OFFICE SPACES FOR MORE INNOVATION AND SPACE EFFICIENCY

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Abstract: The importance of alternative office spaces for more productivity and space efficiency has been analyzed: the way of usage as it was common in the past decades and how new technologies and decreasing productivity in the tertiary and quaternary sector urge intervention in the traditional structures and hierarchies to attain top competitiveness. The paper takes the form of a literature review, considering the history and functionality of the work environment and its widening scope to consider how it would be possible to use the existing office buildings more sustainable, healthier by having more productive workplaces at the same time.

Keywords: Innovation, Office design, Workplace, Architecture, Space efficiency

1. Introduction

In the richest countries, there are usually more people working in the tertiary/quaternary sector than in the primary and secondary sectors, and most of this work still happens in office buildings. The last couple of decades the productivity in this extensively growing sector slowed down though [1]. However, expecting the economy constantly to extend cannot result in sustainable development. If the produced values per hour today are compared to the net worth 50 years ago - it has more than doubled [2]. The idea ‘work less, save the planet’ suggests that reduced working hours would effectively extenuate climate changes [3]. Another interesting indication for the constant matter of sustainability comes from James W. Vaupel, director of Max-Planck Odense Center on the Biodemography of Aging, Denmark [4] by promoting a 25 hour working
week - which would result in a more equal society with less unemployed, healthier and more effective people. If an employee can stay longer in mental and physical health, working in the elderly years could solve the urgent problem of unsustainable retirement systems of ageing societies. Thus it sounds more like a utopia, solving economic crisis is still expected from fostering productivity and discovering hidden potentials in the segment.

2. Flexibility in workspace

2.1. From cooperation towards innovation

To exploit the demands in the design process of a new work environment, employees are usually asked about their present working conditions. It is often said that the office they work in is not supporting concentration, collaboration with peers and having confidential discussions. Businesses today demand increasing levels of productivity, both from employees and the buildings in which they work. Worker productivity definitely increases due to a focus on the health and well-being of employees, but how could they be supported by coming up to the work-life-balance they long for?

One major idea used to be the promotion of remote work: By combining diverse technologies like instant messaging software, web cameras and other online collaboration tools, workers can be untethered from their office. It is not essential to commute to an office each day, extending the carbon footprint with every kilometer driven by car, if there is a possibility for home working. There is a quite rumors story of the decision though, made by Marissa Ann Mayer, CEO of Yahoo, [5] who upset employees working remotely by sending out a memo asking them to relocate to company facilities. The situation indicating this action was more complex but the focus was on collaboration, stating that the greatest insights come from chance encounters between colleagues in the office space, and not necessarily in meetings planned in advance.

Innovation in the workplace often results of unplanned interaction. Information leading to innovation comes from informal encounters typically between colleagues who are otherwise not programmed to come together. Serendipity leading to something innovative is more likely in environments where informal conversations are encouraged and where the workspace design provokes chance encounters. Studies have shown that professionals get 80 percent of their ideas from casual interactions [6]. A critical mass of informal chance encounters can result in greater collaboration and faster knowledge creation. This is the point where design can bring in the cultural changes that are wished to enact.

2.2. From the traditional straight into something new

Most of office spaces today are generally not configured to enable people collaboration, so it becomes more and more significant for the companies - to keep up in competitiveness - to provide their employees with a work environment that serves their
different and changing needs. In a traditionally organized open space environment it is nearly impossible concentrate on focused thinking, problem solving or to have the privacy required for some confidential calls or any conversations.

On the contrary cellular offices offer privacy, but hinder spontaneous communication, as all commonly used facilities are in enclosed rooms - just as the offices itself, which are aligned along a middle corridor and occupied with up to four employees. The main pros are low background noise and natural light; cons are isolation, low transparency, which results in lack of communication. The low space efficiency is also the implication of this structure - as the valuable naturally lit and ventilated space at the façade is reserved by service functions, just as shown in Fig. 1.

The usage of flexible combination offices is quite reserved nowadays as real estate costs have emerged recently. It was developed to combine the advantages of the open space and cell office formats, while reducing their disadvantages. The result was a both cooperative and private concept due to the transparency of glass walls towards central located facilities like printers, filing and communications areas (shown in Fig. 2 and Fig. 3).

Fig. 1. Standard layout of a cellular office

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Fig. 2. Example of a refurbishment using combi offices

Fig. 3. Standard layout of a combi office
Today’s most favored model of work environment is the activity-based office, where fewer individual workspaces are offered, but there is more space dedicated to interactive uses in a range of diverse functions and sizes. A basic scheme is shown in Fig. 4.

The space is optimized for all types of collaboration, ranging from large formal meetings to chance interactions as two people pass in the corridor. Innovative work environments offer not only spaces for meeting and interacting with one another but also tranquility and intimacy for focused work and research.

2.3. Spaces for activity based working - for teams and individuals

Unpredictable spaces are needed where unexpected, interesting things happen to encourage the creativity and innovation. At uninspiring places, where disturbing actions also distract from work, it would be impossible to accommodate new ideas and technologies. The opportunity of quick transitions from collaborative working to focus is needed. The space has to be designed to force more intense interaction [7].

By using the concept of an activity-based office, no one is tied to a desk, and there are numerous opportunities for diverse work environments. One of the main aspects of the design is when individuals are seen in the lounge or kitchenette, they are considered to be working, expanding their network, and broaden their social capital - not simply
taking a coffee, meal, or relaxation break. This is what will end up in unplanned discussions moving towards innovations. Employers have to be aware of that people do not need to sit heads down at their desks to be working. The social effects of playing games together are also noticeable, so a billiard or foosball table, even gaming consoles are becoming common accessories of rooms designed for community.

One of the design patterns, which is used for fostering collaboration, is where self-organizing teams are working together face-to-face in either shared enclosed and shared open spaces in groups of various sizes. The more and more popular benching applications used by 4-8 persons installed with video conferencing allow remote collaborators to join the team virtually.

Individual team members might require convenient options for focused research work. The workspace design must also support employees working alone quietly in the presence of others. The application of medium-height panels in the blocks ensure privacy even in face-to-face desk combinations, allowing concentration on the work, while not feeling isolated.

For even more privacy or confidentiality, fully enclosed spaces are also needed: this could be a pint-sized enclave, - a so-called think-tank - with two pieces of lounge seating, a table, laptop and phone connection. This is the place where individuals go if they need time to do research, make confidential phone calls or face-to-face conversations. This kind of privacy cannot be found in a traditionally used open space, where employees were moved out of office cells into open plans, but they never got back the privacy, which is undoubtedly needed for concentration.

The combination of the patterns for collaboration and concentration (as it is shown in Fig. 5) disaggregates very different usage into shared spaces: employees are provided with a variety of work settings to select the one that best fits in the actual work flow. This flexibility and mobility is appreciated more than the work in an assigned, single-purpose space where the personal and corporate needs are underserved most of the time. The activity based, smart working concept is a mixed-use approach to workspace design where different activities - like team working, brainstorming, deep thinking - are spread throughout shared spaces.

![Fig. 5. Scheme of an activity based concept](image_url)
2.4. The non-territorial office environment

A modern, future oriented office design must incorporate sustainability beside mobility and flexibility. Though the focus is on work effectiveness, there is equal attention to space efficiency. Consequences of these trends result in a workplace where shared work environments are the norm.

In a traditional office concept the real estate is still allocated by title: the president gets a room with 4 windows, the managers with 3, team leaders maybe 2. Even though the economy is recovering, corporations are deliberate and shift from the ‘bigger is better’ mentality to an appreciation of smaller real estate footprint. With this shift in thinking the shared ownership of ‘private’ office spaces is becoming common: the bigger space is not reserved for the management only, who are in the office less time, but the space is also used for short meetings or brainstorming. For an alternative work environment really to work it takes management team to go and lead by example: moving out of the private office, putting the files in the central storage, keeping only the personal or immediate files around, and using all the diverse facilities provided in the open space. If a company is not ready to do that, the concept is predicted to fail. In the non-territorial office design an employee has a private pedestal, which provides permanent storage space for the belongings but the basic workplace is to be shared. Rising real estate costs and competitive pressures are good catalyzer to rethink how workspace should be best provided.

Even adding a bit more value to a traditional work desk, for example by placing it in a garden-like atmosphere, the so called ‘business garden’, the psychological and physical benefits of indoor plants will be measurable in improved well-being of employees. A range of special plants can improve the air quality by removing pollutants, and people working in planted offices feel less pressure and more productive [8] (Fig. 6).

![Fig. 6. Example of a refurbishment using the activity based concept](image-url)

Due to the reduction of personal workspace and private offices, alternative, flexible offices have a range of break out areas with playing or sporting (table tennis for
example) opportunities. One of the best ways to improve employees’ productivity is encouraging relaxation. It is impossible to expend energy continuously during the work day - one should rather pulse between spending and recovering energy. Employees should be encouraged to take numerous renewal breaks throughout the day: the energy brought to the job is far more important in terms of the value of the work than is the number of working hours. It is possible to get more done, in less time, more sustainable by managing the energy skillfully. ‘Paradoxically, the best way to get more done may be to spend more time doing less’ [9].

2.5. Refurbish or demolish?

Until the economic crisis in 2008 globalization was characterized by massive real-estate over-production. In Hungary the trend was - and partly still is: demolishing instead of refurbishing. Demolition is both a loss of substance but also implies the possibility to create something new. This can be considered as a normal process - as even for several hundreds of years buildings had been in constant change, so it is a tool for regenerating building stocks. Analyzing it from the sustainability perspective of the process it ends up mainly in waste and recycling problem.

The life cycle of buildings in the post war era with the introduction of mass construction, preferably produced out of concrete, was estimated about 50 years. Now, as the time has come and they still seem to be constructional well preserved, those large-scale developments get in another significant perspective: demolishing them is more like erasing the collective memory related to the eras whose ideas and ideals are not appreciated and understood anymore. Is it really necessary? The cultural and social consequences of continuity and discontinuity should also be analyzed. Considering regeneration in the larger context of town, it is not just a purely technical or environmental problem. The smoother way to replace a building would begin with some refurbishment work until there are almost no remains of the original. This kind of partial demolition would strain both urban and natural environment less. For about a century ago the small-scale renewal of buildings and cities was the usual way of transformation, which appears to be a more natural or even organic method of redevelopment [10].

‘Green’ has become a way of life. Thinking green and sustainable means also trying to preserve what is given, what is present and trying to make the best of it.

The land is a source, which is limited and non-regenerative therefore only the use of it is changing. Inconsiderate and redundant building activities would lead to ecosystem damage resulting in the reduction of biodiversity [11].

2.6. Preservation and reuse

The aim of the present research is to give alternative solutions for the reuse of office buildings built in the past 2 to 5 decades. Fig. 7 and Fig. 8 show an office building built in 1971, demolished in 2004, though the structure and even the spaces would have allowed an up-to-date office concept and design.
The research aims at helping decision makers by the consideration, whether demolishing or refurbishing is the more sustainable way. Whether only newly built spaces can accommodate the workspaces of the future, or is it avoidable to build lots of new square meters so that the present building stock would molder or be left abandoned. The analysis of the probable amount of building waste comparing demolition and refurbishment, the long-term consequences, the environmental impacts of the materials built in by the development of a new project should be presented. In the research 14 different office buildings throughout Hungary were analyzed, and the first conclusions were:

- The depth of the floor plates is ecological - considering natural lighting conditions and ventilation;
- The building core with the stairs and washrooms is usually independent from the façade - rational and space efficient;
- Concrete skeleton structures were preferential - often prefabricated;
- Ceiling height is usually at the lower limit and in the case of prefabricated structures the beams are visible.
3. Conclusion

It is argued that the preservation of post-war concrete skeleton structures can be used sustainable. Sustainability is usually considered only in terms of construction but it should be complemented in the work environment by satisfaction and well-being of the users. In case of reduced productivity this paper suggests that activity based design practices will result in optimized space quality of office buildings and improved health for their occupants. By analyzing the building performance, human factors should be incorporated as a strategy for productivity enhancement. The paper concludes that further research is required amongst post-war office building constructions considering how to provide healthier and more attractive, inspiring work environments in them.

Research is now continuing with the analysis of various office buildings throughout Hungary.

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