions to be delivered with less assets, and to put forward an approach toward this objective. In this regard, the circular economy (CE). As another example, Minunno et al., (2018) suggest the use of tracking technologies to promote the reusing and recycling of building components.

Summary of literature review

The literature review confirms that the focus has to date mostly been on the design and construction of new buildings, and the micro (building material) scale. Interestingly, even articles with apparent focus on the meso (individual building) scale view existing buildings merely as material banks. These articles focus on the so-called cradle-to-cradle design practices rather than optimizing the use of existing buildings. In summary, the most commonly identified features from the literature related to closing the material loops and designing for the future. While those principles are certainly relevant, they are too restricting and narrow down the concept of circularity.

A focused framework for circular economy in the real estate sector has been developed based on the findings of the systematic literature review presented in Kyrö (2020). The framework was formed by comparing with the widely used RESOLVE framework (Arup 2016), and adapting it to the individual building scale (Kyrö 2020). The focused SPAR framework comprises Sharing, Preserving Adaptation, and Rethinking, as depicted in Figure 1.

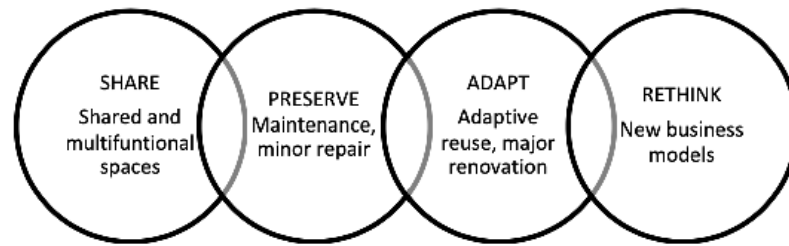


Figure 1 Literature-based framework for CE in the real estate sector (adapted from Kyrö, 2020).

PRACTICE REVIEW

The practice review is a multiple case study, where the cases represent different real estate management cases. A qualitative content analysis follows previously conducted studies as units of analysis to check for elements related to existing circular economy theory. Theory has a deductive role in the analysis, as the current study elaborates existing theory is used to direct analysis. However, the current study aims to elaborate on the existing theory.

The case selection is purposive, as the cases have been extensively studied by the author and colleagues previously. This allowed access to previous primary data, including interviews, and observation during site visits. The cases were also thought to well represent the various approaches to real estate management, and one case can be considered an extreme case (Flyvberg 2006), with a rare and innovative approach.

Next, descriptions of each case are provided. After describing the cases, the characteristics are analysed with regard to how well they correspond to the SPAR framework, or to the paradigm changes access-over-ownership, and service-based business.

Case Business Campus

The first case demonstrates how healthcare organizations value co-locating on a campus with organizations from the same business sector. The findings indicate that organizations benefit from the possibility to operate on multi-firm campus for a number of reasons, which form a value framework for co-location. Connectivity is achieved when the campus offers a favourable location and accessibility. Cost-efficiency mainly derives from optimising space use and shared facility services. Community and Collaboration related to synergy with other sharers. The 4Cs with examples are presented in Figure 2.

FM Role Facilitator	Cost-efficiency Spece-efficiency Shared amenities & spaces	Connectivity Accessibility Parking Reception
FM Role Integrator	Collaboration Shared vision Joint brand & marketing	Community Open door policy Informal encounters Social activities

Figure 2 Value created through co-location (adapted from Kyrö et al., 2016)

It is noteworthy how much the informants placed emphasis on the interaction with others even in the case of a multi-firm campus. The informants saw collaboration, and a little surprisingly even competition, as valuable in providing the customer with a full service and a wider offering. Collaboration was also motivated by the desire to compete with other similar campuses. Joint recreational facilities came into discussion in connection with informal encounters on campus: the recreational facilities were thought to promote interaction, which in turn contributed to the sense of belonging, community.

Case Adaptability Roadmap Service

From a managerial perspective, while it is important to create a functional design that supports the current operation as well as possible, it is even more important to create spaces that can adapt to changes. Kyrö et al. (2019b) suggests a new type of service offering, namely, an adaptability roadmap which would indicate the adaptability measures related to each building system with schedules. Frequent smaller upgrades would reduce the need for thorough retrofits during the building lifecycle (Figure 3). Operational efficiency can be sustained when functioning spaces require only minor adaptation procedures frequently, and the time period between major renovations grows longer. A depiction on optimizing operational efficiency through adaptability during the entire lifecycle of a facility is illustrated in Figure 3.

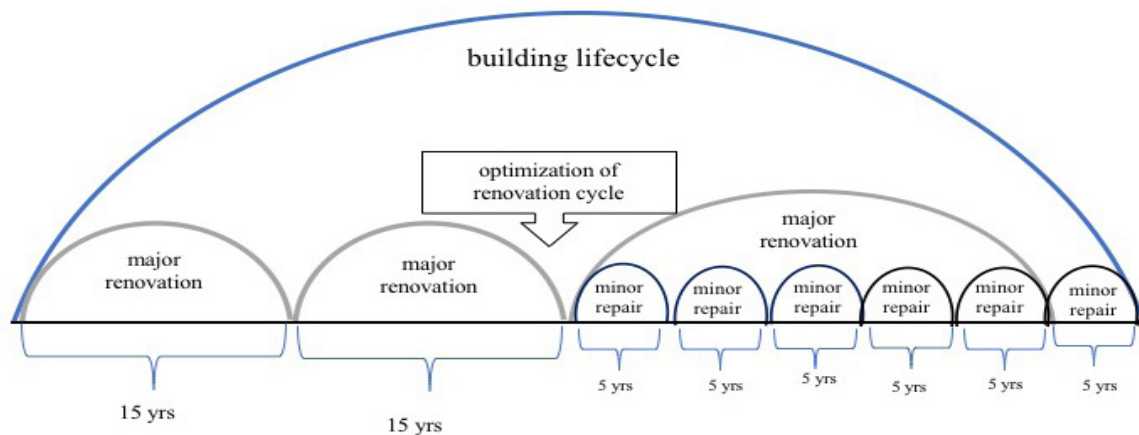


Figure 3 Adaptation and building system life-cycles adapted from (Kyrö et al., 2019b)

The logic presented in Figure 3 should be adapted by managers, and the benefits communicated to end-user clients. The business logic of the designer side would have to be adapted as well. Retrofit projects would become less frequent, but on the other hand, more resources would be directed toward planning for the future. The designers could offer a service where they establish the current state of the facility, and create a comprehensive adaptability roadmap for future retrofits. The roadmaps should detail the different strategies for different zones within the building, including the anticipated timing for the retrofits. Simultaneously, clients should be convinced of the benefits of this service offering, and see beyond the initial investment cost of the adaptability strategies. Most importantly for the clients, the adaptability roadmap would allow greater periods between retrofits, and consequently higher operational efficiencies with less disturbance.

Case Leased Modular Facilities

The ability to relocate an entire building represents the highest level of adaptability, the possibility to expand or decrease the size of existing buildings. Furthermore, relocatable modular buildings contribute to all levels the circular built environment, as they use existing urban structure and infrastructure, and are also resource efficient to manufacture due to factory prefabrication. Comparing with the traditional definition of circular economy by (Geissdoerfer, Savaget, Bocken, & Hultink, 2017), modular relocatable buildings minimize resource use and close energy loops both through prefabrication and leasing, i.e. reusing the modules. Kyrö et al. (2019a) studied both the modularity and usability of such relocatable building modules. Relocatable, leased modular buildings were noted to comply with resource efficiency, preserving and extending what is already made, designing for the future, and rethinking the business

model (EM Foundation, 2015). Figure 4 illustrates the identified benefits of the modular approach.

		Supports usability	Supports circularity
Modularity delivers	Quality: daylight and views	✓	
	Quality: indoor comfort	✓	
	Less onsite disruption	✓	
	Adaptability: multifunctionality	✓	✓
Relocatability delivers	No burden of ownership		✓
	Location within existing urban structure	✓	✓
	Adaptability: elasticity	✓	✓

Figure 4 Connection between modularity and circularity (adapted from Kyrö et al., 2019a)

From the real estate portfolio management perspective, the most attractive characteristics of the modular buildings include the low risk associated with leasing, and the possibility to add or remove modules as needed. Good indoor comfort and energy efficiency, as well as the possibility to customize based on the planned function (school, day care, healthcare) would also be of interest to the municipal real estate manager. Modular facilities could well replace a portion of municipal facilities, making the portfolio more adaptable to fast-paced demographic changes. Leased modular facilities make the connection between circular economy, modularity, and adaptability.

Summary of practice review

The three cases manifest the different elements of circular economy in the context of real estate management in different ways. Notably, each case demonstrates at least two elements in the SPAR framework (Table 1), and are related to at least one of the two paradigm shifts.

Table 1 Overview of cases

Case	Share	Preserve	Adapt	Rethink	Access over ownership	Service-based business
Co-located Businesses	x				x	
Adaptability Roadmap		x	x			x
Leased Modular Buildings	x		x	x	x	x

The case of co-located businesses is primarily about sharing and related to the paradigm access over ownership. Meanwhile, adaptability roadmaps are very focused on the service-based business, and can relate to either minor repairs, preserving, repairs or major adaptations. Leased modular buildings are first and foremost about rethinking the entire business, due the radicality of the relocation. Because the

buildings are leased and not owned, they also contribute to the access over ownership paradigm, and because the rents include all maintenance and minor repair, the service-based business.

DISCUSSION AND CONCLUSIONS

This paper set out to conceptualize circular economy for the purposes of real estate management. The literature review confirmed that the currently dominating conceptions of CE in the built environment are related new construction, more specifically to the recycling of building material. This limited view of circular economy as a material loop system is ineffective, and not the most relevant for the real estate management practice. Much more focus should be placed on optimizing the use of existing buildings, and approaches such as adaptive reuse (Ness & Yin 2017; Sanchez & Haas 2018a, 2018b). Furthermore, the role of the sharing in the transition to a circular economy should be emphasized (Ness & Yin 2017).

Based on the practice review, many management approaches complying to the circular economy principles already exist, although they are not necessarily viewed as such. These comprise preserving and adapting existing buildings, shared use of space, and new types of circular business models. Figure 5 further connects these approaches to the needed paradigm shift on one hand, and the level of intrusiveness to the physical building on the other.

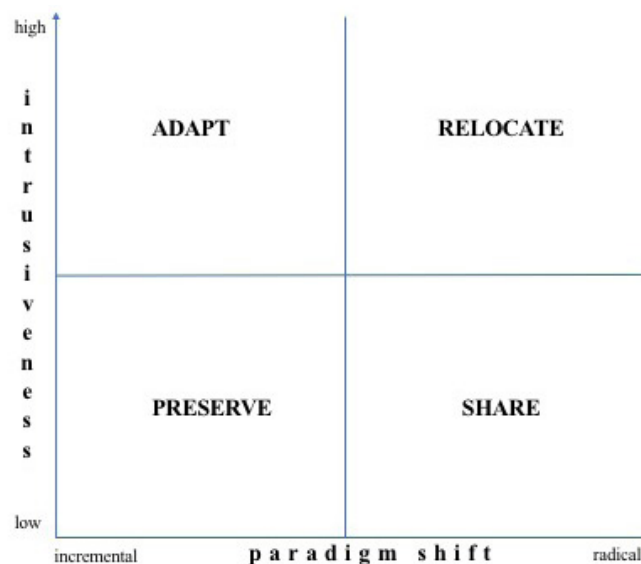


Figure 5 Potential managerial approaches to circular economy in the real estate sector

Co-location is the most common way to implement sharing. Kyrö et al. (2016) identified benefits of co-location to be cost-efficiency through shared spaces and service, better connectivity, collaboration and a sense of community. Sharing is observed to require little intrusiveness to the building structure, but a radical paradigm shift from ownership to access (Nielsen & Brinkø, 2018). It is worth noting that the paradigm shift is more directed toward the end-users of buildings, whereas real estate professionals could facilitate this shift.

Kyrö et al. (2019a) link levels of adaptability to different building system lifecycles and suggest an adaptability roadmap as a service. Adaptability roadmaps could establish the optimal renovation cycle for existing buildings in terms of lifecycle cost and climate change impact. Depending on the cycle, adaptability roadmap would use a preserving approach with low intrusiveness to the building and an incremental paradigm shift. The adaptability roadmap may also lead to major renovations and adaptive reuse, which is highly intrusive of the physical building structure, but requires only incremental shift to a service-based business (Bocken et al. 2014; Ritala et al. 2018).

Kyrö et al. (2019b) studied existing cases of relocatable, modular, leased buildings, and find that they are both in line with CE, and usable based on end-user experiences. This study confirms that leased modular buildings follow the principles of sharing, adapting and rethinking the business. Although existing, the approach is still a niche. Leased modular buildings are not only intrusive to the physical structure,

but also disrupting the prevailing paradigms. A shift to access over ownership as well as to service-based business is needed for this approach to become widely used.

From an academic perspective, this study contributes to the emerging body of knowledge on circular economy in the built environment, which is still nascent and arguably biased towards new construction, and the micro (building material) scale. The developed framework is focused on the meso (individual building) scale, and is as such, a novel theoretical contribution.

From a managerial perspective, the proposed framework allows real estate professionals to expand their thinking on circular economy to cover common approaches in their own work. These approaches include the use of shared spaces and building adaptation. On the other hand, real estate professionals may also be inspired to consider more radical approaches to achieve circularity, such as including relocatable buildings in their portfolio. The approaches included in the framework should intrigue real estate managers, whose role is emphasized in the new paradigms.

The transition to circular economy would mitigate the climate change impact of the real estate sector. This study introduced possible approaches for real estate managers, some already commonly in use, some emerging practice. The study also touched upon the required paradigm shifts for both the industry (service-based business) and end-users (access over ownership). Future research should look into what these paradigm shifts entail for the different actors, what the related challenges are, and how the challenges could be overcome.

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Gender and Leadership in FM: A View from the Top

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ABSTRACT

Background and aim – Leadership and gender is often an emotive subject with each gender picking sides to support their view of what should be obtainable in their industry, and proffering reasons for perceived advancement or a lack thereof. The service industry and facilities management is not exempt from this practice; therefore the aim of this study is to understand the perception of women in leadership positions in facilities management and the enablers and barriers to their career progression; and also the potential impact of mentoring early career females in the industry.

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Methods /methodology – We adopted an interpretivist and inductive approach through qualitative emailed survey questions to 12 participants. The participants were all mid to senior level female professionals from the facilities management sector.

Results – The results evidenced the need for a more focused recruitment and development pathway for women starting in FM and also in terms of career progression. There was a need to be resilient as a woman in the industry, but to remain empathic, and authentic in their leadership. The use of mentoring for early career women new into the industry was seen as important but also to continue that mentoring through mid-career to help break the glass ceiling in organisations, and to ensure the mentoring taken was positive, and provided ongoing support for development. Finally, the other way women built their own self-esteem and earned respect within the industry was through gaining academic and professional qualifications.

Originality/value – While there are several studies on gender and leadership, this study focuses on the service industry with an emphasis on Facilities Management and the use of mentoring to support women in overcoming the issues that arise as a result of their gender.

Practical or social implications – The reality of where women are in the service industry, especially facilities management is different from the perception of stakeholders; both external and internal. Emphasis should be made to celebrate the achievements that could attract and retain qualified experts regardless of gender.

Type of paper – Research paper

KEYWORDS

Facilities Management, Gender, Leadership, Service Industry, Mentoring

INTRODUCTION

Facilities management (FM) is a fast growing and rapidly evolving field which has seen exponential growth even though it is still emerging (Shah, 2006, Li et al, 2019). It has professionals from various sectors and generations and boasts a wide range of skills and competencies (Dettwiler et al, 2009), representing the gamut of working professional types. This is also reflected in the gender equation to some extent. What it has in seemingly short supply, however, are women in leadership roles. “Leadership has been predominantly a male prerogative in corporate, political, military, and other sectors of society. Although women have gained increased access to supervisory and middle management positions, they remain quite rare as elite leaders and top executives” (Eagly & Karau, 2002, p.573). This is as true today as it was in 2002. The Alexander - Hampton Review (2019) made recommendations in their report in 2016 to increase the number of women in leadership positions to 33% by end of 2020, which aligns with the UK Government approach. The FTSE 100 has seen an increase of women in the ‘Combined Executive Committee with Direct Reports’ figures, increasing by 1.6% to 28.6% in the past year, however

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this falls short of the target, meaning FTSE 100 companies will not achieve the overall target by end of 2020 ‘unless the appointment rate of women is near to 50%’ (Alexander-Hampton Review, 2019, p8). In terms of country performance comparison in the FTSE 100 companies, France, Sweden, Norway, Belgium, Finland and Italy have exceeded the 33% target, however the UK is just short on 32.4% although this has improved by 4.7% since 2017.

In a general sense and not just in facilities management, whilst there has been some improvement, there appears to be little impact made by women in the male-dominated world of ‘senior positions in corporate leadership’ (Klettner et.al, 2016, p.397). On examination of the Alexander-Hampton Review data (2019) there does seem to be a lower level of women at board level in construction and real estate companies. This exists despite the advances made for equality in issues such as gender pay (Topping, 2020), and the decisions to impose quotas on the number of women on corporate boards by some advanced countries (Seierstad, 2017); an interesting development which began in Norway and has also been implemented in France. These measures have had seemingly little effect on the number of women in CEO positions in healthcare management in the USA, which is currently rated as 12th in the overall FTSE 100 ‘Women on Boards’ figures in 2019, with only 28.2% (Alexander-Hampton Review, 2019). Athey (2014) discussed in her paper that despite progress, inequalities still existed in American Healthcare Leadership. The American College of Healthcare Executives (ACHE) survey, which has been in existence since 1990 evidenced that in the survey of 2012 there was still a 20% gender salary gap, and this had increased 2% from the first survey in 1990. Of the participants there were 22% male and only 11% of female respondents reporting as CEOs. This figure appears to have had little change since the first survey in 1990 where 28% male and 11% of female respondents reported as CEOs. This evidenced that there has been no obvious narrowing in the gender gap of senior management in organisations, but this might be more evident in a male-dominated sector like facilities management (Athey, 2014). 2017 saw the number of women recorded as leading Fortune 500 companies at 6.4%, however in 2018 the number fell to 4.8%. McKinsey’s report on ‘Women in the Workplace, 2018’ found a concerning trend in that for every 100 men that are promoted there are 79 women, and only 60 women from an ethnic background. Their report consolidated that men hold 62% of manager positions whilst women only 38% (Stedman, 2019). Stedman (2019, p1) also focused on the fields of construction, manufacturing and engineering stating that the number of female engineers has “more than doubled since the 1980s” and that the National Association of Women in Construction had seen an increase in female employment. However, there is not the same level of promotion of women in these industries. As a leader in recruitment, Stedman suggested that professionals with mentors are more likely to advance more quickly than those without.

In terms of female leadership there is a growing body of literature on how mentoring can influence the achievement of women to more senior positions. A study in South Africa (Scheepers et al, 2018:466) focused on sponsorship mentoring as “a talent management intervention for female leaders aspiring to senior levels”. Their research found that there was less issue with young white women, but there was still a barrier to senior leadership for women over fifty and also women of “African, Coloured or Indian ethnicity (ACI)”. Through the literature on gender and mentoring it is evident that the engagement with mentoring offered to women, or even the desire to be mentored has varied (Durbin and Tomlinson, 2014; Tolar, 2012; Dreher and Ash, 1990). However, Chisolm-Burns et al (2017) advocate the benefits of balance in having female leaders, but also that “women must act as their own advocates by seeking out networks, sponsors and mentors” (p.321).

Research aim and objectives

The aim of this study is to understand the perception of women in leadership positions in facilities management and the enablers and barriers to their career progression, and also the potential impact of mentoring early career females in the industry. The objectives of the research were to:

- Understand the perceptions of female leaders in the industry in terms of entrance to the FM industry and their perception of gender within it.
- Understand the enablers and barriers to career progression for women in the FM industry
- Explore the perceptions on the benefits of mentoring for women in the FM industry.
- Propose solutions for engaging more women at leadership levels within facilities management.

LITERATURE STUDY

There is a world of difference between expectations of equality in the workplace and the reality, because of the gender pay gap Topping states women ‘work for free’ for the first two months of the year on average (Topping, 2020). It does appear there is no regulatory effectiveness where policies have been put in place (Klettner et. al., 2016), and the Facilities Management industry may not be exempt from this skewed statistic. This difference is even more evident at leadership levels, where the goal of having 33% of Board members as women has failed to materialize (Goodley, 2020). One of the ways to achieve this, will be to have women already at senior level positions mentor other women on their way up the career ladder. Earl (2019) reviewed women in leadership in FM as part of an MBA dissertation and she discussed that in a 2017 Central Bank study, women held 16% of CEO jobs in Ireland and 26% of Board seats, however on reviewing the top 12 FM companies in Ireland she found only 21% of senior leadership positions were held by women. Female leaders in the FM industry in the UK came together for international women’s day and their discussion focused on the growth of women entering the profession (Facilities News, 2019); but there is still a gap at Board level. Facilities News (2018) ran an article on ‘How can we encourage more women into leadership positions in the FM industry’ and one of their key messages, to enable progression, was to find mentoring networks within FM but also to look for female role models and mentors outside of the industry.

Mentoring comes in different forms with the main two being developmental mentoring, focused more on the relationship and development of skills (Garvey, 2014), and also sponsorship mentoring which is the sponsorship of a protégé, aimed to raise their organisational profile as well as learning from a more experienced mentor (Merrick, 2017). There has been a focus in research on the concept of sponsorship mentoring and gender and the evidence of barriers in terms of gender and mentoring. Abbott (2018) discussed sponsorship mentoring as being increasingly helpful for women and minorities to reach leadership positions in law firms. Helms et al (2016) found that sponsorship helped enable women to further their careers. Sandberg (2013) also reflected that employees with sponsors are more likely to ask for a pay rise, irrelevant of gender; whilst Groysberg and Bell (2013) stated that sponsorship of women can help to reduce the ‘old boys club’ in corporate America. However, Meyers (2015) noted that men can feel uncomfortable with sponsorship or mentoring younger women because of what their colleagues ‘might think’! Czerniawska and Guzman (2016: 39) argued in terms of gender in sponsoring in consultancy firms that if women are in a male dominated organisation that it may be more useful to have a male sponsor to better understand the organisational politics. They did state that the sponsor needs to understand the woman’s position in her career and also to deliver *“concrete suggestions about what to do, who to get to know and how to put yourself forward”*.

The unique attributes of the facilities manager might also be a contributory factor. A typically unstructured role heavily dependent on the support requirements of the organisation, coupled with flexible and often long hours might not be traditionally compatible with women who are often still caregivers in different forms outside of work. This should not prevent career progression or mentoring. As Ehrich (2008) and Singh et al (2002) note mentoring relationships are important for women at all stages of their career cycles, and even after having families and returning to work part time, this needs to be addressed to encourage continued personal and professional development. There is also recognition that the mentoring provides knowledge which is important for promotional opportunities (Durbin, 2011). Does this mean they are less inclined to venture into the field, or are less likely to be selected for available roles? Where they have been offered and accepted facilities management roles, is there any motivation to aspire to senior management roles or is it the case of an invisible ceiling within organisations? Bull’s (2019) research on women in leadership did include interviews with some senior female facilities managers who referred to the “male dominated boardroom” which blocked access to women. This in turn had an impact on their motivation as they could not further their careers in these organisations. It evidenced people with vast experience moving away from organisations that had the old fashioned “boys clubs” to more progressive organisations; and for some, to completely different industries as they didn’t see a progression route in the FM industry.

There is evidence there are few women in leadership positions and relatively no change in these statistics from the last decade (Athey, 2014; Seierstad, 2017, Stedman, 2019; Given the male dominance of

the facilities management field, this research will investigate the perceptions of women in leadership within the FM industry.

RESEARCH METHODS

This study uses an interpretivist and inductive approach, which allowed the voices of the participants to showcase their own perceptions of their engagement with the FM industry and the authors interpretation of these views through a reflective and reflexive process (Dowling, 2006). The research focused on trying to gather shared meanings using a social constructionist lens (Berger and Luckman, 1991). The research was carried out using an adapted qualitative research strategy as identified by Mason and Ide (2014) to move into the 21st century and create alternative means for collecting qualitative data. Due to the nature of the participants and to be able to draw on a broader UK and Ireland perspective, this method involved emailing the participant, who were originally selected due to their seniority in the industry, to invite them to participate in the research and secondly to gain consent. Approximately 30 requests were sent out with 12 confirming their participation. This followed with the emailed qualitative survey questions. The participants were also invited to give an insight into their work history with most of them attaching their CVs to the responses. The qualitative survey questions (as highlighted below) asked them to explore their own engagement within the FM industry.

1. Tell us about your career history (length of time in organisations, how you entered FM, timelines and significant events in terms of your career/career progression)
2. Do you feel there is a gender difference in the FM industry? (If yes or no, please explain why you think this)
3. Do you think there is a need, as a woman, to change your behaviour to advance to a leadership role in the FM industry? (If yes or no, please explain why you think this)
4. How would you encourage women into FM as a profession?
5. How would you encourage women to aspire to a leadership role in FM?
6. What has helped or hindered your career?
7. Have you ever had a coach or mentor, and if you have what were the perceived/tangible benefits?

The questions included asking them about their own experiences and for stories about their own careers including their own enablers and barriers. The female participants also shared their career histories through their CVs or written career history, helping the authors to understand the background and historical context of the participants. The purposive data sample (Saunders et al, 2016) was based on 12 women working in a cross section of middle to senior management in facilities management, in both the public (5) and private sector (7). The names of the participants have been removed for anonymity, but Table 1 offers a brief overview of their length of career in FM, type of organisation, seniority level and approximate age.

Table 1 Participant Overview – UK and Ireland.

Participant	Length of career in FM	Current Organisation	Management level	Age Range
Participant 1	8 years	FM Company	Middle Management	30-39
Participant 2	11 years	NHS	Middle Management	30-39
Participant 3	26 years	FM Company	Senior Management/ Board Level	50-59
Participant 4	26 years	NHS	Senior Management	50-59
Participant 5	21 years	Consultancy	Owner and MD	60-69
Participant 6	30 years	FM Company	Senior Management/ Board Level	50-59
Participant 7	14 years	Consultancy	Owner and MD	50-59
Participant 8	24 years	Private Sector	Senior Management	40- 49
Participant 9	23 years	Education sector	Middle Management	50-59
Participant 10	26 years	FM company	Senior Management/ Board Level	50-59
Participant 11	11 years	Local Government	Middle Management	50-59
Participant 12	10 years	Education sector	Middle Management	30-39

In terms of data analysis, a thematic approach was taken (Braun & Clarke, 2006) and thematic analysis was used to discover any patterns in the data (Fereday & Muir-Cochrane, 2006). This involved coding the data and the development of a thematic map (Gray, 2018). As Clarke and Braun (2017:297) discussed the focus of thematic analysis is to “*identify and interpret key, but not necessarily all, features of the data guided by the research question*” but noting that the research question can evolve through the theme development. The key themes were generated and a further check through the data was carried out to review the creation of the themes. “*A theme captures something important within the data in relation to the research and presents a level of patterned response of meaning in the data*” (Gray, 2018:692). As interpretivist, inductive researchers, the results were determined by the social actors’ words as opposed to pre-assumed outcomes (Blaikie, 2010; Clarke & Braun, 2017).

RESULTS

The discussion below follows three key themes that were identified from the data using the thematic analysis method (Clarke & Braun, 2017). These themes are highlighted below and discussed in turn:

- Theme 1: Perceptions of gender difference in the FM Industry
- Theme 2: Overcoming the hurdles (from entrance to career progression)
- Theme 3: Finding the right mentor

Theme 1: Perceptions of gender difference in the FM Industry

Every one of the twelve women acknowledged there was a perceived gender difference in the industry, for some this was based on an experiential level and for others more of a perception. There did also appear to be a difference in perception on the gender balance from those that worked in the public and private sector, with those in the public sector referring to a greater gender imbalance. There was a particular statement that stood out from one participant who was a senior manager, working in the NHS, with the senior management responsibility for both estates and FM and she referred particularly to her negative engagement with male colleagues in capital projects and construction: “*I see the reaction from males in the industry at all levels, from operatives working on site through to site managers. Examples include being talked over, omitted from communication, not being consulted, opinion not worthy, etc.*”. She did laugh after she had given this statement, saying that they soon learn to behave differently, and noted being more ‘assertive’ in these environments. This provoked the question when reviewing this of whether women then need to behave differently in the industry. Two other women working in the public sector, one in higher education and another in the NHS referred to having to flex their own natural style to ‘fit in with the boys’. One referred to ‘banter being a requirement’ but the other referred to ensuring they were ‘emotionally resilient’ to ensure they gained the respect of their male counterparts. One of the private sector participants suggested that she does not change her behaviour but must overcome bias on a daily basis. She gave the sense of having to be better than her male counterparts and to achieve more to prove her worth in the role. This does not evidence gender neutrality.

There was a split in views where some people split this gender difference to hard and soft FM, with hard FM being seen as more “gendered” than soft FM which was perceived as having a stronger gender balance in leadership positions. Also, whilst the external perception was of the male dominated industry, one of the participants was adamant that this should not be the case, as working in management in FM is not about “hard skills” but more about leadership qualities and skills, which in her view were non-gender specific.

Overall, the perception was that there is a gender gap within FM, and there needs to be further consideration by the industry bodies on how this can be addressed. The UK Government are starting to try to address the gender gap in organisations through their gender reporting (<https://www.gov.uk/guidance/gender-pay-gap-reporting-overview>). The Institute of Workplace and Facilities Management were also perceived by the participants as moving this agenda in a positive way for the industry, but there still feels like there is still more work to be done across the FM industry, in both public and private sectors.

Theme 2: Overcoming the hurdles (from entrance to career progression)

There was a feeling amongst some of the female leaders that one of the main issues for the industry

is that FM is perceived externally as “the boys club”. However, there was also discussion of the lack of promotion of the industry to both genders of young people. This has been recognised by the industry bodies in terms of trying to encourage the younger generation to work in FM, however the challenge is to ensure this message and opportunity is being given to all.

One of the more experienced female leaders, with 20+ years’ experience in management within the industry, drew on the changes to entry routes as she felt these had changed from being the old traditional route of entrance to the industry from engineering, military or surveying backgrounds to a more focused approach on strategic and leadership skills. An experienced property manager from the public sector also suggested there could be more targeted apprenticeships for girls into the FM Industry, this provoked an interesting point in that we want to encourage young people, but equally would the industry want to become bias to one gender or another in terms of recruitment. Looking at the CVs that were submitted from the participants, there were varied entrance routes to the FM industry, for some they came from a more technical background such as surveying but for others they have come from a more administrative/management route.

There were notable hurdles or barriers that most of the women had overcome through their careers, from the concept of bias as discussed in theme 1, to watching males being promoted above them, when they felt they had the best skills for the job. This is based on perception and therefore this has been a lived view for some of the individuals. If this had been an isolated case, or a disgruntled employee, you might discredit this discussion, but these women are highly motivated employees who have felt like they have been passed by based on gender. For some this has led to them leaving that employer and finding a more senior position in a different organisation; for others this has been a massive knock to confidence levels, and in Bull’s (2019) research where she interviewed senior leaders from all industries, a lack of confidence or even imposter syndrome could have a real impact in applying for their next role. Sherman (2013:57) states that *“the feeling of impostor syndrome is common in women leaders”*. One of the women referred to her self-confidence as a blocker to her career and perhaps she could have achieved more if she had more self-belief.

Several of the participants recognised that gaining industry specific qualifications has given them a boost to their career, but also earned them respect from colleagues in the industry (irrelevant of gender). Dinos and Palmer (2015) referred to the concept of academic achievements to self-esteem. They also recognised that networking and being seen in the industry as an expert has helped to move their careers forward.

All the women that took part in this research stated they have advanced their career through hard work and determination, but from some of the conversations it did feel they had to do more than their male counterparts to achieve the same.

Theme 3: Finding the right mentor

This theme was drawn from several different aspects from having informal mentors such as “a great boss” (informal mentoring); to role models that influenced them; and to having formal mentoring relationships. Role models have been an interesting part of most of the participants’ journeys in their careers, they have seen female leaders and aspired to ‘be like them’. They also talked about the importance for them to be seen as female role models for young women entering the industry, and for some of them they take this further and are committed to speaking at female focused FM events. Interestingly this concept of female role models links back to the eighteenth century when there was a society of women who came together to have conversations and to share knowledge (Garvey, 2014), and perhaps this was one of the first acts of role modelling in a society where women would have been second class citizens. One of the women, a Managing Director of an FM company, stated that *“There are some great women role models and the profession has a very strong support network for women in FM and encourages leadership within its fraternity.”* This evidenced a great supportive network, but how easy is it to enter these networks if you are a junior manager with aspirations and not a part of these networks already?

Not all the respondents stated they had formal mentors but most acknowledged that they felt it would have enhanced their career if they had been given one at the early stage of their careers. However, a formal mentor has to be a good fit (not just based on gender) and for those that had been given a formal mentor some noted that this had not always benefitted them, in fact some referred to the formal mentor as a hindrance stating *“Mentoring has sometimes hindered, with hindsight I felt one of my mentors was more focused on her own outcomes and not on mine. There was also (I feel) a bit of jealousy on her part at my perceived success and ability to connect people.”* This linked to the research by Parker and Kram (1993:43) who found that there could be a disconnect between women wanting to mentor or be mentored by other women; senior women reported *“feeling discounted or overburdened as mentors; junior women complained that senior women are competitive with or unreceptive to them as potential protégés”*. For some the more informal mentoring arrangements with their line managers, or with people they had met through networks, or even their husband, have provided the most inspiration. These were not necessarily gender specific and were borne out of friendship or trust-based relationship.

As Garvey (2014) states there are four main elements of mentoring, the first being based on human qualities, including trust and commitment; the second being based around the skills of listening but also being able to ask challenging questions. The third focuses on the mentee’s needs, there is a need to understand their purpose, and the fourth is on the mentor/mentee relationship with a focus on learning and development. Hunt and Weintraub (2002) concur with Garvey’s idea in that there tends to be a stronger emotional bond between the mentor and mentee. Deans et al (2006) discussed the impact this type of relationship can have on a woman’s confidence. Throughout the qualitative data there were different responses to the benefits of these types of relationships and the ability of the mentors chosen, but perhaps there needs to be better understanding of what it means to be a mentor before people agree to take on a mentoring role.

CONCLUSIONS

This section will draw together the themed discussions evidencing the learning taken from the research along with suggestions on how we can engage more women in leadership positions in FM. As discussed in the methodology section, the themes have been developed from the data, and were guided by the research questions (Clarke and Braun, 2017). The emergent themes evidenced that the women engaged in the research had a particular focus on trying to reduce the gender discrimination in senior executive positions in the industry, they recognised an improvement in recruitment of women, but that there was still a gap in the numbers of women executives in the industry and the sense was that there needed to be more positive action in the encouragement of women to aim for leadership positions. This is a common phenomenon in western cultures and is not an industry related issue per se (McKeen and Bujaki, 2007; Høigaard & Mathisen, 2009; Surawicz, 2016) but as discussed by many authors on the subject of women in leadership, mentoring relationships have been recognised as one suitable approach for overcoming gender related barriers and female career progression (Høigaard & Mathisen, 2009; Stedman, 2013; Chisholm-Burns et al, 2017; Gipson et al, 2017). Mentoring does offer the opportunity to increase the number of women in leadership roles, but this must be right for the individual, bad mentoring can be more detrimental than not having any at all (Scandura, 1998; Jung & Bozeman, 2019). There also needs to be consideration of the gender of the mentor and the fit to the mentee. Tolar’s (2012) research evidenced that having a male mentor may not always be the right approach for a young woman and may have a negative gender influence, a women in their research stated *“I think many older male mentors have ideas about what younger women should do, and if you vary from their suggestion, they see you as a rebel, where men who vary are assertive and powerful”* (Tolar, 2012:181).

In terms of the participants entrance to the industry most came to it via circuitous routes, through administration-based roles, human resource management, and conferencing, whilst there were two participants who had trained as surveyors. Their enablers and barriers to career progression in the industry were that you may have to work harder than your male counterpart, a need to stand out but also evidenced a need in the industry for the creation of a career pathway for women entering the profession through to leadership roles. For some of them having a sponsor or mentor has been beneficial, but for the most part the enablers were themselves and the support that comes from the female networks they have created (Stedman, 2019). Literature that has focused on leadership as a skill

has found it hard to evidence that men or women make better leaders than each other, but perhaps there is still evidence in the FM industry of 'ingrained stereotypes and gender role definitions' (Gipson et al, 2017:48). The facilities management leaders interviewed for international women's day in 2019 evidenced their view that the industry is still male dominated but changes are happening, and the key messages were to remain true to yourself (authenticity), be empathic, be kind and try to reduce the tendency to be self-critical (Facilities News, 2019). Gaining academic or professional qualifications also helped to boost the self-esteem of the participants as this gained further respect of their ability within the industry (Dinos and Palmer, 2015). There is ownership to be taken on both sides of the argument, yes the industry may need to move into the 21st century in some instances and remove the 'old boys club' but women also have to stand up and take the opportunities that are out there, and be prepared to not accept a 'no' and keep pushing at the glass ceiling (Chisholm-Burns, 2017).

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Practical Applications of Emerging Technologies in the FM Sector

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ABSTRACT

Background and aim – Facility services largely consist of routine tasks, which makes it susceptible to automatization. Existing studies primarily focus on the macro economic effects of this radical shift. This research addresses how the facility services themselves will change, in order to gauge which tasks will be replaced and how the FS provision will alter.

Methods – A quantitative literature research of more than 720 use cases of digitization in the FS industry was conducted to define the usage of the technologies and the development of the usage. Out of the analysed use cases one most widely spread IoT use case was selected to demonstrate the benefits for the FM/FS sector and the low cost of this technology.

Results – The primary technologies driving digitization in the FS industry are IoT, AI, Big Data, and Robotics. The services most affected by this process are Maintenance and Operation (1160), Safety (2110), and Energy (1171). Based on these results an IoT use case, using temperature and humidity data, in the area of preventive maintenance was selected.

Originality – The database consists of 720 use cases. This large scope allows for comprehensive analysis of the current situation of digitization in the facility services industry. A proof of concept for easy to use and cheap IoT sensor implementation is presented.

Practical or social implications – This research gives an updated overview over the status quo of emerging technologies within facility services. The best use case developed in this study is exemplary of wider trends in the facility services industry. The research shows how services are enabled or altered by digitization. This research can therefore serve practitioners as a guide for implementation and optimisation of processes.

Type of paper – Technical research paper.

KEYWORDS

IoT, digitization, AI, ML, automatization, facility services, evaluations of smart building technologies

INTRODUCTION

Many macro-economic studies have shown that the facility services industry will be heavily affected by digitization (Stopajnik & Redlein, The Development of the Outsourced Facility Service Industry in Europe, 2017), (Chotipanich, 2004), (Selinger, Sepulveda, & Buchan, 2013), (Čas, Rose, & Schüttler, 2017).

The impact of digitization on work processes in general has been well studied. Most studies agree that the greatest effect will be on routine tasks and that a shift in knowledge will be necessary for the workforce to keep up with these developments (Nagl, Titelbach, & Valkova, 2017), (Stopajnik & Redlein, Current Labour Market Situation and upcoming Trends in the European Facility Service Industry, 2017), (Frey & Osborne, 2013).

These existing studies primarily focus on the change that digitization will have on the FS industry and the economy as a whole. However, they pay little attention to the processes that will be changed or which new technologies will be at the forefront of these developments (Stopajnik & Redlein, Current Labour Market Situation and upcoming Trends in the European Facility Service Industry, 2017).

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Therefore, three years ago, we started a research project to better understand to which extent the digitization process is affecting facility services. Our research shows that digitization has two major impact factors:

1. The core business is changing, which demands dramatic modifications of infrastructure and services like new ways of working
2. Emerging technologies are allowing for a more efficient way of service provisioning. This means disruptive changes for the service provision itself

This paper focuses on the second factor and will show how digitization alters and optimizes service provision in the FS sector. Previously published papers from this project have focused on which technologies are important and how digitisation affects facility services. In this work, we wanted to verify some of the assumptions that have arisen in that work.

This paper focuses on the following two research questions:

1. What is an easy to use and cost-efficient use case, representing many similar use cases in the research database?
2. How is the service provision changed by the application of this use case?

For this reason, we expanded our dataset. Based on the additional use cases analysed we can validate the existing results. Based on the database a use case was selected. This use case was selected out of the technology most widely used and the services most heavily affected by digitization. Our main objective was to study the effects of digitization on particular facility services on a smaller scale. The use case we selected and developed further was cheap, easy to set up and use, and was representative of many similar use cases in our database. It was implemented and the usage was analysed to better understand the relationship of technology and changing service provisioning. This helped us to better understand the impediments and benefits of digitization of facility services.

It showed that while facility management and especially service provision are relatively slow to adapt emerging technologies, even small interventions can have huge impacts on how services are provided. Time consuming repetitive tasks can be easily relegated to technology, freeing personnel for more difficult tasks. In our example instead of routine inspection of basements cheap and easy to use IoT sensing can be used to automatically detect problems and send information to the relevant service personnel via SMS or email. This shows that service provision will not only change for big players who can afford to spend vast sums of money, but also and especially for smaller providers of facility services. This example is also used to provide industry representatives a hands-on experience. The main purpose of this paper is to present this easy to implement digitization use case in facility services and to describe the practical impact.

RESEARCH METHODOLOGY AND METHODS

Our research consists of multiple steps. We did a preliminary literature review to find out which technologies will most likely be drivers of digitization (Schwab, 2016).

Then these results were used as the base for a database, which currently consists of 720 use cases. The publications analysed here appeared in scientific journals, companies' white papers, strategy documents of well-established consulting firms, and publications like the MIT Technology Review. The results were validated to safeguard data quality. The use cases are practical applications in the FS industry as well as other industries. Due to a detailed definition of facility services in the EN15221:4, it was possible to map non-FS use cases on facility services. As a next step the database was analysed to discover which services were most affected by digitization.

For a more detailed description of the methodology used in this first phase, please see Relationship of emerging technologies and their influence on Facility Services (Redlein & Höhenberger, 2019). The results of the first 300 use cases gathered in the years 2016 to 2018 were validated by the analyses of more than 400 use cases in 2019. The goal was not only to validate the results regarding the technologies and services affected but also to analyse the change in technologies used and services affected.

After this validation and updated assessment of the most important technologies and the services most heavily affected, we selected a use case that represents best these findings. This was done to assess in more detail how a certain service is affected by emerging technologies. In addition to being representative of the data we had previously collected, the use case had to fulfil certain requirements. It had to be cheap, easy to set up and use, scalable, and be applicable in real life situations.

Based on our research results, IoT use cases are most predominant and Maintenance and Operation, Energy, and Safety are the services most affected by digitization. Therefore, we selected an IoT use case applicable in these services. The use case monitors room parameters like temperature and humidity, in an area usually prone for mould. This allowed us to better understand how service provisioning is changed by emerging technologies, and how even simple solutions can influence service provisioning on the whole.

RESULTS

Relevant Technologies

Figure 1 shows which technologies, according to our quantitative literature review, are most widely used in the FS industry. The results are presented as a percentage of overall use cases analysed.

Technologies with less than 36 overall occurrences (equalling 5% of use cases analysed as of February 2020, n=720) were omitted from the figure. BIM was included to show that while experts state its importance as a smart building technology, the literature review does not support this claim. Software as a Service (SaaS) and Cloud Computing on the other hand were not part of the initial pre-study. These two technologies are a way to provide software and support smart building technologies, rather than tools themselves.

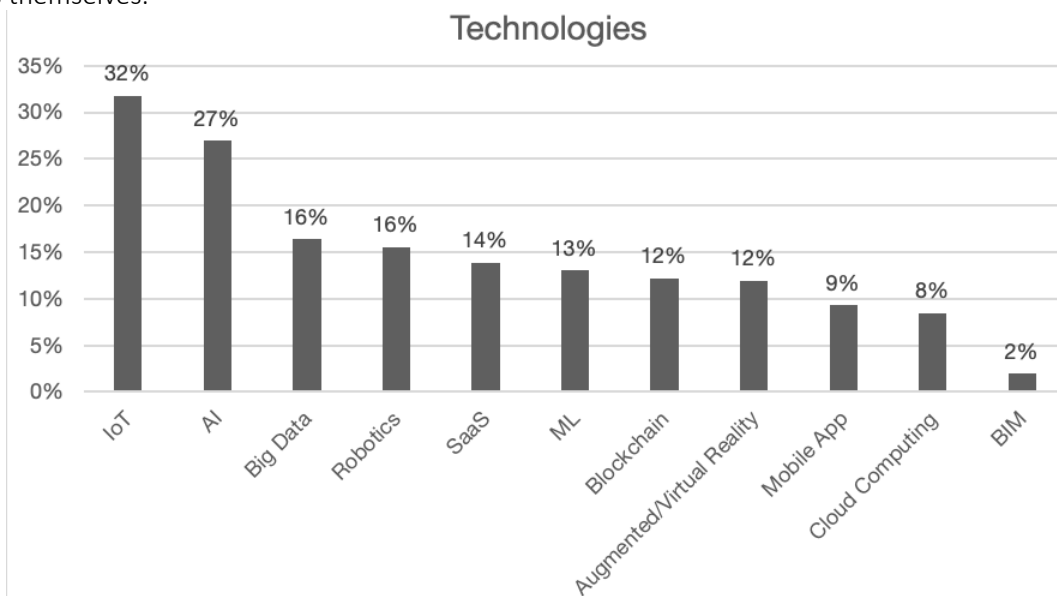


Figure 1 Technologies grouped by category and occurrence within the case studies as a percentage of 720 use cases analysed (February 2020)

The analysis of the database showed that technologies like IoT, AI, big data, and robotics are already widely used in facility services. This can be accredited to massive lowering of prices of IoT sensors and hardware in general as well as increased data processing speed over the last years. Robotics remain important in FS applications, as they mostly carry out repetitive tasks. They become more flexible and versatile, especially in combination with 5G technology.

Services affected by digitization

Figure 2 show the occurrence rate of all analysed cases as a percentage of the 720 analysed use cases. The services most affected by digitization are Maintenance and Operation (1160), Safety (2110), Energy (1171), Security (2120), and Logistics (2410, 2430, 2440). Many use cases were added which find applications in the facility services Safety (2110), Customer Experience (2000), and Healthcare.

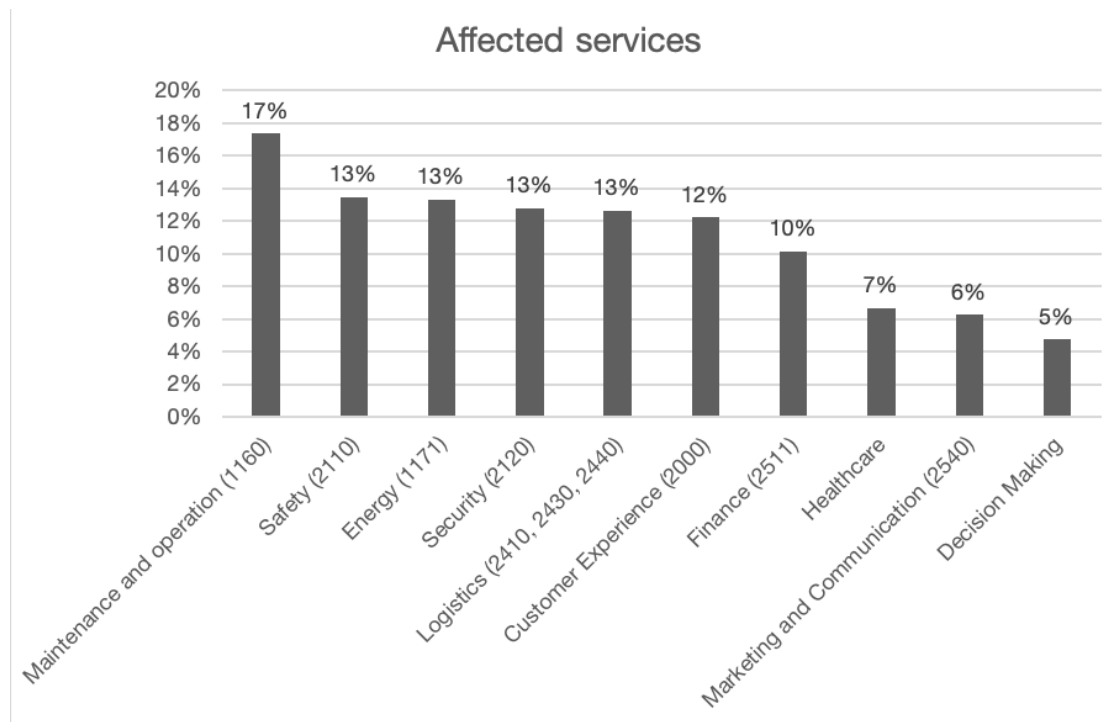


Figure 2 Affected services according to number of occurrences in publications as a percentage of the number of cases analysed (720 use cases as of February 2020).

The dominance of IoT technology in the facility services industry overall can also be observed in the individual services. To illustrate this, the service Maintenance and Operation (1160) has been analysed more closely (see Figure 3). 59% of Maintenance and Operation (1160) use cases in our current database use some form of IoT technology, mostly sensors. This is followed by Machine Learning and Big Data, with AI trailing behind a little. These technologies are often used in tandem. For example, IoT sensors constantly monitor KONE elevators and escalators. These sensors send the data to a cloud for storage. This data is then analysed by IBM Watson's AI, which identifies possible malfunctions before they occur, which allows for in-time maintenance scheduling. This transforms reactive maintenance tasks into predictive ones (KONE Corp., 2016).

Robotics also have a significant share within Maintenance and Operation (1160) use cases. This can be attributed to an improvement in robotics technology, transferring dangerous maintenance tasks from humans to robots. For example, drones are used for remote pipeline inspection (Meakin, Wong, Zikry, & Shae, 2019).

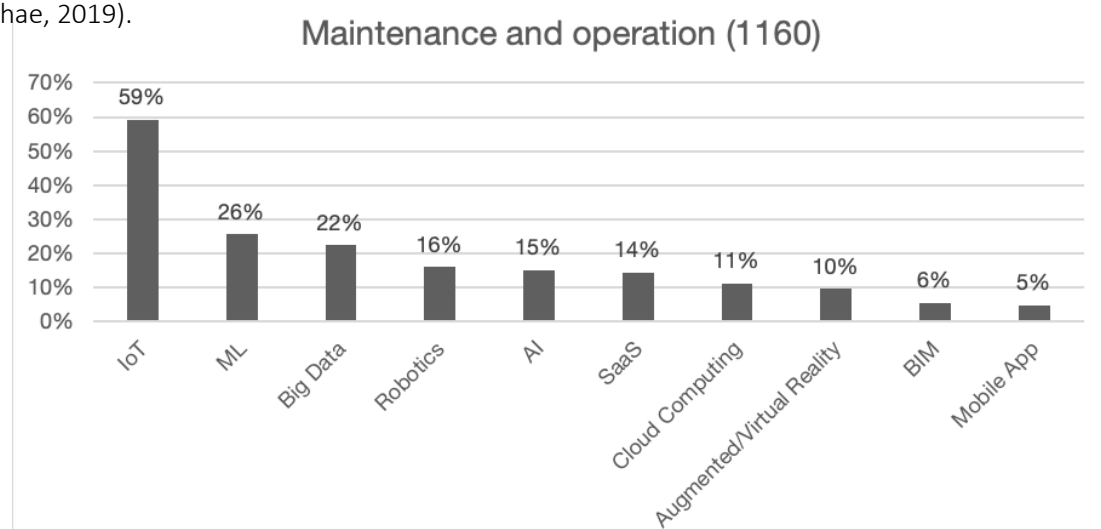


Figure 3 Used technologies according to number of occurrences in publications as a percentage of the 125 overall "Maintenance and Operation" use cases (February 2020).

Our next goal was to show how technology affects service provisioning on a micro level. As stated earlier, IoT sensing was chosen as use case due to its dominance not only in services overall, but their importance in Maintenance and Operation (1160) especially. The low price of readily available sensors also played an important role in this decision.

We chose a scenario that is relatively wide spread and representative for the three services most affected by digitization: room inspection for mould. The most important factors with regard to mould growth are relative humidity, temperature, substrate and time (Sedlbauer & Krus, 2002). Since substrate is provided by the building material and can therefore not be changed easily, the three decisive factors for intervention are relative humidity, temperature, and time. In order to supervise whether mould has developed it is paramount to regularly check vulnerable areas. Usually, a person would check such a room visually for mould infestation on a regular basis. This takes time and effort.

Therefore, we decided to transfer this repetitive task to sensors. Instead of checking in visually, these sensors monitor temperature and humidity of the affected area constantly. By making sure that certain thresholds have not been exceeded, it can be deduced that mould will not find suitable conditions for growth. This means that instead of reacting to a situation (mould growth), this use case will prevent the growth of mould by withholding conditions susceptible for its development.

IoT Sensor Set Up

As can be seen, Maintenance and Operation (1160), Safety (2110) as well as Energy (1171) are, according to our database, highly affected by IoT technology. IoT technology itself is the most important smart technology affecting facility services overall. Using these facts as a starting point, we wanted to show in practice how technologies are changing facility service provisioning. As a result, an IoT use case was selected for further analysis that touches on the three services most affected by technology. Maintenance is simplified by IoT monitoring. Health and Safety issues like moulding are dangerous for people staying in spaces. And lastly, reduce in energy use can be achieved by better understanding temperature and humidity patterns, reacting accordingly.

In order to show how simple IoT implementation is, we developed a cheap and easy to set up use case. The sensors were installed in areas prone for mould. Since mould growth is influenced by humidity and temperature, its spread can be confined by monitoring these parameters and proactively influencing them. This problem touches on the three facility services that are, according to our research, most susceptible to digitization. This provides a good use case for easy IoT implementation. The costs for one unit were about 80€ and interested personnel were taught how to set up the sensors, program tasks, and read and interpret the data in a two-hour workshop.

The start-up procedure consists of several steps:

1. Connecting the keyboard and mouse with a Raspberry Pi (RPI) via USB
Connecting a USB power adapter suitable for continuous operation with a Rpi USB power supply
2. Connecting a screen via HDMI (alternatively via VGA or VNC)
3. Connecting the RPI to the internet (via WLAN or LAN)
4. Connecting the sensor and preliminary testing
5. Adapting the existing lines of code for the individual purposes. For example: triggering a task when a certain level of humidity or temperature was exceeded
6. Maintain security (changing passwords, keeping software up to date, using a firewall)

All that is needed on-site is a wall socket, space and internet access. The costs are equivalent to having a technician come and monitor the desired parameters once. But with this set up it is possible to monitor the data continuously over a long period of time.

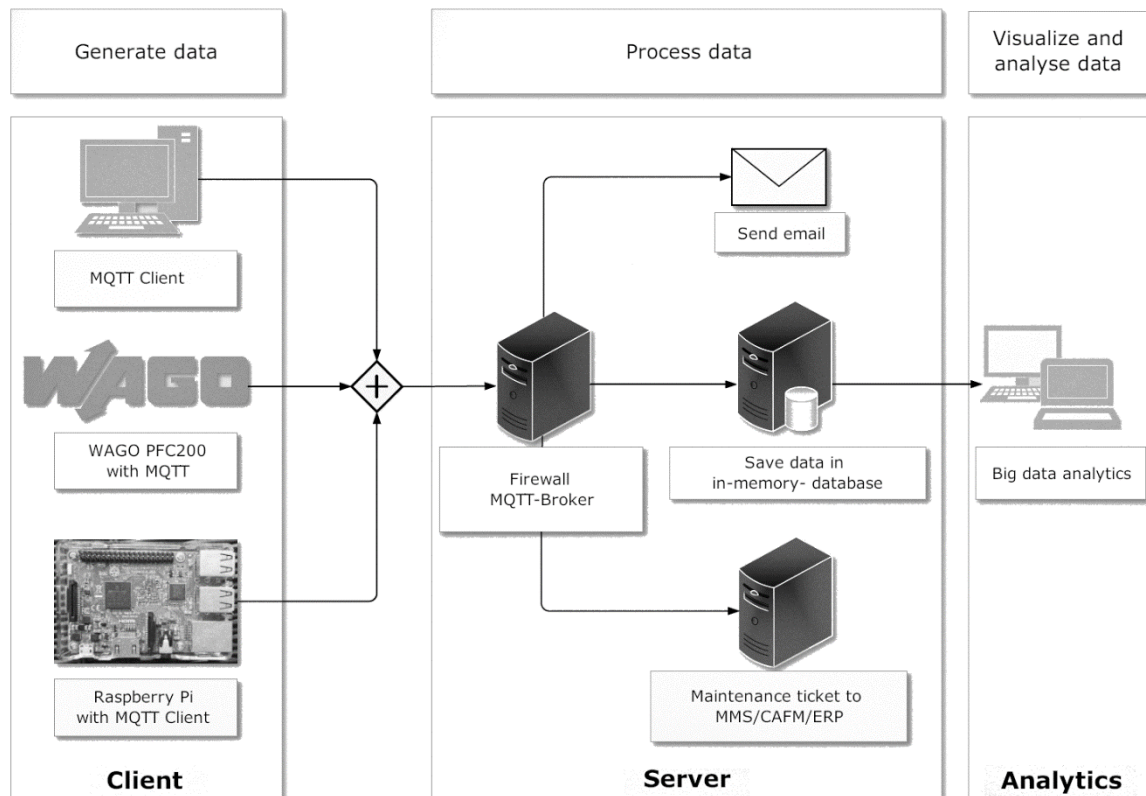


Figure 4 Set up for IoT use case.

In order to prevent mould, two parameters were measured by a sensor: The relative humidity and the temperature of the room. This allows maintenance personnel to see whether there is danger for mould or a leakage of sorts. The sensor data is processed by a RPi single board computer which triggers one of three actions, if a certain temperature or humidity threshold is exceeded:

1. An email is sent.
This email contains the individual ID of the RPi, therefore allowing the recipient to easily identify where the incident has taken place. This email immediately alerts the personnel responsible. It also gives information about why this action has been triggered by the system, by telling the recipient whether the temperature or relative humidity are too high or too low.
2. The data is stored in a database for further Big Data analysis.
This allows maintenance personnel to ensure that the temperature and relative humidity have never exceeded or fallen below certain thresholds. The data can also be used for further analysis over a longer period of time, greatly improving results gathered from isolated expert technician visits, which cost about the same as this whole IoT use case set up
3. Information is sent to an existing MMS/CAFM/ERP system.
Like the email, this action informs maintenance personnel of where and what has occurred. In this case, a ticket is created. The IoT setup thereby seamlessly integrates with existing in-house or outsourced IT solutions for maintenance operations.

These simple and adaptable tasks (the thresholds for temperature and humidity can be easily changed) ensure that the system is proactively monitoring the environment. The system easily integrates into existing infrastructure, and automatically alerts responsible personnel when problems arise. The setup can be adapted for various uses, depending on the needs of the building and maintenance demands. For example, since this specific set up can be installed in areas that are prone to develop mould, in a more advanced step a dehumidifier could be activated automatically to prevent this.

Remote and regular supervision of the data ensures that physical check-ins can happen at much greater intervals, further reducing costs. This small, cheap, and simple set up illustrates that even at this scale, due to digitization, a shift from reactive towards predictive maintenance is taking place in the FS sector.

DISCUSSION AND CONCLUSIONS

Digitization heavily affects facility services, especially Maintenance and Operation (1160), Safety (2110), Energy (1171), Security (2120) and Logistics (2410, 2430, 2440). Not all technologies are equally important to this process. According to our research, IoT technology, especially with regards to sensors, is the main technology in digitization processes. IoT is followed by AI, Big Data, and Robotics. BIM on the other hand plays a minor role in this development.

Digitization in the FS industry not only means that tasks that were previously conducted by humans are now executed by technologies. The high degree of technology use has effects on how the tasks are performed, and in the process on the tasks themselves. For example, reactive maintenance is shifting towards preventive and predictive maintenance.

To illustrate this concept, we developed an easy to use and cheap IoT use case. This set up can be used to monitor humidity and temperature levels in areas susceptible to moulding. Low price IoT sensors enable a continuous monitoring of the room parameters for almost no costs. The permanent analysis makes it possible to optimise the systems continuously in contrast to one-time audits. In addition to the continuous supervision, maintenance staff is automatically informed about problematic developments. This makes it possible to react before damage happens, at a fraction of effort. As was shown by preceding research, first-line personnel tasks will change dramatically. In our example, instead of regular in-person check-ins at short intervals, the temperature and humidity are always monitored by the IoT sensor. An email or ticket is sent automatically to the personnel responsible to take care of the problem when it arises. Because of this, in-person checks can happen much less frequently.

However, a sensor is worthless if the data generated from it is not in some way analysed. To what extent IoT is dependent on other technologies to sustain a fully functioning autonomous system is the topic of further research.

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Housing Federation Hub Initiative – A Collaboration between FM and Academia

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ABSTRACT

Purpose – The objective of this paper is to present the results from one approach in the Co-operative Housing Federation of Norway (NBBL) HUB activities, which consist of eight different feasibility study projects geared towards a potential contribution to Paris Climate Agreement. NBBL is a national membership association representing 41 co-operative housing associations (building co-operatives) managing 12.700 housing co-operatives and condominiums, counting 510.000 houses representing 1.020.000 members which is approximately 25% of total housing in Norway.

The Norwegian building stock consists of approximately 400 million square meters gross area. Of this housing is app 67%. In order to reach the Paris Climate Agreement goals, it is not enough to concentrate on new constructions, the biggest potential lies within the existing buildings stock. Fostering changes towards more sustainable neighborhoods, we propose in this research to tighten the collaboration between FM and Academia to create a network of universities and local FM, following the goals and strategies developed at the strategical level. “Hjernringen” is an initiative from NBBL to co-develop new solutions and research topics for more sustainable urban communities in collaboration with Norwegian Universities and local residential FM.

Methodology/approach – This paper presents one case study in detail as an example of collaboration between FM and Academia. The methodology used are both qualitative and quantitative research methods. It was organized as a student summer school for four weeks working on site. A substantial part of getting information was to listen, inform, understand people’ needs and voices, ultimately creating a visual survey. Consulting with users was important to make an interactive platform with 3D models capable of collecting feedback and have a tailor-made communication of the benefits of sustainable renovation.

Results – The results of this research are showing that a tight collaboration between FM and Academia benefits both parties in the development of innovative solutions both from the academic and industrial perspective. It has also enabled to shed light on the importance of better communication between FM and users. The media coverage of the experience has also increased the attention given to the issue.

Practical implications – The research is important to increase the understanding of users’ involvement in sustainable building renovation and its potential to move towards a more sustainable society. For NBBL, together with their 41 co-operative housing associations, it is an opportunity to develop a new platform for decision-making in renovation projects of urban communities.

Type of paper – Educational paper

KEYWORDS: 3D model, communication, co-creation with residents, well-being.

INTRODUCTION

As a signatory of the Paris Climate agreement, Norway had committed to reducing its overall Greenhouse gas emissions by 40% by 2030 compared to 1990 levels. In a recent statement, following the publication of the European Green Deal, the Norwegian government has increased this target to 50% and towards 55% by 2030. The country has expressed the will to take a leading role in helping to reach this goal at the EU level. In order to pave the way to success, major industry actors will have to take actions. With the building sector accounting for almost 40% of the global CO₂ emissions and 36% of the energy use, there is a big potential for these actors to make a significant contribution.

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Housing in Norway accounts for 67% of the building stock, of this, the Norwegian Federation of Building Cooperatives (NBBL) represents 25%. NBBL is a national membership association representing 41 co-operative housing associations (building co-operatives (BBL)) managing 12.700 housing co-operatives and condominiums, counting 510.000 houses representing 1.020.000 member. As a major actor of the residential building sector, they have set ambitious goals and a visionary approach to contribute to the overall climate goals set by the Norwegian State. The initiatives developed are clustered in their “HUB project pool”. The collaboration with Academia called “Hjernringen” is part of their “HUB” activities, through the organization of summer schools and the sponsoring of Master Thesis, a research project has emerged aiming to find new ways to engage citizens (i.e. residents) in the fight against climate change. Together with their 41 local co-operative housing association, they are aiming to engage their members into Sustainable Building Renovation (SBR). In this paper, SBR is understood as defined by Jensen et al. (2017) “a renovation of existing buildings that results in buildings that are more sustainable after the renovation than before”.

While nearly half of the Norwegian population acknowledges “being scared of the consequences of climate change on them and theirs”, it remains a challenge to motivate residents to engage into ambitious SBR projects. Indeed, the majority of people have already consented to change their behavior in many areas (transportation, food habits, recycling) but barriers remain when addressing their individual property. Social strategies focused on engaging citizens in formal and informal groups play an important role in achieving social behavioral changes for climate mitigation and adaptation (Temeljotov-Salaj et al., 2018). Hauge et al. (2013) points social mechanisms that efficiently influence human attitudes and actions, such as: social norms, competition, praise and acknowledgement, social-identity theory, pilot examples, social learning, attention from others, face-to-face stronger together and consensus. The latter was named by NBBL as a goal to reach when addressing their members and engaging in sustainable renovation of their neighborhoods.

In order to foster innovation in sustainable building renovation processes, Killip et al. (2013) through their study, suggest to focus on the three following aspects: quality of design, quality of physical work and quality of communication. They define the need for improved communication as an important factor for successful building renovations. They also point out the need for systematic feedback mechanisms while also naming it as a challenge to implement. By being involved in both the design and operational phases, Facility Managers have the potential to centralize the communication with end-users and improve it to collect feedback and react quickly on it but it remains a challenge to implement.

As a result of this challenge, NBBL decided to collaborate with the Norwegian University of Science and Technology (NTNU) in order to initiate a research project to facilitate communication of SBR’s benefits in the specific context of the Karolinerveien Borettslag’s Renovation project in Trondheim. This research is especially relevant for the groups identified as crucial for achieving the UN Sustainable Development Goals within the building sector: facility managers, co-operative housing federations and associations (specifically NBBL and its local branch TOBB), the construction industry, citizens and other actors (public institutions, energy providers and academia).

The main Research Question explored in a summer school experience is “how can the collaboration between FM and Academia contribute to the development of innovative solutions for more sustainable neighborhoods?”

Hjernringen concept

NBBL decided to intensify its efforts towards the achievement of the relevant United Nations’ Sustainable Development Goals by collaborating with Academia on a “Hjernringen” (‘Brain Ring’ in English), as a part of NBBL “HUB” activities (NBBL’s Project Pool). NBBL has initiated a collaboration with six universities around the country, a network is created between NBBL HUB, students and housing development teams, with a goal to use the academic potential to foster the sustainable development in residential areas, and opposite to find the “bottlenecks” for reducing energy consumption by 10 TWh. Christian Fredrik Mathisen, NBBL’s innovation leader stated *NBBL HUB will provide assistance in making smart choices, increasing the pace of development and being ready for the future*. Thus, the interest of collaboration from both sides is seen as a large network with national focus; creating a collaborative project solutions

network; using multidisciplinary knowledge for increasing attention of sustainable upgrading; linking students to “actual life problems” in housing area; to improve decision-making processes in housing cooperatives regarding sustainable and green transformation. NBBL organized a workshop, led by Daniella Axelsson, on which partners defined the strategic common topics, resources and activities in collaboration (Table 1). Both sides pitch into Hjernringen with a strong wish to collaborate and generate new knowledge to contribute to SDG.

Table 1 – Hjernringen strategic topics, resources and activities

Academia	NBBL
• Competence, students and pilot projects • Professional knowledge and credibility for greater influence • National and international networks • Innovation • Research expertise and skilled researchers across institutions • Act as mentor and promoter • Analyzing data in a professional way • Take Norwegian research about housing to the world- help the NBBL housing expert • R & D base in NBBL • Knowledge of what has already been done, where there are gaps	• Greater influence through the unique network • Access to the “real” projects, case studies, themes • Be one HUB-connect academia and Building Co-operatives • Formal and informal dissemination • Platform to show each other up • Starting circular-economic projects • Promoting green transformation • Contribute to new business models • Create interest among students • Access to data and information • Building confidence in Building Co-operatives • Greater political influence

Besides, collaboration with Academia is identified as a very positive one as both parts can gain. More practically, various collaboration benefits are identified: bring experience; support research problem; set smaller group to consider a task; learning about climate problems from more applicable side; case studies, seminar assignments, bachelor-, master- doctoral theses; contributions from NBBL to teaching; project-pitches, thematic roundtables and discussion. NTNU has started a cooperation in June 2019 by organizing two Summer schools and dedicated several master students and one doctoral student to Hjernringen. In the present research, the cooperation between NBBL and NTNU is presented through one case, which was focused on the problem of increasing the citizen engagement in sustainable refurbishment projects.

RESEARCH

Case study

Partners and context of the study

NBBL is the largest co-operative Housing Federation of Norway and represents here the Strategic level of Facility Management. Following the Paris Agreement ratified in 2016 and aligning with Norway's ambitious goals announced in the Nationally Determined Contribution Act published in February 2020, NBBL has been proactive in defining a strategy to upgrade the existing stock of buildings.

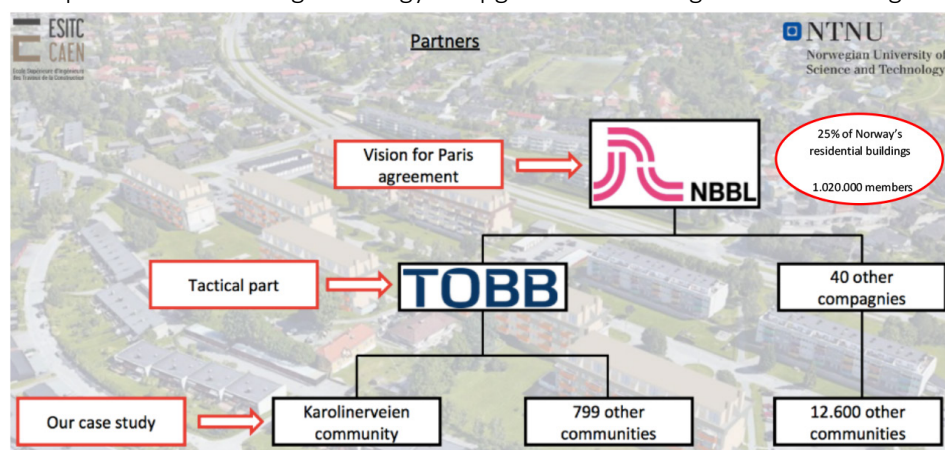


Figure 1 Organization of the Facility Management company made by the ESITC students, 2019

The tactical level is represented by their local team, TOBB, responsible for the management and maintenance of the Karolinerveien Housing Cooperative located in Trondheim, Norway. This urban community has seven building blocks from 1967, with a total of 315 apartments and large outdoor areas. In order to comply with today's standards, Karolinerveien needs to undergo renovation. NBBL seized the opportunity of this project to start developing a vision for a sustainable regeneration of the neighborhood together with an upgrade of the buildings' performances.



Figure 2 Karolinerveien 1 and 2. Source: NTNU & ESITC.

The NTNU's Department of Civil and Environmental Engineering contributed to the development of a research project by organizing summer schools as well as semester courses and guidance of Master thesis related to the theme "citizen engagement in sustainable refurbishment projects". The first summer school, of which this paper presents the results, was organized in collaboration with the Caen Institute of Civil Engineering (ESITC). 5 students from ESITC together with 3 students and 3 researchers from NTNU participated to this 4-week workshop in June 2019.

First observations and initial development

Before the first day of the summer school, the students received the following statement from the NTNU and NBBL team: *"The Government has signed the Paris climate agreement. If Norway does not fulfill the requirements, the EU will give a penalty. But who is going to fulfill? Building owners. So, what is the potential within existing communities with dwellings? A case shall be examined - in Trondheim (Karolinerveien); what can be done to upgrade to a wellbeing area?"* (L. M. Bendiksen, 31.05.19).

The goal was set and communicated by the main coordinator of the NTNU research team as follows: *"Create a visualizing tool for sustainable communication, using Karolinerveien as a case"* (A. Temeljotov-Salaj, 31.05.19).

During the first week, the team focused on introducing the students to the Facility Manager's role and the potential of Urban Facility Management to contribute to more sustainable neighbourhoods. A field trip was also organized to make the first observations on the Karolinerveien area. Having a civil engineering background, the first comments made on the spot were pointing to technical problems such as a poor condition of the balconies' structures and the possible presence of asbestos. However, after being encouraged to also consider the social aspects, the students observed a lack of social meeting places and an under scaled playground area considering the size of the community.

After the first field trip and following a meeting at the local residential FM, TOBB, the students started developing ideas for improvements of the neighborhood. They structured their suggestions between "hard-services" and "well-being", therefore combining technical solutions with more social intervention in order to improve the overall quality of life of the residents. In the meantime, the research team asked them to consider a communication plan or medium that could allow a transfer of knowledge from their engineering background to residents with various backgrounds and interests.

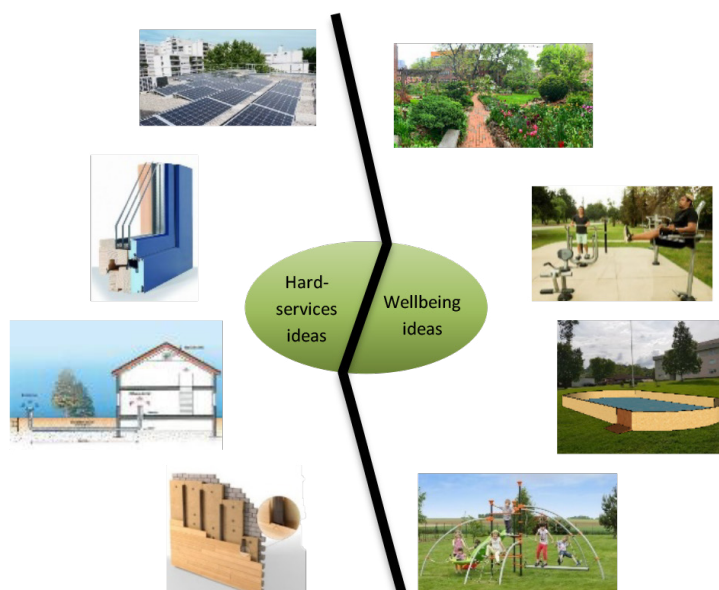


Figure 3 Students' first suggestions for improvement of the built environment. Source: NTNU & ESITC.

A survey⁵ conducted by TOBB earlier in the year and analyzed by the students revealed the main concerns and challenges experienced by some of the residents. People were experiencing high humidity level, bad ventilation, cold drafts from untight windows and doors resulting also in acoustic disturbance. 62.5% of the respondents said they had to open the windows in order to get satisfactory ventilation in their apartment. This clashed with one of the issues experienced by the respondents, namely the acoustic nuisance from seagulls in the summer. Indoor temperature also revealed itself to be problematic with respectively 77.9% and 58.1% of the participants reporting overall or partial excessive warmth in the summer and excessive cold in the winter.

A tailor-made communication tool

Reflecting on how they could have the best impact and maximize their chances of reaching out to residents, the students decided to split in two groups where one would be going on site and interact directly with people to let them know about the project and the purpose of their work, and another would start developing visual support and a web-based platform for better communication of SBR benefits. The idea behind this process was to achieve a tailor-made communication tool where users would be addressed in a more personal and interactive way than a regular pamphlet about global benefits of Sustainable Renovation.

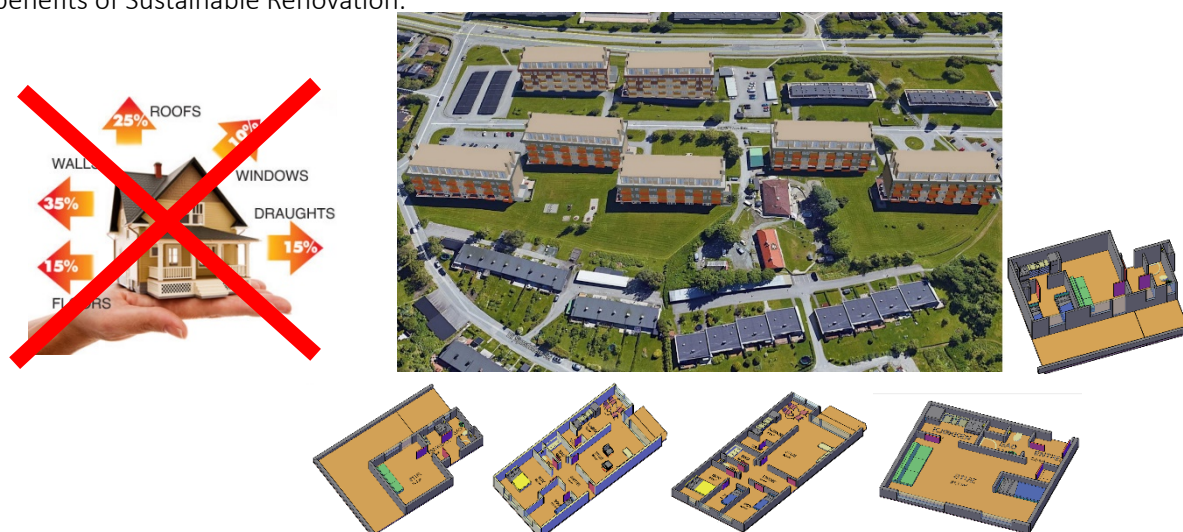


Figure 4 From widely used images to tailor-made visual content. Source: NTNU & ESITC.

⁵ TOBB (2019) Beboerundersøkelse Karolinerveien

The group on the field started interacting with people and engaged them into a two-minute activity where they could pick a pictogram and write a few words on a white paper to express their experience of living in the Karolinerveien neighborhood. While the feedback was substantially similar to the results of the survey, the students also noticed the relatively young age of the residents. This led them to think that a web-based interactive tool could contribute to an improved communication.

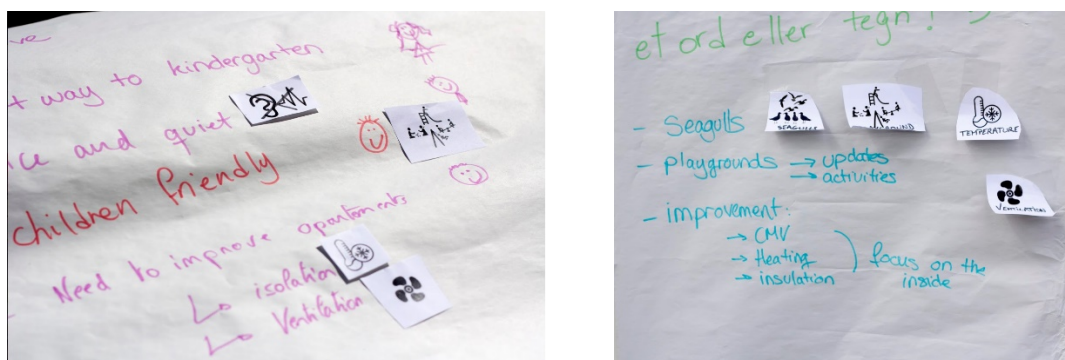


Figure 5 Examples of compositions produced by residents during a field trip activity.

Source: NTNU & ESITC.

The other group started building 3D models of the area as well of each type of apartment that could be found in the buildings to support the visualization of potential solutions. This, combined with the daily reported experience of the other group, led the research team to include co-creation and active participation in the final version of the tool. The concept of two “mini-games” emerged, one being a visual survey where people could point to specific areas in their apartments where they had challenges and the other one presenting what kind of improvements could be expected by upgrading different elements of the built environment. The name of the platform, “blimedOSS” comes from the Norwegian sentence “Join us” where “OSS” means “us” and stands for “Our Sustainable Society”.

One of the games, called “pick your picto” is collecting feedback on pre-determined issues in a more visual and playful way. The point being to increase the level of participation by providing an attractive interface. All five types of apartments identified in the blocks are available for people to choose the one they actually live in. They can then place pictograms representing different issues they might experience at home (noise, humidity, cold drafts, temperature, ventilation). The user composes its own picture of its “home experience” and can send the final result together with additional comments to the administrators of the site (i.e. the research team) anonymously.

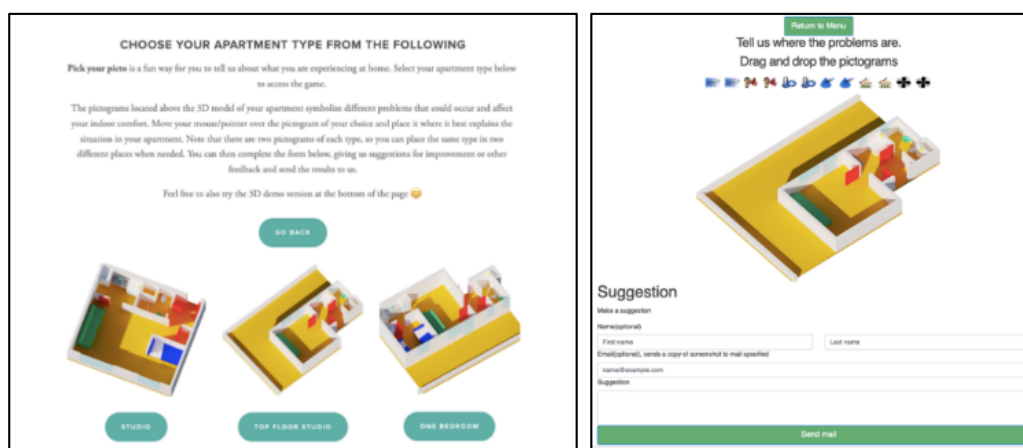


Figure 6 Landing page of the “pick your picto” game and interface for the “top floor studio”.

Source: blimedOSS.

The second game, “click and tip” aims to provide tailor-made information about the benefits of sustainable renovation of the block and its surroundings. The user can click on different magnifying glasses placed on specific elements of the building and its environment (façade, windows, ventilation, playground) to get information about how the situation could be improved. There is also a field to send suggestions or questions anonymously.

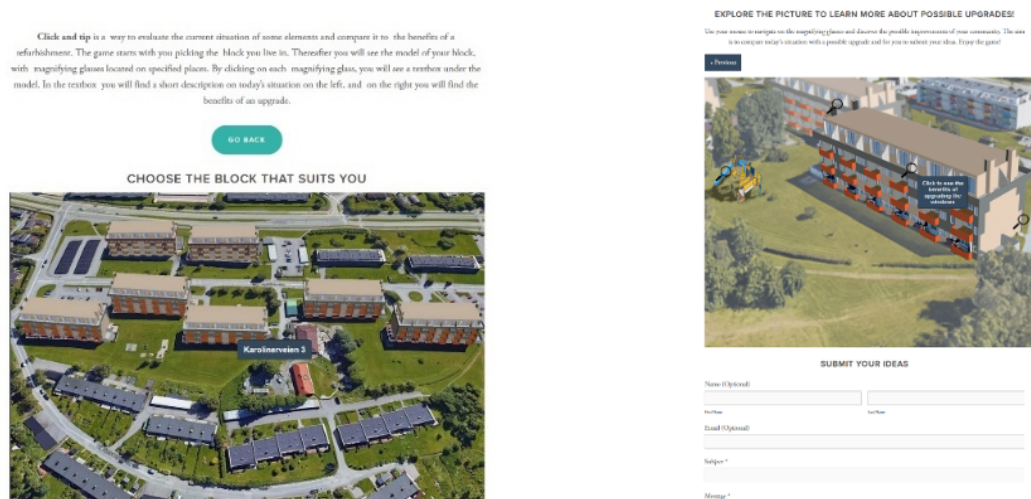


Figure 7 Landing page and interface of the Click and Tip game.

Source: blimedOSS.

“Click and Tip” will evolve to a more interactive interface and the concept of a “SIMS-like” interface is being developed where people could create an avatar and fill in some information in order to receive information fit to their profile and priorities.

The residents could thereby see the effects of their decisions in the project on their different “levels” such as their environmental impact, well-being, economic, etc. This is motivated by the analysis of “successes and failures” in sustainable renovation of housing cooperatives which revealed that communication and transparency in the process were high on the list of users’ priorities. Challenges in communication and intervention of third parties during the pre-project phase were identified as important factors alongside the financial aspect and the lack of options for external funding.

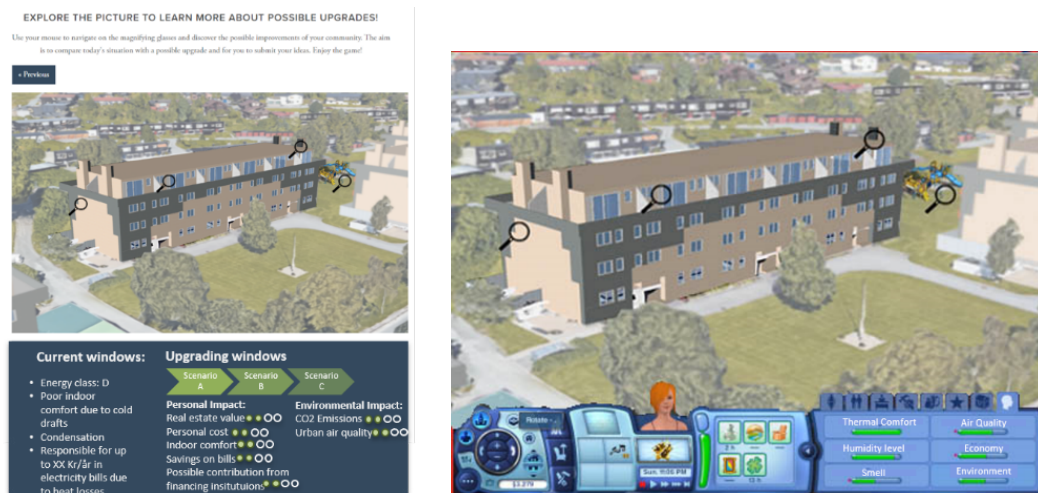


Figure 8 Simulation of the future interface of "click and tip". Source: C. Senior.

The current version of the platform can be accessed now at www.blimedoss.com and has been presented to NBBL and TOBB. The representative from NBBL, in charge of the project expressed her satisfaction regarding both the final product and the overall fruitful collaboration. It is seen as an opportunity to create value for the local residential FM and their members as it can easily be adapted to more communities in order to engage more people into sustainable renovation projects. It has been presented to an extended audience at both academic and industrial conferences and received a lot of attention from actors in the field.

Continuing collaboration between NBBL and Academia-Semester work and Hjernringen

Building on the results of the 2019 summer school, the Karolinerveien case was used in semester courses at NTNU investigating the role of FM in renovation projects. A report produced by students investigated

the successes and failures in similar cases in order to identify triggering effects in the development of sustainable renovation projects of urban residential communities. Interviews conducted with the communities' board leaders and operational Facility Managers pointed out to breaches in communication and participation in the project. This also opened new paths to explore among which Universal Design, the impact of SBR on real estate value and the digitalization of decision-making processes.

The continuing collaboration between NTNU and NBBL has resulted in the development and financing of three master thesis projects to be submitted in 2020. These will serve both as a complement to and a kick-starter in the overall sustainability accounting strategy defined by NBBL. This sponsoring opportunity is also an incentive for students to write their master thesis on themes relevant to actors in the construction sector.

The experience between NTNU and NBBL through the Karolinerveien case also shows great results in communication and dissemination of the research. Articles published in specialized media and the presentation of the project in relevant channels within academia and industry have increased the visibility of both parties.

Discussion and conclusions

The collaboration between NBBL and Academia, has proven through the NTNU experience to be fruitful and has allowed both parties to develop innovative solutions and processes for a wider acknowledgment of the SBR's benefits. By involving academia and its student workforce in their global strategy defined in the "BBL HUB", the Residential FM company is fostering deep changes and increasing the speed of their implementation. Indeed, the student work usually demands less time to plan and execute than corporate decisions and actions. The goal for both Academia and NBBL is to create a toolbox which both can pick from. The prototypes of these tools can then be further developed into practical solution implemented by the tactical level of FM.

During a Workshop gathering partnering universities at NBBL's headquarters, the participants to the session expressed their enthusiasm to work closely together, thereby also strengthening the university network and knowledge sharing between them. From the academic point of view, the Hjernringen initiative is seen as an opportunity to develop joint research projects based on the challenges and objectives defined by NBBL. The national network of both universities and local residential FM companies also enables replication and dissemination of the results at a larger scale.

The renewal of student participants in the project also guarantees a new set of eyes and fresh minds to foster innovation while the red thread is kept through the continuing engagement of the Hjernringen academic and corporate staff.

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Social Needs for Sustainable Refurbishment in Trondheim

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ABSTRACT

Background and aim - Sustainable refurbishment of existing buildings requires more people-centered innovative processes and solutions. Gaining better insight in the needs of cities and citizens, and correspondingly the ability to develop processes, services and business models that better fit people's needs is a task for urban facility management in the neighbourhoods. This paper aims to adapt the refurbishment project needs to the population by analysing their habits and developing some activities that they would like to get, with the goal to improve their health and wellbeing.

Method - Cross-sectional questionnaire surveys (both paper-based and online version) were conducted on 341 citizens in Ila neighbourhood, Trondheim, Norway.

Results - Findings show the individual/ social needs, which help to better shaping the urban services to create maximum value for the users. Some of the very interesting results show the diversity of the needs. The main reasons for refurbishment are shown as aesthetic (32% of respondents) and comfort (30%), reduce electricity costs (24%) and environmental friendliness (15%). Respondents voted for thermal comfort as the major indoor problem in both summer and winter time. On the question what type of financial help they would be interested, the answers are: participations from the municipality to finance the community projects (29%), lower prices on energy and renewable resources of energy (26%), tax reduction (19%), co-funding (15%), better loan possibilities (10%) and other (1%).

Practical implications - The research is important to increase the understanding of citizens' needs.

Originality/value - The paper discuss the key characteristics important for urban FM to better understand and develop new services and business models.

Paper type: Research paper

KEYWORDS

Individual/ social needs, Urban FM, Sustainability, Refurbishment.

INTRODUCTION

Trondheim Municipality has adopted a very demanding plan to reduce GHG emissions. To reach the goal, ten strong objectives are set, five as city development targets and five as municipality development targets.

- *Energy and climate targets for Trondheim city:* i) Trondheim is a role model and a collaborative arena for green value creation and development of climate-friendly technology and ways of living, by 2020; ii) Direct greenhouse gas emissions in Trondheim have been reduced by 10% compared to 1991, by 2020; iii) Trondheim is robust to meet future climate change, by 2025; iv) Stationary energy use in building and construction is at the same level as in 2013 (about 3.5 TWh). This corresponds to a 20% reduction in consumption per person by 2030; and; v) Direct greenhouse gas emissions have been reduced by 80% compared to 1991 by 2030.

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- *Energy and climate targets as municipality's activities: i) Trondheim municipality will start phasing in climate-neutral vehicle park for heavier vehicles as soon as they are available; ii) Energy consumption in own operations is reduced by 7% compared to 2017 by 2020; iii) By rolling of the plan in 2020, targets are set for indirect emission cuts; iv) To reduce the climate footprint for major investment projects in the municipality by 30%, in comparison with the reference building, assuming that life cycle costs do not significantly increase, and; v) The municipality of Trondheim becomes a zero-emission business (2030).*

From the built environment perspective, it is often focused on the technical aspects as non-technical dimensions are more disruptive (Lindkvist et al., 2017) resulting in projects that meet technical requirements but not livability requirements. The reduced focus on livability issues for communities' disregards that in order to create social value, human activity needs to be center (Bjørberg and Temeljotov-Salaj, 2018a). Working with communities through a value-driven approach could lead to a mutual drive of developing solutions that meet community needs as well as link to sustainable goals and business opportunities. Social aspects underpinning sustainability illustrates the importance for dialogue and cooperation to meet UN sustainable goals, which also should link to community's needs (Grum et al., 2020). Partnerships plays a key role and are particularly important when considering the scale of neighborhood within cities. Neighborhoods are made up by different partnerships, which include residents, commercial industry and political/municipality representatives. Indeed, a neighborhood should ideally incorporate the triple bottom line of sustainability being social, economic and environment as well as their inter-relationship. The challenge of understanding social needs within the complex environment of the city lays in the intangibility and subjectivity of needs in communities living in different areas of the city. Studies reflect these challenges and particularly in terms of developing sustainable indicators for planning purposes of a district (e.g. Turcu, 2013, Kristl et al. 2019, Temeljotov Salaj et al. 2020). In addition, studies have shown the clear relationship and influence people have on energy use of buildings (e.g. Pettersen et al., 2007). Buildings are a major part of cities and people are active participants therefore both buildings and people are necessary to work with to reduce carbon emissions. The planning of the regeneration of a neighborhood in a city environment is not just about the specific location of that space. It is also about the connectivity to its wider environment and this is often lacking in built environment dimensions (Dixon, et al. 2014). Little is known how local community values and understandings of sustainability is integrated into plans (Turcu, 2013). There is often a danger that local needs get lost in the noise of the different agendas. However, it is problematic as "*many indicator sets do not rest on citizen's values and understanding of sustainability, but rather on expert views on what these values might be*" (Turcu, 2013, p.702). In addition, urban decision-makers are often constrained with short time-scales and the immediate spatial scale of their jurisdictions with 'nested' governmental hierarchies (Dixon et al., 2014).

Urban FM and participations

Urban FM has a role to become an active and valuable partner for facilitating livable areas, with the focus on health and well-being, which strongly includes focus on Sustainable Development Goals (Grum et al., 2016, Salaj et al., 2018, Gohari et al. 2020). Spatial interventions from design and accessibility point of view, are very important to improve citizens health and well-being (Mobach et al., 2019, Nijkamp et al., 2020). The main idea of Urban FM is to improve the quality of the physical environment; create employment opportunities and ensure inclusivity of communities in design and management of service in the urban environment. The deterioration of physical place is connected with the absence of self-organization of neighbourhood residents, leading to tensions between societal groups (among citizens), but also between citizens and government or citizens and other institutions (Kuijlenburg et al., 2019, Kuijlenburg, 2020). City planners and decision-makers need to clarify and communicate their approaches to the problem, intervention methods, available resources, and possible decisional procedures (Gohari et al., 2020). According to Xue et al. (2019) Urban FM can cover all five levels of multisector participation to inform, consult, involve, collaborate and empower. Besides, facility managers can enhance the level of participation, by building on variables such as trust, efficacy, competence, responsiveness and legitimacy.

Being in close relationship with citizens, Urban FM can also create an effective, collaborative and interactive governance for co-creation, co-finance and co-ownership of urban public spaces to improve

citizens' sense of attachment, commitment, trust, inclusion and integration (Temeljotov-Salaj et al. 2018). While studies highlight the complexity of cities and their multiple dimensional aspects in light of sustainability necessarily means a cross disciplinary approach (Dixon et al., 2014), but also require an intermediary to bring multiple dimensions together (Lindkvist et al., 2019a). Jensen et al. (2013) proposed FM to be considered as a network of relationships, which creates perceived value amongst key stakeholders (clients, customers and end users) where perceived value can only exist and be produced within this specific network of relationships. Global citizenship calls for an active role from people, in their community, and the cooperation with others to make our planet more equal, fair and sustainable, what could be seen from FM side how to contribute to their awareness of social issues at neighbourhood (Kuijlenburg et al., 2019). In order to create an urban value ecosystem, which has people and environment as the main driving forces and urban facility manager as the main enabler and implementer, the new urban economics, focused to regenerate the environment, explores various partnership models, among which Public-Private-People-Partnership (PPPP) are prioritized (Temeljotov et al., 2011, Salaj et al., 2018, Bogataj et al., 2019). Urban FM is an intermediary discipline that closes the gap in urban thinking.

There are opportunities to develop more sustainable cities through incorporation of an Urban FM but contextualizing in the European Green Deal (2019), which lays out the EU Commission's strategy to implement the United Nation's 2030 Agenda and sustainable development goals. "It takes 25 years - a generation – to transform an industrial sector and all value chains, to be ready in 2050, decisions and action need to be taken in the next five years" (European Green Deal, 2019, p.7). Urban FM can aid in the acceleration laid out in the European Green Deal by facilitating in its goal of a 'renovation wave' of public and private buildings through the engagement of diverse stakeholders; identifying initiatives that combine societal pull and technology push in local communities to work towards a sustainable future and support the oath 'to do no harm' through development of action and policies to pull together. Therefore, current knowledge areas of FM on strategic, tactical and operational level need to be enlarged to: (a) urban planning, (b) data modelling, (c) business models, such as PPPP, (d) financial and (e) multi-criterion optimization models, (f) social infrastructure in dynamic development, (g) forecasting methods, (h) demographic models, (i) communication methods, (j) spatial statistical methods, and (k) visualisation methods. Therefore, various methods and tools need to be developed, based on the theories of (a) value orientation, (b) sustainability, (c) motivation of owners and users, (d) community engagement, and (e) behavioral changes (with Xue et al., 2019).

Current approaches to identify social needs

The most prominent tools to identify social needs comes from Building Research Establishment Environmental Assessment Method (BREEAM) Communities and Smart Cities Information Systems (SCIS). BREEAM Communities promotes cooperation among stakeholders through a common framework in which there is space for changes and improvements whenever they are necessary during the planning process (BREEAM, 2012). The main opportunities with BREEAM communities is that projects are distinguished from other similar projects branded with a recognized marketing tool; there is potential to reduce overall costs of projects as there is early thinking of what happens beyond planning and design of an area; and it is user friendly compared to other sustainable certifications and can decrease uncertainty in the planning processes (Callway et al. 2019). However, its implementation has been low despite the potential impact on sustainable planning. Two areas are identified that affect the standard's uptake and application: (i) the need for greater consistency in BREEAM Communities' structure, including how 'global' sustainability issues are addressed in differing local contexts and stakeholder agendas, as well as the need for post-construction validation; (ii) how BREEAM Communities might better reflect the wider context, where numerous factors impact construction sector application of voluntary standards, (e.g. the rate developments enter the market, private and public sector demand for 'sustainable' neighborhoods, perceptions of cost, administrative burden and relevance) (Callway et al. 2019).

The Smart Cities Information Systems social monitoring guide promotes engagement during the phases of developing energy efficient building projects where indicators are based on a broad framework of satisfaction and comfort of residents after completion of building works (Ferrer, 2016). Three stages of social monitoring are recommended – Stage 1 before the project starts, stage 2 during the project

and stage 3 after completion. While the interaction of wider stakeholder groups (including end-user) is valuable to ensure design meets user needs, the process does end after completion. However, research of buildings require a settling in period before users can really understand how the design of the building meets their user needs and sometimes there are changes that are necessary to do once a building is in operation (Forcada et al., 2015, Fedoruk et al., 2015). When one moves away from the building scale to the city scale, there is an implication of a necessary monitoring period of the new use of a city development, which guides such as the SCIS guide neglect. This neglect indicates an assumption that once plans of a city are implemented, they remain in place. Such an assumption ignores that citizen's interpretation of a development in a city maybe different to the original goals and intentions of the project. Sustainability is an ongoing process and successful sustainable areas in a city must be able to adapt to changing circumstances (Newman, 2007). The sustainable development of an urban area is dependent on the values and culture of the area so their interpretation and use of the area realistic decides on how sustainable the area is in use. This is why refurbishment projects are important as the communities are existing and may already have an established culture that require certain social needs to be recognized in sustainable refurbishment, but at the same time requires change that encourages sustainable behavior for a future oriented approach on how areas evolve.

Scope of the research

This study aims to investigate the integral part of social needs for sustainable development. In other words, it is going to answer the research question of "How to improve people's living habits and health and well-being through identifying their social needs in relation to neighborhood refurbishment.

RESEARCH METHODS

This investigation was carried out in Trondheim, Norway. Trondheim with 197501 population, is located in Sor-Trondelag, Norway, with geographical coordinates of "63° 25' 0" North, and "10° 25' 0" East and elevation above sea level for 18 m (Raporter 2018, Geodateos, 2020). Municipality in Trondheim has recently initiated programmes for energy efficiency measures and renewable energy for cultural heritage buildings and areas. The set of specific instruments includes a bold city vision, public incentive schemes, and open innovation with industry partners and the research centres.



Survey design

Cross-sectional questionnaire surveys were conducted in June 2018 in Trondheim, Norway. Questionnaires were available in both online and hard copy versions; consisted of an 'Introduction' part (including the definition of some expressions, e.g. sustainable and refurbishment); and several sections of questions on:

- Individual's background (e.g. age and occupation)
- Subjects' living conditions (e.g. building and neighbourhood quality, services)
- Refurbishment motivations (e.g. discomfort sources and reasons for renovation)
- Environmental requirements (e.g. environmentally friendly behaviour, contributions to save environments)

Paper version was distributed among the Ila residents available in the street, and the hard copy version was sent over via email to a group of people, who responded according to their consent. Overall, 341 citizens participated in this study. A summary of their age and occupations is provided in table 1. Participants were mainly full-time employees above 40 years old (42%) and students between 21-25 years old (27%). Collected data was statistically analysed using SPSS, statistical analysis package.

Table 1 Summary of the participants background.

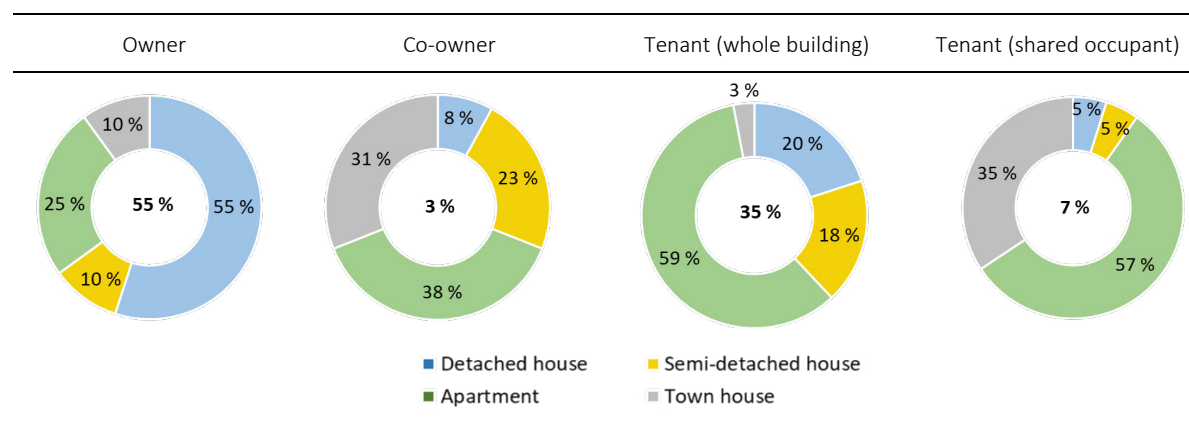
Age group	Employee full-time (%)	Student (%)	Employee part-time (%)	Retired (%)	Unemployed (%)	Total, age group (%)	Total numbers
Under 21	67	33	0	0	0	3	9
21-25	46	37	5	5	7	27	94
26-30	50	40	0	10	0	12	44
31-35	78	7	0	11	4	8	24
36-40	54	19	12	8	8	8	26
Above 40	52	16	12	11	9	42	141
Total, occupation (%)	52	25	7	9	7	100	338
Total numbers	171	80	23	28	21		323

RESULTS

Participants' living status

The initial analysis on the living status shows that approximately 55% of the participants owned houses, 35% rented a place and the others shared a place (tenants or co-owners). It was quite variable in terms of the number of people living with the respondents; some live with their family (35%) or a partner (27%), and the other either live alone (23%) or share a place with someone else (15%).

Results regarding the moving motivations shows that the majority of the subjects did not wish to move from their residence, which may confirm that the respondents are quite attached to their living environments. However, *bad building condition (heat loss, humidity, etc)*, *small place*, *undesirable location* and *private reasons* were listed with those of who prefer to move out from their current places. While private reasons are unclear, one can infer that the physical aspects of the building are important for the majority of respondents. The relation between the building types and the ownership status is presented in table 2. Detached houses and apartments are shown to be the first and second priority of the buyers, whereas, apartment buildings are more preferred by the tenants and those of who sharing a place.

Table 2 The relation between the building types and ownership status.

While many of the respondents live on the third floor of their building, stair cases appear to dominate over elevators and there seems to be a low number of handicap parking lots and automatic door openers across the board for all respondents indicating accessibility could be a problem for residents who have health problems. At the same time above 90% of the respondents believed that their main entrance was adapted to their needs.

Around 26% of the participants did not provide answer (or did not have enough information) on "when your dwelling was built?". However, the other 74% of the buildings, in average, were built before 1950. This indicates that many of these building may not meet the same standards expected of today's new building regulations. The majority of people responded that the building has been refurbished since they were originally built which indicates why the majority of respondents view the building to be in good condition.

Building refurbishment/renovation

To have a background on the existing discomfort sources in dwellings, participants were asked to vote for the main dissatisfactions in their living environments; result of which is shown in Figure 1.

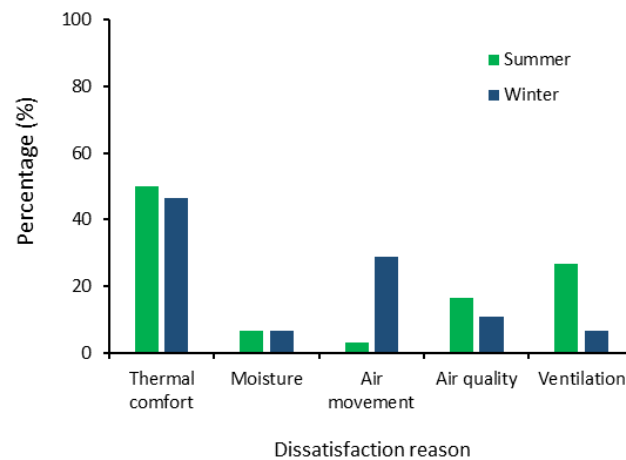


Figure 1 Dissatisfaction sources in the dwellings.

Excluding the residents who were overall satisfied with their homes almost 50% of the subjects did refer to thermal comfort as the most problematic in winter and summer months. This has implications on the amount of energy being used in a household (Jowkar et al., 2020). This is followed by ventilation for 30% and air quality for around 20% of the participants as the second and third sources of dissatisfaction, respectively during summer. Although air movement is shown as a considerable discomfort reason for almost 28% of the participants, it does not cause discomfort within the summer. Ventilation, air quality and moisture are apparently the less influencing comfort factors from the participants point of views.

Although more than 50% of the participants' dwellings had already been refurbished, approximately 58% of them still showed their interest to refurbish their living environments. While indoor ambient environmental aspects were the main issues in the dwellings, aesthetics/architectural aspects (32%) was shown as the first motivations for refurbishment followed by comfort considerations (30%) not far behind. Reducing costs (24%) and environmental friendliness (15%) were also listed as the two lowest ranked reasons for renovations in Figure2.

This indicates that there is often a very individual motivational need to conduct refurbishment based on economy, ensuring comfort and appeasing people subjective appeasement on the design of the building. It may also indicate that the respondents in this survey did not associate community with where they live. It appears from this survey that respondents fulfill the need for community/socializing needs away from their dwelling.

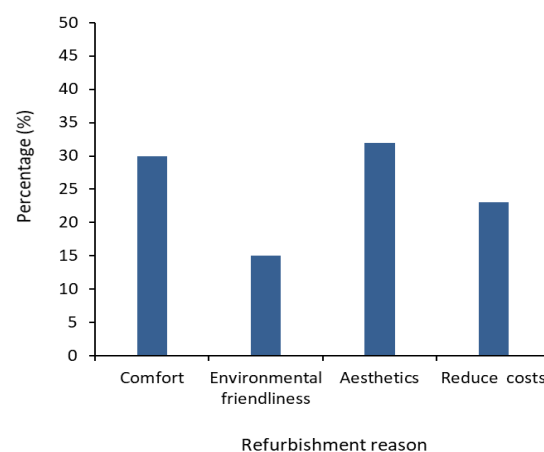


Figure 2 Reasons for refurbishment.

Neighborhoods and daily routines

Results on 'how often the participants leave their houses' show that they normally leave their place 1-3 times a day, mainly for work/studies/school and meet friends. There were also indications that a lot of the respondents are concerned with health and well-being with many of them leaving the house to get fresh air and exercise.

In terms of distances from work the majority of people live between 1 and 6 kilometers from work and between 0-1 kilometer from the grocery store, so they appear to live quite central for their day to day social needs which is reflected in their choice of transport in the summer time for the majority of respondents being bicycle and walking.

The preferred transport options are briefly presented in Table 3. People mostly prefer to walk to their job/schools, to take fresh air, for exercise, etc. in both summer and winter. In summer, use of car and bike are prioritized compared to the other transport options. However, use of tram does not look very common in summer. These trends are somewhat reflected in the wintertime with the majority of people walking. Almost number of people use bus to car during the winter, which indicate that individual transport is still prioritized over collective transport. While there was an increase in respondent opting for the bus, there was a large drop in the number of respondents choosing bicycle who may therefore choose the bus as an alternative. The number of those choosing trams negligibly increased in winter than summer.

Table 3 Transportation preferences in summer and winter.

	Walk (%)		Bike (%)		Car (%)		Bus (%)		Tram (%)	
	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Job/school	35	35	26	6	22	28	14	28	2	3
Food	37	35	25	6	22	27	16	28	2	3
Companying	28	26	28	9	32	41	11	19	2	2
kids										
Exercise	36	36	27	7	20	25	15	30	2	3
Meet	36	36	26	6	21	26	15	30	2	2
friends										
Fresh air	36	34	26	6	23	29	14	27	2	2
Travel	35	33	26	7	23	27	13	26	4	5

When respondents were asked which services they needed in short distance from the house, the highest rated service was the grocery store, parks and cafés, with not far behind indicating that social needs close to the home is important to respondents. Hiking areas were also rated quite high which is reflected with the Norwegian culture of wishing to be outside and close to nature. Furthermore, considering walking as the priority of the participants for their daily activities (Figure 3), providing them with the required facilities and social services in their residential neighborhood, not only can improve residents satisfactions but also can decrease the use of cars and buses, and consequently save the environment. There was no clear indication that residents did want the municipality to upgrade their home. This may be reflected in the view that above 80% of the subjects rated their neighborhood as (very) good in the surveys.

To reduce the carbon footprint, the majority of people (42%) recycle which is a service that is facilitated through the municipality (Figure 3).

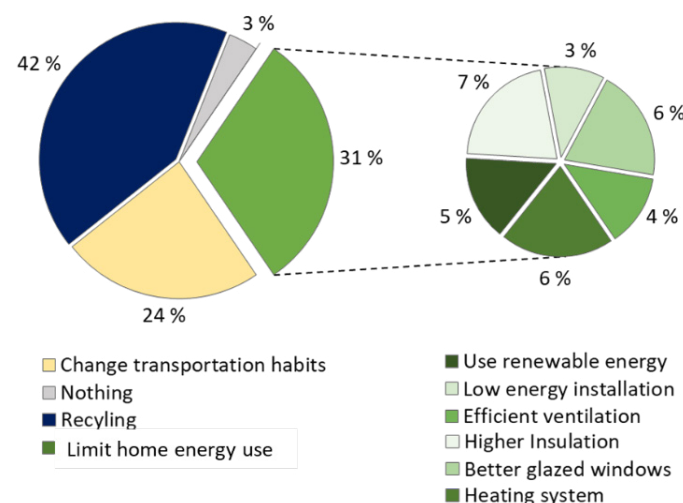


Figure 3 People environmentally friendly behaviours.

However, individual initiatives appear to be more aspirational where respondents were trying to limit their energy consumption (31%) and change their transport habits (24%). Details regarding the energy efficiency were investigated by analyzing the responses to the question of “How your home can be more energy efficient?”. Participants mainly voted for *higher insulation level, utilizing better quality glazed windows and heating systems* as the energy efficient considerations in their dwellings. This presumably indicates a wish to do more to reduce their carbon footprint and perhaps more of a push in line with the municipality’s objectives will facilitate further change in reduction of resident’s carbon footprint.

Regarding the refurbishment, statistics showed that 58% of the respondents would renovate their dwellings subject to receiving financial support. This is in somewhat contradictory of their initial response when they said they did not want to refurbish their homes due to the cost. However, receiving help with cost ignites a new perspective of refurbishment.

Participants believed that building renovations, has a positive implication on reducing the carbon emission footprint in their neighborhoods. Apart from that, people’s satisfaction with the neighborhood was also shown to improve with renovation of their dwellings. Approximately 49% of the participants did not provide answers on when their building was renovated. However, analyzing the existing responses, presented in figure 4, showed that the occupants of the buildings refurbished after 2000 had greater satisfaction level with their neighborhood environment. This presumably confirms a link between the building quality and the occupant’s satisfactions with their living environments. However, it is clear from the result that financial aspects need to be addressed as well.

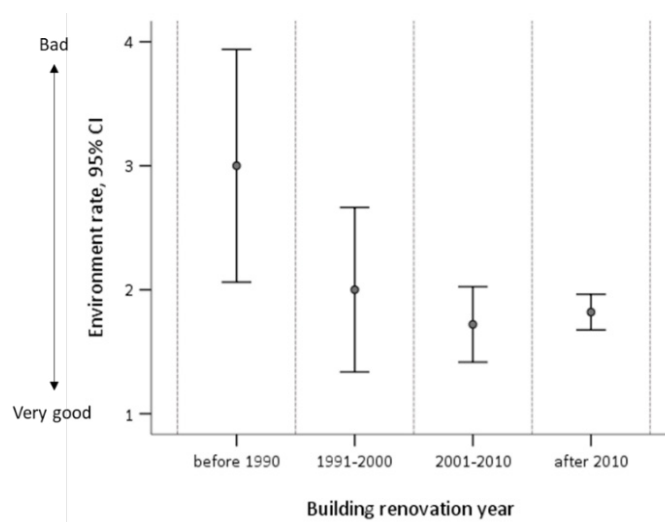


Figure 4 The relation between building quality and residents’ satisfaction with their neighborhood.

Municipality plan to upgrade the residential buildings

The respondents seemed open to receiving participation from the municipality to finance the community project as well as liked the idea of receiving lower prices on energy and renewable resources of energy or tax-reduction. This indicates that PPPP is a business model that appeals to the respondents of the survey.

The PPPP business model requires a lot of cooperation within the neighborhood and support for this cooperation was unclear from the survey. The majority of respondents said that they were neither interested in a large nor small degree to work for a better neighborhood, but at the same time the respondents did want to have the benefit of a PPPP business model in terms of gaining access to professional knowledge and financial support. It is clear that the respondents are worried about the environment and would like to have their homes refurbished but are unwilling to engage in the discussion on a cooperative approach. Less than 50% of respondents said they were interested in sharing knowledge on sustainable refurbishment and interested in participating in environmental events, with other respondents saying they were not interested or appeared uncertain. This reflects a challenge in the Norwegian context as a 50% interest is not good enough for refurbishment within a housing association which requires a majority of the housing association to agree to invest in refurbishment.

DISCUSSION

The community feel did not come out strong in our survey, with many respondents seeking the socializing aspects away from their home as well as leaving their home quite often on a normal day to day basis in order to get access to amenities. This is in line that neighborhood is not just about the specific location of the building but also about the connectivity to its wider environment (Dixon, et al. 2014). While this is lacking in built environment dimensions, by considering the wider aspects of amenities and services link to Urban FM opens up new opportunities in the refurbishment of existing neighborhoods. However, there is a challenge in developing a community focus where the community is not obvious. Kuijlenburg et al., (2019) highlights this challenge in identifying how the absence of self-organisation of neighbourhood residents, leading to tensions between societal groups (among citizens), but also between citizens and government or citizens and other institutions. Within this survey, we saw how the motivation for refurbishment was very individualistic based on economy, ensuring comfort and appeasing people subjective appeasement on the design of the building. Spatial interventions were important in terms of where facilities were located that respondents used on a daily basis in terms of grocery stores and exercise facilities, but accessibility seemed to have had low consideration within these existing building with many of the respondent living on third floor being accessed by stairway and a low number of housing having elevators. While spatial interventions from design and accessibility point of view, are very important to improve citizens health and well-being (Mobach et al., 2019, Nijkamp, 2020), these aspects were primarily fulfilled by the surrounding location of the buildings, with the buildings not emphasising accessibility between different floors. On the other hand, many of our respondent were under 25 years of age so are likely to be quite healthy. The healthy aspects was reflected with the majority of respondents using bicycles and walking, however, still more than a third of respondents still using the car to drive around in both summer and winter. While human activity needs to be center for livability issues for communities (Bjørberg and Temeljotov-Salaj, 2018), there is also some work to go in creating awareness of how neighborhoods activating as a joint community can improve livability issues through cooperation amongst themselves and municipality. This would overcome some of the barriers of a top down model where experts decide what is of value in a neighborhood (Turcu, 2013) rather than the citizen outlining what is important for them in terms of social value and working with their understanding of sustainability. However, there is a missing link to work with neighborhoods, municipality and businesses, which we argue falls within the role of Urban FM.

While Jensen et al. (2013) proposed FM to be considered as a network of relationships, which creates perceived value amongst key stakeholders (clients, customers and end users), this is primarily done within an organizational context, where as neighborhoods are much broader. Within the European Green Deal engagement of diverse stakeholder is highlighted for a 'renovation wave' of public and private buildings, but requires an intermediary role (Lindkvist et al., 2019) that can transfer knowledge across the diverse stakeholders. Tools such as BREAAAM Communities' and SCIS, are useful but lack the approach of addressing different local contexts, different stakeholder agendas and concern over costs (Callway et al. 2019), which require an interpersonal role like Urban FM as well as a business model such as PPPP.

CONCLUSION

The sustainable refurbishment concept is orientated toward environmental footprint reduction and includes the concept of maximizing the building's economic performance and check the indicators, such as technical condition, usability situation, adaptability and indoor climate. PPPP with Urban FM role intermediary joining social needs is seen as needed to implement new solutions, to overcome the institutional, social and financial barriers. Especially from financial part, we can note that typical business models should be adapted to implement social innovations, or sufficient possibilities for scaling up innovations.

The Trondheim Municipality Climate and Energy Action Plan to 2030 include concrete instruments for energy and climate-friendly buildings, such as changing the oil energy heaters and promoting energy efficiency in existing buildings by implementing energy saving measures. Searching for more innovative solutions, establishing an arena for research, construction and real estate players is interesting, especially looking from PPPP perspective. Through the research, construction industry, and real estate network, it is possible to find more innovative and cost-effective solutions.

In addition, prioritization of energy efficiency solutions in existing building stock by municipality gives the grounds for a development of new incentives for neighborhoods to energy as neighborhoods rather than individuals living on one area. The majority of the respondents show high concerns about the environment but are unsure regarding showing the interest of being involved in the environmental events, besides expressing low knowledge of the refurbishment. There is a need to consider what services are needed to encourage people to meet their aspirations to be more environmentally friendly and act in sustainable ways. In the study the individual reasons for the refurbishment were discovered like comfort, reducing costs and environmental friendliness. Study shows that expected financial services are financial help, lower prices on energy or renewable resources of energy and tax reduction. Furthermore, social needs close to the home are important to respondents such as grocery store with parks and cafés. The individual transport is still prioritized over collective transport during the wintertime, so services can introduce green-shift mobility solutions.

Urban FM role is seen as a way of motivating citizens for sustainable refurbishment due to: good relationship with citizens, business companies and public institutions; knowledge of sustainable solutions; and development of a business model in terms of gaining access to professional knowledge and financial support. This reflects the challenge in the Norwegian context of sustainable regeneration of existing areas with the highest sustainability goals.

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The Contribution of the Work Environment on Employee Attraction

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ABSTRACT

Background and aim – In the ‘War for Talent’, work environments have become a strategic asset to attract and retain skilled employees. In addition to work environments, organisational attractiveness (OA) depends on other factors, such as image of the organisation, development opportunities, and rewards. This paper aims to determine the relative importance of work environment and its most important aspects in organisational attractiveness for potential employees.

Methods / Methodology – The data for this study was collected by means of an online survey including 368 responses. Respondents were asked to rate the degree of influence of various factors on the perceived organisational attractiveness. The presented attraction factors were derived by a literature review and supplemented by expert interviews. The adopted survey employs a hierarchical value tree design, with four levels of attraction factors. A constant sum measurement is used on each level. The conducted research design enables the determination of the relative weights of the attraction factors, allowing for accurate (cross-level) comparison.

Results – Although the work environment factor was the second lowest-rated factor in OA, the difference with the typically overruling importance of factors such as ‘rewards’ and ‘social climate’ is not evident from the results: work environment has a weight of 14% and the highest-ranked factor ‘social climate’ has a weight of 20%, which can be considered as of comparable weight. Within the work environment factor, ‘location’ and ‘workplace’ are the two most important characteristics in attracting new talent.

Originality (if applicable) – The applied research design allows for accurate comparison between factors, independent of the hierarchical level they are part of. In such, this research provides value insight in the relative importance of the work environment, and more specifically the workplace, compared to the main attraction factors such as rewards.

Practical or social implications – Organisations may benefit from these results by implementing and/or emphasising the work environment as part of their employee attraction strategies. An effective work environment strategy requires a “tailored” approach, whereby the work environment concept matches with the preferences of the target employees.

Type of paper – Research paper

KEYWORDS

Work environment; Employee Attraction; War for Talent; Knowledge Workers

INTRODUCTION

Since recent decades, job vacancy has steadily increased. Especially the business services sector suffers from shortage of knowledge workers (CBS, 2018a). McKinsey & Company introduced the term ‘war for talent’ in 1997 to stress the competition for talented employees. According to Beechler and Woodward (2009), war for talent does not (or should not) solely focus on top talents, but on a wider range of employees to build advantage through diversity. Many companies see employee attraction as an important component of their overall corporate strategy. Real estate (RE) and workplace can be seen as a strategic asset to attract and keep employees (e.g., Jylhä et al. 2019; De Bruyne and Gerritse, 2018; Jensen et al. 2013). The physical workplace is identified the third most important factor influencing the decision making to accept or leave a job (Lindholm et al. 2006). Also, in practice real estate consultants have highlighted the importance of real estate to attract and retain talents. Work environment transformation into inspiring workplaces with optimal facilities, and relocations for example to Central

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Business Districts, are real estate-related solutions that are used in practice to increase organisational attractiveness for potential employees.

An understanding of work environment-related preferences enables companies to develop employee attraction strategies and enhance their competitive advantage within the war for talent. The aim of this paper is to determine the relative importance of work environment and its most important aspects in organisational attractiveness (OA) for potential employees.

The paper is structured into five sections. The literature study summarises the OA first from the HR perspective and then from RE and workplace perspective. After the methods, the relative importance of work environment and its most important aspects in OA are presented. Finally, conclusions are drawn and future research is proposed.

LITERATURE STUDY

Employee Attraction Variables

Table 1 summarises the organisational characteristics based on human resource management and recruitment literature. The found attractiveness categories are (1) organisational image, (2) personal image, (3) organisational specific values, (4) rewards, (5) work conditions, (6) actual job, (7) personal development opportunities, (8) relations and (9) real estate.

Organisational Image

Employee attraction variables focusing on the image of an organisation are discussed in most of the found publications. Sub-variable 'values and culture' (Table 1) is on the top of the rank list in the first 'War for Talent' research conducted by Chambers et al. (1998). This sub-variable scored first also in CIPD's Resourcing and Talent Planning survey (2017) that studies the most important elements of employer brand in attracting employees. In addition, 'organisational reputation' is valued number one in a study on employers of choice (Rampl, 2014). The most discussed image related sub-variables are 'organisational reputation' and 'commercial image'.

Personal Image

Berthon et al. (2005) presented **personal image as one of the employee attraction variables**. The personal image refers to feeling good about yourself and having more self-confident because of working for a certain employer.

Organisational specific values

Organisational specific values are studied to some extent in the literature. Specific values- such as social responsibility, sustainability, innovation and creativity – are discussed for example in Berthon et al. (2005).

Rewards

Rewards are widely discussed among literature on employee attraction: rewards is one of the two topics that is discussed in all included publications (Table 1). Although monetary rewards have a dominant role, it can also mean for example social rewards (Wong, Wan & Gao, 2017).

Work conditions

The most discussed sub-variable within the work conditions category is 'job security'. Another popular topic seems to be 'work-life balance/ acceptable pace and stress' (Table 1).

Actual job

The actual job is reviewed in the majority of the found employee attraction studies. Some of the sub-variables in this category are ranked high in the studies, such as 'job has exciting challenges', 'autonomy' and 'work content' (Table 1). The sub-variables related 'Actual job' are extensively presented in Armstrong (2006).

Table 1 Employee Attraction Variables from the literature
(x = discussed in the reference, number = the ranking of the variable when available).

		Chambers et al., (1998)	Hiltrop et al. (1999)	Berthon et al. (2005)	Armstrong (2006)	Uggerslev et al. (2012)	Rampl (2014)	Bellou (2015)	Wong et al. (2017)	CIPD (2017)
	EMPLOYEE ATTRACTION VARIABLES									
ORGANISATIONAL IMAGE	General organisational image					X	7	X		
	Organisational reputation					X	1		X	7
	Values and culture	1			X					1
	Organisational mission/ goals	13			X					6
	Industry leader/ commercial image	9						X	X	5
	Company has exiting challenges	6								
	Familiarity					X				
	Size					X				
	Well managed	4			X	X				
	Many talented people	10			X					
	High quality products/ services	7		15						
PERSONAL IMAGE	Feeling good about yourself because of employer			9						
	Feeling more self-confident as because of employer			8						
ORGANISATIONAL SPECIFIC VALUES	Customer oriented			18						
	Social responsibility			20				X		11
	Sustainable							X		
	Innovative	12		17				X		
	Creativity			14					X	
REWARDS	Salary	8	10	2	X	X	4	X	X	3
	Bonusses (related to successes)				X			X		
	Other forms of compensation	7		3					X	
	Retirement agreements								X	
	Recognition			13				X	X	
WORK CONDITIONS	Flexible working								X	4
	Work-life balance/ acceptable pace and stress	17			X	X			X	
	Working hours		5							
	Holiday terms									
	Job security	16	11	7	X	X			X	
	Use of technology								X	12
	Respect for lifestyle	14								
ACTUAL JOB	Job has exciting challenges	3	6		X	X			X	
	Job responsibilities		7							
	Job variety		4							
	Interesting work/ work content				X	X	3			
	Rewarding work				X					
	Autonomy	2	9		X	X			X	
	Leadership									9
	Teach others			19						
	Freedom	2			X					
	Teamwork					X				
	Travel					X			X	
PERSONAL DEVELOPMENT OPPORTUNITIES	Training		3					X	X	
	Learning/ self development			19	X			X	X	
	Specialisation opportunities									
	Springboard for future employers			12						
	Internal promotion		8	6		X	5		X	
	Career development opportunities	5		5	X	X			X	2
	International career opportunities		2							
RELATIONS	Boss/ manager/ superiors	7		10		X		X	X	
	Colleagues	15		4		X		X	X	
	Diversity/ inclusion					X				13
	Employee treatment/ involvement/ respect			11		X			X	10
	Social climate/ work culture/ work environment		1	1**	?		6		?	
	Social activities					X				
REAL ESTATE AND WORK ENVIRONMENT	Physical workplace								X*	8
	Location	11				X	2			
variables on recruitment processes are not mentioned since they are not within the scope of this research										
* comfortable working atmosphere, nice seating, personal office, good view										
** 'happy work environment'. 'Fun work environment' and 'working in an exciting environment' ranked lower										

Personal development opportunities

Aspects within personal development opportunities are widespread discussed and often ranked high in research on employee attraction. The mostly common discussed topics are 'career development opportunities', 'internal promotion', and 'self-development' (Table 1). The sub-variables 'international career opportunities' and 'training' are even respectively ranked second and third in the research of Hiltrop (1999).

Relations

'Relations' are also discussed in all included publications. Sub-variable 'social climate/ work culture/ work environment' is ranked as number one in two of the resources (Berthon et al., 2005; Hiltrop, 1999). Other often discussed sub-variables are the relation with 'colleagues' and with 'boss/ manager/ superiors' (Table 1). An extensive number of relations related sub-variables are listed and tested at different stages of the recruiting process in a study conducted by Uggerslev et al. (2012).

Real Estate and Work Environment

Based on this literature study, real estate barely plays a role in literature on employee attraction. Only attraction factor *Location* was found in some literature on employee attraction (Chambers, 1998; Uggerslev et al., 2012; Rampl, 2014), and some *workplace* related aspects such as 'nice seating', 'personal office', 'good view' were mentioned (Wong et al., 2017). Only the CIPD report on 'Resource and Talent Planning' explicitly discusses the influence of the 'Physical workplace'.

Work Environment Attraction Variables

Table 2 presents the work environment related attraction variables found from the real estate, facility and workplace literature. In this paper, the discussed variables on employee preferences are emphasised, since preferences, according to Rothe (2011), have a strong relationship with attraction. The variables can be divided into four main categories (based on Rothe, 2011): Location, Services & Facilities, Building, Workplace.

Most studies, which focus on the relation between people and the work environment, examine the consequences and impact of specific work environment characteristics on employee behaviour, satisfaction, productivity and well-being (e.g., Giuliani & Scoplliti, 2009; Rothe, 2011). For example, in the research of Appel-Meulenbroek & Feijts (2007), 51 CRE aspects are presented that are proven to have an effect on organisational performance. An analysis on satisfaction with many work environment aspects that are divided into features and facilities is conducted by Appel-Meulenbroek et al. (2015). In addition, the effect of desk ownership on employee satisfaction, productivity and health is researched by Kim et al. (2016).

In contradiction to research that focuses on satisfaction, the research of Rothe et al. (2011) is most comparable to the topic of this thesis, as it focuses on preferences (Rothe, et al., 2011). In her licentiate thesis, she distinguishes 19 factors that consist of 73 attributes. In a publication of Rothe, Beijer & Van der Voordt (2011), the most important aspects of the work environment are examined by exploring similarities and dissimilarities concerning work environment priorities of Finnish and Dutch office users. The rank order of the most important attributes according to the Dutch office users can be found in Table 2.

Table 2 Work Environment Variables from Literature
(x = discussed in the reference, number = the ranking of the variable when available).

CATEGORIES	SUB CATEGORIES	WORK ENVIRONMENT VARIABLES	Appel-Meulenbroek & Feijts, 2007	Rothe, 2011	Rothe, Beijer & Van der Voordt, 2011	Appel-Meulenbroek et al., 2015*	Appel-Meulenbroek et al., 2015**	Kim et al., 2016
LOCATION	GENERAL	Image of area		X				
		Safety and cleanliness of area		X				
		Central location		X				
	ACCESSIBILITY	Accessibility general			3			
		Accessibility by car		X				
		Accessibility by public transport		X				
		Accessibility by walking/ bike		X				
	PROXIMITY OF FACILITIES	Proximity of nature		X				
		Proximity restaurants/ cafeterias/ bars		X		6		
		Proximity leisure and culture services		X				
		Proximity bank, post, healthcare		X				
		Proximity fitness center		X				
		Proximity kindergarten		X				
		Proximity physiotherapist		X				
SERVICES AND FACILITIES		General facilities (management)			12	7		
		Practical/ hospitality services		X		5		
		Lobby/ reception		X				
		Parking places (car, motorbike, bicycle)		X				
		ICT (services)		X	10		2	
		Work related services		X				
		Shower and changing facilities		X		2		
		Storage space			18		4	X
		Coffee, tea, other refreshment facilities				1		
		Restaurant offering in the building		X				
BUILDING	GENERAL	Overall building		X	17			X
		Building image/ appearance/ aesthetics	X	X	16			
		Building layout	X					
		Networking opportunities in the building		X				
		Health and safety provisions				4		
		Cleanliness				3		
	CLIMATE	(Adjustability of) indoor climate	X	X	4			
		Lightning/ day light		X	11		5	X
		Temperature		X			3	X
		Air control					8	X
		Acoustics/ noise			13		7	X
		Material properties (e.g. reflection, isolation)	X					
WORKPLACE	GENERAL	Floor layout	X					
		Interior design			9		10	
		Choice of workplace		X				X
		Amount of workspace/ density						X
		Room booking systems					14	
		Opportunities for remote working			8		9	
		Openness and transparency of environment			15			
		Influence on workplace development		X	19			
	TYPES	Variety in workspace types			7		17	
		Meeting places		X			6	
		Social/ informal places		X			13	X
		Open places		X				
		Innovative places		X				
	INDIVIDUAL WORKPLACE	Individual workplace layout	X					
		Functionality and comfort/ ergonomics of workplace	X		1			
		Personalisation of work area					15	X
		(Comfort of) furnishing					1	X
	CONTACT	Possibility to adjust workplace	X	X			11	X
		Privacy		X	6		12	?
		Concentration		X	2			?
		Accessibility/ interaction on workfloor	X		14	5	16	X
		Opportunities to communicate			5			
		Environment supports collaboration		X				X
OTHER		Space supports organisational image and values		X				
		Environmental impact		X				
Preferences								
Importance								
Satisfaction								
Variables that do not apply to knowledge workers are not mentioned								
Variables that are from their nature not able to have an influence on employee attraction are not mentioned								
*Focused on facilities.								
**Focused on features.								

RESEARCH METHODOLOGY

This research follows a mixed method research approach. In exploratory sequential design, according to Creswell (2003), qualitative data and related analysis are used to build and develop the quantitative data collection phase.

Data collection preparation

In this research, the literature studies and qualitative interviews were conducted to provide an input for the quantitative questionnaire. 10 semi-structured interviews were done with HR, RE and other experts to identify a valid set of variables for the questionnaire. The 10 interviewees were selected based on purposive sampling to cover a variety of relevant perspectives. The interviews were structured into three parts. First, the interviewees were asked to list the five most influential attributes from the employee perspective when considering a potential employer. In the second part, the interviewees were asked to do the same but only focusing on the work environment. In the last part, the interviewees received a list of attributes based on the literature studies to finalise their lists.

Tables 3 and 4 presents the final attraction factors that are used in the questionnaire.

Table 3 Employee Attraction Variable Selection.

Variables	Description
Organisational Image	reputation, brand, familiarity, values, mission, delivered quality
Rewards	salary, bonuses, retirement agreements, other forms of compensation
Social Climate	relations with colleagues and managers, social activities, work atmosphere, culture
Development Opportunities	(international) promotion opportunities, training, personal development
Working Hours	flexibility of working hours, work-life-balance, pace and stress level, amount of overtime
Work Environment	location, building, services & facilities, workplace

Table 4 Real Estate Variable Selection.

Variables	Sub variables	Description
Location	Geographical Location	specific location/ city
	Location Type	Central Business District, historical city centre, business park, former industrial site, country house
	Accessibility of the Location	by public transport as well as own transport
Services & Facilities	Proximity of Amenities	e.g. park, restaurants, fitness centre, physiotherapist
	ICT (helpdesk)	
	Coffee, tea, and other refreshments	
	Healthy Catering	
Building	Car Parking Places	
	Building appearance	(architectural) appearance
	Networking Opportunities	with employees of other organisations within the building
	Sustainability Implementations	e.g. presence of solar panels or toilets that are flushed with rainwater
Workplace	Interior	design, appearance, lay-out
	Variety in Workplace Types	e.g. concentration, meeting, and informal places
	Personal Desk	whether or not having an assigned or a flexible desk
	Opportunities for Remote Working	ICT (services) that allow you to work e.g. at home or in the train
	Ergonomic Workplace	comfortable, functional and adjustable
	Amount of Light	daylight and lighting

Data collection

The online survey was distributed among (to-be-)knowledge workers including employed knowledge workers and students. The inclusion of both groups provides insights into whether having experience with work environments provides different preferences. In total 368 responses were received. Some background (e.g. demographic) information of the respondents, also used in the analysing, is presented in Table 5.

Table 5 Data Description

Socio-demographic perspectives	Sub Groups	Sample (n)	Size
Current Status	Employed	279	
	Student	89	

Gender	Women	188
	Men	140
Generations	Baby Boomers (1946 – 1964)	13
	Generation X (1965 – 1979)	68
	Millennials (1980 – 1998)	247
Years of Work Experience	<1	28
	1 – 3	58
	3 – 7	41
	7 – 15	67
	>15	85
Total dataset	Respondents	368

To assess the representativeness of the research sample for the population of Dutch knowledge workers the data is compared with data from CBS Statline. The CBS data used for the comparison relates to the higher educated working population. The comparisons indicates an overrepresentation of Students, Millennials and Baby Boomers in the research sample which is taken into account when interpreting the results.

Analysing methods

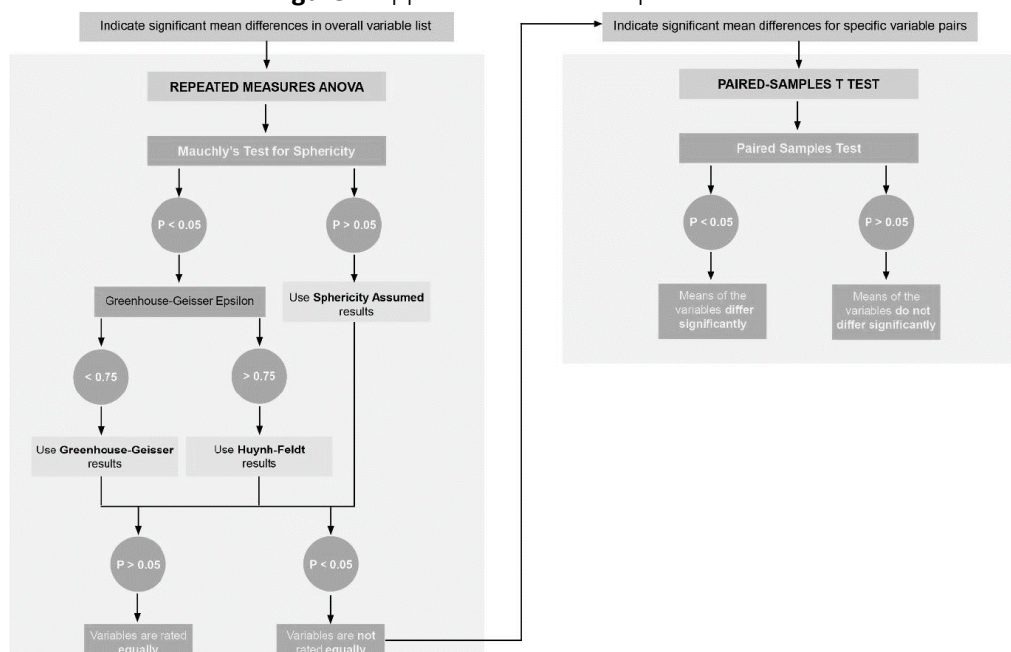
In this study, two multi criteria analysis methods are combined: the hierarchical value tree method, and distributed weight allocation that provides calculable data of the constant sum method. This combined method is barely used in research. However, a similar method is used in the research of Kodali et al., (2009), by using the name: ‘analytical hierarchy constant sum method’.”

In the questionnaire, the respondents were asked to divide 100 points over a list of variables according their influence on organisational attraction by asking them: “How much influence do the following factors have on your choice for a new job?”. A multi-criteria method in which allocated points sum up to a certain constant number is called a Constant Sum method (Chayes, 1960; Kodali, Prasad Mishra, Anand, 2009).”

Repeated measures ANOVA is used to analyse the data. Repeated measures ANOVA is the appropriate method when measurements are made on different levels, as is the case in the employed value tree research design in this study. Repeated measures is a parametrical test and therefore the data should meet the assumptions for parametrical tests, such as: data measured at interval or ratio level, normal distributed data, homogeneity of variance and independent observations. If test indicated that one or more of the assumption are not met this is discussed in the result section.

The analysis is divided in two steps. First the sample is analysed by a repeated measures ANOVA, and if the test results indicate that the variables are not rated equally the second step is performed. The second step consist of a pairwise comparison of the variables to determine which variables are rated significantly higher than the others. Figure 1 illustrates the applied statistical tests procedure.

Figure 1 Applied statistical test procedure.



RESULTS

The value tree presents the means and standard deviations of the main attraction categories (level 1) and sub-categories (levels 2 & 3).

Although, *Work Environment* is ranked at the second lowest place among the main attraction variables on level one (mean 14 in Figure 2), it is highly comparable with the means of the other variables: it is of similar influence as the other main employee attraction variables. Furthermore, when solely asking the respondents about the influence of the work environment (without presenting other variables), the respondents valued the work environment very high with an average score of 52 degree of influence on a 100-point scale. The Work Environment, therefore, is regarded as an important Employee Attraction factor, although other factors take priority over Work Environment they do not dominate as commonly is assumed.

The results on the 2nd level indicate that the 'Location' and 'Workplace' are considered the most important factors in regard to work environment. The high ratings of Geographical location and Accessibility (3rd level) indicate that commuting time is an important consideration for knowledge employees. The Workplace sub-variables (3rd level) are rated relatively similar, although, Remote Working and Amount of light are rated significantly higher than the other factors.

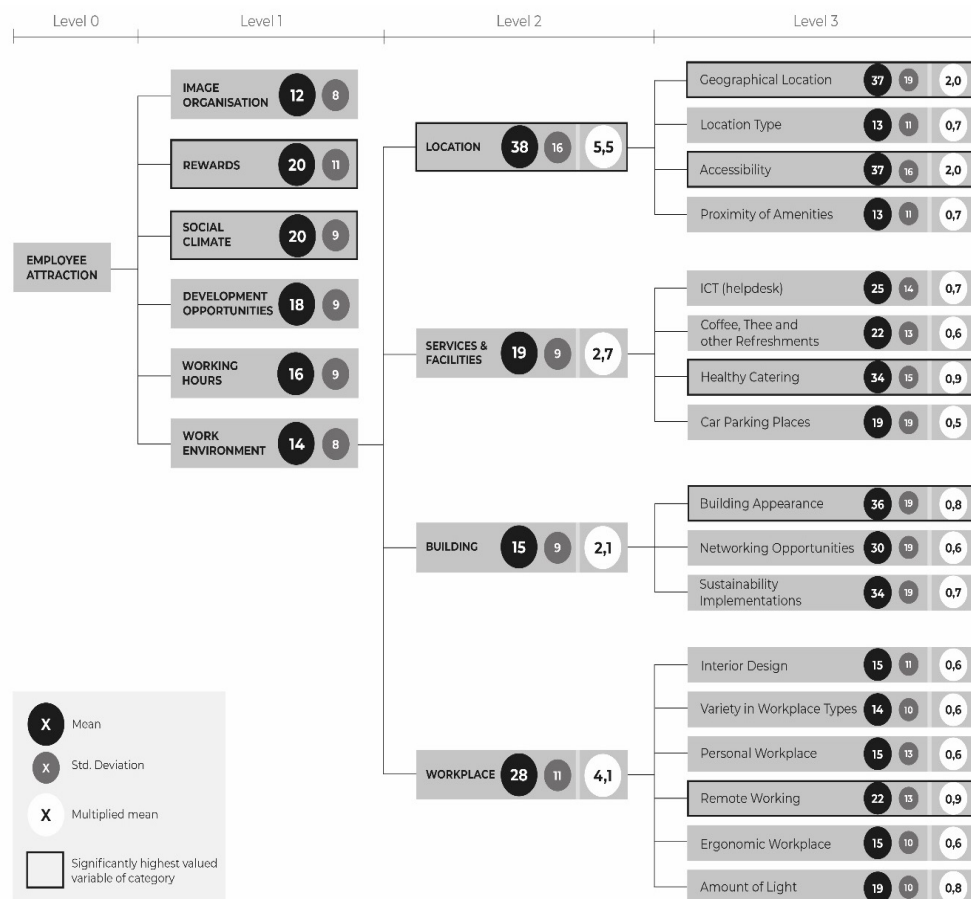


Figure 2 Value Tree Results

CONCLUSIONS

Companies are competing for the most suitable employees within 'the war for talent' and are prioritising employee attraction within their overall business strategies. As it is assumed that real estate and related work environments – consisting of a wide range of characteristics on location, service & facilities, building, and workplace level – have a positive influence on employee attraction, companies invest in their work environments in an attempt to attract their employee target group. The main aim of this paper was to determine the relative importance of the work environment and its' most important

aspects in organisational attractiveness for potential employees.

The (value-tree) survey results indicate that *Social Climate* followed by *Rewards* are the most influential factors for employee attraction. Although, the Work Environment was ranked only at the second lowest place, the relative importance of the Work Environment is still considered substantial: the difference with other factors such as 'rewards' and 'social climate' is not as big as one might expect considering, the typically overruling importance of these factors.

A drawback of the employed stated preferences survey is that it is based on the assumption that the respondents are going to make the same choice as they would do in reality, which is not always the case (e.g., Louviere et al., 2000). A social desirability bias, for example, might exist in regard to "Rewards" as respondents might answer this questions in a manner that will be viewed favourably by others. Furthermore, the overrepresentation of the younger generations of knowledge workers in the sample size limits the generalisability to some extent. The reported results might, therefore, be more representative for the generation of young and future knowledge workers than other groups. A larger sample size is required to analyse if heterogeneous preferences among groups of knowledge workers exist.

This research provides a clear indication that work environment has a substantial influence on knowledge workers' job choice decision-making, i.e., the influence of the work environment is similar to the other main attraction factors. This means that an office should cover the different aspects of the work environment to offer 'something for everyone' if real estate and related workplace is used as a strategic asset to attract employees. In the future, it would be interesting to further study what these aspects would be. Are generations attracted by different attributes and how do the work experience and life situation impact on what is perceived attractive?

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Challenges of the Learning Environment in the Inclusive Special Needs Education

Timo Savolainen¹ and Kaisa Airo²

ABSTRACT

Background and aim – Inclusive learning environments are more common today in Finland than before. Students of special needs are taking part to the normal curriculum, which concludes to the reduction of special education groups and facilities. The idea behind inclusion is to remove all barriers limiting the participation to studies and eliminate all forms of discrimination in the learning environment (UNESCO 2019). This brings challenges for example to students with diagnose of autism spectrum disorder (ASD) because many of them have sensory abnormalities. The article aims to find out the major risks of inclusive physical learning environments and what can be done in order to make that environment safe, secure and usable for all its users.

Citation:

Savolainen, T. and Airo, K. (2020) Challenges of the Learning Environment in the Inclusive Special Needs Education, In the Proceedings of the 19th EuroFM Research Symposium, EFMIC 2020, 3-4 June 2020, online conference.

Methods / Methodology – The primary data was collected through interviewing two vocational special needs teachers, one coordinator and two personal care assistants of students at Vocational College in Helsinki Metropolitan Area. In other words, interviews were used as a qualitative data collection method. The interviews were semi-structured, with topics related to the learning environment and organisational safety and security. The data was then analysed by using document analysis.

Results – The main finding of this research was that many students have sensory abnormalities, which is one of the main reasons why for example soundproof classrooms are important. For the same reason, there is a need for rooms where students can study individually. Dedicated spaces for dedicated tasks seems also to be important from the safety and security perspective.

Originality (if applicable) – Studies of the learning environment often focus on the needs of the students who have no learning disabilities such as ASD. There has not been many researches on the learning environments from the safety or security of special needs perspective in a built environment. This research combines all those approaches together, which makes it original.

Practical or social implications – This article presents ways in which various learning environment challenges could be reduced or eliminated and how to prepare for the risks. It gives recommendations in designing, managing and building the inclusive learning environment from the special needs education perspective. In other words, results of this research will give insights in designing, managing and building the inclusive physical learning environment.

Type of paper – Research paper

KEYWORDS

Autism spectrum disorder, safety, security, risk management, learning environment, usability, inclusion.

INTRODUCTION

Today, teaching is moving towards inclusion. There are two different perspectives in the general debate on this issue. Some people say that special needs students should not be transferred to normal teaching. Others think that this is something that should be done in order to make it possible. (Lönnroth 2016.) This paper focus on to the Finnish education system, which is moving towards inclusion. Although the topic is national in nature, it provides interesting information to the international perspective. A little Finnish and international research has been done on this subject from the perspective of safety and security in the inclusive physical learning environment. This report tries to give a holistic framework for safe and secure physical learning environment in the case where all students including special needs students study at the same classes mixed with each other.

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This study gives a general view of the importance of the learning environments and the issues that can be arisen when more special students are included into a normal curriculum. Sensory abnormalities, which are very common with ASD people, pose a challenge to all school activities, especially when the facilities have a lot of people and noise around. This research will look at learning environments from safety and security perspective.

The research questions of this study are as follows:

- What are the challenges or dangers faced in the special needs learning environments from the school's staff perspective?
- How can these challenges be avoided or reduced by changing physical learning environment?

Next, we will go deeper in to the literature in order to get better overview and understanding about the issues that could effect on learning environments.

LITERATURE STUDY

In order to understand the specifics of special educational institutions, one must first consider the learning environments, autism spectrum and educational safety and security (S&S) at a general level. Educational S&S has hardly been studied before. There are only two doctoral dissertations made in Finland from an organisational safety and security perspective. Learning environments are usually studied from the perspective of the student following the normal curriculum. There are hardly any new doctoral dissertations from the special needs physical learning environment perspective and the most newest research on the subject is related to the use of virtual or information technology as a learning environment in general. Utilising virtual technology and other computing devices will exclude all students who cannot read, speak and write. It also excludes learners who have challenging behaviours due to sensory stimuli, which in practice will mean that, different devices will not withstand everyday use. In the UK, there has been done some research what the classroom should look like for students with ASD. For example, McAllister (2008), in her article, discusses about that. The specifics of the autism spectrum disorder have been extensively studied, but its impact on safety and security has been limited. Next, this article delves into learning environments, ASD challenges, and educational institution's safety and security.

Learning environments

Traditionally, learning environments can be divided into four parts: psychological, social, pedagogical and physical. The psychological learning environment contains the atmosphere of the learning situation. The social environment includes teachers, students, friends and all networks that support learning and interact with each other. The pedagogical environment includes topics related to teaching design, such as teaching methods and the choice of teaching materials. Physical learning environments are all places where teaching and learning take place. (Piispanen 2008, 18-24.) The breakdown of the learning environment in this study is modeled on that of Piispanen's (2008) dissertation, which combines the psychological and social environments because they may have a strong influence on one another. Piispanen (2008) mentions in her doctoral dissertation that a good learning environment is safe. However, she does not talk more about safety or security in her work.

In the research on the learning environment, the emphasis is usually on 'normal learning environments' and technology. For example, Auvinen (2015) discusses technology and distance learning in his dissertation. Kuusikorpi (2012) deals with the future physical learning environment, which includes various online solutions, student self-directedness and collaborative teaching methods. Piispanen (2008), on the other hand, discusses the learning environment more broadly from the perspective of a good learning environment, which has also been one of the starting points for this research. Vellonen, Kärnä and Virnes (2013, 170) have explored how technology can strengthen the autism spectrum of students in their own way of learning and thus highlight their strengths. Nuikkinen (2009) deals extensively with school building and well-being in different types of learning environments. One of her conclusions is that the experience of security and safety is influenced by the opportunities provided by the learning environment to manage everyday life and to schedule time. Minkkinen (2015), in turn, examines child well-being from both a psychological and a social perspective. She charts the importance of social support when a student is depressed and how bullying is associated with it.

Challenges of ASD

The abnormal sensory and perception abilities associated with the underlying problem of people with autism have been the subject of much research in recent decades (Bogdashina 2003; Delacato 1995; Kootz, Marinelli and Cohen 1982; Rimland 1964). Sensory and perceptual problems can lead to typical behaviours that include anger attacks, self-harm and withdrawal. These behaviours make life easier for the autistic people, but make it more difficult for them act as independently as possible in the future. (Bogdashina 2003; Szedga and Hokkanen 2009.) According to Delcato (1995, 80-84), disorders of the sensory canals can be divided into three parts, which are hyper, hypo and white noise. Hypertension refers to sensory hypersensitivity. Hypo means that the sensory signals are not properly transmitted. White noise, on the other hand, means that the sensory system does not function because it is disturbed by the body's own functioning, causing a background noise. (Decalto 1995, 80-84.) About 80 percent of people with autism have intellectual disabilities (Kaski, Manninen and Pihko 2009, 107). From the interior design perspective, sensory problems creates its own challenges. This is true especially nowadays, because the trend in teaching is inclusion, where the idea is that all students or pupils study and use the same facilities at the same time.

Safety and Security of the educational institutions

Safety can be seen as a state being safe away from danger. We are talking about safety when something unintentional happens that can harm or damage somebody or something. In other words, safety measures are actions that protect people, property, reputation from dangerous or other unwanted situations. (Martikainen 2016, 22.)

Security can be seen measures against an intentional and violent attack and danger, which leads to injury harm or damage. Those security actions are made to make sure of the safety of a person or a building or a country. (Martikainen 2016, 22.) According to SFS-ISO 28000 (2012, 11) security can be seen as the resistance to an intentional, unauthorized act that is intended to cause harm or damage (SFS-ISO 28000:2012, 11).

The basis for the safety and security of vocational schools can be found from Chapter 80, Section 9 of the Act on Vocational Education and Training (531/2017), which states that everyone has "the right to a safe and secure study environment." The Basic Education Act (628/1998) also emphasises everyone's right to a safe and secure study environment. Safety is a multidimensional concept, which means that it can be subjective or objective (Levä 2003, 31-35). The areas of organisational safety and security include: "1 occupational health and safety, 2) information security, 3) crime prevention, 4) environmental safety, 5) premises security, 6) contingency planning, 7) personal security, 8) rescue operations, 9) safety and security of production and operations and 10) security of operations abroad. The assets, such as image, persons, information, material and environment, including learning environment, are protected by means of organizational Safety and Security Management." (Martikainen 2016, 42). This means that the educational and the organisational safety and security concept are almost the same. The difference is that educational safety and security has one more angle, which is the student care that promotes learning and balanced development. (Waitinen 2011, 65.)

This means that, from an organisational perspective educational safety and security is quality work. It is risk management and ensuring that the school's operation is not disturbed. It can be managed through different systems. (Kerko 2001; Martikainen 2016; Molarius 2016; Lanne 2007; Levä 2003; Simola 2005; Tanninen 2008 and Waitinen 2011.). However, it should be noted that management systems such as the occupational safety system ISO 45001 do not necessarily guarantee safety (Ghahrami 2016, 67). Ghahrami (2016) and Writh and Sigurdsson (2008) see safety culture as an important driving force for achieving a safe work environment. Therefore, it can be assumed that the learning environment of an educational institution will not be safe and secure by a mere occupational safety system, but it will also require other things, such as a good interactive safety culture and a safe physical environment.

A safety culture is part of an organisational culture that leads to a certain way of working safely. (Reiman 2000, 8; Nilsen 2012; Ruuhilehto and Vilppula 2000, 12-16). Organisational culture has three components: artefacts, expressed values, and fundamental assumptions (Schein 2004, 25). Waitinen

(2011, 208) defines school safety culture as a layered phenomenon in which everyone engages in their own activities. According to Lindfors and Somerkoski (2016, 6), the safety culture of an institution is an interactive activity in a learning environment aimed at promoting wellbeing and safety (Lindfors and Somerkoski 2016, 6).

RESEARCH METHODOLOGY

The primary data in this article has been obtained through interviews with vocational special needs education teachers, coordinator and personal care assistants at one of the Finland's biggest Vocational Special Collage.

The study was conducted as a qualitative interview study. The target group of the interview was employees of vocational special college. A total of 5 people were interviewed. The interview was chosen as the method of data collection because it is a flexible method and provides in-depth information (Hirsijärvi et al. 2009, 204-207 ; Eskola & Suorata. 2008; Ghauri & Grønhaug 2010). By its very nature, this interview was semi-structured, with open-ended questions. The interviews were recorded and transcript. The analysis of the material was guided by a completed model consisting of Waitinen's (2011) school safety and security aspects and other theory of safety management, safety culture, ASD and learning environment. The analysis looked for similarities that recur. The interviews were completely anonymous and the interviewer was an outsider. This way it was easier for the interviewee to trust and tell about a sensitive security and safety situations. As a result, more reliable data and, at the same time, deeper information was obtained, which allowed to get a more comprehensive picture of the safety and security phenomenon. Next in this article, we go through what kind school the interviewees work and how the interview was conducted. At the end of paragraph five, we go through the results of the interview.

Vocational College (special education institution)

Vocational College provides service for individuals who need special needs education, individual support and guidance in their studies and employment. There are many reasons for the need of support. These reasons are for example, health, learning difficulties, and social or psychological challenges. Most of the students are studying in order to get professional qualification certificate. However, some of them are studying and training for work and independent living. In Finland, these studies are called TELMA-studies and they are intended for students with a wider range of special needs. Usually these students have multiple diagnoses including ASD, mental disability and they have challenging behaviour. The individuals who were interviewed for this article were working with TELMA students.

Selection of the interviewees and Interview process

The selected school has about 1000 students and about 100 of them has diagnose for ASD. Many students whom have ASD diagnose have also other diagnoses. This leads to the need for a special support among the target students. The interviewees were selected among educational staff, who work with people with ASD and other diagnoses for example psychiatric diseases and mental handicap. In the selected school, the number of the target students was approx. 50 meaning sample classes of 5. One educational staff member from each of the 5 classes was asked for the interview. To cover a variety of views, people with a different work experience and educational background were selected for the interview. The work experience of the interviewees varied between 30 years and 1.5 years. Two of them were special needs teachers. One was coordinator and two were personal care assistants. This was the reason why five people were interviewed and why quantitative methods were not considered for this research.

Table 1 The selected Interviewees.

Interviewee	Job title	Duration of the interviewee (min)
Interviewee A	Special needs teacher	69 min
Interviewee B	Coordinator	45 min
Interviewee C	Special needs teacher	43 min
Interviewee D	Personal care assistant	36 min
Interviewee E	Personal care assistant	35 min

The interviews were conducted in two weeks and it took from 69 to 35 minutes for the interviewees to answer them as it can be seen from table 1. Every interview was first recorded and then transcript. Before the actual interview, interviewees read the questions and they asked if there was any terms that they did not understand. The questions were based on the literature study above. After transcription researcher searched for common issues that raised from the text. After the fifth interview saturation point was reached. When all the recordings were written down, the researcher went them through again and found similarities that can be found from most of the transcript documents. Next, the article will present the results.

RESULTS

The research focused on learning environments of special needs education. The learning environments were divided into three different parts according to Piispanen's (2008) doctoral dissertation: pedagogical, physical and psychological learning environment. Psychological learning environment is included into a social learning environment (Piispanen 2008). Interviews revealed that dangerous situations usually occur when people do not have good safety instructions, too many students are at the same time in a same place or too many employees are on a sick leave. The most common reasons for challenging behaviours are for example biting, hitting and running around. This may be due to students' sensory problems.

One special needs teacher described this best by saying *'A lot of people and a big crowd, lot of people comes in at the same time and a lot of people in the same corridor, both students and staff... If you are thinking about sensory problems, someone has very strong perfumes and loud voice or so, the loudness and stuttering, when somebody is coughing... It may annoy and then if you are in a tight space... It can cause many problems'* (Interviewee A).

The coordinator mentioned that: *'Well challenges... There have been challenges in the last couple of years... Maybe the inadequacy of the classrooms and maybe a bit of ambiguity or maybe the facilities has not been really good'* (Interviewee B). He also said that *'There is then just physical violence or threatening situations that affects both the staff and students'*.

When the researcher asked what challenges or hazards have you experienced or seen in the learning environments. The other special needs teacher said *'Perhaps the challenges or incidents are related to student behaviour, provoking others and when student's own self-control is lost unwanted situations can occur that will have affect to the personnel or the environment.'* (Interviewee C).

Both Personal care assistants also said that improper facilities are a big problem. Lack of training and instructions is a problematic and there are no individual studying facilities or they are not suitable for the purpose. Every interviewee mentioned that if the classroom has too many different kind of items not in order or for example, shelves are not attached to the wall and it may cause dangerous situations when students get nervous and are running around in a classroom. Students may also throw items towards other students or staff (Interviewee A,B,C,D and E.) All of the interviewees (Interviewee A,B,C,D and E) mentioned about violence one way or other, which is caused usually if routine breaks down or there is too much noise or people in a same place at the same time. That is the reason why it is important that students school day begins with a calm manner.

When Interviewees were asked about: 'What safety issues should be addressed if your students who have ASD diagnose are transferred to follow a normal curriculum?' Every interviewee stressed the importance of facility and what it is used for. Structure was considered important as well. (Interviewee A,B,C,D and E.) The importance of guidelines and individual needs of the students was a common theme in every interviews. (Interviewee A,B,C,D and E).

One teacher said: *'Well, people should pay attention to individual facilities. One should have place where to go and get a rid of stress when one needs to. In addition to that, you need to have smaller groups. There should not be too much noise, furniture and everything has to be selected in away, which makes it hard to rumble. The walls should not echo. Soundproofing is important. Some classes should have for example chairs and other furniture that cannot make noise. The biggest thing is the size of the teaching*

group and then you should have staff who have work experience with people who has ASD diagnose.' (Interviewee A).

The other teacher mentioned: *' Well, probably just that you should take into account the how the facilities are built. There should not be facilities that cause too many stimuli. The environment should be calm not too much people walking around. The actual place should be easy to walk around and there should be clear signs where everything is. Then one should plan advance how much special needs student needs support and guidance. People who work at school should have knowledge of the needs of the autism spectrum student.'* (Interviewee C).

The coordinator said that: *' Well, that's yeah of course it's the social side of the autism. The biggest challenge in general is their own behavioural structures, which is pretty hard to change and that makes it hard for them to follow a normal general curriculum. You should be able to be flexible, individualise true teaching, and also have strong clear structure for the autistic students. In other words, it is truly independent and (pause). How should say it. So, one could say if an autistic person learns to do something in a certain place then he or she may not be able to do the same thing in another place and if there is no clear structure that where something is done then it may rise some challenges. '* (Interviewee B). Table 2 will show what kind of challenges are most common according to these interviews.

Table 2 Most common challenges.

Job position	Challenges in Physical Learning Environment	Challenges in Mental/ Social Learning Environment	Challenges in Pedagogical Learning Environment
Vocational special teacher (Interviewee A)	Not enough individual studying facilities, or they are inappropriate Sensory Abnormalities (noise, smell)	Violence (kicking, punching, throwing items)	Not enough time to plan. Not enough training and education.
Coordinator (Interviewee B)	Not enough individual studying facilities or they are inappropriate.	Violence (Physical and Mental violence)	Not enough time for planning and no special facilities for it.
Vocational special teacher (Interviewee C)	Not enough individual studying facilities or they are inappropriate. Sensory Abnormalities (noise).	Violence (Students throw items)	Planning. Materials.
Personal care assistant (Interviewee D)	Not enough individual studying facilities or they are inappropriate.	Violence (need for self-defence instructions)	Poor planning and execution.
Personal care assistant (Interviewee E)	Not enough individual studying facilities or they are inappropriate. Poor quality of air. Items are not locked inside of shelves.	Violence (students throws items)	Poor planning and execution. No good teaching materials.

There were also exceptions that were mentioned only once in these interviews. Interviewee B mentioned that there have been some thefts. It is easy for people who are not staff members to go in and steal. (Interviewee B and D). One interviewee mentioned that HR and management department should also be more careful when they hire new staff or let someone go. (Interviewee A).

From the organisational S&S perspective, most common challenges occur when personnel security and occupational safety are endangered. Every interviewee said that there should be good instructions what to do in a difficult and dangerous situations (A,B,C,D and E). This could raise a problem when for example there is a fire alarm on.

According to interviewees, the following things should be considered when one tries to reduce or avoid challenges by changing physical learning environment if special needs students are attending to the normal curriculum:

- Clear structure, what students and staff are doing every day? (Students with ASD do not usually want to differ from daily routines).

- Routine in using facilities. (People with ASD may get nervous if same kind of assignments are not done in a same place).
- There should be a place where student can go to calm down or study independently. (The lesson can continue normally in the classroom. Student who has difficulties to participate group lesson in that moment can still learn same subject individually.)
- Fewer furniture is better. (Then there is a smaller probability to stumble if someone decides to start running and fewer furniture may also create calmer atmosphere.)
- Furniture that makes less noise if they are changed from place to place or furniture that are too complicated to move around. (Less noise makes atmosphere calmer and if furniture cannot be shifted- they cannot be thrown at other students and staff.)
- Facilities should be built in a way that it takes into account sensory abnormalities. (Too much noise, light etc. may cause students to get nervous if they have sensory abnormalities.)

From organisational perspective, it is very important that there are enough competent employees, who have a good understanding of special needs education and ASD as well, as how to act in crisis or challenging situations that may lead to violence. A physical learning environment, which includes all the facilities and outdoor spots where the teaching takes place, has a big role in mitigating those risks.

RECOMMENDATIONS

From the results of these interviews and literature review, it can be said that the physical learning environment has an important role in safety and security for educational institutions. Most important is that the facilities have places or silent rooms where students can go to calm down or do the assignments individually without any disturbance. All facilities should be built in a way that they do not cause sensory overload, which includes smells, noise, too bright light etc. All materials should be impact resistant, especially windows. Every classroom should have meaning that usually do not change because it helps students who have ASD to structure their school day. Proposals for managing inclusive learning environment are as follows:

- Reducing the amount of loose items or locking them.
- Avoiding student contact with hard surfaces especially windows and use of protected glass.
- Time planning in a such a way, the students with ASD can come a bit later or sooner than rest of the students, in order to avoid noise and crowds.
- Flexible classroom design and corridors, in order to easily create silent and private spaces.
- Fixed class room setting in a sense, the students always enter the similar space.
- Dedicated spaces for dedicated tasks, keeping them always the same.
- Avoiding changes in general, whether it is time, space or pedagogical decisions. If they do occur giving, the students time to adjust and inform early and slowly.

Overall, the most important design principal is consistency. Whether its sensory consistency, such as colours, sounds or smells or pedagogical consistency, any kind of change will disrupt the everyday learning environment and thus the safety of the staff and the students.

CONCLUSIONS

The world of education is currently in a state of transition. Special needs students are increasingly involved in regular curriculum. In the special educational institutions, challenges such as the too large study groups and inappropriate facilities have created challenges for the overall S&S of the learning environment. This is important to know, as the S&S needs of educational institutions will change with the inclusion. Based on the results of these studies, it can be said that the outlook of learning environment should be addressed. This can improve the safety and well-being of all students and educational staff in the changing field of education. The most effective and permanent ways to mitigate risks is to make the physical learning environment as safe as possible with a good planning and standardised use of facilities that takes into account sensory and perceptual problems.

This research gives an overview about what kind of things are important in the inclusive physical learning environment. The key results from the challenges of learning environment perspective are lack

of individual studying facilities and sensory abnormalities. One of the main reason for challenges in the physical learning environments is noise pollution. The main challenges in the mental/social learning environment seems to be linked to the violence and to the sensory abnormalities. From pedagogical learning environment perspective lack of study material and time for planning lesson are the main concerns.

One way these challenges can be avoided or reduced from the physical learning environment perspective are reducing the amount of loose items or locking them. The other is to avoid students to contact with hard surfaces especially windows and use protected glass. Third, is having a flexible classroom design and corridors in order to create silent and private spaces. Fixed classroom setting and dedicated spaces for dedicated tasks is a good way to create routines and ease stress because then the students can always enter to the familiar space. Avoiding changes in general, whether it is time, space or pedagogical decisions seems to make school day safer. If changes do occur, one may argue that by giving time to the students and staff will mitigate the risks and make the learning environment safer. More time helps staff to change the physical learning environment setting to be less stressful to and for students it gives a moment to understand what tasks are included to the school day agenda.

We suggest that more research should be made. The next approach could be arranging a workshop with architects, interior designers, S&S professionals, and educational experts. After the workshops, a more accurate design proposal could be made and its functionality could be tested.

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INTERVIEWS

Vocational special needs teacher interview 14.01.2020

Vocational special needs teacher interview 27.01.2020

Vocational special needs coordinator interview 16.01.2020

Vocational special needs personal care assistant interview 27.01.2020

Vocational special needs personal care assistant interview 27.01.2020

Facilitate Hospitality by Improving the Human Touch

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ABSTRACT

Background and aim –Service providers need to be competent in the provision of hospitality. However, the question is, how to operationalize the experience of hospitality? Existing literature shows limited concrete service characteristics that lead to a hospitable experience in service environments. This paper presents user-centred research into the experience of hospitality. Elaborating on the Experience of Hospitality scale developed by Pijls et al. (2017), the *human touch* refers to human related aspects that influence the hospitality experience of their guests are identified.

Methods / Methodology –Four cases studies were performed: a conference centre, a public swimming pool, a public library, and a railway company. Methods used were literature review, combined with observations, surveys and interviews.

Results –The results show what nonverbal employee characteristics contribute to the distinctive factors of hospitality, *inviting*, *care* and *comfort*. Smiling, having eye-contact, nodding and an open and relaxed body posture are related to all factors. Greeting seems to be specifically related to ‘inviting’, shaking hands to *inviting* and *care*, a well-groomed and recognizable appearance to ‘inviting’ and ‘comfort’, and visible presence of staff to *comfort*. These insights offer facility managers the opportunity to steer on the experience of particular components of hospitality.

Practical implications – Although further research is needed to further validate the results, the present paper shows that it is possible to, next to measuring the hospitality experienced by customers, identify concrete characteristics of employee behaviour that people associate with hospitality. This facilitates facility managers to manage the hospitality performance of service organisations.

Type of paper – Research paper.

KEYWORDS

Hospitality, customer experience, human touch, care, comfort, inviting.

INTRODUCTION

People like to feel at ease, in private as well as in service environments. The service industry is well aware that their customers appreciate the experience of pleasant and appropriate sensations that makes them feel welcome and comfortable. Not the service itself, but the way the service is delivered determines whether customers connect to an organisation. Therefore, service providers need to be competent in the provision of hospitality.

Tasci and Semrad (2016) distinguish four layers of hospitality. Layer 1 concerns the provision of basic needs (e.g. the provision of food, drink, shelter, and hygiene). Layer 2 is about entertainment (e.g. TV, pool, playground). Layer 3 concerns the provision of services, such as housekeeping maintenance and front office. Finally, layer 4 is about taking care of needs by serving with hospitableness. Facility management has already been paying attention to the first three layers. However, offering products and services in a hospitable way is still a challenge. The last decades the interest in customer experience within the field facility management has increased (e.g. Coenen & Felten, 2014), also in relation to hospitality related aspects such as courtesy (Bandy, 2003).

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However, when is service staff experienced as hospitable? Operationalisation of hospitable service staff has resulted in several distinguishing dimensions of hospitality (Ariffin & Maghzi, 2012; Blain & Lashley, 2014; Pijls, Groen, Galetzka & Pruyn, 2017; Tasci & Semrad, 2016). However, in order to improve the hospitality provided by service staff, organisations need to know what specific employee characteristics influence the experience of these various hospitality dimensions. However, we often do not get much further than ‘keep smiling’ and ‘shaking hands’. So far, academic research has yielded little concrete insights in this area.

Pijls et al. (2017) have developed a holistic scale to measure how people experience the hospitality and its underlying dimensions *care*, *comfort* and *inviting*. *Inviting* refers to the experience of inviting, openness and freedom, *care* is about experiencing empathy, servitude and acknowledgement, and *comfort* refers to feeling at ease, relaxed and comfortable. The scale was developed and validated in various types of organisations, e.g. hotel, hospital, public transport, catering (Pijls et al., 2017). However, what makes that we experience *care*, *comfort* and *inviting*? This has not yet been concretised. In this paper, this hospitality model has been used to operationalise the experience of hospitality further. Four different types of service organisations shared the aim to improve the hospitality performance of their employees. This paper presents four case studies on improving the experience of hospitality by identifying aspects of the *human touch*, by uncovering concrete employee characteristics that contribute to people’s experience of hospitality in service environments.

LITERATURE STUDY

Until recently, we had little knowledge about the meaning of hospitality for service guests. However, the growing academic attention to the meaning of the concept of hospitality is gradually decreasing the knowledge gap on this topic. Academics have addressed the meaning of the concept of hospitality, predominantly in the context of the hospitality business, such as hotels or restaurants (Ariffin & Maghzi, 2012; Ariffin, Maghzi, Soon & Alam, 2018; Tasci & Semrad, 2016), but because of the growing interest in hospitality outside the hospitality business recently also for the service sector in general (Pijls et al. 2017). The focus in the literature is mostly on hospitable service staff behaviour, by identifying separate dimensions of hospitality.

In conceptualising and measuring customer experience, some authors only use experience-related variables to define the experience (Heide & Grønhaug, 2009; Pijls et al. 2017; Tasci & Semrad, 2016). Others also include service aspects that influence the experience (Ariffin & Maghzi, 2012; Brunner-Sperdin & Peters, 2009; Ladeira, Costa & Santini, 2013; Slåtten, Mehmetoglu, Svensson, & Sværi, 2009). However, they often combine different levels of concretion, without making a distinction between experience-related variables that concern feelings of the customer, and concrete aspects of the service delivery that influence the customer experience.

Scales that incorporate both aspects related to the physical environment and aspects related to social interaction often identify service characteristics for the physical component, such as lighting, colour, scent and sound, whereas they use experience-related items for the social component, such as friendly, helpful, empathy and responsiveness (Brunner-Sperdin & Peters, 2009; Ladeira et al., 2013; Slåtten et al., 2009). Furthermore, in their hospitality scale for hotels, Ariffin & Maghzi (2012) also use a mixture of experience-related items (e.g. ‘giving a warm welcome’, ‘treated as a friend’ and ‘care for their guests’) and service characteristics (e.g. ‘the hotel staff gave me authentic smiles all the time’, ‘the hotel staff knew my name and/or nationality’, and ‘the hotel staff made eye contact with me during conversations’).

The research presented in this paper clearly distinguishes between the perception of hospitality and the characteristics of employees that will influence (dimensions of) the experience of hospitality. These characteristics are the humanic clues in Berry, Wall and Carbone’s differentiation of factors that influence customers’ service experience. Besides functional clues (calculative quality perceptions) they distinguish emotional perceptions of quality, subdivided in humanic clues (related to employees’ behaviour) and mechanic clues (sensory information). These emotional clues may be noticed consciously, but they also influence one’s perceptions on a subconscious level (Berry, Wall and Carbone, 2006). What, then, are potential employee characteristics influencing the experience of hospitality? The studies focus on

nonverbal communication, which accounts for nearly 70 percent of all communication (Barnum and Wolniansky, 1989).

Sundaram and Webster (2000) state that nonverbal aspects of employee-customer interactions are relatively unexplored in the service and marketing literature, despite its importance regarding the outcome of service encounters. It is also hardly researched in facility management. Nonverbal behaviour helps communication become meaningful and successful (Islam & Kirillova, 2020). It also contributes, amongst others, to hospitality-related perceptions of courtesy (Ford, 1995) and interpersonal warmth (Bayes, 1972). Additionally, Gabott and Hogg (2000) stress the importance of nonverbal communication in service evaluation, because interpersonal interactions are essential in services. Nonverbal behaviour furthermore contributes to the alignment between customers and frontline service employees by expressive similarity in nonverbal communication (Lim, Lee, & Foo, 2017).

Nonverbal communication includes body movement, tone of voice and appearance (Berry et al, 2006; Sundaram & Webster, 2000). Body movements concern aspects such as body orientation (e.g. relaxed or open posture), eye contact, nodding, handshaking, and smiling. The literature suggests that body movements of employees can induce feelings of hospitality. Smiling, for example, induces interpersonal warmth (Bayes, 1972) and customer satisfaction (Grandey, Fisk, Mattila, Jansen, & Sideman, 2005). Eye contact links to likeability, believability (Beebe, 1980) and assurance (Magnini, Baker & Karande, 2013).

The tone of voice includes vocal pitch, vocal loudness or amplitude, pitch variation, pauses, and fluency of speech. Based on these speech characteristics, two communication styles can be distinguished. A conversational style is characterised by lower pitch, slower rate, lower to moderate volume, and less inflexion; this style is associated with trustworthiness, kindness, warmth, friendliness, and pleasantness. In contrast, a public speaking style is characterised by higher pitch, faster, high vocal intensity and higher inflexion (Sundaram & Webster, 2000); this style is associated with dynamism, dominance, and competence (Pearce and Conklin, 1971). A conversational style is probably experienced as more hospitable than a public conversation style.

Physical appearance represents specific information regarding a person's grooming and dress codes (Breytenbach (2001), cited in Islam & Kirillova, 2020). Company clothes provide an identity with the organisation, and also enhances the appearance of the employees. For example, several service companies have manipulated the clothing of employees to determine the most effective style and way of dressing concerning the employee's perception of the customer's professionalism (Sundaram & Webster, 2000).

Aspects of non-verbal communication may be researched by observing authentic employee behaviour and employee-customer interaction, complemented by surveys or interview to obtain insight into customers' (conscious) evaluation of this behaviour (Rafaeli & Sutton, 1990; Lin & Lin, 2017). As both behaviour and evaluation thereof may be influenced by context, a variety of cases are needed to allow generalisation of results.

Therefore, this paper presents four case studies – representing four different contexts- investigating service characteristics of behaviour of service employees related to hospitality provision, using both observation and either interviews or surveys.

CASE ONE: CONFERENCE CENTRE

Context and aim

The conference centre facilitates people meeting each other. It offers rooms and facilities from small meetings to large conferences, and accommodates more than 8000 meetings and conferences per year. The total floor space is 100.000, the number of visitors per year is 2.5 million. The study aimed to explore what nonverbal employee characteristics influence the hospitality that is experienced by clients of the conference centre.

Method

The method consisted of structured observations and interviews. Firstly, during five days, 46 structured observations of nonverbal behaviour of interactions between employees and contact persons of the

clients of meetings and conferences were performed. Secondly, 16 interviews were held (8 clients of small meetings and 8 clients of conferences) to discuss the hospitality they experienced and their ideas for improvement of the hospitality offered by the organisation. The factors *inviting*, *care* and *comfort* of the experience of hospitality (Pijls et al. 2017) formed the basis for the interviews. The interviews were analysed using open and axial coding (Brown & Clark, 2006).

Results

The observations revealed that most employees showed a forward body lean (n=37), and a relaxed (n=37) and open (n=26) posture. Furthermore, the majority of the employees (n=27) used the conversational style of speech (lower pitch, slower rate, lower to moderate volume), which according to the literature is related to hospitality. However, other employees showed a public speaking style (higher pitch, faster rate, high focal intensity) or showed a less open body posture (n=16). Employees regularly did not smile (n=27) and showed limited eye contact (n=36). Thus, the observations provided nonverbal employee characteristics that are expected to be experienced as hospitable, but also nonverbal employee characteristics that are expected to be experienced as less hospitable.

The results of the interviews confirm the findings of the observations; the employees were perceived as reasonably hospitable, but there is room for improvement. According to the clients, hospitable hosts recognise their guests, shake hands, look friendly, communicate openly and transparently and are available (*inviting* factor). Furthermore, hospitable hosts think along with the customer, know their standards and preferences, take work off customer's hands, are proactive and solve problems immediately (*care* factor). Finally, a hospitable host gives the customer the feeling that things are going well, is visibly present and provides feedback on changes (*comfort* factor).

Conclusions

Overall, at the conference centre, the right kind of reception and recognition are essential. Clients appreciate it to be recognised based on prior visits, in person and also by knowledge regarding their demands and preferences (*comfort* factor). As to nonverbal communication, according to clients, recognising guests, looking friendly, shaking hands and being available contributes to their experience of hospitality. These nonverbal employee characteristics are predominantly related to the *inviting* factor of the experience of hospitality.

Moreover, the proactivity of employees is the key to a more hospitable organisation (*care* factor). Furthermore, a conversational style of speech (lower pitch, slower rate, lower to moderate volume) is recommended, because this is known to communicate kindness, warmth, friendliness and trustworthiness (Pearce & Conklin, 1971). Also, incidental touch may help to further enhance the hospitality. Together this is expected to lead to a feeling of being welcome (*inviting*), feeling relaxed (*comfort*) being taken care of and acknowledgement (*care*).

CASE TWO: Public swimming pool

Context and aim

The aim of this case study was to examine the hospitality of an indoor public swimming pool. The swimming pool offers swimming lessons, water sports, and recreational swimming. It was investigated what characteristics of nonverbal employee behaviour influence customers' experience of hospitality.

Method

The study consisted of structured observations as well as a survey. The observations focused on the non-verbal behaviour of employees in interaction with recreational swimmers and participants of swimming lessons, both at the reception and at the swimming pool. 53 interactions between employees and visitors were observed: 26 concerned recreational swimmers and 27 children that took part in swimming lessons and their parents. Attention has been paid to speech (pitch, pauses, clarity), posture (relaxed, open posture, nodding and eye contact) and appearance (grooming).

Next, a survey was conducted among both recreational swimmers and parents of children that had swimming lessons, to measure the experience of hospitality using the EH-scale (Pijls et al. 2017), measuring the degree to which respondents experienced the factors *inviting* (e.g. openness and

freedom), *care* (e.g. empathy and acknowledgement) and *comfort* (e.g. feeling relaxed and feeling at ease). Furthermore, respondents evaluated the contact with staff during their last visit on nonverbal employee characteristics (the same aspects as used in the observation). Participants were further asked to select three factors of non-verbal behaviour of employees that, in their opinion, contribute most to a hospitable experience. A total of 245 questionnaires were collected (199 recreational swimmers and 46 parents of children that had swimming lessons), collected both at the location and via internet.

Results

The observations showed that employees generally showed an open posture, nodded and showed eye contact. Two additional aspects emerged from the observations. The first factor concerned contact with children. Receptionists mainly talked to the parents, but paid little or no attention to the children who came for the swimming lessons. The second aspect concerned clothing. Every receptionist wore company clothing, but the company logo was often not visible, for example because a jacket over a shirt or a jacket worn open, hiding the logo.

The results of the survey showed that the hospitality generally scored satisfactorily (average score 3.5 on a scale of 1 to 5). However, the experience of the three hospitality factors varied: for *inviting* and *comfort* the experience was relatively high (mean values were respectively 3.9 and 4.0), whereas the experience of *care* scores lower (mean score 3.1). Analysis of variance (ANOVA) showed no differences in the scores between recreational swimmers and parents of children participating in swimming lessons. In addition, visitors indicated eye contact, an open posture, clear speech and a well-groomed appearance as the most important characteristics for a hospitable experience. To examine whether these explicit indications also emerged from their response patterns, correlation analysis was performed.

Table 1 shows the correlations between the scores on the above-mentioned employee characteristics based on the analysis of their last visit, and the scores on the hospitality factors. Each characteristic was significantly correlated with the factors of the hospitality experience ($p < 0.01$). However, the correlations with the *care* factor is lower than with the other factors. Furthermore, the non-verbal factors (open posture, eye contact, appearance and nodding) showed higher correlation than the verbal factors (clarity of speech, pitch and pause). Furthermore, besides eye contact, open posture, appearance and clarity of speech, which visitors indicated to be important for being hospitable, also a relaxed posture and nodding have a considerable contribution to people's experience of hospitality.

Finally, both the data from the observations and the survey showed that shaking hands with employees hardly ever happens. Respondents furthermore did not indicate shaking hands as important (only 13 of the 245 respondents). However, Analysis of variance (ANOVA) showed a significant effect of shaking hands on the experience of hospitality ($F(1,243) = 10.52$, $p < .01$), whereby the mean score on the overall experience of hospitality was 4.17 for the respondents shaking hand as opposed to 3.47 for people not shaking hands.

Table 1 Pearson correlations between employee characteristics and the hospitality factors.

Hospitality factor	Eye contact	Open posture	Relaxed posture	Appearance	Nodding	Speech-clarity	Speech-Pitch	Speech-Pause
Inviting	.42	.50	.47	.48	.47	.32	.37	.20
Care	.32	.42	.43	.28	.42	.18	.32	.19
Comfort	.39	.45	.44	.47	.41	.26	.29	.18

Conclusions

In a swimming pool, an open and relaxed posture, eye contact, nodding, shaking hands, paying attention to children and a well-groomed appearance behaviour seem to be particularly important for the experience of hospitality. To improve the experience of specifically the *care* factor, which showed room for improvement, the public swimming pool could best focus on a relaxed and open posture, nodding and possibly introducing shaking hands. In line with Berry et al. (2006), the study additionally shows the

value of not only asking people explicitly about employee characteristics that influence the experience of hospitality, but also measure implicitly the relationships.

CASE THREE: PUBLIC LIBRARY

Context and aim

This public library, since 2018 located in its new 4 storey building, offers books and DVD's, as well as educational and cultural courses. The set-up of this case study is comparable with the study in the public swimming pool. It focussed on what characteristics of nonverbal employee behaviour influence visitors' experience of hospitality in a public library.

Method

The method consisted of both structured observations and a survey. Spread over five days, 25 interactions between staff and visitors were observed in the central hall of the library. Attention has been paid to eye-contact, smiling, open and relaxed posture, appearance, introducing oneself, shaking hands and the use of technical language. Next, a survey was conducted to measure the experience of hospitality using the EH-scale (Pijls et al., 2017). Furthermore, it was assessed which employee characteristics (the same aspects as used in the observation) visitors find most important for a hospitable experience. A total of 100 completed questionnaires were collected on the spot.

Results

The results of the observations showed that the posture of the employees was generally open and relaxed (23 of the 25 observations). Only in eight of the observations the employees smiled clearly, and in another five cases to a limited extent. Mostly visitors initialised the contact (21 observations), even though in most cases it was clear that the visitor had a question or did not know where to go. Furthermore, it was observed that employees did not introduce themselves or shook hands. Finally, in 10 out of 25 observations, the employees looked up something in the computer, which prevented them, at least partially, from making eye contact.

In line with the results in the public swimming pool, the results of the survey showed, that the public library was perceived as *inviting* and *comfortable* (both average scores of 4.3 on a scale of 1 to 5), whereas *care* scored less well (average score 2.9). Visitors felt that the library showed no real interest and showed limited effort to help them. Concerning the importance of the nonverbal behaviour of the employees, visitors considered 'a smile', 'an open body posture', 'eye contact', 'a well-groomed appearance' and a 'relaxed body posture' to be the most important aspects for being hospitable. Based on the observations, especially smiling and eye contact can be improved. Correlation analysis was performed to examine to what degree the nonverbal behaviour of employees was related to the three hospitality factors. Table 2 shows the significant correlations between the scores on the factors' inviting', 'care' and 'comfort', and the scores on the employee characteristics. Overall, the characteristics rated as most important for the hospitality were in line with the results from the correlation analysis.

Table 2 Significant Pearson correlations between hospitality factors and employee characteristics.

Hospitality factor	Eye contact	smiling	Open posture	Relaxed posture	appearance	Shake hands	Company clothing	technical language
Inviting	.42	.48	.36	.37	.36	.29	-	-
Care	.30	.28	.36	.42	.28	.42	.24	.44
Comfort	.44	.39	.21	.32	-	-	-	-

Conclusions

Similar to the situation at the conference centre, increasing the proactive behaviour of staff would improve the library's hospitality performance. This can be achieved by staff initialising the contact with visitors, introducing themselves and offering explicit help. The nonverbal behaviour characteristics that seem most important for experiencing hospitality are eye contact, smiling, an open and relaxed body

posture, a well-groomed appearance. Introducing shaking hands and the use of language that visitors can easily understand would especially positively influence people's experience of care, the hospitality factor that showed the most room for improvement.

CASE FOUR: RAILWAY COMPANY

Context and aim

The Netherlands Railway company transports about a million people per day, and focusses both on functional aspects of train travel and on passengers' experience. The aim of this study was to examine the role of behaviour of train conductors on the experience of hospitality of train passengers.

Method

Firstly, twenty 15-minute interviews were held with train passengers, both business and leisure passengers, to explore what behaviour of train conductors influences the hospitality performance of the a railway company. The results formed input for the online survey, which was completed by 277 members of the customer panel of Netherlands Railways Company. The survey aimed to identify what behaviour of train conductors positively influences the hospitality experienced by train passengers.

Results

The results of the interviews showed that train passengers experience hospitality when the conductor is friendly, patient, solution-oriented, cheerful and energetic. Furthermore, a train conductor is considered hospitable when smiling, wearing a uniform, greeting, making jokes, being visibly present by walking along in the train and addressing undesirable behaviour of fellow passengers. Messages via the intercom are considered to be hospitable if extra information is given and if the reporting is also done in English for foreign passengers.

The results of the survey showed that, according to business and leisure passengers, friendliness, greeting, visible presence, addressing undesirable behaviour of fellow passengers and wearing a uniform are the most influential characteristics of conductors for a hospitable experience. The survey additionally showed that the type of intercom messages (formal and informal) and an open and accessible attitude of conductors influence the passengers' experience of hospitality. Furthermore, at different times of the day, certain behaviour seems to contribute to different hospitality dimensions. A formal announcement, for example, mainly affects the experienced *care* in the morning and afternoon, but affects *comfort* in the evening. Likewise, an open and accessible attitude of a conductor contributes to the feeling of *care* in the morning and afternoon, but to the feeling of safety and *comfort* in the evening. Table 3 shows the percentages of respondents that associated the various behavioural characteristics with the three hospitality factors, specified per part of the day.

Table 3 The percentages of respondents that associated the various conductor characteristics with the three hospitality factors, specified per part of the day (black > 50%, grey 30-50%, light grey 10-30%).

Hospitality factor	Smiling	greeting	Visible presence	Addressing undesired behaviour	Informal messages	Formal messages	Wearing a uniform	Open & relaxed posture
Inviting morning	■	■	■		■			■
afternoon	■	■	■		■			■
evening	■	■	■		■			
Care morning	■		■	■		■	■	■
afternoon	■		■		■	■	■	■
evening	■	■	■		■	■	■	■
Comfort morning	■	■	■	■	■	■	■	
afternoon	■	■	■	■	■	■	■	
evening	■	■	■	■	■	■	■	■

Besides the different effects on the hospitality factors during the day, the results presented in Table 3 show that greeting and the use of informal messages is mainly related to *inviting*, the use of formal messages, wearing a uniform and an open and approachable posture is related to *care*, and visible presence, addressing undesired behaviour of fellow passengers and providing messages through the intercom is mainly related to *comfort*.

Conclusion

To improve the hospitality experienced by train passengers, best can be focused on friendliness, greeting and the use of informal messages to improve the experience of *inviting*, on using formal messages, wearing a neat uniform and showing an open and approachable attitude to improve the experience of *care*, and on being visibly present, address undesired behaviour of fellow passengers and providing messages through the intercom to increase feelings of safety and *comfort*.

GENERAL CONCLUSIONS AND DISCUSSION

This paper offers a step towards understanding what concrete behavioural characteristics of service employees lead to the experience of hospitality in service environments. Hospitality is indeed about smiling and shaking hands, but it is more than that. The four exploratory case studies performed in four different types of service environments show considerable consensus about what nonverbal employee characteristics induce feelings of hospitality. Furthermore, the studies presented in this paper are a first attempt to identify what nonverbal employee characteristics contribute to the distinctive factors of hospitality, *inviting*, *care* and *comfort*. Table 4 combines the main results of the four case studies and provides an overview of the most relevant nonverbal characteristics of service employees. Most employee characteristics seem to have an impact on all hospitality factors: smiling, having eye-contact, nodding and an open and relaxed body posture. However, there are also characteristics that seem to specifically affect one or two factors. Greeting seems to be specifically related to *inviting*, shaking hands to *inviting* and *care*, a well-groomed and recognizable appearance to *inviting* and *comfort*, and visible presence of staff to *comfort*.

Table 4 The associations between employee characteristics and the hospitality factors in the four case studies. Cases: 1= conference centre, 2= public swimming pool, 3=public library, 4=railway company.

Employee characteristic	inviting	Care	comfort	Case
Smiling	▪	▪	▪	3, 4
Eye-contact	▪	▪	▪	2, 3
Nodding	▪	▪	▪	2
Open & relaxed posture	▪	▪	▪	2, 3, 4
Greeting	▪			3, 4
Shaking hands	▪	▪		2, 3
Appearance	▪		▪	2, 3, 4
Visible presence			▪	1, 4

These insights offer facility managers the opportunity to steer on the experience of particular components of hospitality. Creating an *inviting* experience requires employees to wear company cloths, smile, have eye-contact, greet customers, show an open body posture and possibly shake hands. A clear appearance and visible presence of employees make customers feel *comfortable*. To express *care*, besides the non-verbal characteristics also other aspects seem particularly relevant. Case study one (conference centre) showed that proactive behaviour, a conversational style of speech, recognizing customers, thinking along with customers, taking work off their hands and solving customers' problems seem to give the feeling that the organization takes *care* of their customers. Case study three (library) showed that in the library the experience of 'care' could be improved by initialising the contact with visitors, by employees introducing themselves and offering explicit help.

Although multiple case studies in various service environments were performed, mixed method were used and a combination of explicit and implicit measurements were done, further validation of

the contribution of the various behavioural characteristics of service employees needs to be done. Quantitative studies, for example experimental research, will help to further investigate the relations between employee characteristics and hospitality factors, and also to establish causal relationships.

However, the present paper shows that it is possible to identify concrete characteristics of employee behaviour that people associate with hospitality, which facilitate facility managers to manage the *human touch* of service organisations. Facility management is not only about delivering the right service, but also about delivering it in the right way (Tasci & Semrad, 2016). Facility management staff that is involved in customer contact should be trained and motivated to use appropriate non-verbal communication. Facility managers may use the results of this paper to select staff for front line tasks: it shows the importance of appearance and (hospitable) behaviour in interactions between staff and customers. The cases may also be used as examples in staff training and in customer surveys.

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Perception of Hospitality and Safety are Two Sides of a Coin

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ABSTRACT

Background and aim – The entrance of a building and the reception, are a ‘moment of truth’ (Carlzon, 1989) and may invoke feelings of hospitableness. Both the physical environment and staff behaviour deliver ‘clues’ that together conjure an image of (lack of) hospitality (Berry et al., 2006; Pijls et al., 2017). Depending on the organisation’s risk perception, or on a positive image of humankind, the focus of a receptionist is more on the benign or on the harmful aspect of visitors, resulting in the use of either a host or a security officer at the entrance. However, the division of tasks to either the pleasing host or the controlling security officer to a certain extent disavows the overlap between perception of hospitality and safety.

Methods / Methodology – This exploratory qualitative study combines a group interview with managers responsible for hospitality and security in reception areas (N=3) and Critical Incidents by staff and visitors (N=62). Thematic coding was based on Vierendeels et al. (2018) and Pijls et al. (2017).

Results – The critical incidents show that hospitality and safety are indeed two sides of a coin. Though security measure may make people aware of risks, most people do accept these measures, provided that staff acts in a hospitable way. Lack of security measures may increase ‘inviting’, but decreases the perception of care for your visitor, and may cause uncertainty and thereby decrease comfort. A correct risk perception, flexible appliance of security measure, and a friendly approach connect aspects of ‘safe’ and ‘hospitable’.

Originality - Research on the interrelatedness of hospitality and safety is scarce.

Practical implications – understanding the interrelatedness of hospitality and safety may lead to service designs that are perceived as hospitable and safe simultaneously.

Type of paper – research paper/viewpoint paper

KEYWORDS

Perceived hospitality, perceived safety, risk perception, safety culture, reception, building entrance.

INTRODUCTION

Hospitality is a broad concept that originates from the Latin *hospes*, meaning host, guest, as well as stranger. The offer of hospitality recognizes the mutual obligations of the host and guest (Lashley and Morrison, 2011); hosts to ensure the wellbeing of their guests, guests to respect the rules of the host and to reciprocate (Derrida & Dufourmantelle, 2000). They point out that hospitality encompasses the impossible pairing of the necessary openness to the other and the equally necessary exclusionary sovereignty.

Hospitality has often been used to control strangers and outsiders (Candea & Da Col, 2012). This control perspective particularly applies to building entrances and receptions. The reception may invoke feelings of hospitableness in guests but may also be perceived as a barrier. Depending on the organisation’s risk perception and risk aversion or on a positive image of humankind, the focus of receptionist is more on the benign or on the harmful aspect of guests, resulting in the use of either a host or a security officer at the entrance. This division of tasks to either the pleasing host or the controlling security officer to a certain extent disavows the overlap between the perception of hospitality and perception of safety.

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So, the question arises: when is the reception perceived as hospitable and/or safe by both hosts and guests?

LITERATURE STUDY

Hospitality

Defining hospitality is not easy, as different disciplines and sectors frame hospitality in quite distinct ways (Lynch et al., 2011). In its pure form, hospitality involves selfless giving, however, in practice, hospitality emerges through transactions and reciprocal arrangements of giving and receiving (Derrida and Dufourmantelle, 2000). Hospitality is about gestures of welcoming and the creation of inclusive physical and symbolic spaces (Dikeç 2002). Burgess (1982) describes hospitality as ‘the social relationship fostered by the warm, friendly, welcoming, courteous, open, generous behaviour of the host, creating the hospitable social environment’. Aspects that contribute to the feeling of welcome of the guest are friendliness, inviting, warm, home-like, openness, sincerity and generosity (Brotherton & Wood, 2008; Hemmington, 2007; Clapp & Ridge, 2016).

Brotherton and Wood (2007, p.40) identify two dominant perspectives on hospitality in social science: as a form of social and economic exchange and as a means of social control. Hospitality as a form of exchange is common in a business context, especially the hospitality industry. Lynch et al. (2011, p.4-5) state that such a definition of hospitality reduces the interactions between hosts and guests to commercial exchanges and the elements of hospitality to commodities. Lugosi (2014) argues that it is important to avoid conceptualising hospitality only in positive actions, as hospitality may also be used to ascribe status, reinforce hierarchies and (re)construct relationships of power, fitting the perspective of hospitality as a means for social control.

According to Hemmington (2007) and Brotherton & Wood (2008) the sense of safety of the guest is one of the most important responsibilities of a host. Pitt-Rivers highlights the mutual implication of power and welcome: the guest is necessarily at the mercy of the host, on a knife-edge between suspicion and trust (1968, cited in Candea & Da Col, 2012, p5). Many authors emphasize here the reciprocity whereby the host strives to protect and keep the guest safe and at the same time the guest is ‘obliged’ to behave safely and not to do any damage (King, 1995; Derrida & Dufourmantelle, 2000; Morrison & O’Gorman, 2006; Lynch et al., 2011). Thus, hospitality is used as a mean of controlling ‘people who are essentially alien to a particular physical, economic and social environment’ (Brotherton and Wood 2007, p.40). Thus, hospitality is used as a mean of controlling ‘people who are essentially alien to a particular physical, economic and social environment’ (Brotherton and Wood 2008, p.40); the act of giving and receiving offers a way to negotiate potentially harmful relationships between individuals and groups (Candea and Da Col, 2012). Transactions of hospitality may help create liminal spaces in which transgressions are possible and alternative values and norms can be created (Lugosi, 2008, 2009). Locating hospitality in this way highlights how hospitality acts as a powerful mediating social control mechanism (Lynch et al., 2011). This perspective suits our study as it includes security.

Safety and Security

The underlying concepts of safety and security are complementary (Line et al. 2016); safety cannot be achieved if security is not guaranteed. Security is the condition of being protected against danger or loss, which is achieved through the mitigation of adverse consequences by the implementation of a broad spectrum of acceptable practices, procedures and principles (Broder & Tucker, 2012; Talbot & Jakeman, 2009), to create a stable, relatively predictable environment in which an individual or group may pursue its ends without disruption, harm and fear (Fischer, Halibozek & Walters, 2013). Security measures can be clustered according to organizational measures (i.e., policies, procedures, security staff), behavioural measures (i.e. creating awareness, training), technical measures (i.e. security camera’s, metal detection gates), and physical measures (i.e. locked doors, entrance barriers). Another classification commonly used is visible versus non-visible; obtrusive versus non-obtrusive measures.

Occupational Safety and Health (OSH) practices are generally defined as the science of the anticipation, recognition, evaluation and control of hazards arising in or from the workplace that could impair the health and well-being of workers or harm surrounding communities and the environment (Alli, 2008). Differences between security and safety lie in nature of threats (security: external deliberate threats;

safety: unintentional occupational hazards); emotional (safety) versus physical (security) aspects; and coverage (security: narrow, safety: broad).

OSH management systems help companies accept and administer the building and maintenance of a culture of health and safety as their prime responsibility (Alli, 2008). Based on an extensive literature review, Guldenmund (2000) concludes that safety climate can be interpreted as denoting attitudes to safety within an organisation, and safety culture being the (broader) convictions or dogma's underlying safety attitudes. The safety climate may be induced by policies and practices but is considered to have a stronger impact on behaviour than safety policies (Cabrera et al., 1997, cited in Guldenmund, 2000). Schein & Schein (2016, p.21) define culture as 'the accumulated shared learning of that group as it solves its problems of external adaptation and internal integration. Accumulated learning is a system of beliefs, values, and behavioural norms that come to be taken for granted as basic assumptions and eventually drop out of awareness.' They identify 3 layers of culture: basic underlying assumptions (system of beliefs), espoused values and behaviour (ideals, goals, values, aspirations, ideologies and rationalizations), and artefacts (visible and tangible structures and processes and observed behaviour) (Schein & Schein, 2016, p.28-29). Vierendeels et al. (2018) apply Schein's layers of culture to define safety culture. Their 'Egg Aggregated Model of Safety Culture' encompasses 3 related domains: the organisational domain (leadership, trust in the organisation, management commitment, and communication- leading to a safety climate); influencing the human domain (individual attitudes, skills and ability, personal characteristics, knowledge – leading to the intention to behave); influencing the technical domain (technology, procedures, training, and behaviour of people - leading to observable safety outcomes). Although this model stems from OSH, it is applicable in our study as security needs to be more procedure-driven in a weak safety culture.

Perception

Consciously and subconsciously our senses provide us with information about the environment. These sensory clues are filtered and interpreted by our brains using prior experience, knowledge and expectations. Perception is closely related to experience and satisfaction. The environment in which service delivery takes place can be characterised by its physical and social dimensions (Brunner-Sperdin & Peters, 2009; Berry, Wall & Carbone, 2006). Following Berry et al. (2006), the experience of a service is based on three types of clues: functional clues (performance of the reception and security services); mechanical clues (sensory perception of the physical environment of the entrance); and humane clues (behaviour and appearance of employees and other guests). Experiences are internal and individualized and therefore not easy to investigate (Knutson, Beck, Kim & Cha, 2010). We distinguish between the perception of hospitality and feeling safe.

Perception of hospitality

Both the design of the physical environment and staff behaviour deliver 'clues' that together conjure an image of hospitality. Experience is the interaction between the individual and its environment, containing functional, mechanical and humane clues, and the inner responses to this interaction (Pijls et al., 2017).

From a host perspective, frequently mentioned associations with hospitality-experience are *desire to please* (Ariffin and Maghzi, 2012; Blain & Lashley, 2014; Tefler, 2000); *understanding needs* (Ariffin and Maghzi, 2012; King, 1995; Sim et al., 2006); *welcoming* (Ariffin and Maghzi, 2012; Brotherton & Wood, 2008; Burgess, 1982) *friendly* (Brotherton & Wood, 2008; Burgess, 1982; Tasci & Semrad, 2016); *security* (Burgess, 1982; Hemmington, 2007; Sim et al., 2006). Amongst others, the offer of hospitality leads to *comfort* (Ariffin and Maghzi, 2012; Blain & Lashley, 2014; Brotherton & Wood, 2008; Burgess, 1982); *pleasure/being happy* (Blain & Lashley, 2014; Brotherton & Wood, 2008; King, 1995; Tasci & Semrad, 2016).

Research into the guest perspective of hospitality experience is scarce (Ariffin and Maghzi, 2012; Blain & Lashley, 2014; Tasci & Semrad, 2016; Pijls et al. 2017). Pijls et al. (2017) have developed a holistic scale for measuring the guest's experience of hospitality. Its underlying dimensions are 'inviting', 'care', and 'comfort'. Inviting relates to openness and experience of freedom during a visit. Care is associated with amongst others providing support, taking care of a person, relieving him/her of tasks or worries, and taking an interest. Comfort is associated with feeling at ease, relaxed and comfortable. In two previous qualitative studies exploring the meaning of the experience of hospitality from the viewpoint of

professionals offering hospitality and from a customer's perspective, safety and security were both found to be attributes of the experiential dimension 'feeling at ease'. Likewise, Groen (2014) concluded that the value of FM in hospitals may concern realizing a functional, pleasant, and comfortable environment, and behaviour that makes patients feel at ease and valued as an individual. This will reinforce the feeling of safety, an important aspect of hospitality in a hospital.

Perception of safety, feeling safe

Comfort, connection, knowledge and control, interaction, feeling at home and trust, contribute to a positive feeling of safety (Schuilenburg & Van Steden, 2014; Bigo, 2008; Akalin et al., 2019). Based on participant-led photography, Pijls et al. (2016) identified 8 experiential dimensions of hospitality out of 438 images, among which 'safety'. Images of safety include access gates, presence of security personnel/equipment, remaining waiting time, well-organised entrance, open architecture.

But what are the effects of such visible security measures on feeling safe? Could it be that these evoke fear by making people aware of security risks? Research on fear of crime in the school setting related to environmental characteristics helps to achieve a better understanding of the mechanisms through which fear is created and maintained. Multiple studies into safety in schools in the U.S.A. show that visible security measures have an adverse effect on feeling safe in students, although the type of security measure matters. For example, Schreck & Miller (2003) found that metal detectors, locked doors, supervised hallways and drug education were predictive of increased worry about being a victim of school crime, but no significant effect for security guards, visitor sign-in, locker checks and passes. Perumean-Chaney & Sutton (2013) performed a secondary data-analysis using the National Longitudinal Study of Adolescent Health (NLSAH; 5785 students, 112 schools). Their study suggests that metal detectors and the use of at least two physical security measures may harm student perception of safety. However, environmental factors and previous experiences mediate the effect. Male, white students with higher Grade Point Averages that feel safe in their neighbourhood, were more likely to report feeling safe at school, while those who experienced prior victimizations, had larger class sizes, and who attended schools that had disorder problems were more likely to report not to feel safe at school. This finding aligns with the social constitution of fear approach, which suggests that the experiences of fear should be seen in relation to wider social and geographical context, social relations and power structures (Kytta et al., 2014, p.312).

Perception of hospitality and feeling safe combined

The entrance of a building, being the first point of contact, is considered important in providing hospitality. It is also a crucial element in keeping a building safe and secure. Functional clues from a provider-perspective are related to services offered, procedures, scripted behaviour, and physical measures. The host (receptionist) provides for the guest's security, psychological and physiological comfort (Hepple, Kipps & Thomson, 1990, p.308) and is part of the security management system that protects an organisation and its assets against external threats. According to Schuilenburg & Van Steden (2014), Bigo (2008), Akalin et al. (2019), comfort, interaction, and feeling at home contribute to a positive feeling of safety. These attributes relate to the experiential dimension of hospitality 'comfort' (Pijls et al., 2017). The common denominator is the absence of stress. On the other hand, the presence of visible and intrusive security measures may cause stress in a person, triggered by his/her expectations and previous experiences, which harms feeling safe and at ease, that are also part of the perception of hospitality (Schreck & Miller, 2003; Perumean-Chaney & Sutton, 2013).

Because in literature security is not considered to be part of hospitality, it is worthwhile to explore to what extent both constructs ('safe' and 'hospitality') can be recognized in people's perception of (entrance) areas in utility buildings.

METHODS

This exploratory qualitative study combines a 2-hour unstructured group interview with 3 managers of hospitality and security in reception areas working for one of the major FM-suppliers in the Netherlands (December 2019) and Critical Incident Technique (January-February 2020). The aim of the group interview was to explore how the perceptions of safety and hospitality mutually influence each other. The group interview was transcribed and coded using open and axial coding. To further

explore underlying experiential factors, narratives were collected, using the Critical Incident Technique (CIT); 51 descriptions of situations were collected from hosts (team managers, receptionists) and guests (visitors, workers), using the following classifications for the situations described: both hospitable and safe (N=15); hospitable but not safe (N=9); safe but not hospitable (N=14); neither hospitable nor safe (N=13). 46 situations could be labelled as Critical Incidents, 5 were narratives. Coding was based on the Egg Aggregated Model (Vierendeels et al., 2018; organisational, human, technical domains) and the Experiential Hospitality-scale of Pijls et al. (2017; inviting, comfort, care).

RESULTS

In interviews with frontline staff, managers of frontline staff, visitors and workers 61 situations were collected. A number of situations described did not fulfil the criteria for 'critical incident', these were all observations by managers of front-line staff. As the observations provided useful information on perception of hospitality and safety, these were included in the analysis as narratives. Table 1 shows an overview of the critical incidents and narratives.

Table 1 Characterisation of the critical incidents and narratives.

Characteristics	Hospitable and safe	Hospitable	Safe	Not hospitable, not safe
Critical incident, host perspective	8	6	9	9
Narrative, host perspective	4	1	0	0
Critical incident, guest perspective	3	2	5	4
Total	15	9	14	13

A quote from one of the interviewees nicely describes what prompted this research, namely the situation where organisations employ both security staff and hospitality staff, and consider them to be separate functions, instead of two sides of a coin:

'I've been to a number of clients and what I'm really wondering is why there should be a certain level of security when in my experience it should have been hospitality much more often. First you meet 6 security people, and then you come to a desk with 2 ladies but there's a queue of 4 people there. And then I ask myself, to what extent are all those security guards needed? They don't make me feel very comfortable, do you really need that? I think it has to do with higher management wanting a lot of security, and then there's a facility manager who thinks, it's also useful when people are offered a cup of coffee and so let's add a host. I think it would be much better to have receptionists there, and then we'd add security, or we'd solve that with technical measures.'

This interview resulted in a plan to interview frontline staff, managers of frontline staff, and visitors/workers regarding their experiences with reception of people in buildings, and perceptions of safety and hospitality, resulting in the following critical incidents and narratives.

In five situations **workers or visitors ignored or even sabotaged safety instructions**. In one case a worker pushed the emergency button 'to see what happens'. In a second situation a worker demanded to be allowed to enter without showing an entry pass and thereby violating entry protocol.

'Are you technical? Can you push a button?'

In the group interview the same kind of situation was described:

'Some of our clients are very hierarchical. We pay you; you just have to run and get it in order. It's friendly, but it's very direct. Conversation? Why? We pay you, and it just has to be good. If you don't do it right, you have to work on it. Different way of thinking. You notice that towards the hosts, too. Those high-paid expatriates see our employees as their servants. That's nasty.'

In two situations people complained about an emergency drill, or even refused to take part. In these cases, the worker has apparently a lack of safety perception, and deliberately violates safety protocol. Staff reciprocates by rebuking the visitor, showing a lack of 'care'. The workers claim hospitality, especially 'inviting', beyond what is considered safe. Risk perception of the worker is lacking, whereas the host rebukes the worker because (s)he does feel responsible and is aware of risks taken.

In a fifth situation a visitor simply ignores the receptionist and immediately approaches his host. The receptionist, somewhat flabbergasted, lets it happen, but feels confused. Should she address the visitor about this behaviour? The visitor feels happy and 'invited' and seems quite unaware of this breach of protocol. And what about the situation where somebody, when in a friendly way addressed by the receptionist (who wondered what this person was doing there) immediately leaves? Apparently, he thought he wouldn't be noticed and, in the meanwhile, enjoyed the inviting factor of the hospitality of the organisation.

In situation 6 a mystery visitor deliberately used a fake name, which was not noted by the receptionist. In this case it's the risk perception of the host that is too low.

Fourteen situations turn around **(strong) emotions of visitors**. Angry, frightened and/or confused people trigger the risk perception of the host:

'Because of prior experiences the receptionist is worried about what the visitor might do.'
'I had a very bad feeling about this situation.'

The hosts try to calm down the visitor, by letting them air their anger or fear. To do this, they need the skills and attitude to deescalate the situation, while at the same time complying to procedures.

During the group interview it was mentioned that

'One of our customers has a security status as a fair percentage of clients show aggressive behaviour. In a successful pilot, we have deployed a number of hostesses to kindly welcome people, send them to the counter, give them a cup of coffee and to quieten them down'.

If necessary, security will be called for:

'The confused person is restless, screams, and the hostess calls for help from security by walkie.'

The emotional visitor should be contained in the reception area. While experiencing negative emotions themselves (fear, pity) they control their own feelings (emotional labour; Hochschild, 1979), but show typical 'caring' behaviour, by supporting the visitor, making them feel heard, and relieving their worries (Pijls et al., 2017). Communication is crucial, language barriers may decrease perceptions of both safety and hospitality, for employees and visitors. And dress code is also an issue: one of the interviewed hosts explains why they don't wear uniforms.

'When people approach the desk, and the security staff is in uniform and the hostess is formerly dressed, they feel even less at ease'.

Next to situations involving excessive emotions, 2 visitors and 2 hosts described situations involving **more-than-average security measures**. These measures undoubtedly trigger the risk perception of visitors. One interviewee said:

'Focus on security brings focus on unsafety. Whether it is the presence or absence of danger, you become aware of the fact that there is danger in the world. You can't go in carefree.'
'The funny thing is that if you want to increase safety by putting up security guards, people become aware of risk and they feel less safe because of the association with risk.'

And even though visitors may quite understand that these measures are necessary, these may be considered unpleasant, especially uninviting and uncaring, and they induce stress and thereby decrease comfort. However, by compensating the required procedures with hospitable humanic clues (Berry et al., 2006; friendliness, relaxed attitude) the visitor is forgiving towards the organisation and accepts the measures as necessary for the safety of the organization.

'When you enter the bank, they scan you, but in a very friendly way; you feel you are being treated respectfully.'

'When you're dressed up for the occasion it's not very pleasant to have to take off belt and shoes, but the friendly approach makes up for the inconvenience.'

Also, in situations with the usual entry procedures, frustrations may arise **when people come unprepared and the procedure cannot be completed as usual** (10 critical incidents), e.g. because they did not bring an ID, or the registration number of their car was not provided up front, there is no parking space, or they try to park their car where they shouldn't. These are awkward situations, because the host has to refuse entry, and that feels inhospitable. However, good communicative skills, and showing understanding for the visitor may solve the problem without causing too much frustration. The trick is to be flexible, and think of alternative solutions, e.g. by letting the contact person identify the guest. Without this flexibility the situation will escalate unnecessarily. 'The visitor/worker will sense (s)he is being heard ('caring') and this will lessen their negative response.

'Then we explained the employee that it's also about hospitality, and that his way of dealing with the situation lead to unnecessary frustration'.

Or, as a manager said in one of the narratives:

'The guest perceives the situation as safe because of our clear protocols, but also because our people are able to apply these protocols without being too blue [as in the Dominance-Influence-Steadiness-Conscientiousness (DISC) personality colours]'.

Quite another situation arises when there is **no procedure** for visitors that enter a building, there is nobody to receive the visitor, especially when this is not what the visitor expected, or when staff has no overview over the area (13 critical incidents).

'I observed a visitor entering the building where there is no procedure to register visitors, you are free to go to your appointment. The receptionist hardly notices the visitor and does not take any action'.

The visitor does not consider this 'inviting', but rather not 'caring', as the attitude of the receptionist is interpreted as uninterested.

'Not hospitable as we felt really lost.'

Also, not a comfortable situation for receptionist, as they are quite aware that they may not notice unwanted visitors; this situation may be characterised as too 'inviting'.

This may lead to unwanted situations:

'A group of students on an international excursion visits a building site of a major contractor. Upon arrival the contact person invites them into the building. No check, no registration. Just before the group leaves, three students need to go to the restroom, without informing the host. Result: the incomplete group leaves the site, and the three remaining students are locked-in, and there is nobody to help.'

The hospitable hassle-free welcome leads to a rather uncaring departure, and apparently nobody, host nor visitors, saw any harm in not checking who entered and who left. The experience was maybe 'inviting', but not safe.

A last aspect that needs to be discussed is **the balance between hospitality and safety**.

Quoting the group interview:

'The extent to which you are threatened as a person or organisation determines the emphasis on the visible security side or the visible hospitality side.'

In five situations the safety aspect prevailed, e.g. because there was an emergency call while the visitor approached the receptionist. Or because surveillance cameras were deemed necessary. In these cases, perception of hospitality will decrease, but question is whether this could have been avoided. The group interview revealed that visible security measures may trigger a feeling of unsafety in visitors, which has a negative impact on the comfort dimension of perceived hospitality, especially 'feeling at ease'. However, context and previous experiences seem to be important mediating factors. However, when a person feels unsafe on entering the premises, physical security measures may have a positive effect.

GENERAL CONCLUSIONS AND DISCUSSION

The incidents and narratives presented in this research mostly concern situations where the visitor has no intention to harm the organisation.

In these cases, entry protocol, for safety, is no breach in hospitality, as in fact an entry procedure will often be expected by visitors. Visitors understand that such procedures are necessary to avoid risks. It does in fact add to the perception of 'inviting'. Entry procedures also add to a feeling of 'care', as it means that the organisation pays attention to you, 'sees' you, and acknowledges your presence. Whether it's a host or security staff did not seem to matter in our results.

The perception of 'caring' even compensates rather strict entry protocols: a hospitable human approach softens the impact of strict procedures, and safety and hospitality complement each other.

However, a strict enforcement of protocols that ensure safety, without an understanding attitude, not only creates annoyance – so no feeling of inviting and caring – but also causes stress – no perceived comfort – and lack of understanding from the visitor and stimulates evasive tactics. The host or security employee now has to enforce procedures on an unwilling visitor, whereas a more understanding approach might have induced compliance in the visitor. In these cases, safety may be ensured but the lack of hospitality leads to unwanted behaviour and stress in both visitor and host.

No entry protocol also does not lead to a desired effect: although there will be visitors who do not mind (or even enjoy the lack of security measures), quite a number of visitors will start to feel insecure, and become quite aware of the risks the organisation might be taking. The result is that not only does the visitor not feel safe, there is also no perception of care, and both inviting and comfort are compromised.

Based on these reflections we may conclude that in cases where visitors pose no real threat to an organisation, security measures carried out by (hospitality or security) staff that has a hospitable attitude will not be perceived as decreasing the hospitality of an organisation, as the visitor will feel safe, as well as treated in a hospitable way.

In some of the cases, hospitality and/or security staff was confronted with emotional visitors, who were or became frightened, angry and/or confused. In these cases, staff will need to perform emotional labour. Hochschild has defined emotional labour as 'the management of feeling to create a publicly observable facial and bodily display' (Hochschild, 1983). It is a person's response to emotionally stressful situation, where the employee's task requires that (s)he displays emotions differ from the emotions the employee feels. This so-called surface acting may be required e.g. when handling incivility by clients, or confused and angry visitors (Hur et al., 2015).

In these cases, staff looks for support; the protocols provide a handhold, but they also experience emotional labour. In order to perform their tasks well, and be as hospitable as possible given the circumstances, they need to stay calm and not respond with anger, fear or confusion. In those cases, it is beneficial to provide human support to the host, e.g. by having both two members of staff present, preferably hospitality as well as security staff, as this will alleviate stress of the person confronting the emotional visitor. Language plays a crucial role in under these circumstances, as without a common language it hard for people to understand each other. Lack of understanding will increase feeling of not-safe and not-hospitable.

So far, the cases in this exploratory study have shown that perception of hospitality and safety go very well together, asking for alignment of measures to ensure each of the two. However, it remains to be seen whether this still is the case in other situations, e.g. when either risk perception is very high and people feel rather unsafe, or in situations where hospitality needs to be very prominent, not to forget situations where people's behaviour is more extreme, or when hospitality and security staff need to deal with crowds instead of individuals.

For now, we conclude that safety and hospitality do act as two sides of a coin, and the one needs the other.

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Workplace Change – Does it Always Lead to a New Space?

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ABSTRACT

Background and aim – There are various reasons driving the change of workplace in organizations. The process of workplace change is complex and includes not only the transformation of physical spaces but many simultaneous technical, operational, social and psychological changes. It has been indicated in previous research but as important as physical workplace solution is the process of change and how employees have been involved in it. This paper aims at indicating the most current workplace change drivers in various workplace transformations in Finland. Moreover, it proposes ideas of change paths that organizations might implement through Place and Use-map. The research question presented is: What kind of different drivers for workplace transformations can be identified and how they can be clustered as a more comprehensive guidance for workplace developers?

Methods / Methodology – The study takes qualitative multiple case study approach. The data is gathered from the workplace change cases presented in the national “Workplace Action Reward initiative” in Finland in 2019 and analyzed through coding.

Results – Seven drivers for workplace change were identified, demonstrating variations between the cases. The cases are mapped by using Place and Use-map from earlier literature, which is supplemented by introducing change paths for workplace change.

Practical or social implications – The research introduces potential different paths for workplace change processes, which would benefit practitioners by emphasizing the need of understanding and evaluation of organizational processes and people. In practice, this could mean more user-centric workplace change processes.

Type of paper – Research paper

KEYWORDS

Workplace change; change drivers; digital and physical workplace; new ways of working

INTRODUCTION

Workplaces are changing, because the nature of work and the role of the workplace in business strategy are changing. The world largest distant working test is ongoing due to the Covid19 crisis. We are experiencing how one can work always-on, anywhere, anytime, through diverse channels. Distributed work has expanded the concept of work environment; it is now seen as an entity of comprising of social, virtual and physical space, meaning the social context and network of an organization, ICT solutions and the built environment (Aaltonen et al. 2012). The unprecedented developments in information and communications technologies now permit a variety of forms of remote working and the subsequent shifting of spatial and temporal boundaries between home, office and city. (Cole et al, 2014).

The changing working culture is also making organizations of all sizes, across all sectors, to re-plan and re-configure their workplaces to better tune them to the work processes and workstyles at hand (Yang et al. 2019). The developing new ways of work have passed on the baton from employers to every employee to develop the work and its operational environment (Eurofound 2015). This is called ‘job crafting’ which is a self-initiated change behavior that employees use with the aim to align their jobs with their own preferences, motives and passions (Wrzesniewski & Dutton 2001). Part of the jobcrafting are the ways how the workplace is used. This paper focuses on workplace changes, not only as a change process towards new workplace solution but also as a way to use it. In this study, we have investigated how various work environment changes are done in Finland. The goal of the research was to identify

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the drivers for work environment change and cluster them to provide a more coherent guidance for workplace developers and organizations planning the change.

WORKPLACE CHANGE IS NOT ONLY ABOUT THE PLACE

Just as any organizational change, workplace change should be considered as a constant adaption process to changing conditions (e.g. Burnes 2004). In workplace change, one of the challenges is to align the activities of real estate change with organizational goals (e.g. Heywood, 2011; Osgood, 2004; Appel-Meulenbroek and Haynes 2014). Additionally, the need to integrate and manage many simultaneous technical and operational, as well as social and psychological processes makes the process even more complex (e.g. Appel-Meulenbroek et al. 2014). There is an obvious need to develop good practices and operational models for change management that unify an organization's strategic and workplace change processes, as well as genuinely utilize user-centric knowledge in the development work (Lahtinen et al. 2016).

The balance between satisfying the needs of an organization and the experience of employees is hard to find and maintain. Often, there is a strong temptation to use modern facilities in traditional ways. In the past, the work carried out in the office room or in the dedicated workstation could not be transferred as such to an activity-based work environment. In the middle of the change, it is typical for individuals to turn back to old ways to work. (Haapamäki et al. 2011). One can illustrate that with the “place and use”- map with four different orientations (Figure 1):

Modern work environment and old ways to use it.	Modern work environment and modern way to use it
Traditional work environment and traditional ways to use it	Traditional work environment and new ways to use it

Figure 1 “Place and use” –map.

1. Traditional work environment and traditional ways to use it
 - This is the status quo and organizations start to shake this fixed setting when thinking of changes in strategic, tactical or operational level from various reasons.
 - In individual level, this is the comfort zone and the change of it is causing anxiety and frustration, especially if one feels that there is no reason to change anything.
2. Modern work environment and old ways to use it.
 - This is the stage when organization is focusing on built environment without putting so much emphasis to change work or work environment behavior.
 - In individual level, the work environment change is not comprehensive and there is no motivation to change behavior according to new solution.
3. Modern work environment and modern way to use it
 - This is the stage where the organization is working towards new ways of working and using the work environment as a catalyst in the change.
 - In individual level, this is a jump to something unknown and the change management support is needed.
4. Traditional work environment and new ways to use it
 - This is the stage when organization is making retrofitting in order to support the new ways of working.
 - In individual level, the change is something to be connected and the retrofitted environment at its best is supporting the change.

“Place and Use”-map is visualizing both the balance and non-balance potential in workplace change processes indicating that the physical solution is only part of the adaption to new environment. By crafting their work, employees and employee teams balance their job resources and job demands with their personal values, needs and abilities (Tims and Derks 2014; Nielsen & Abildgaard 2012). The ways to use the workplace is part of work crafting in operational level within organizations. It is also an essential part of the workplace change process in strategic level and need to be considered.

The workplace change can, at its best, be a learning process in which the people learn and have influence on the outcome both to the ways to use the work environment and the workplace solution itself. However, the learning is not easy and the journey towards the unknown and unfamiliar experiences is something what people want to avoid and resist. “Place and Use”-map is one tool to visualize the change process.

DIFFERENT DRIVERS TO WORKPLACE CHANGE

There are different reasons why organizations decide to change their work environments. Previous research identifies multiple drivers related to external environment, organizational changes, as well as changes in ways of working.

- Changes in external environment

Global competitive environment has a strong effect on organizations, thus, their need/decision to change the workplace. For example, changes in economic situation such as global economic crises or the growth of economies of scale affect organizational decision-making (e.g. Pullen 2014; Dewulf et al. 2000, Saurin 2012). Various governmental economic policies such as taxation, employment rates, competition might also lead organizations to not only change business processes but also a location (Senior 2002). Technological development leading towards faster business turnaround times, cheaper production or new types of products and services requires different work environment as well (e.g. Dewulf et al. 2000; Schriefer 2005).

In addition, increased attention to sustainability (e.g. the need to reduce energy consumption) might trigger the need for the changes in the work environment (Nord et al. 2019; Ouye 2010). In previous years, sustainability as a change driver was ranked one of the lowest in importance (Ouye 2010). However, its role is increasing. Climate change is making people to consider their environmental behavior and choices. Pro-environmental behavior and ways of working are promoted by organizations (e.g. Staddon et al. 2016) or by employees themselves (e.g. Garcia-Mira et al. 2017). Next to it, governments are starting to support environmentally friendly solutions as well.

- Organizational changes

Multiple organizational factors also lead towards work environment change. Different size of the company might trigger the change (e.g. Starr et al. 2019). New markets or competitors might require changes in workplace (Saurin 2012). Changes in the leadership structures, for example, into more linear management style, would also trigger changes in physical environment. Networks and connections gain more importance than hierarchy does. Increasing amount of technology like Artificial intelligence (AI), cloud, social media and Internet of Things (IoT) are changing the organizations and its people and processes. In organizational change management literature, technology is also mentioned as playing a vital role as it can affect methods of communication and work practices (Jacobs et al. 2013). Moreover, the need to increase company's recognition and enhance organization's brand or other way communicate to stakeholders quite often drives towards changes in the physical appearance of the organization (CABE 2005).

- New ways of working and workforce

The processes of work are changing significantly, thus creating a need to make changes in physical space and organizational practices. Knowledge workers no longer focus only on one particular task during a workday; the day is composed of different tasks in terms of collaboration and complexity. Creating an environment where teams can work effectively might trigger workplace change too (e.g. Appel-Meulenbroek 2009; Skogland 2016). A concept of activity-based work environment has been growing, giving the possibility to work in solitude or social spaces, or group spaces – according to the task at hand. The complexity of the workplace increases, because it is no longer seen only as a physical

space; the social and virtual aspects need to be considered as well (Aaltonen et al. 2012). Managing and organizing work processes is becoming even more important since managing employees creates challenges when it is no longer visible where, when, and what employees are working on. It is therefore important that managers have trust in their employees, focus more on the output instead of presence at the office, and provide them with more autonomy by stimulating own initiatives (van Steenberghe et al. 2018). The development of teams that can work together effectively are driving the change in organizations' workplace.

The experience of the employee is very important for the success of a company. Organizations are recognizing that improved employee experience allows incorporating culture and values into the work and using it to recruit and retain the best talent. Through the development of the physical environment as well as the technologies and tools that enable productive and more satisfactory work, employee experience can be created (Petrulaitiene and Jylhä 2015). Hence, work environment change is driven by the need to improve employee experience and satisfaction.

Changes in workplaces and use of them as well as motivation to conduct the change are investigated further in the empirical part of the paper. Cluster of workplace changes are used in testing the frameworks presented.

RESEARCH METHODOLOGY

The research follows qualitative study methodology. Case study research is a suitable method when contemporary and real-life phenomenon is studied (Creswell 2013). Multiple case study research design was chosen in order to be able to understand the differences and/or similarities appearing from the cases (e.g. Yin 2003; Gustafsson 2017). Eisenhardt and Graebner (2007) also suggest that multiple cases are suitable when one expects to elaborate on existing theories which this article aims at.

Purposeful sampling technique was applied (Yin 2014) with intention at selecting cases which could represent different industries, vary in sizes and have gone through different change processes but at the same time a workplace change should have happened recently or during similar time to limit the factors that might affect the change. Thus, the national "Workplace Action Reward Initiative" competition cases were used for this research. The case descriptions were submitted by organizations themselves in February 2019 and the workplace change actions had to be finished by the end of the year 2018. The criteria for the competition included: impact (on business and performance of the organization and impact on customer experience), sustainability and responsibility, innovativeness, and applied digital solutions. Thirteen case organizations participated in the competition and they varied in size and industry, most of them going through own workplace change with few exceptions of real estate owners changing their offered premises (Table 1).

Table 1 Description of case organizations.

Case	Industry	Size of the space (by number of users)	New or retrofitted space
A	Construction services	<1,000	New space
B	Telecommunications	>1,000	Retrofitted
C	Aviation	<1,000	Retrofitted
D	Financial services	>1,000	Retrofitted
E	Financial services	<100	Retrofitted
F	IT	>1,000	Retrofitted
G	Manufacturing	<1,000	New space
H	Rail	<1,000	New space
I	Religious organizations	<100	New space
J	Public administration	>1,000	Retrofitted
K	Public administration	>1,000	Retrofitted
L	Public administration	>1,000	New space
M	Financial services	>1,000	New space

Case organizations submitted their written descriptions, some also included video materials. For this research, only written data was used, and texts were coded by two-level coding approach in Atlas software. The codes were grouped under categories *Change*, *Drivers*, and *Benefits* and were used for further data analysis. Abductive reasoning approach was taken in this study with the aim to find the best way to create new knowledge and add new dimensions to existing theories (Mitchell 2018). In this paper, only information concerning *Drivers* of workplace change is presented.

ANALYSIS AND RESULTS

This chapter presents the results of the study related to the *Drivers* for workplace change.

Workplace change involves both changes in environment and usage

Each case organization presented a short description on what has been done (changed) during their workplace change process. In order to evaluate the extent of the change, analyzed cases were fitted into “Place and use”-map (Figure 2).

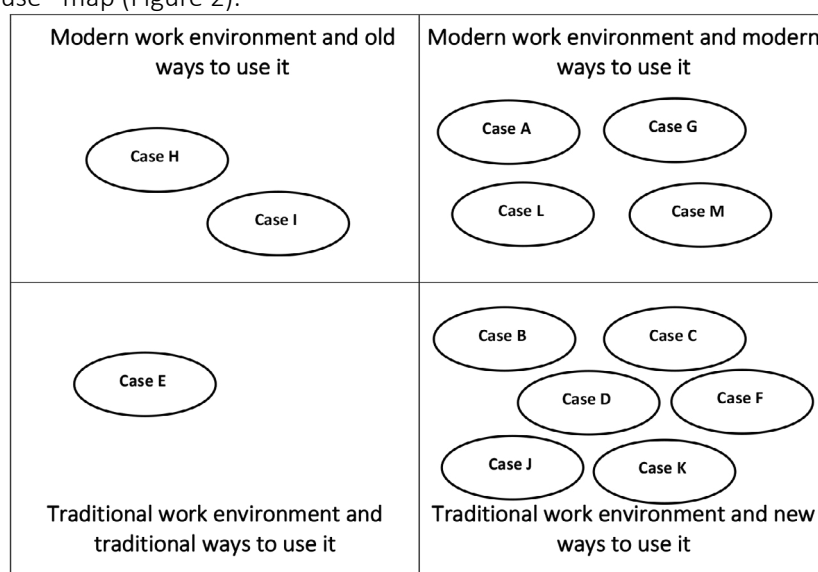


Figure 2 Cases placed on “Place and use” –map.

Figure 2 illustrates that most of the organizations (10 out of 13) included changes for people in terms of their behavior at the office and new ways of working. However, not all of them went through an extensive physical work environment change during discussed workplace change.

Nevertheless, here it is important to mention that ‘traditional’ does not necessarily mean “old-school” cellular office but rather talks about the workplace concept that has been in place for some time (e.g. big retrofitting or move has been done some years ago).

1. Traditional work environment and traditional ways to use it

Case *E* organization is placed in this quadrant since no significant changes in the work environment or ways to use it were identified. The change was mostly related to adding services for employees but did not question the status quo.

2. Modern work environment and traditional ways to use it

Cases *H* and *I* are placed into the quadrant. Both organizations moved into new premises which went through major renovations and support the idea of a modern work environment. The motivation of the workplace change was focused on the built environment – physical condition of the building and the need to save expenses related to the building. Even though the changes in the behavior of employees are visible, there is a risk of reduced motivation to change the behavior completely or in a long-term perspective to fit the new environment.

3. Modern work environment and modern ways to use it

Four cases (*A*, *G*, *L*, and *M*) went through a major workplace change, affecting physical, digital, and social environment, changing ways of work and behavior in the workplace. In all cases, the change was

created by considerable organizational transformations and old working environment was not suited anymore. This type of change requires extensive support for people and involvement.

4. Traditional work environment and new ways to use it

This quadrant places six cases (B, C, D, F, J and K) that indicated their biggest transformations happening in terms of ways of working and using the physical environment. Retrofitting of existing places was done in order to support the work in the organization better and there was a clear connection between the environment and work. In some cases (B, C, D, F), organizations have had major physical environment (and relocation) changes earlier while in others (J and K), relocations or major changes are limited due to specific activities or guiding policies.

Drivers for workplace change

Second, based on the previous literature, seven main drivers for change were identified. Reasons for change were influenced by external environment changes, organizational change and changes in ways of working. Table 2 represents the drivers mentioned in each case.

- New ways of working included increased collaboration not only within teams but also across organizations, increased need for agility and flexibility at work.
- Six organizations mentioned changed operational methods as a driver for change. This mainly included the need to change work processes to support the changes that are happening in terms of how people work and how they use the environment and tools available.
- Physical spaces and technological development were mentioned by four organizations. Physical spaces as drivers were mentioned in cases where buildings either had major physical issues or were not suitable for retrofitting based on organization's needs. Technology was mentioned as a driver leading towards new ways of working (smart work, new tools) or process efficiency (data access, visualization and reporting).
- Social environment was mentioned by organizations that aimed at increasing employee experience and satisfaction.
- Organization's transformation included situations where organizations went through strategic changes such as merger of companies or policy changes. External communication as a driver included the need for stronger image, visibility and role in the society.

The most commonly mentioned driver was the new ways of working, which was mentioned in 9 out of 13 case as one of the main drivers for change.

Table 2 Drivers for workplace change.

Case	Drivers						
	Technology	Physical spaces	New ways of working	Social environment	Operational methods	Organization's transformation	External communication
A	x		x				
B			x	x	x		
C	x		x		x		
D			x				
E				x			x
F	x				x		
G	x	x	x			x	
H		x					
I		x	x				
J			x		x		
K				x	x		
L			x			x	x
M		x	x		x	x	x
Total:	4	4	9	3	6	3	3

Differences in changing physical spaces

In the analysis, researchers wanted to understand if there are different drivers between organizations choosing to locate into a totally new (physical) space or retrofit the existing one (Table 3). In analyzed

cases, a change towards new physical spaces (in 4 out of 6 cases, this meant moving to a different location) was a strategic decision, driven by new ways of working, new technological tools to be exploited at the organization and building-related issues. In three cases, organizations went through major transformations and required a comprehensive workplace solution to suit the changing needs. Through an ambitious physical space change, also external communication (image, brand, visibility) is triggered.

Table 3 Change drivers by changes in physical space.

Case			Drivers						
Name	No. of users	Space	Technology	Physical spaces	New ways of working	Social environment	Operational methods	Organization's transformation	External communication
A	<1,000	New space	x		x				
G	<1,000	New space	x	x	x			x	
H	<1,000	New space		x					
I	<100	New space		x	x				
L	>1,000	New space			x			x	x
M	>1,000	New space		x	x		x	x	x
C	<1,000	Retrofitted	x		x		x		
E	<100	Retrofitted				x			x
B	>1,000	Retrofitted			x	x	x		
D	>1,000	Retrofitted			x				
F	>1,000	Retrofitted	x				x		
J	>1,000	Retrofitted			x		x		
K	>1,000	Retrofitted				x	x		

Surprisingly, case organizations that changed the physical environment to the new one were smaller organizations (<1,000 users) than the ones that had a retrofitting change, with the exceptions of cases *C* and *E* in *Retrofitted* spaces and Cases *L* and *M* in *New* spaces. Case *C* organization moved to brand new spaces in 2013 and Case *E* had a significantly smaller team size than the rest of the analyzed organizations. In case *L*, although the number of the users was big, new spaces were quite small in size by square meters (not a full workplace environment change) and in case *M* organization, the transformation has led to a significant change in users and operational model. Assumptions can be made that 'modern working environments' are becoming more 'business-as-usual' where smaller organizations (which are likely to not prioritize workplace environment) are noticing the benefits of change or have the pressure (e.g. from various stakeholders) to change. They are applying the idea of using workplace as a change catalyst.

DISCUSSION AND CONCLUSIONS

The aim of this research was to open the discussion on different reasons for workplace change in organizations and cluster them to provide a more coherent guidance for workplace developers and organizations planning the change.

First, the analysis indicated that the change towards flexible office environments took place in all sizes and types of organizations. Although, workplace change might not have included a move to a new space but rather involved retrofitting the existing space. Moving to a new space or location seemed to be influenced by the need to support big transformations that happened either in specific industry market or globally. For example, if a company was re-organized in one way or another, if technology drastically changed the way the work was done in that company, then the work environment needed to change drastically as well. In some cases, existing physical spaces have become obsolete. Moreover, changes in the market/organization were followed by the need to create a certain image about the organization, thus, required a major transformation in the physical environment.

However, research also indicated that workplace change was a continuous process and operational changes often appeared after the strategic change was implemented. For example, after using new spaces and new ways of working, it was understood that operational procedures were not optimal, thus, new methods were implemented. The same, based on the user feedback, spaces and ways of working were adjusted to suit the needs better. The potential of workplace crafting by individual employees was not maybe fully used.

The results of this study support earlier research that identified the drivers for change and emphasized changed ways of working, technological development and external and organizational changes as strategic reasons for moving to a new place. Moreover, this research adds to existing knowledge by showing the importance of adjusting operational methods and the need to improve social environment (user experience). This might be done by introducing incremental changes in workplace, such as adding new services, retrofitting smaller scale spaces, and similar.

In practice, one can develop the fixed structure of “Place and Use”-map to proposal of three diverse change paths (Figure 3).

Path 1 is Space-Led Path, where only physical environment is changing. This means that physical spaces are driving the change, however no significant changes are done to the ways organization operates.

Path 2 is Radical Path, where the transformation is holistic and considers how both physical transformation and how people operate in the place.

Path 3 is Use-Led Path, where behavior is changing more than place. This can be the case when physical environment already meets the standards of “modern”, most often activity-based workplace design, however where significant mismatch between the use and the space is observed.

Despite, there are possibilities to have the variations of the Radical Path: it is possible, that the intended change is leading back to old environments or old ways to use it. This is often seen only after the workplace change process as such is managed and the learning curve of the change has not really taken place. In practice, this proposal of different paths indicates how the change requires a good understanding of organization’s processes, involvement and analysis of users (people). For practitioners, this would indicate the need for more user-centric workplace change processes.

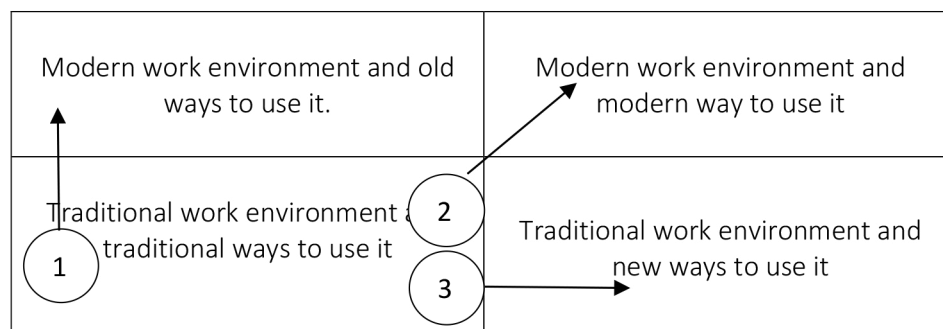


Figure 3 Proposed change paths in “Place and use” -map

This study is based on a limited amount of cases in Finland with compressed written texts available. Without in-depth analysis of each case, some assumptions might be questionable. However, the text analysis was supplemented by authors’ knowledge of the cases. Thus, to gain more insights, a deeper analysis of cases studying their change management processes would be beneficial to understand the origins of change, order, timing, intensiveness, or best practices used. Moreover, it would be interesting to follow up annual development of workplace change projects in the future as the contest in 2019 was organized for the 1st time. One can identify more patterns to “Place and use”-map.

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