Master Thesis

Real Estate and Facility Management Department TU Wien

Workplace in office buildings and employees engagement

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INFORMATION SUMMARY

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ABSTRACT

The purpose of this thesis is to illustrate the link between the workplace in office buildings and employees engagement.

The main focus is to understand how the employees are actually influenced by their workplace and working conditions in office buildings around the world, considering cultural differences, office layout type, work environment. Thus, three hypotheses are proposed to be analyzed:

H1: Employee engagement is related to workplace satisfaction

H2: Cultural context influences office layout and engagement levels

H3: Work environment influences employee performance

Using the literature review as a methodical approach, books, journals, reports, research dissertations and thesis, and any other relevant sources were used to evaluate the research problem.

On the basis of the results of this research, it can be concluded that:

- The sense of belonging to the company, the feeling of connection with colleagues, the proud to work for company, the sense of personal achievement, feeling motivated by work, optimistic about the future in the company and the quality of life at work influences the employees' satisfaction with the workplace and hence the level of employees engagement.
- Cultural differences influence the way office layout are designed and the office layout influence the level of employees engagement.
- The work environment influences performance through factors like: temperature, light, noise, color, air / ventilation, office design, ergonomics, other amenities.

Keywords:

Workplace, office, engagement, performance, satisfaction, cultural context, office layout, work environment

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1. INTRODUCTION

The workplace is the physical location where an employee works and does his job.

The workplace is an important social space and a „central concept for several entities: the worker and his/her family, the employing organisation, the customers of the organisation, and the society as a whole." (Suomi, 2002)

The workplace environment is a very important key for the employee quality of work and level of productivity. How well the workplace engages an employee can impact their level of motivation and engagement.

The disadvantages of employee's disengagement may be numerous, from the fact that it costs companies money, slows down projects, lowers resources, undermining the company's goals, to the fact that the efforts of the involved partners decrease. That is why the commitment of the employees is one of the main issues facing the world's top organizations. (Steelcase Global Report, 2013)

Therefor this thesis analyse the link between employee commitment and workplace in office buidings.

There will be made an analysis on the relationship between the overall office layout, working environment and employee perception of work.

Focus will be on cultural differences in Asia, Americas and Europe to identify whether they affect the attitude of the employees.

1.1. Research problem

The research problem will be the relationship between employee engagement and their workplace.

According to BusinessDictionary, employee engagement is defined as an "emotional connection an employee feels toward his or her employment organization, which tends to influence his or her behaviors and level of effort in work related activities. The more engagement an employee has with his or her company, the more effort they put forth. Employee engagement also involves the nature of the job itself - if the employee feels mentally stimulated, the trust and communication between employees and management, ability of an employee to see how their own work contributes to the overall company performance, the opportunity of growth within the organization, and the level of pride an employee has about working or being associated with the company." (BusinessDictionary, 2017)

In an article by CustomInsight, employee engagement is defined as „the extent to which employees feel passionate about their jobs, are committed to the organization and put discretionary effort into their work." (CustomInsight, 2014)

Following the study conducted by Steelcase in 2013, the workplace can influence employee's productivity but at the same time they can shape the employee's attitude and beliefs. The study also shows that the workplace can be part of a global strategy that can improve employee engagement level. (Steelcase Global Report, 2013)

In the study „Work environment and its effect on job" (2015), Dr. Ganesh Salunke showed that the workplace environment impacts employee morale, productivity and engagement - both positively and negatively. He believes that the productivity may decrease due to factors such as: poorly designed workstatios, unsuitable furniture, insufficient space, lack of ventilation, inappropriate lighting, excessive noise, bad air quality, inadequate workplace layout.

Also, in the study it is emphasized that the working environment can influences the motivation and performance of the employees.

The link between the employee and the company can directly influence the error rate, the degree of innovation the employee develops, the collaboration with other colleagues, the absenteeism, and also how long the employees remain in the same

company. (Salunke, Work environment and its effect on job satisfaction in cooperative sugar factories in Maharashtra, India, 2015)

1.2. Research question

The main focus is to understand how the employees are actually influenced by their workplace and working conditions in office buildings around the world, considering cultural differences, office layout type, work environment.

1.3. Hypothesis

The following objectives have been established at the start of the research to be answered in this study:

H1: Employee engagement is related to workplace satisfaction

H2: Cultural context influences office layout and engagement levels

H3: Work environment influences employee performance

1.4. Aims and structure

The research aims to determine how the employees are actually influenced by their workplace.

The structure of this thesis consists of five chapters, organized in a systematic manner. The structure of each of the main chapters is as follows:

Chapter 1. INTRODUCTION: is the chapter that provides the motivation, the definition of the research problem, the outline of the main research question and places the thesis in context to establish why it is important.

Chapter 2. BACKGROUND: this chapter offers a short description of what office building and workplace and employees engagement means and how office development over the years affect the design.

Chapter 3. DESCRIPTION OF THE METHICAL APPROACH: is about the research methodology and it describes the information retrival and the method of analysis.

Chapter 4. RESULTS: presents the analysis of data and interpretation of the results found from literature study.

Chapter 5. CONCLUSIONS: focuses on the summary of findings, conclusion and discussion of implication for theory, practice and research.

2. BACKGROUND

2.1. Office buildings and workplace

According to the book „Office buildings" (2002) by Kohn and Katz, we are talking about a great variety of structures when we say „office building". We may mean anything from a few-story suburban building to a sky-scraper urban high-rise.

Office buildings are a complex type of buildings regardless of size and characteristics. The most important role that must be fulfilled is to be a second home for the people who work there, and its design greatly affects the performance of employees.

The design of office buildings must take account of location, place culture, whether it is in rural, urban or suburban areas, design codes and local zoning.

Kohn and Katz said that in the last years of office development it seems that different things have been pointed out depending on the cultural context:

- in the **United States**, emphasis was placed on workplace efficiency, productivity and the expansion of communication technology;
- in **Europe**, energy conservation, the environment and access to natural light and air have been the main concerns;
- in **Asia**, the influence is on the great demand for space and the symbolic importance of high-rise buildings;

Through the development of technology and access to tablets, laptops, smart phones and other such devices, employees can work away from office any time, from places such as home or other third-party (park, café, restaurant, train, and others) without their productivity being affected. The workplace no longer means a limited physical space with four walls in office buildings. (A. Eugene Kohn, 2002)

Office design and the role of office buildings in the community will be influenced by the fact that urban areas are developing into smart cities. "Smart cities are defined as cities that use information and communication technologies (ICT) to be more intelligent and efficient in the use of resources, resulting in cost and energy savings, improved service delivery and quality of life, and reduced environmental footprint – all supporting innovation and the low-carbon economy." (Stoklund, 2013)

Because of the facts that the market has a rapid growth and change rate, there is a ascending trend in the level of buildings sophistication and the urban population is growing, market developers will have to build new office buildings quickly and cheaply. The buildings will have to be easy to manage (where it comes the need for specialists) and more durable, easy to build and easy to demolished. An example could be the Broad Sustainable Building group solution based on prefabricated modular technologies. The Broad group has built tall buildings in Asia and the United States, including a 30 story building which was built in 15 days in Hunan Province, China. (ISS World Services A/S, 2013).

30-Story Building built in 15 Days (Time Lapse) YouTube video

Figure 1: 30 story building which was built in 15 days in Hunan Province, China (photo source: http://freshadda.com/images_adda/30-STOREY-BUILDING/)

According to John Willy Bakke (Bakke, 2007), in recent years, the theme of workplace design has emerged as a rich – and controversial – theme in workplace studies and workplace practices. Companies have adopted new design solutions with the aspiration of achieving flexibility, higher quality of the work done and a higher degree of creativity and innovation, as well as cutting office costs. New concepts, such as 'touchdown offices' and 'hot-desking' flourish, and previously disparate groups of professionals have engaged in discussions about the future of workplaces as well as the future of work.

Workplace design will always be local, and needs to have both top-leader support and employee participation in order to achieve a fitting design, and to get support for necessary changes.

Changes in workplace practices have led to the development of new concepts for work and workplace design. It is now common to see terms as flexible and mobile work, distributed work, touchdown offices, hot-desking, and hoteling.

According to Nordic Innovation Centre guide (Bakke, 2007), there is a multitude of factors that may actualize considerations about workplace design processes. Some of these considerations relate to decisions in facilities management, such as:

- The wish to reduce office costs;
- Changes in the number of employees;
- Changes in ownership of the corporate building(s);
- Mergers or outsourcing;
- Plans for improving the systems for light, heat and ventilation;
- Plans for improvements of enterprise culture or vitalizing knowledge management within the company;
- Plans for strategic location / presence;

Space design in today's offices must encompass not only the building(s) seen as the main office, where everyone is expected to attend; space design solutions are increasingly more distributed, where colleagues may be at different sites, and where each individual may move from place to place, both inside and outside the office buildings. Consequently, spatial strategies and spatial analyses must encompass flexible, multi-located work.

2.2. Employee engagement

The HRZone report „History of employee engagement - from satisfaction to sustainability" (Byrne, 2013) says that „employee engagement may seem a relatively recent concept but actually it goes back over 20 years when the term first appeared in an academic journal in 1990".

Starting with the 70-80s, the focus of human resources (or as it was then: 'personnel') was on the **satisfaction** of employees. This has more to do with the person well-being and little or no connection with performance. Is more about employee than the organization or the employee's relationship with it.

Meanwhile, the focus has shifted from satisfaction to **dedication** (and somewhere along the way 'personnel' became 'human resources') for a job and possibly a job for life, the employee would be loyal and commit himself to the organisation. Whilst dedication is an important element and a predictor of engagement it cannot replace engagement.

Things have begun to change once with globalization and growing competition all around the world. The shift from a production economy to a serivice-based economy has made employers more flexible, leaner and more competitive. People were free – encouraged even – to move from job to job, selling their skills and at the same time acquiring new ones courtesy of the new employer. So it benefited the employee but employers soon realised that actually they were losing people they didn't want to lose. It was costing them money and affecting their ability to compete effectively.

In this point the concept of **engagement** matured. Key to this was a paper published by the Institute of Employment Studies (IES) in 1990 „From People to Profits, the HR link to the service-profit chain" (L.Barber, 1999) which showed that employees' attitude and behavior are performance-related.

3. DESCRIPTION OF THE METHICAL APPROACH

A literature review surveys books, journals, reports, research dissertations and thesis, and any other relevant sources, and by doing so, provides a description, summary, and critical evaluation to the research problem being investigated.

Literature reviews are designed to find all relevant sources to provide an overview of the sources that have been explored while researching and to demonstrate how the research fits within a larger field of study.

In her technical report „Procedures for Performing Systematic Reviews", Barbara Kitchenham said that „literature review identifies, analyzes and synthesizes avaible relevant research to a particular research question or topic". (Kitchenham, 2004)

There are two types of literature based methodology: systematic literature review and traditional literature review (also known as narrative or comprehensive).

In this thesis is used systematic literature review. It's a quantitative approach that may include meta-analysis (the specific statistical method to combine results from different studies into single summary estimate for quick reference).

The main steps in literature review process are:

- select a topic
- search and choose the literature
- analyse and interpret the literature
- write the review

3.1. Information retrieval

Information retrieval (IR) is the activity of obtaining information resources relevant to an information need, from a collection of information resources. Searches can be based on full-text or other content-based indexing.

An information retrieval process begins when a user enters a query into the system. Queries are formal statements of information needs, for example search strings in web search engines. In information retrieval a query does not uniquely identify a single

object in the collection. Instead, several objects may match the query, perhaps with different degrees of relevancy.

Exemples of queries used for this thesis: workplace and engagement, workplace in office buildings, workplace in time, office buildings around the world, office layout, office environment and performance.

3.2. Method of analysis

„Data analysis is a process for obtaining raw data and converting it into information useful for decision-making by users. Data is collected and analyzed to answer questions, test hypotheses or disprove theories". (Charles M. Judd, 1989) „Data Analysis: A Model Comparison Approach".

The steps followed in the analysis method were as follows:

- Data collection: Books, journals, reports, research dissertations and thesis, and any other relevant sources were searched in order to find the answer for the research question.

  Database for collection: Web of Science, Cushman & Wakefield, Gallup, JLL - Jones Lang LaSalle, Knight Frank, Steelcase.

- Data processing: Data initially obtained must be processed or organised and storaged for analysis. To simplify things, the Microsoft Excel program were used to make a table to centralize search results by name, type, source, author, year, country.

- Data cleaning: Once processed and organized, the data may be incomplete, contain duplicates, or contain errors. Data cleaning is the process of preventing and correcting these errors.

- Data exploration: Once the data is cleaned, it can be analyzed. Data exploration means to understand the messages contained in the data collected.

- Data modeling: Again, Microsoft Excel program were used for data modeling into tables and charts in order to achieve results. Based on this, the review was writen and questions are answered in next chapter.

4. RESULTS

4.1. H1: Employee engagement is related to workplace satisfaction

Chartered Institute of Personnel and Development (CIPD) define employee engagement as „an internal state of being – both physical, mental and emotional – that brings together earlier concepts of work effort, organisational commitment, job satisfaction and 'flow' (or optimal experience)." (Duncan, 2011)

„Employee satisfaction is the extent to which employees are happy or content with their jobs and work environment.", according to (CustomInsight, 2017) Employee Engagement Survey.

Employee engagement and employee satisfaction are connected, but they're not synonymous. An employee can be satisfied with their pay, or the hours they work, or some of the perks they receive from their job, but that doesn't automatically mean they're engaged.

Satisfaction involves personal happiness with the job, while engagement indicates an employee's sense of connection and commitment to advancing organizational goals.

The following definitions are given in the Gallup study „State of the American Workplace":

- *Engaged:* Employees are highly involved in and enthusiastic about their work and workplace. They are psychological "owners," drive performance and innovation, and move the organization forward.
- *Not engaged*: Employees are psychologically unattached to their work and company. Because their engagement needs are not being fully met, they're putting time — but not energy or passion — into their work.
- *Actively disengaged*: Employees aren't just unhappy at work — they are resentful that their needs aren't being met and are acting out their unhappiness. Every day, these workers potentially undermine what their engaged coworkers accomplish. (Gallup, 2017)

The (Steelcase Global Report, 2013) „is the first to explore the relationship between employee engagement and how people feel about their workplace."

The study shows that employees' engagement may be affected by factors such as: working environment, people's perceptions of workplace and organization, different dimensions of work experience.

According to the data from this study, employees with the highest level of engagement are those who are satisfied with various aspects of their workplace.
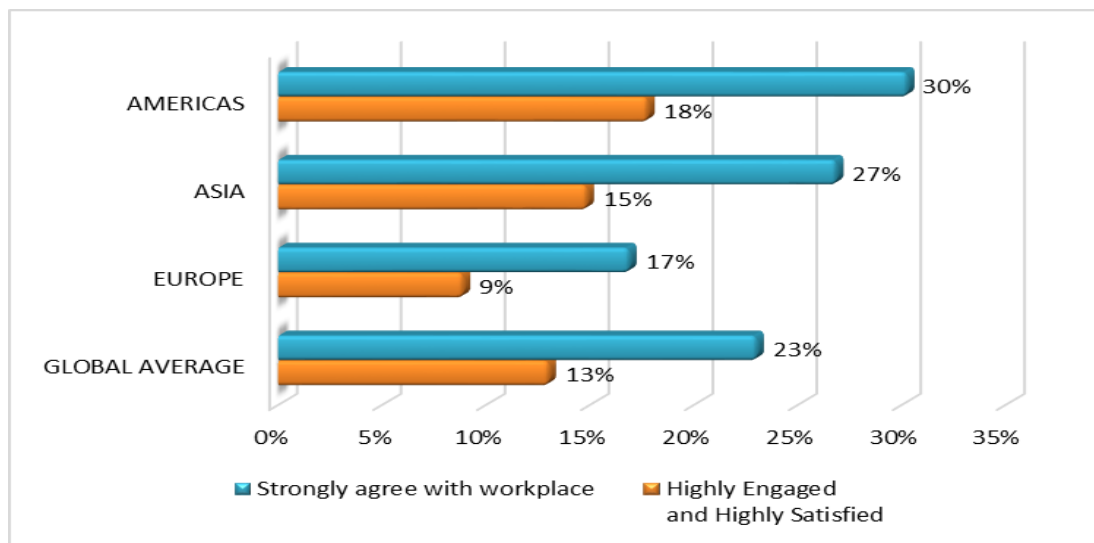
Figure 2: Link between engagement and workplace satisfaction (Steelcase Global Report, 2013)

Also, the reciprocity is valid. Employees who disagrees with the workplace aspects are those who show the lower engagement level.
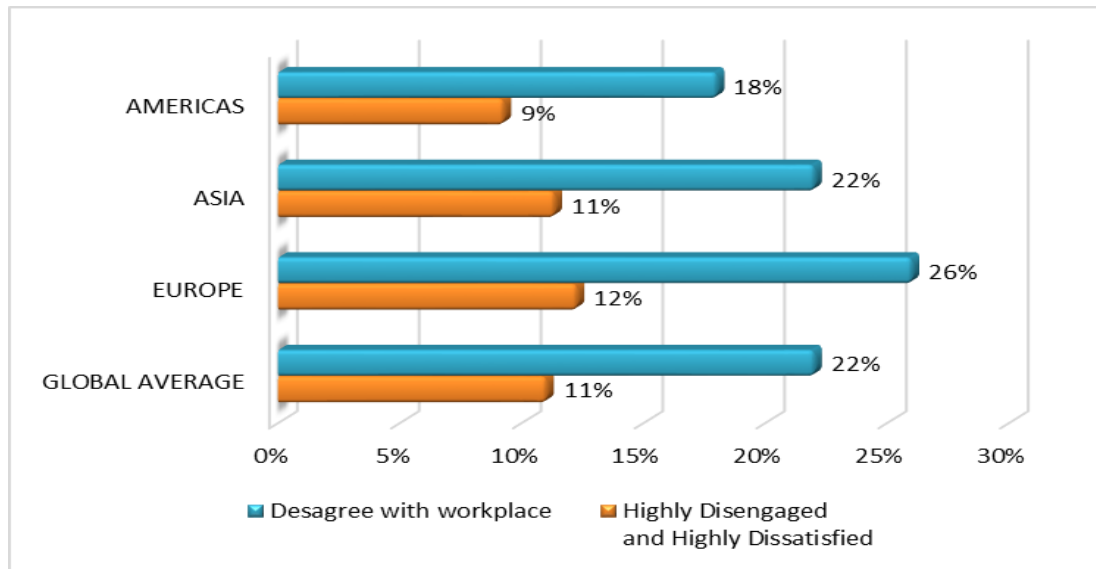
Figure 3: Link between engagement and workplace dissatisfaction (Steelcase Global Report, 2013)

The study concludes that, on average, only 13 percent of global workers are highly engaged and highly satisfied with their work environment.

"Employee engagement is the emotional commitment the employee has to the organization and its goals.", says Kevin Kruse - writing for Forbes (Kruse, 2012)

According to Kevin Kruse article, we can say that engaged employees can help develop the company, as can be seen in the diagram below:
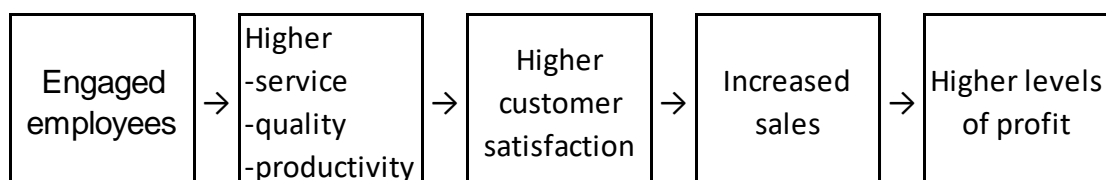
Figure 4: Employees engagement and company development (Kruse, 2012)

Moreover, the Steelcase report shows that the level of engagement is higher when the feeling of belonging to the company is higher.
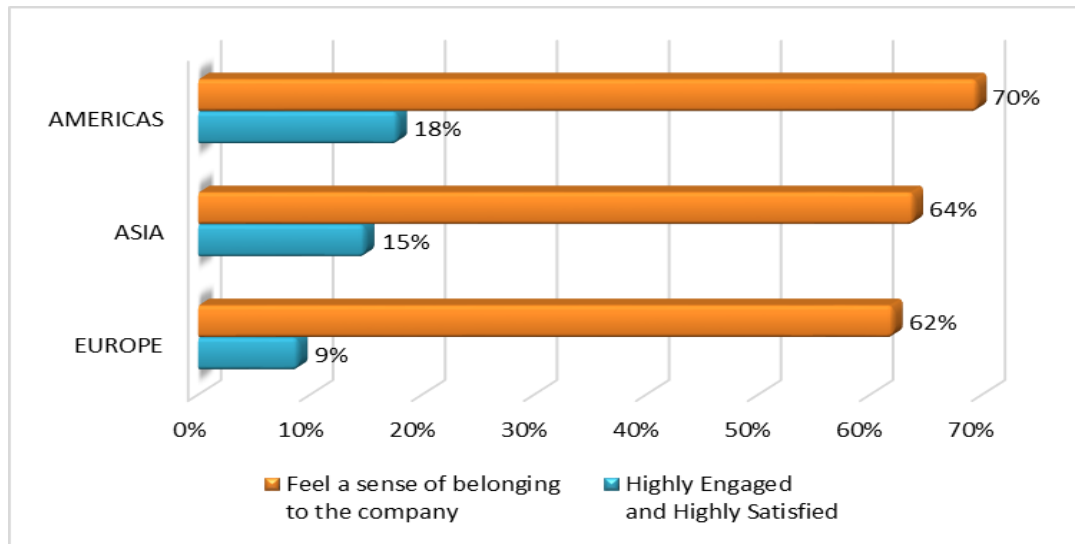
Figure 5: Link between engagement and the sense of belonging to the company (Steelcase Global Report, 2013)

When the employee has a more positive attitude towards the company the level of engagement is higher. The study analyzed employees' perception of the company through the following statements:

- feel connection with colleagues;
- happy to go to work;
- proud to work for company;
- motivated by work;
- sense of personal achievement;
- recommend the company as an employer;
- value the company culture;
- endorse company's strategy and direction;
- optimistic about the future in the company;
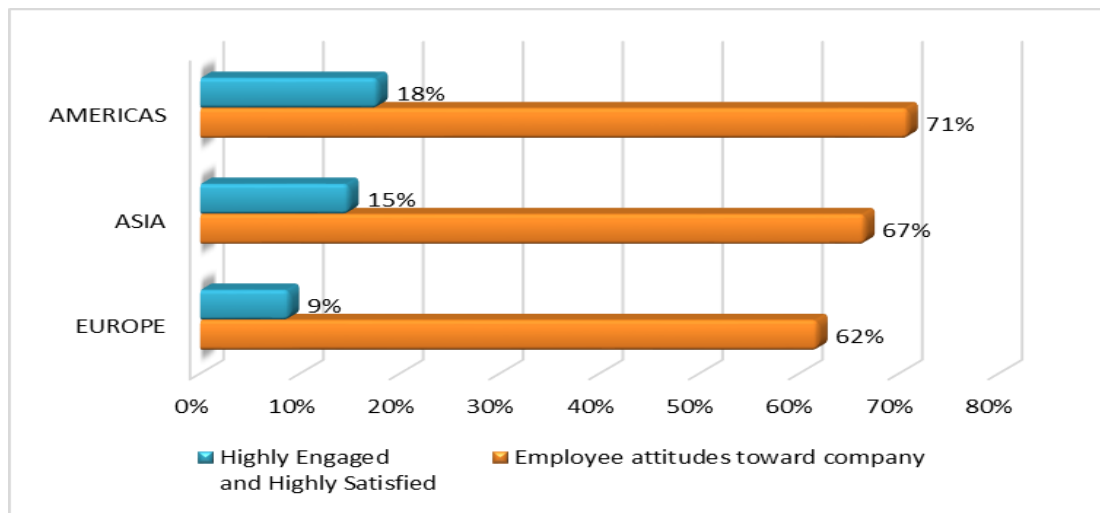
Figure 6: Link between engagement and employees' attitude towards company (Steelcase Global Report, 2013)

Workplace experience compares with the experience in five others categories:

- health and well-being;
- trust and safety;
- enjoyment and satisfaction;
- focus and prioritization;
- meaning and significance ;

"An overall feeling of enjoyment and satisfaction at work is an important key to being sustainably engaged in our jobs", says Tony Schwartz in a publication for Harvard Business Review. (Schwartz, 2017)

From the report we can see that the quality of life at work influences positively employees' engagement.
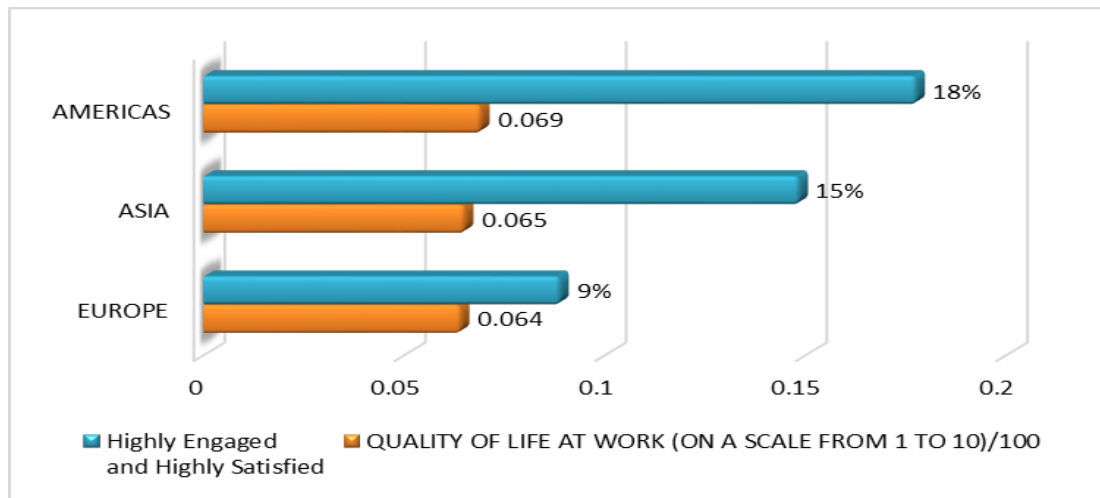
Figure 7: Link between engagement and quality of life at work (Steelcase Global Report, 2013)

In her study, Shweta Malhotra said that job satisfaction is "a term sometimes used interchangeably with employee engagement" and "is defined as how an employee feels about his or her job, work environment, pay, benefits, etc. The happier people are with-in their job, the more satisfied they are said to be." (Malhotra, -)

Because the engaged employees are those who are highly involved in and enthusiastic about their work and workplace, various aspects of their workplace are important and in direct connection with the level of engagement.

From the study we can conclude that the sense of belonging to the company, the feeling of connection with colleagues, the proud to work for company, the sense of personal achievement, feeling motivated by work, optimistic about the future in the company and the quality of life at work influences the employees' satisfaction with the workplace.

That being said, we can conclude that H1: Employee engagement is related to workplace satisfaction is true.

OFFICE BUILDINGS \ VARIABLE	Highly Engaged and Highly Satisfied	Highly Disengaged and Highly Dissatisfied	QUALITY OF LIFE AT WORK /10	PERCEPTION OF WORKING ENVIRONMENT DO YOU LIKE YOUR WORK			EMPLOYEE ATTITUDES TOWARD COMPANY	EMPLOYEE ATTITUDES TOWARD WORK ENVIRONMENT Feel a sense of belonging to the company
				Strongly agree with workplace	Agree	Desagree with workplace		
USA	14%	9%	6.8	27%	49%	16%	73%	70%
BRAZIL	24%	12%	6.8	38%	37%	17%	69%	69%
CANADA	11%	10%	6.5	21%	51%	19%	71%	65%
MEXICO	22%	6%	7.5	35%	41%	19%	70%	74%
CHINA	10%	4%	7.0	24%	47%	26%	71%	75%
UNITED ARAB EMIRATES	20%	5%	6.7	29%	41%	18%	71%	64%
INDIA	28%	4%	7.4	37%	46%	12%	83%	80%
KINGDOM OF SAUDI ARABIA	18%	22%	6.1	31%	36%	18%	68%	61%
TURKEY	12%	15%	6.2	31%	36%	22%	63%	59%
JAPAN	1%	18%	5.4	9%	36%	36%	43%	44%
BELGIUM	6%	14%	6.5	12%	48%	29%	62%	49%
FRANCE	5%	18%	6.0	12%	45%	31%	58%	52%
GERMANY	12%	12%	6.4	26%	46%	20%	66%	65%
NETHERLANDS	7%	5%	6.8	19%	50%	22%	71%	73%
POLAND	13%	11%	6.2	17%	52%	22%	56%	68%
RUSSIA	10%	11%	6.6	15%	43%	30%	56%	73%
SPAIN	7%	15%	6.5	16%	47%	27%	58%	56%
UNITED KINGDOM	11%	12%	6.3	18%	48%	24%	67%	60%
GLOBAL AVERAGE	13%	11%	6.6	23%	46%	22%	67%	66%
AMERICAS	18%	9%	6.9	30%	45%	18%	71%	70%
ASIA	15%	11%	6.5	27%	40%	22%	67%	64%
EUROPE	9%	12%	6.4	17%	47%	26%	62%	62%

Figure 8: An overview of data modeling in Excel (Steelcase Global Report, 2013)

4.2. H2: Cultural context influences office layout and engagement levels

According to (Bakke, 2007), there are many different types of office designs ranging from traditional private offices to open offices. These include:

1. **Cell office** – a personal room surrounded by four walls with a window, private meetings and most work activities are facilitated in the room;
2. **Shared room office** – 2-3 persons share the office which is surrounded by four walls, has a window/windows and most activities are facilitated in the sharedroom;
3. **Open plan landscape** – employee has a personal workstation in a common workspace, no access to own window, telephone communication and meetings in specific rooms and most of the activities are facilitated in common shared spaces;
4. **Flex office** – there are no personal workstation and this type depends on advanced information technology, which makes the employees independent to choose when and where to work from. Employee's personal belongings and work materials are in a pedestal-on-wheels or personal cupboard. There is access to "back-up spaces" for meetings and phone calls and all work activities are facilitated in the common shared spaces;

According to Aoife Brennan field study, open offices were designed in the 1950s and reached their height of popularity in the early 1970s, when many companies converted to these types of designs. Original claims by the designers of open offices were that they created flexible space, allowing layout to be more sensitive to changes in organizational size and structure. Workstations can be easily reconfigured at minimal cost and meet changing needs. It was also believed that the absence of internal physical barriers would facilitate communication between individuals, groups, and even whole departments, which consequently, would improve morale and productivity.

Many companies continue to adopt open office designs primarily because of the reduced costs in construction and maintenance. However, another reason why open plan offices are so popular is the belief that they facilitate greater communication, which in turn, facilitates greater productivity (Aoife Brennan, 2002).

Dr. Mike O'Neill said that in most industries and organizations, there are multiple work habits and preferences for different types of workspaces. The preference for open or enclosed work environments is based on work habits and the type of work the employee performs. (O'Neill, 2008)

According to A. Eugene Kohn, each region retains unique features in designing office buildings, characteristics that are not influenced by foreign trends or technological developments, although the trend is general globalization. These result from a combination of priorities specific to that place, including climate, geography, local codes and construction practices.

We can say that the world today can be divided into three major markets for office buildings, each with distinct regional characteristics: the United States, Europe and Asia. For the present, all other market can be considered derivatives of those.

- In the **United States**, the performance of mechanical systems (which can account for more than 25% of an office building budget) is considered vital to competitive survival. Air-conditioning is often required first for computers, then for employees. In the United States, employee mobility is an accepted fact, and there is hardly any expectation of organizational stability. The typical lease in the US is 10 to15 years, allowing tenants to move easly.
- In **Europe** is established by law that every office worker is entitled to work in natural light. This effectively limits the depth-to-core dimension to 8m. There is also an almost exclusive use of cellular offices, as well as an overwhelming cultural preference for natural ventilation and an acceptance of summer temeratures that American workers would find uncomfortable. As a source of natural light and ventilation, and as a key energy-conserving feature, the exterior wall is a crucial component, justifying greater design consideration and greater investment in this region than in other parts of the world.
- Significantly, the **Asian** market is rapidly increasing in size and eventually will probably be the biggest, especially in tall and large projects.
  (A. Eugene Kohn, 2002)

In a study of Harvard Business Review (Gall, 2013) about how culture affects office layouts in different countries, researchers mapped each country's results to the poles of six different categories:

1. **Autocratic vs. Consultative:**

Little communication and collaboration between workers of different levels, as opposed to highly collaborative environments where workers help make decisions;

- In China, teamwork is emphasized within groups, but departments are highly segregated in distinct spaces. Employees have little access to executives.
- On the other hand, on the United States, leaders' work spaces are accessible, inviting interaction among employees at all levels and expediting decision making.

2. **Individualist vs. Collectivist:**

Self-sufficiency and independence versus emphasis on the group and harmony;

- In the United States, eliminating the cubicle in favor of flexible work environments lets employees choose the space that best suits their current task.
- In China, where supervisors exert more control and guidance, alternative spaces are a new concept. Employees are comfortable with densely arranged workstations.

3. **Masculine vs. Feminine:**

Competition vs. Harmony;

- In Europe, most firms have assertive, competitive corporate cultures. Visible symbols of hierarchy, such as private offices, are important. Collaboration spaces tend to be no-frills.
- United States organizations generally feature more fluid spaces that encourage equality and reflect a focus on well-being.

4. **Tolerant of Uncertainty vs. Security Oriented:**

Flexible and open to change versus being detail oriented and married to structure;

- The United States are at ease with unstructured, unpredictable situations and prefer work spaces that promote sharing, mobility, and creative thinking.
- In Europe, workers tend to be careful about sharing information and make big changes only after deliberation. Accordingly, the design of spaces should reflect their intended use.

5. **Low Context vs. High Context:**

Direct communication versus emphasis on more subtle cues, such as body language and other subtexts;

- In low-context the United States - communication is expected to be honest and straightforward. How a message is delivered is less important. Here, office spaces should be outfitted with whiteboards and other information-sharing tools.
- In high-context China - tools such as video conferencing allow participants in virtual meetings to see visual cues such as where people are seated and their body language, building deeper understanding.

6. **Short Term vs. Long Term:**

Fewer investments and faster returns in contrast with longer investments and company longevity;

- In the United States, being fast, flexible, and innovative is important. Spaces should allow for quick toggling between individual and group work
- In China, spaces embody a company's history, values, and rituals. Executive offices are important symbols of tradition, order, and long-term stability.

In the Nordic Innovation Centre's Guide it is specified that „drawing on a number of different studies, one finds a series of national differences in office design. There are at least differences in building types, in the average size of companies, and the average size of offices. Further, there are different sets of legislation and regulations, such as employee participation, and different workplace culture. Employee participation was seen as particularly important, as a way to get employee perspectives into the design process, and to serve as a corrective to expert design. This plays together with a tradition for small status differences, a climate – as well as legislation – for cooperation, and the strength of the trade unions." (Bakke, 2007)

According to the survey of Nordic offices there are also certain differences within the Nordic sphere:

- Individual offices appeared to be particularly common in Norwegian, Finnish, Swedish and Icelandic enterprises;
- Small open-plan offices dominating in most organisations in Denmark;
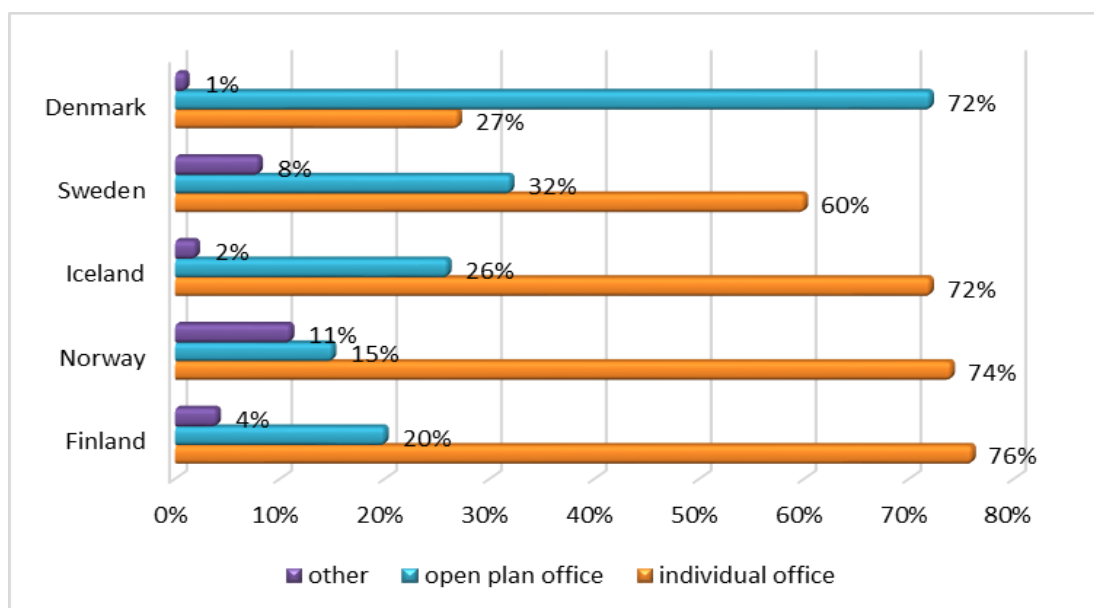
Figure 9: Office layout for Nordic sphere (Bakke, 2007)

Media and popular culture may create the perception that workplaces have changed dramatically in the past decade and that offices are open, informal and collaborative. In some places this is true. But the reality for employees around the world is that most

people work in traditional office environments, with an emphasis on hierarchy and desk-based individual work.

Despite the rise of collaborative work globally, more workplaces are configured with entirely private offices than those comprising completely open space configurations (31 percent vs. 23 percent). The majority of workplaces (46 percent) consists of both open and enclosed private spaces. (Steelcase Global Report, 2013)
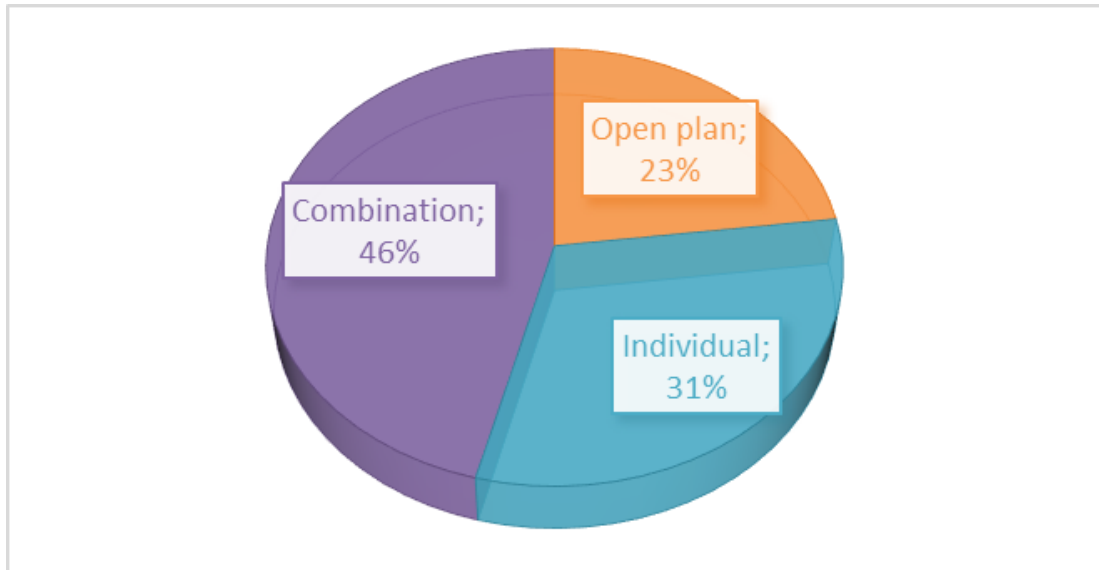
Figure 10: Overall office layout (Steelcase Global Report, 2013)

Most individuals work in private offices or shared private offices. This is primarily driven by job title and status.
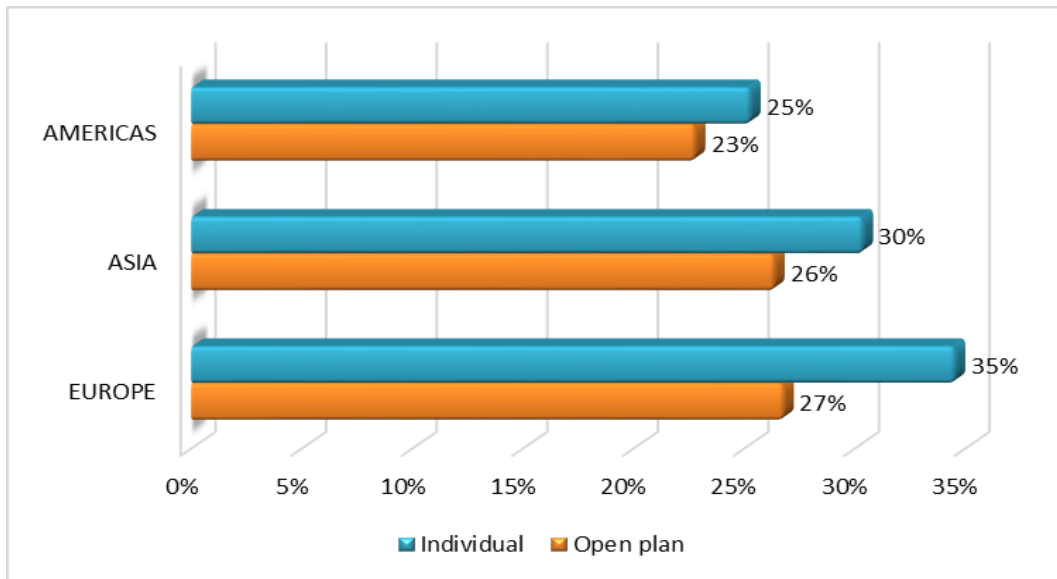
Figure 11: Individual vs. open planed office (Steelcase Global Report, 2013)

According to Harvard Business Review (Gall, 2013), in **China**, firms share a high tolerance for density and are extremely hierarchical. Many employers optimize their office layouts by reducing workers' space and giving managers and executives plenty of room.
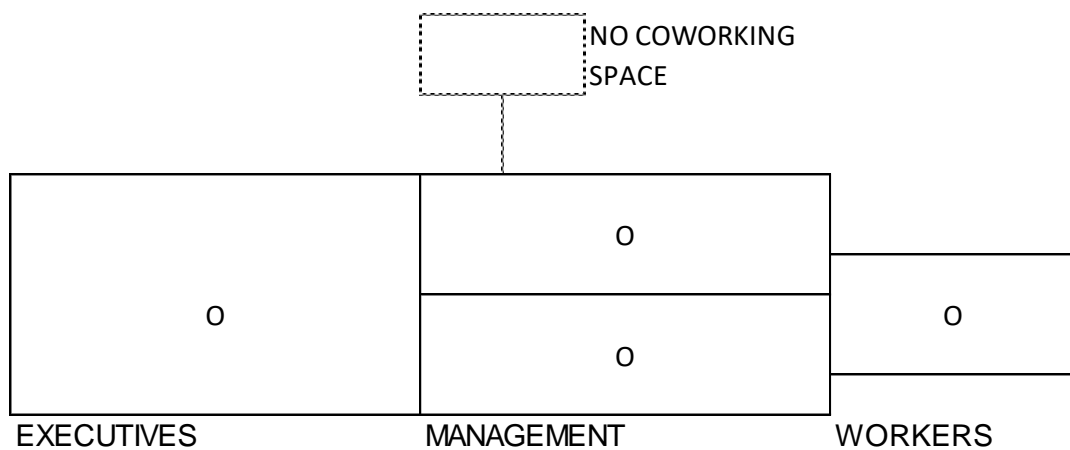
Figure 12: Office layout in China (Gall, 2013)

In **Europe**, where space allocation is more egalitarian, firms tend to optimize by reducing the size of both private offices and open work spaces. Firms there are

beginning to explore alternative locations, such as coworking facilities and satellite offices, to address overcrowding.

```
                    ┌──────────────┐
                    │      O       │ SOME COWORKING
                    │              │ SPACE
                    └──────┬───────┘
                           │
┌──────────────┬──────────┴───┬──────────┬──────────┐
│              │              │    O     │    O     │
│      O       │      O       ├──────────┼──────────┤
│              │              │    O     │    O     │
└──────────────┴──────────────┴──────────┴──────────┘
   EXECUTIVES     MANAGEMENT        EMPLOYEES
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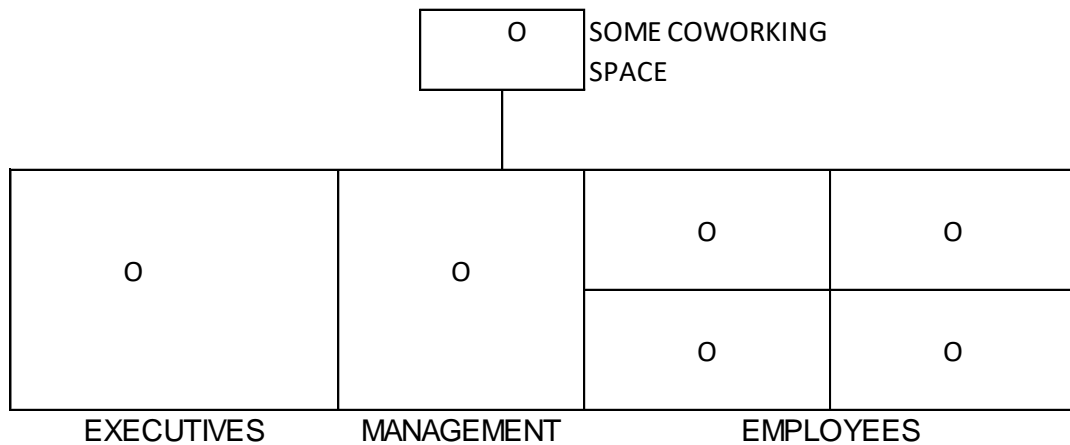
Figure 13: Office layout in Europe (Gall, 2013)

In the **United States**, spaces reflect a progressive view of work, with all levels of employees sharing spaces. At the same time, workers don't like to feel crowded, which has led to the liberal use of "hotel" spaces and telecommuting.

```
        ┌──────────┐      ┌──────────┐
OFF SITE│    O     │      │    O     │ COWORKING
        └────┬─────┘      └─────┬────┘
             │                  │
ALTERNATIVE  ┌────────────────────────┐ EXECUTIVES
WORKSPACES   │    O          O        │ MANAGEMENT
  ┌──────┐   │                        │ EMPLOYEES
  │  O   ├───┤    O          O        │
  └──────┘   └────────────────────────┘
```
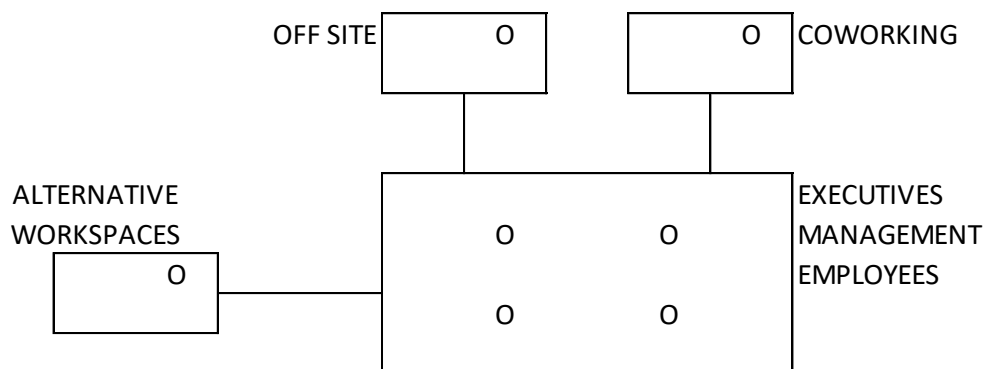
Figure 14: Office layout in the United States (Gall, 2013)

According to HOK report (Workplace Strategies that Enhance Performance, Health and Wellness, -), today's knowledge work requires high levels of concentration, collaboration and everything in between. Well-designed workplaces provide opportunities for both and allow individuals to choose when and how they use them.

Susan Cain author of the book „Quiet: The Power of Introverts in a World That Can't Stop Talking" (Cain, 2012), said in an interview for ZDNet, "A 'best office' is one that would give people a choice of how much stimulation is coming at them at any one time. I would create an office that has lots of nooks and crannies, lots of zones of privacy, but also lots of zones where people can come together and schmooze and hang out. Another thing is that when people work on projects, there should be more of a tolerance for people working on their own. I think it's okay to work on a team, but within that team, the individual members need to be able to go off by themselves and do their own things and have a lot of autonomy and more privacy." (Petrilla, 2012)

Workplace strategies according to HOK report:

a) Provide a variety of work settings in the right proportion to support a variety of work functions:

- Focus work: Provide quiet zones or spaces for concentrated work.
- Collaboration: Emphasize small group collaboration and provide diverse settings (formal and informal).
- Learning: Consider the workplace to be an educational environment that supports learning and mentoring by providing e-learning and in-person, one-on-one learning.
- Socializing: Provide a variety of informal spaces that accommodate work and casual communication while fostering informal collaboration and innovation.

b) Provide technology – headsets, sound masking and white noise – that allows workers to perform focused work when necessary.

c) Provide technology that allows workers to connect and collaborate more effectively in person and virtually. Consider a mix of teleconference, video conference, web conference, instant messaging, social media and other tools to enable different teams to communicate in the way they work most easily.

In a report of Sodexo Group (Institute for Quality of Life, 2016), six elements of employees' wellbeing are described and their relation with office design:

1. Optimism
   - Performance driver: Foster creativity and innovation
   - Design considerations:
     - Allow choice and control over where and how people work;
     - Create spaces that allow personalization and individual customization, instead of tightly enforced workplace standards;

- Offer settings and affordances that help employees feel supported in their work;
- Design for transparency, so people can see and be seen, and build trust;

2. Mindfulness
   - Performance driver: Fully engaged
   - Design considerations:
     - Create spaces that help people connect with others one-on-one and eye-to-eye, and not just through their technology devices;
     - Design areas that allow workers to control their sensory stimulation and choose if they want to amp it up or down;
     - Offer places that are calming, through the materials, textures, colors, lighting and views;
     - Create areas where people can connect with others without distractions or interference;

3. Authenticity
   - Performance driver: Really yourself
   - Design considerations:
     - Create spaces that help people feel comfortable to express themselves and share their ideas;
     - Incorporate informal, non-constricting environments with a home-like feel;
     - Design areas that help people connect their personal values to the brand values;

4. Belonging
   - Performance driver: Connecting to others
   - Design considerations:
     - Create entrances that are welcoming with visible hosting for people who don't work there routinely;
     - Provide ample and well-equipped spaces for mobile and resident workers to work individually or in teams;

- Offer videoconferencing configurations that allow remote participants to see content in the room and on the walls, and to hear everyone equally;
- Design informal areas for socialization, in person as well as virtually;

5. Meaning
   - Performance driver: A sense of purpose
   - Design considerations:
     - Include spaces beyond the lobby that reinforce the brand, purpose, history and culture of the company;
     - Leverage vertical real estate to make thinking and progress visible;
     - Use technology to display real-time information;
     - Create an ecosystem of spaces that give people choices and empower them to work productively alone or together;

6. Vitality
   - Performance driver: Get up and go
   - Design considerations:
     - Design areas that give people choices for controlling the level of sensory stimulation around them;
     - Provide easily adjustable furniture to fit a range of sizes, needs and preferences and to promote movement throughout the day;
     - Include cafés with healthy food choices and displays;
     - Bring nature in with daylight, views, ventilation, patios, etc.
     - Support active, healthy lifestyles with centrally located stairways, outdoor walking paths, bicycle racks, etc.

An example of an office building where space is designed and divided so that the needs of each employee can be met, is the Microsoft office in Vienna.

It offers many meeting rooms with different themes, team-work space but also individual working space. There is a relaxation area and a coffee or snack spot.

Interesting thing: inside the building there is a slide that can reach from the first floor to the ground floor. Also, a point of interest is the vertical gardens made on the walls.
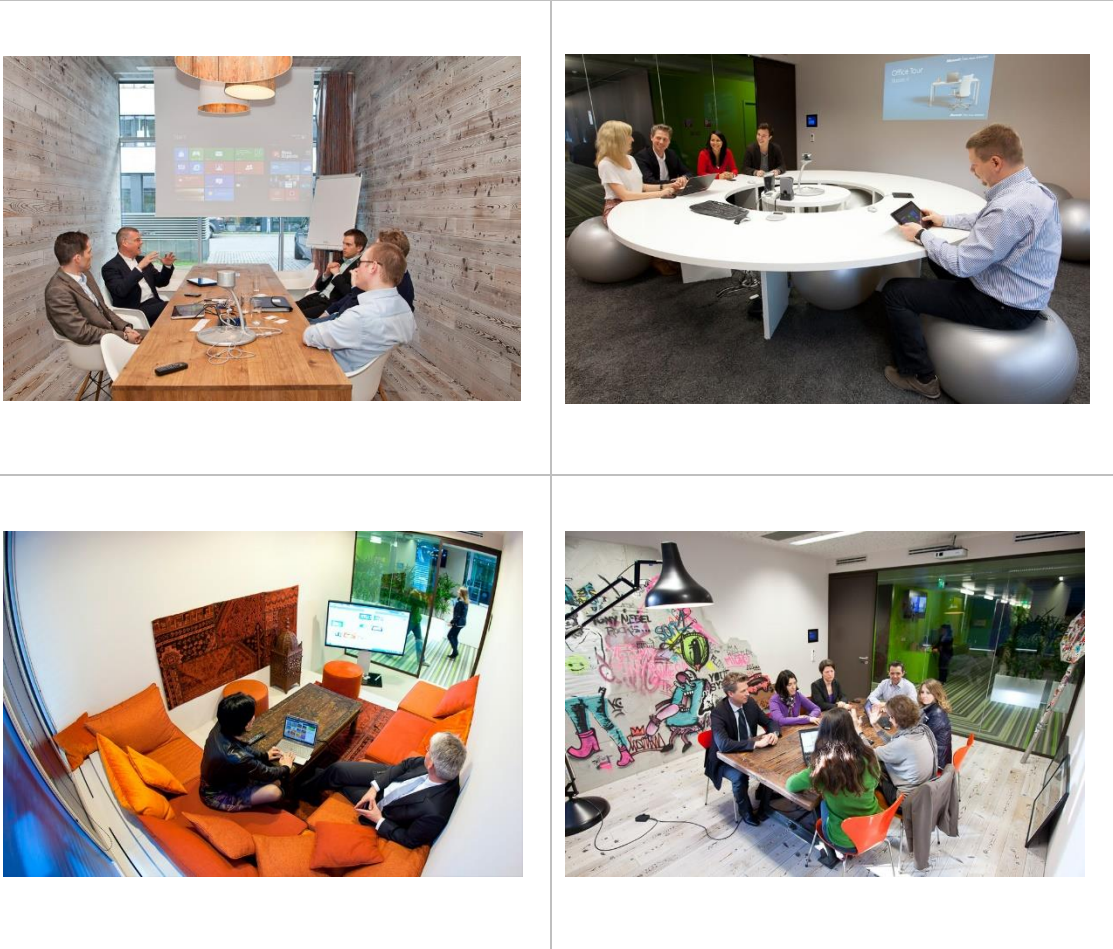
Figure 15: Various themed meeting-rooms in Microsoft office building, Vienna
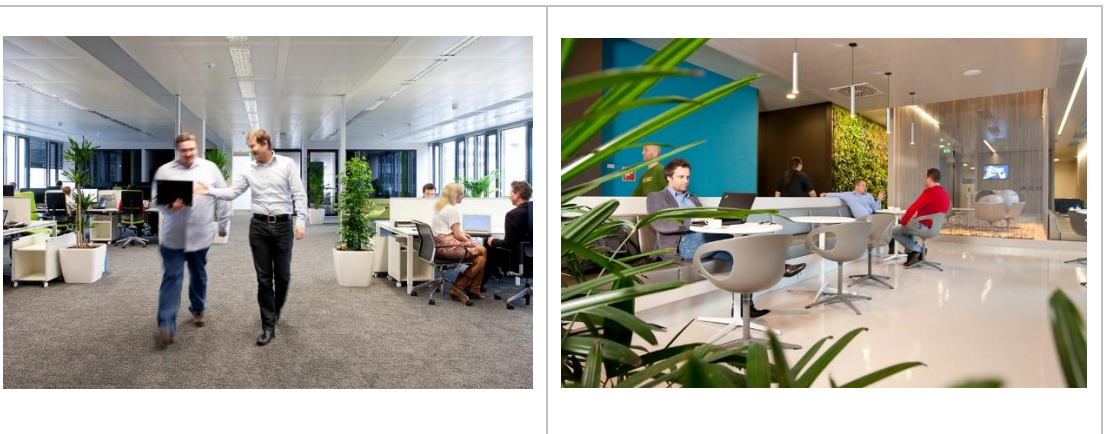
Figure 16: Working space in Microsoft office building, Vienna

Figure 17: Slide, relaxation area and a coffee/snack spot in Microsoft office building, Vienna

Photos source: (Ein Bild sagt mehr als tausend Worte..., n.d.)

The (Steelcase Global Report, 2013) says that the place where an employee lives and works has an impact on how he perceives work and the work environment.

Cultural norms and economic factors influence employee satisfaction with the workplace and the overall level of engagement.
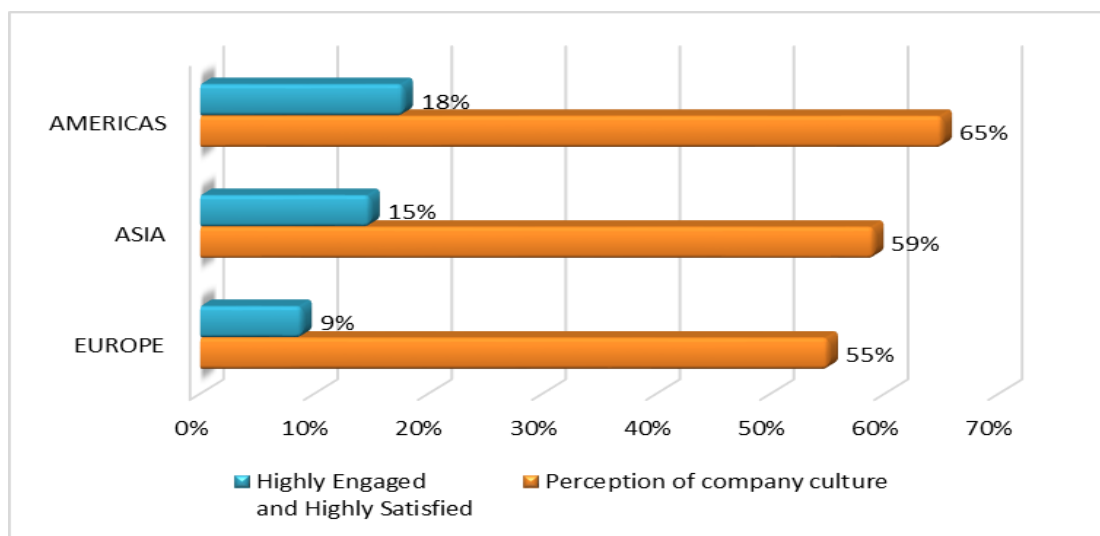
Figure 18: Link between engagement and company culture (Steelcase Global Report, 2013)

The highest degree of engagement tended to belong to employees from economically developing countries (energetic, optimistic attitudes often prevail in these countries and workers are highly satisfied with their environments – like India), while the lowest degree of engagement is in economically stable countries (like Japan).
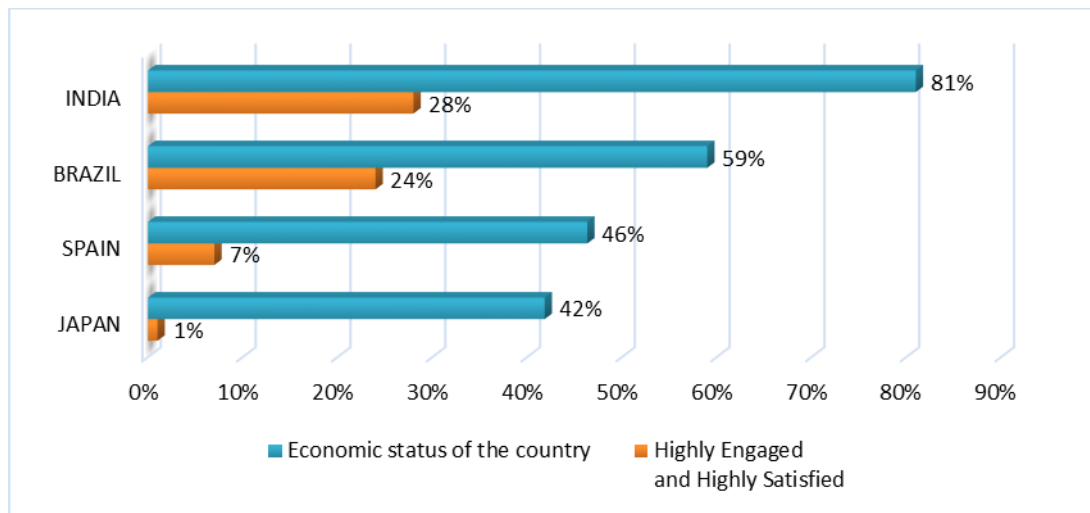
Figure 19: Link between engagement and economic status of the country (Steelcase Global Report, 2013)

In the report it is said that "these findings are important for global organizations that are exploring workplace strategies in different countries and regions. A key insight to this finding is that one solution may not be right for all locations. It is important that organizations consider the cultural context that can influence engagement levels and explore workplace design solutions that best match the needs of people in diverse cultures."

In a survey led by Lameck B. Million and Edward I. Mondi the change of location for the office building and the transition from cell office to open plan office was analyzed. (Mondi, 2013)

The survey shows that a majority of the administration staff were satisfied with their job in current office and their preference is towards cell office design.
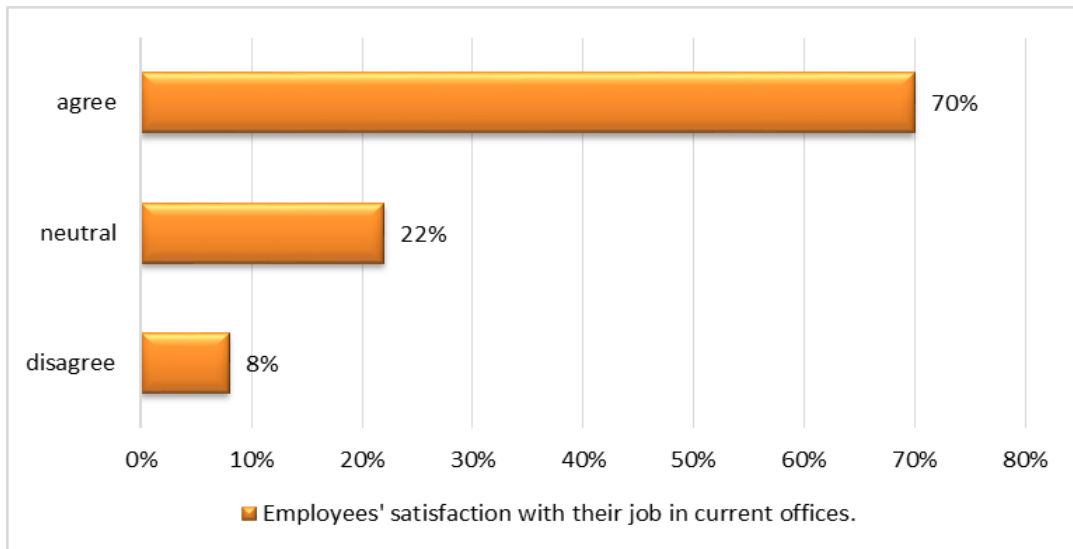
Figure 20: Employees' satisfaction with their job in cell offices (Mondi, 2013)
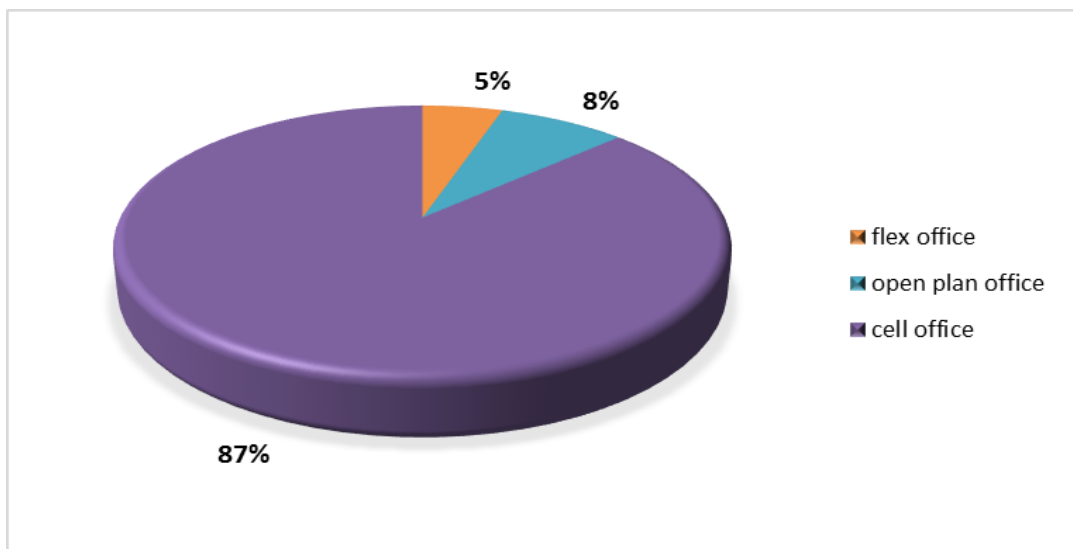
Figure 21: Employees' choices on office types (Mondi, 2013)

Almost all employees have agreed that a closed office gives them the opportunity to focus and give them privacy. At the same time, the majority did not agree that the closed office limits communication or knowledge sharing.
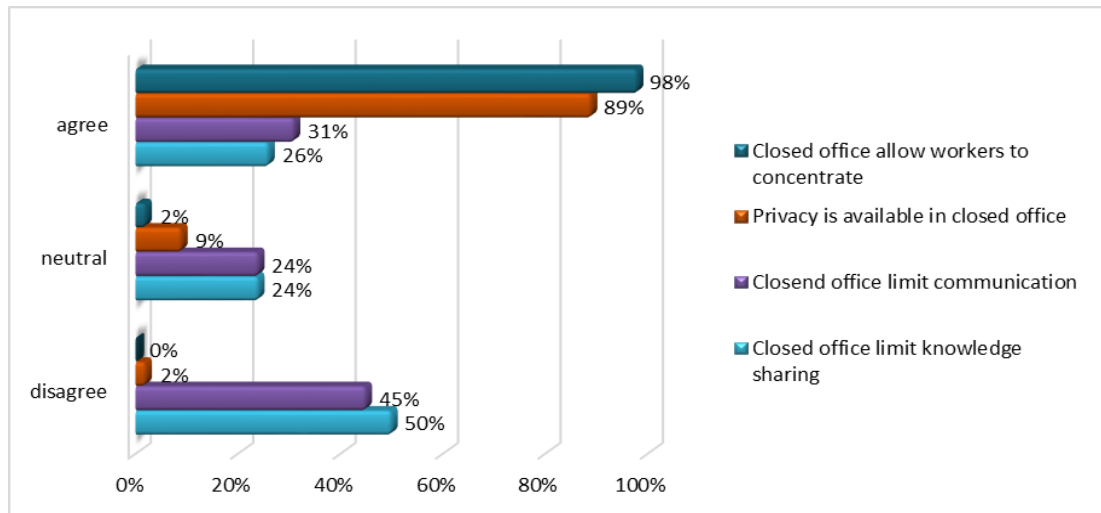
Figure 22: Opinions on advantages and disadvantages of closed offices (Mondi, 2013)

On the other hand, an open office does not confer privacy and exposes employees to work interruptions. Most have had a neutral view of the fact that an open office helps to communicate more effectively and most people felt that an open office encourages knowledge sharing.
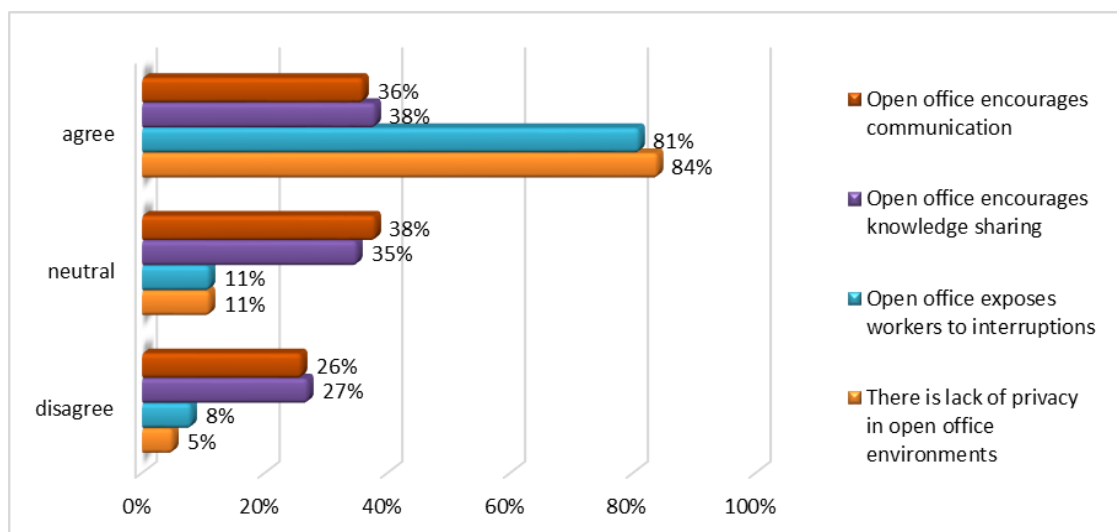
Figure 23: Opinions on advantages and disadvantages of open office (Mondi, 2013)

In a study by the University of Botswana, the perception of over 200 people on the open space office elements was analyzed. The results showed that lecturers have a negative perception of open-plan office. It appears that most of them are not satisfied with workplace, believes that an open-plan office eliminates social status and highlights the lack of privacy. Also, they consider that personal items are not in safe, they don't have control over space and work life and there is no lack of distractions in open-plan office. However, most have agreed that open-plan office leads to group cohesiveness. (Oyetunji, 2013)
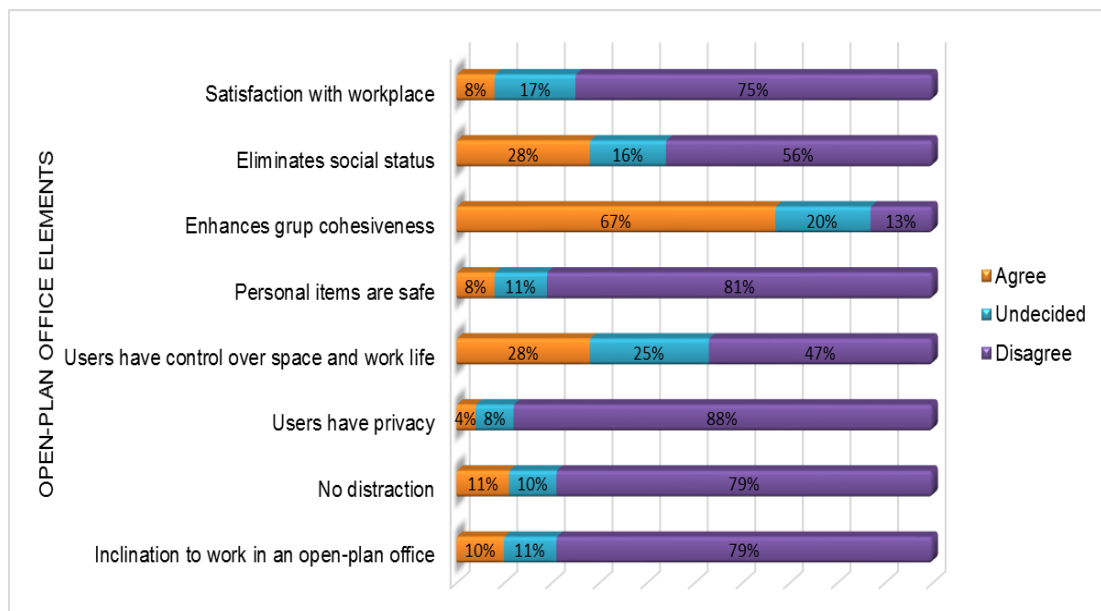
Figure 24: Open-plan office elements and lecturers' perception (Oyetunji, 2013)

According to Nordic Innovation Centre Guide (Bakke, 2007), companies that work strategically with new office design typically choose solutions encompassing open-plan solutions, since:

- Open-plan offices provide a high degree of flexibility;
- Open-plan offices are often introduced with the goal of promoting knowledge sharing;
- Solutions primarily with cellular offices do not provide similar options for using workplace design as a strategic instrument – although cellular offices have other qualities;

From the study it can be observed that the cultural differences influence the way offices layouts are designed. China share a high tolerance for density and are extremely hierarchical, in Europe the space allocation is more egalitarian and alternative working locations are explored and in the United States the space is shared with all levels of employees.

The employees' preference when it comes to office layout are the closed offices because it allows them to concentrate and it gives them privacy. They also consider that an open-plan office eliminates the social status and that the personal items are not in safe.

On the other hand, the companies choose the open-plan offices solutions because these provides a high degree of flexibility, it encourages knowledge sharing and enhances group cohesiveness.

These being said, we can conclude that there is a link between the cultural differences, the type of office and the way the employee perceives the work environment, so H2: Cultural context influences office layout and engagement levels is true.

OFFICE BUILDINGS VARIABLE	Highly Engaged and Highly Satisfied	Highly Disengaged and Highly Dissatisfied	OVERALL OFFICE LAYOUT			PERCEPTION OF COMPANY CULTURE						
			Open plan	Individual	Combination	Encourages teamwork and colaborative work	Gets the best out of you	Attaches great importance to the H&S of its employees	Encourages to use initiative	Recognizes and values its employees	Takes a genuine interest in the wellbeing of its employees	
USA	14%	9%	21%	23%	56%	76%	73%	75%	73%	57%	69%	71%
BRAZIL	24%	12%	35%	29%	36%	64%	62%	58%	58%	54%	58%	59%
CANADA	11%	10%	25%	22%	53%	76%	70%	70%	66%	61%	62%	68%
MEXICO	22%	6%	10%	27%	63%	63%	71%	66%	64%	60%	59%	64%
CHINA	10%	4%	28%	24%	48%	85%	65%	68%	64%	70%	59%	69%
UNITED ARAB EMIRATES	20%	5%	11%	32%	57%	68%	59%	59%	58%	59%	47%	58%
INDIA	28%	4%	14%	37%	49%	85%	81%	80%	81%	80%	79%	81%
KINGDOM OF SAUDI ARABIA	18%	22%	8%	39%	53%	62%	53%	52%	49%	57%	39%	52%
TURKEY	12%	15%	19%	41%	40%	59%	65%	57%	53%	47%	37%	53%
JAPAN	1%	18%	78%	9%	12%	56%	39%	50%	35%	34%	37%	42%
BELGIUM	6%	14%	32%	32%	37%	64%	50%	51%	52%	41%	42%	50%
FRANCE	5%	18%	24%	37%	39%	59%	52%	51%	48%	34%	36%	47%
GERMANY	12%	12%	19%	54%	27%	66%	62%	60%	55%	55%	51%	58%
NETHERLANDS	7%	5%	28%	36%	36%	71%	58%	63%	67%	61%	60%	63%
POLAND	13%	11%	20%	40%	41%	60%	51%	57%	57%	45%	42%	52%
RUSSIA	10%	11%	16%	40%	44%	64%	65%	44%	61%	49%	55%	56%
SPAIN	7%	15%	26%	23%	51%	47%	45%	52%	45%	45%	44%	46%
UNITED KINGDOM	11%	12%	49%	14%	37%	74%	61%	69%	67%	56%	58%	64%
GLOBAL AVERAGE	13%	11%	23%	31%	46%	68%	63%	62%	62%	56%	54%	61%
AMERICAS	18%	9%	23%	25%	52%	70%	69%	67%	65%	58%	62%	65%
ASIA	15%	11%	26%	30%	43%	69%	60%	61%	57%	58%	50%	59%
EUROPE	9%	12%	27%	35%	39%	63%	56%	56%	57%	48%	49%	55%

Figure 25: An overview of data modeling in Excel (Steelcase Global Report, 2013)

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4.3.   H3: Work environment influences employee performance

4.3.1. Employee performance and productivity measurement

According to HOK article (Workplace Strategies that Enhance Performance, Health and Wellness, -), we can define performance as a function of the three factors acting together: **Performance = Ability x Motivation x Opportunity**.

−   Ability: refers to the idea that a person *can* accomplish a task;

−   Motivation: refers to the idea that a person *want* to accomplish a task;

−   Opportunity: refers to the *chance* that a person have to accomplish a task (all the resources and amenities that are given to that person);

At the Conference on Highly Effective Facilities at the American Institute of Architects, Judith H. Heerwagen presented a paper in which she said:

"A building can positively affect *ability* by providing comfortable ambient conditions, by enabling individual control and adjustment of conditions, and by reducing health and safety risks. Negative impacts on ability to do work are associated with conditions that are uncomfortable, distracting, hazardous, or noxious."

"A building can positively affect *motivation* by providing conditions that promote positive affective functioning, psychological engagement and personal control. Moods create the 'affective context' for thought processes and behaviors and are directly tied to motivation."

"A building can affect *opportunity* by providing equitable access to conditions that reduce health and safety risks, equitable access to amenities and compensatory design options where inequities exist and are difficult to eliminate entirely." (Heerwagen, 1998)

By having a better office workplace, the employees will work better, produce better work and enhance their work performance.

An inappropriate working environment in office space leads to health problems, and thus to a higher rate of absenteeism. A higher rate of absenteeism reflects a decreased productivity of employees and this also affects their performance.
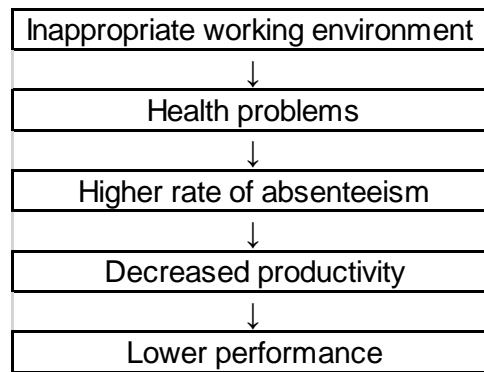
Inappropriate working environment
↓
Health problems
↓
Higher rate of absenteeism
↓
Decreased productivity
↓
Lower performance

Figure 26: Inappropriate working environment and the results

A case study of three public universities in Malaysia, "The effect of physical environment comfort on employees' performance in office buildings", says that "employee's performance can usually be used as a measure of how well a certain organization converts its resources into services or goods, which reflects that all employees' productivity is imperative to the organization. A high level of employee work performance is most likely to bring profitability to that organization." (Azlan Shah Ali, 2015)

Productivity is usually defined as the ratio between inputs and outputs. For example in a factory, productivity can be measured traditionally, considering the number of products made in the unit of time. Conceptually, productivity is an objective and quantifiable measure.

To measure productivity in office buildings it is a difficult task, as there is no exact measuring method for determining the exact figure. Despite this, a number of studies have proven that evaluating the productivity of employees in an office building could be carried out through individual measures by checking on their health issues, absenteeism rate and job satisfaction.

In James Sullivan's report "Measuring Productivity in the Office Workplace", advantages and disadvantages for different forms of productivity measurement in the office environment are highlighted (James Sullivan, 2013):

- **Perceived productivity rating**
    - Advantages:
        - Provide an indication of productivity effects
        - Surveys allow many people to be assessed relatively cheaply
        - Can be assessed very quickly and easily (1 question)

- General question can be broadly used. Is common practice
- Relationships between environment and subjective measures are supported by objective research, suggesting it is a viable indicator
  - Disadvantages:
    - No validation of accuracy for knowledge work
    - Studies suggest people are poor at assessing their performance
    - Perceptions of performance can be majorly distorted by things like critical feedback
    - Relationships between objective and subjective ratings where available are generally weak
    - Some indication that subjective ratings may exaggerate productivity effects
- **Cognitive performance tests**
  - Advantages:
    - Provide indications of productivity effects
    - May be done on computers
    - Cognitive effects may provide broad benefits to many tasks
  - Disadvantages:
    - Only measures parts of productivity
    - Magnitudes of effects on productivity unclear
    - Just provide indications
    - Tests may require significant time, may be impractical or expensive
- **Computer activity monitoring**
  - Advantages:
    - Does not need more time from occupants
  - Disadvantages:
    - Only measures a small part of productivity for most jobs
    - Ignores non-computer based work
    - May be highly misleading
    - Difficult to work around factors such as task type
    - May cause counterproductive behavior

- **Absenteeism**
  - Advantages:
    - Quantifiable measure of productivity losses
    - Is very clear and straightforward
    - Can be used with surveys without needing people to give more time
  - Disadvantages:
    - Only measures part of productivity
    - Accuracy depends on the rigor of the administrative records
    - Different absenteeism indices (e.g. time lost or frequency) can give different results
    - Possible logistical issues around use of data (e.g. can it be aggregated by building?)
    - May require records over prolonged periods (at least a year) to be reliable
- **Self-estimated absenteeism**
  - Advantages:
    - Provides a quantifiable estimate of some productivity effects
    - May be the only way of getting absenteeism data
    - Surveys allow many people to be assessed relatively cheaply
  - Disadvantages:
    - Accuracy questionable, studies indicate significant biases
    - Just provides an indication
    - Only measures part of productivity
- **Reported frequency of health problems**
  - Advantages:
    - Provides an indication of productivity
    - Specific questions may be easier for people to answer accurately
    - Specific effects may provide a more compelling argument (i.e. Better 'health' vs. less headaches and eyestrain)
  - Disadvantages:
    - Just provides an indication
    - Ordinal scales somewhat vague
    - Magnitude of effects on productivity unclear

- Large number of questions may be time consuming

- **Time lost due to issues affecting productivity**
  - Advantages:
    - Provides an indication of productivity losses
    - May provide an estimate of time lost
    - Specific questions may be easier for people to answer accurately
    - Specifics may provide useful guidance as to what issues need to be addressed to improve productivity
  - Disadvantages:
    - People's ability to accurately estimate such things is questionable
    - Estimates may exaggerate the occurrence of rare events
    - If added to another survey, the large number of questions could be time consuming

- **Mood**
  - Advantages:
    - Provides an indication of potential performance
    - Positive mood is linked to many valuable performance and behavioral outcomes
    - Surveys allow many people to be assessed relatively cheaply
  - Disadvantages:
    - Just provides an indication
    - Influenced by many factors, difficult to identify environmental effects
    - Due to its high variability, would need to be assessed multiple times
    - May not really be practical

- **Subjective sleepiness**
  - Advantages:
    - Provides an indication of productivity
    - Can be assessed very quickly and easily (1 question)
  - Disadvantages:
    - Just provides an indication
    - Due to low reliability, may need to be measured multiple times

- **Job satisfaction**
  - Advantages:
    - Provides an indication of productivity
    - Is one of the most commonly used measures
    - Can be assessed very quickly and easily if necessary (1 question)
  - Disadvantages:
    - Just provides an indication
    - Relationship to productivity may not be as strong as people think
    - If multiple questions are used, it may take more time
    - May be more strongly affected by other factors, which could hide environmental effects
- **Job engagement**
  - Advantages:
    - Provides an indication of productivity
  - Disadvantages:
    - Just provides an indication
    - Relatively weak evidence linking it to environmental effects
    - Use of different surveys may make comparisons difficult
- **Intention to quit**
  - Advantages:
    - Provides an indication of possible productivity costs, i.e. turnover
    - Can be assessed very quickly and easily (1 question)
  - Disadvantages:
    - Just provides an indication
    - Distorted by things like restructuring. May be difficult to detect effects past confounding factors
- **Turnover**
  - Advantages:
    - May allow estimation of some costs
    - Can be used with surveys without needing people to give more time
  - Disadvantages:

- May need long periods to get a reliable average
- Distorted by things like restructuring
- May be difficult to detect effects past confounding factors
- Accuracy of organizational records may be questionable

In his study, Azlan Shah Ali says that "the type of performance measurement method used differs depending on the work environment, type of work that the employees do and also type of business." (Azlan Shah Ali, 2015). He highlighted three types of performance measurement:

- **Sink and Tuttle model** (1989)

There are seven performance criteria or measurements introduced by Sink and Tuttle to evaluate performance at organizational level:

- effectiveness
- efficiency
- quality
- productivity
- quality of work life
- innovation
- profitability or budget ability

This model is very useful as it enables the managers to clearly understand the system as well as providing ways for improvement and performance measuring.

- **The performance pyramid** (developed by Lynch and Cross (1991))

In the performance pyramid, a link between the performance measures at different levels of hierarchy in a workplace is created. The aim of this performance measure is to ensure that each individual group and department will own the same goal and work together to achieve it. The ability to assimilate the organization's objectives with the operational performance indicators is one of this performance measurement's specialties.
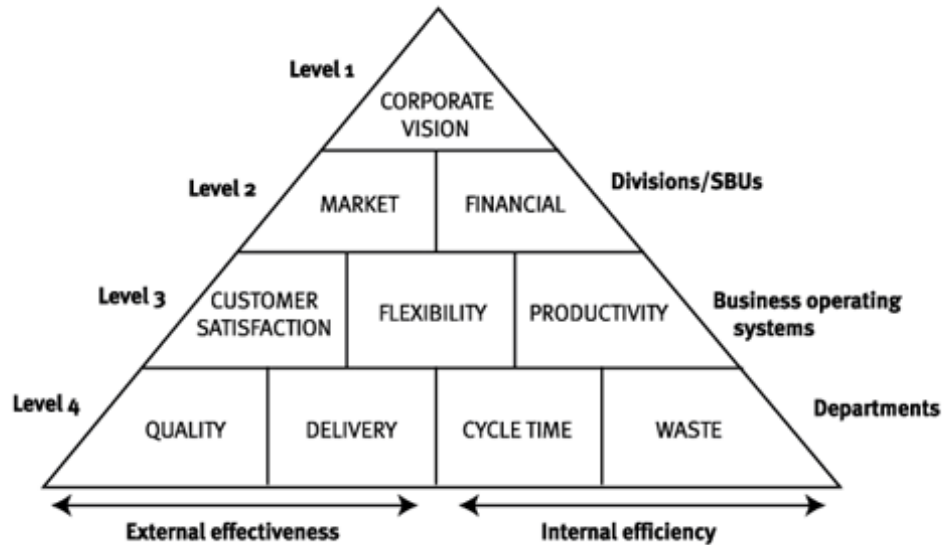
Figure 27: The performance pyramid (photo source: http://kfknowledgebank.kaplan.co.uk)

- **Harper theory**

According to Harper (1984), productivity represents a vital component of measurement in financial performance measurement. There are seven areas that need to be looked into when measuring performance under this theory:

- productivity
- unit cost
- factor proportion
- cost proportion
- price
- product mix
- input allocation

As can be seen from the three selected performance measurement methods, all of the measurements have their own criteria in performance measuring. However, it can be seen that productivity is the common criterion among the three measurement methods.

Usually, the criteria used for performance measurement of the employees working in the office will be focused on their productivity in completing their tasks.

4.3.2. Environmental factors that affect performance

Several studies have shown the importance over performance of some environmental factors like:

- **temperature**: (Salunke, 2015), (Institute for Quality of Life, 2016), (Ajala, 2012), (Dr Ruchi Jain, 2014), (Leder, 2015), (Kamarulzaman, 2011)
- **air / ventilation**: (Newsham, 2009), (Salunke, 2015), (Institute for Quality of Life, 2016), (Ajala, 2012), (Dr Ruchi Jain, 2014), (Leder, 2015), (Kamarulzaman, 2011)
- **noise**: (Newsham, 2009), (Salunke, 2015), (Institute for Quality of Life, 2016), (Ajala, 2012), (Dr Ruchi Jain, 2014), (Leder, 2015), (Kamarulzaman, 2011)
- **light:** (Newsham, 2009), (Salunke, 2015), (Institute for Quality of Life, 2016), (Ajala, 2012), (Leder, 2015), (Kamarulzaman, 2011)
- **office design**: (Salunke, 2015), (Ajala, 2012), (Dr Ruchi Jain, 2014), (Kamarulzaman, 2011)
- **ergonomics**: (Salunke, 2015), (Institute for Quality of Life, 2016), (OSHA, 2000), (Health and Safety Executive, 2013)
- **colors**: (Institute for Quality of Life, 2016), (Kamarulzaman, 2011)
- **other amenities**: (Salunke, 2015), (Ajala, 2012), (Dr Ruchi Jain, 2014), (Kamarulzaman, 2011)

Many researchers have addressed the effect of lighting, acoustics, indoor air quality, and other indoor parameters on physical symptoms such as headaches, fatigue, musculoskeletal pain, and eye, nose, throat and skin irritation.

There is also evidence that better physical health is correlated to higher job satisfaction and other factors such as lower job stress and better psychological well-being. Also, increasing environmental satisfaction was associated with increased satisfaction with compensation and with management, which were associated with increased job satisfaction. (Newsham, 2009)
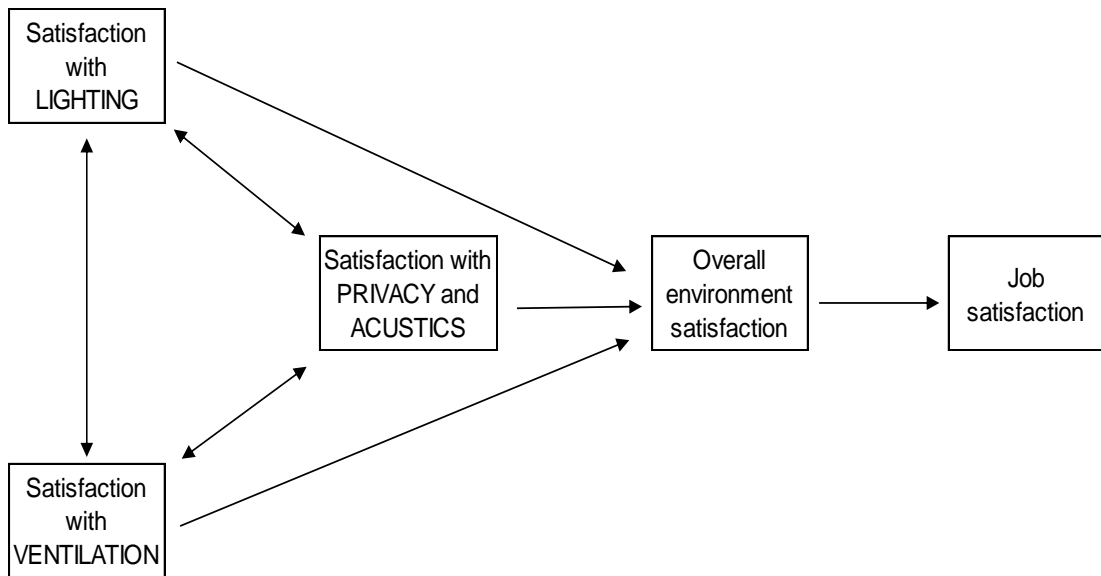
Figure 28: Relationship between environmental satisfaction and job satisfaction modelling on Cost-effective Open Plan Environment (COPE) field study data

Office employees spend a lot of their time inside a building, where the physical environments influence their wellbeing and directly influence their work performance and productivity.

In the workplace, it is often assumed that employees who are more satisfied with the physical environment are more likely to produce better work outcomes.

In the (Steelcase Global Report, 2013) the satisfaction with the workplace basics was analyzed, including satisfaction with: light, office furniture, room temperature, ambient noise level, ventilation.
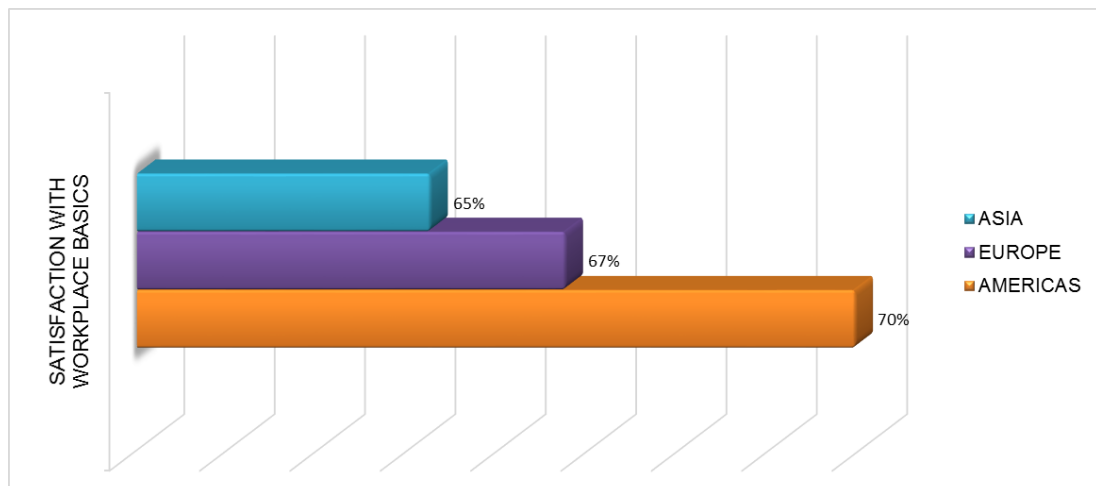
Figure 29: Satisfaction with workplace basics (general) (Steelcase Global Report, 2013)
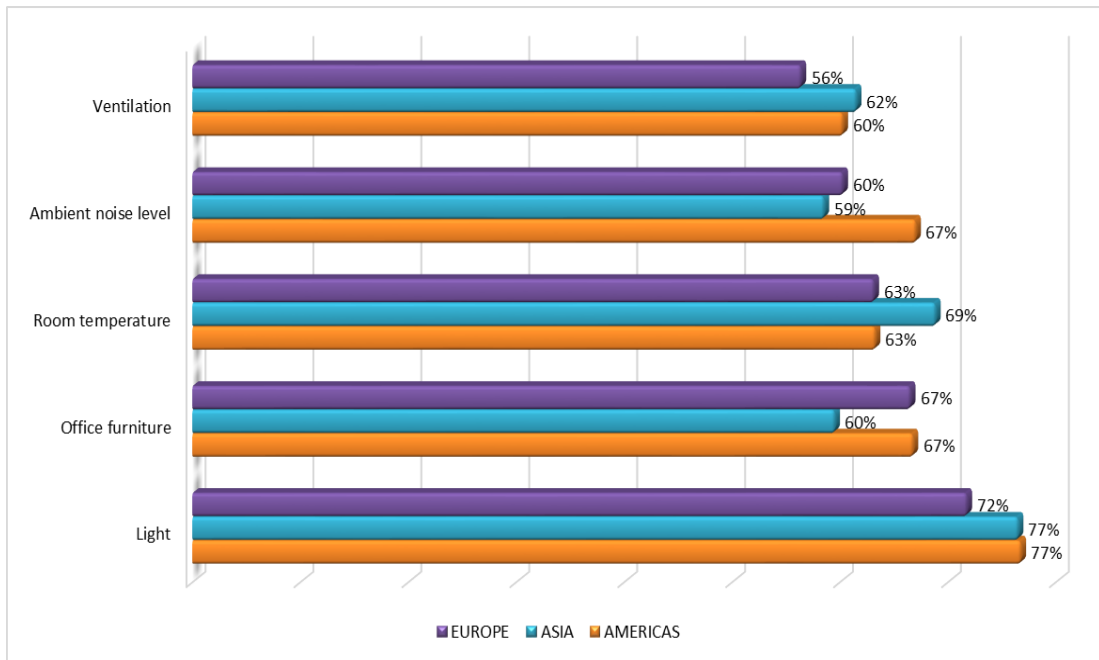
Figure 30: Satisfaction with workplace basics (detailed) (Steelcase Global Report, 2013)

From the same study we can see that those who described their workplace as a stimulator one, also have a higher degree of satisfaction with the workplace basics.
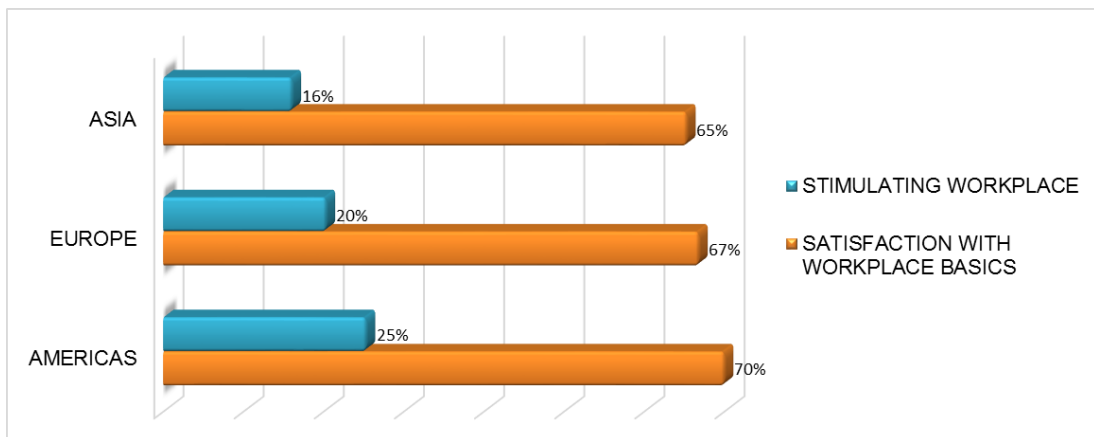
Figure 31: Link between stimulating workplace and satisfaction with workplace basics (Steelcase Global Report, 2013)

OFFICE BUILDINGS	Highly Engaged and Highly Satisfied	Highly Disengaged and Highly Dissatisfied	WORKPLACE DESCRIPTION Stimulating	SATISFACTION WITH WORKPLACE BASICS					
				Light	Office furniture	Room temperature	Ambient noise level	Ventilation	
USA	14%	9%	20%	80%	71%	62%	69%	62%	73%
BRAZIL	24%	12%	22%	78%	65%	68%	67%	64%	70%
CANADA	11%	10%	21%	71%	68%	59%	64%	53%	69%
MEXICO	22%	6%	38%	78%	63%	64%	68%	62%	69%
CHINA	10%	4%	14%	86%	72%	81%	69%	71%	76%
UNITED ARAB EMIRATES	20%	5%	24%	76%	57%	65%	55%	61%	63%
INDIA	28%	4%	18%	88%	79%	82%	74%	77%	81%
KINGDOM OF SAUDI ARABIA	18%	22%	25%	71%	51%	61%	46%	57%	57%
TURKEY	12%	15%	10%	76%	58%	73%	58%	62%	65%
JAPAN	1%	18%	5%	62%	40%	51%	49%	41%	49%
BELGIUM	6%	14%	18%	70%	65%	63%	55%	52%	65%
FRANCE	5%	18%	16%	63%	62%	59%	51%	51%	61%
GERMANY	12%	12%	19%	75%	70%	75%	61%	70%	72%
NETHERLANDS	7%	5%	29%	81%	79%	62%	65%	51%	73%
POLAND	13%	11%	16%	73%	70%	73%	68%	61%	71%
RUSSIA	10%	11%	19%	77%	60%	62%	60%	60%	65%
SPAIN	7%	15%	23%	67%	59%	56%	59%	52%	62%
UNITED KINGDOM	11%	12%	22%	68%	67%	55%	63%	54%	65%
GLOBAL AVERAGE	13%	11%	20%	76%	66%	66%	63%	61%	69%
AMERICAS	18%	9%	25%	77%	67%	63%	67%	60%	70%
ASIA	15%	11%	16%	77%	60%	69%	59%	62%	65%
EUROPE	9%	12%	20%	72%	67%	63%	60%	56%	67%

Figure 32: An overview of data modeling in Excel (Steelcase Global Report, 2013)

Temperature

Numerous studies have shown that indoor climate impacts both health and performance, which in turn affect productivity. Discomfort factors can decrease employees' focus on their works.

However, employees can focus more when high temperature is reduced by the use of air conditioning equipment. Several studies conducted by Lorsch and Abdou, "shows that when the air-conditioning system was introduced, employees feel that their work space becomes more comfortable and the productivity tends to increase by 5-15 percent because they can concentrate on their work." (Abdou, 1994)

In Olli Seppänen's research, it is showed a decrease in performance by 2% per °C increase of the temperature in the range of [25-32] °C, and no effect on performance in temperature range of [21-25] °C. (Olli Seppänen, 2006)
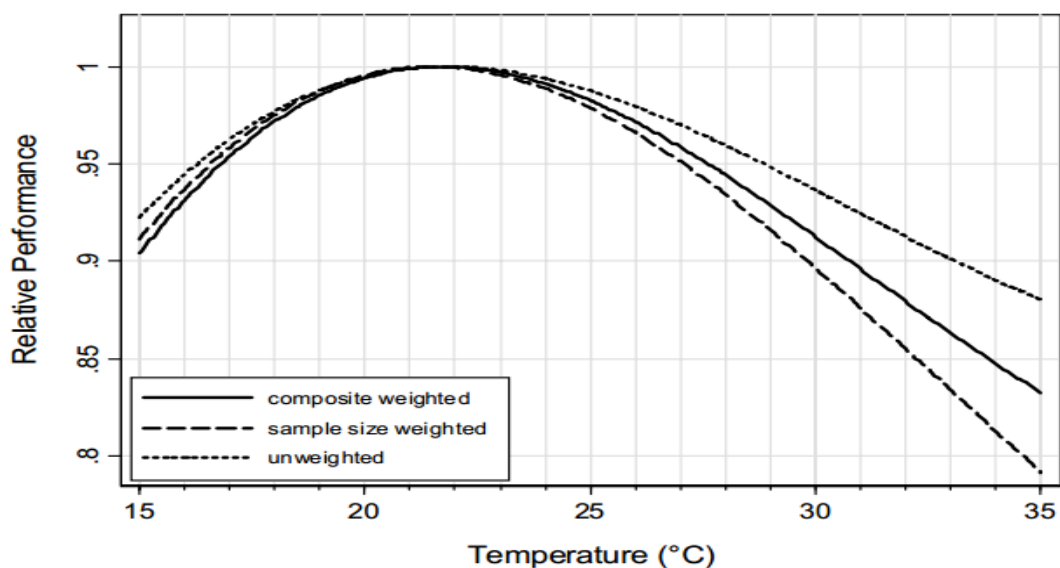

Figure 33: Link between relative performance and temperature (Olli Seppänen, 2006)

Thermal comfort is created through the right combination of temperature, airflow and humidity. A combination of these elements is required for physical comfort in the workplace.

Noise

Sound or noise problem in an office is something that could not be avoided. Studies have shown that when sound is turned off, errors in work are reduced and productivity increases.

Noise has been suggested to cause interruption, irritation and lowered performance among employees and is one of the most common reasons for complaints, especially in open-plan office environments. Ringing telephones, air conditioning, and office machinery have all been suggested to cause disturbances in office environments.

In an open plan office employees have little control over their levels of privacy and this, in itself, becomes a source of job demand. There are consistent findings that distraction caused by overhearing irrelevant conversations is a major issue in open plan office environments and, further, that distraction is negatively linked with employee performance, negative perceptions of the workplace, and / or stress.

Although there is evidence of increased stress from low-noise exposure, worker reports and a simple productivity index did not reveal greater stress under low noise. (Johnson, 2000)

Some suggestions can be made through which the noise in the workplace is attenuated:

- Install a sound absorbent material on the ceiling, walls and floors of the office;
- Install 'felt pads' on typewriters and other machines that produce sound to reduce noise;
- Changing the ringing phone to the 'buzzers' system, 'light indicators' or 'bleeps' to reduce noise;
- If necessary, a small room in an office can be provided for the purpose of discussion or an appointment of personnel to avoid interference from outside;
- Noise impacts can be reduced by installing a floor covering such as carpet and so on;
- In open plan environments, ensure that people are sitting near those with similar work patterns or subjects of study;
- Provide headsets to tune out noise;

Light

The quality and quantity of lighting in a workplace can have a significant effect on productivity. Good lighting can decrease errors as well as decrease eye-strain and the headaches, nausea, and neck pain which often accompany eyestrain. Adequate lighting allows workers to concentrate better on their work which increases productivity.

According to Chris Blank, two major problems with improper lighting are glare and insufficient light.

− *Direct glare* results from direct light shining into your eyes from bright sunlight or strong indoor light fixtures; *Reflected glare* results when light rebounds from reflective surfaces, such as a computer monitor, and reflects into your eyes. When you are continually exposed to glare, your eyes adjust, making it more difficult to see when glare is not present.

− *Insufficient light* or poorly spaced lighting that creates shadows often causes reduced productivity, errors in work that requires close concentration and precision, accidents, eye strain and headaches. (Blank, -)

The Chartered Institution of Building Services Engineers (CIBSE) recommend the following lighting levels (measurements in Lux) (Kellwood, -):

- General offices: 500 [lux]
- Drawing offices: 500 [lux]
- Executive offices: 300-500 [lux]
- Computer workstations: 300-500 [lux]
- CAD design areas: 300-500 [lux]
- Conference rooms: 500 [lux]
- Rest rooms: 150 [lux]
- Canteens: 200 [lux]
- Changing Rooms & Toilets: 100 [lux]

It is recommended that the workplace to include ways in which each worker can customize his office, including in terms of lighting.

Color

It is a fact known in psychology that the mood of people can change due to the influence of colors. Each color has different effects on the human body. Everyone experiences color in their own personal way. Peoples have reactions to different color schemes depend on their culture, education, genetics and socio-economic level. As a result, behavior, health and productivity in the workplace are heavily influenced by space, structure, color, lighting and activity.

Some colors have an influence already known like:

- green and blue – can help employees fell calm, relaxed and hopeful; lower heart rates, blood pressure and respiration; reduce anxiety; restful for eyes; but, in excess, can bring feelings of sadness;
- yellow, orange and red – can stimulate and energize employees; stimulates memories; increase brain wave activities, heart rates and respiration; but, in excess, can stimulates appetites, anger, frustration and hostility;

In the systematic review led by Nattha Savavibool, a scheme has been made with the effects that the colors have in work environment. (Nattha Savavibool, 2016)
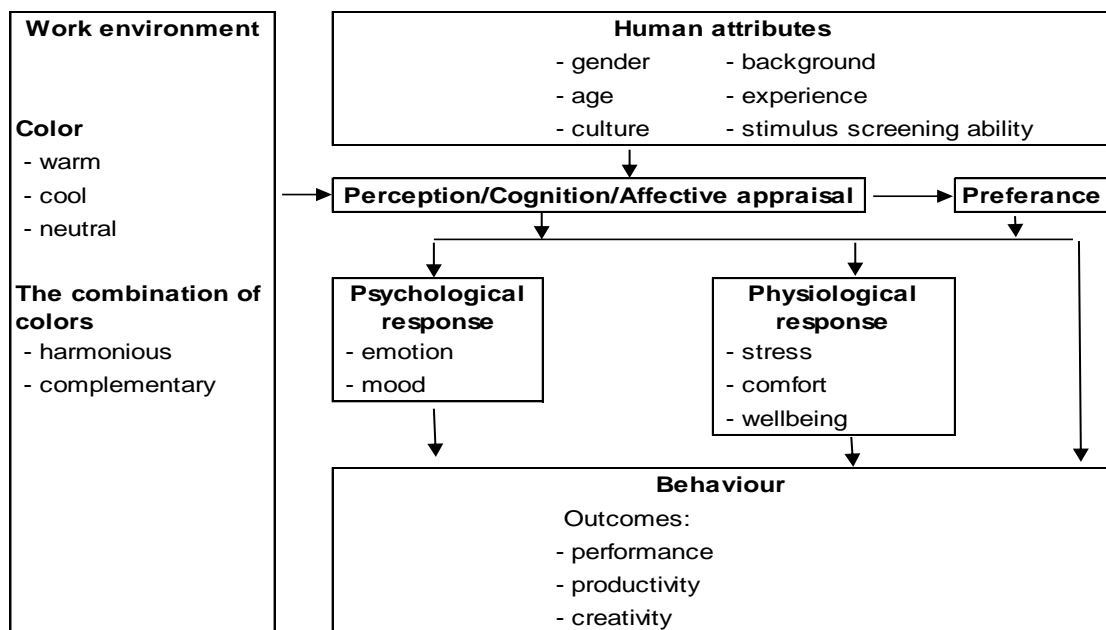

Figure 34: The effects of colors in the work environment (Nattha Savavibool, 2016)

The employee performance can be seen as a tree-factors function: ability, motivation and opportunity. The opportunity refers to the chance that a person have to accomplish a task, all the resources and amenities that are given to that person.

The working environment makes part of what the opportunity to work is. By having a better work environment the employee performance will be greater, they will work better and produce better work.

We can usually use productivity as a measure for performance, but in office buildings it is a dificult task. For this we can also use computer activity monitoring, absenteeism rate, reported frequency of health problems, employees' mood, job satisfaction, job engagement, intention to quit etc. (these things can be found directly from employees through questionnaires).

From the study we can conclude that environmental factors that can affect performance may be: temperature, noise, light, color, air / ventilation, office design, ergonomics, other amenities.

That being said, we can conclude that H3: Work environment influences employee performance is true.

5. CONCLUSIONS

Because the engaged employees are those who are highly involved in and enthusiastic about their work and workplace, various aspects of their workplace are important and in direct connection with the level of engagement.

From the study we can conclude that the sense of belonging to the company, the feeling of connection with colleagues, the proud to work for company, the sense of personal achievement, feeling motivated by work, optimistic about the future in the company and the quality of life at work influences the employees' satisfaction with the workplace.

That being said, we can conclude that H1: Employee engagement is related to workplace satisfaction is true.

From the study it can be observed that the cultural differences influence the way office layout are designed. China share a high tolerance for density and are extremely hierarchical, in Europe the space allocation is more egalitarian and alternative working locations are explored and in the United States the space is shared with all levels of employees.

The employees' preference when it comes to office layout are the closed offices because it allows them to concentrate and it gives privacy. They also consider that an open-plan office eliminates the social status and that the personal items are not in safe. On the other hand, the companies choose the open-plan office solutions because these provides a high degree of flexibility, it encourages knowledge sharing and enhances group cohesiveness.

These being said, we can conclude that there is a link between the cultural differences, the type of office and the way the employee perceives the work environment, so H2: Cultural context influences office layout and engagement levels is true.

The employee performance can be seen as a three-factors function: ability, motivation and opportunity. The opportunity refers to the chance that a person have to accomplish a task, all the resources and amenities that are given to that person.

The working environment makes part of what the opportunity to work is. By having a better work environment the employee performance will be greater, they will work better and produce better work.

We can usually use productivity as a measure for performance, but in office buildings it is a dificult task. For this we can also use computer activity monitoring, absenteeism rate, reported frequency of health problems, employees' mood, job satisfaction, job engagement, intention to quit etc. (these things can be found directly from employees through questionnaires).

From the study we can conclude that environmental factors that can affect performance may be:

- temperature
- noise
- light
- color
- air / ventilation
- office design
- ergonomics
- other amenities

That being said, we can conclude that H3: Work environment influences employee performance is true.

Employers are advised to take these outcomes into account because the increased employee engagement level can help the company prosper.

Unfortunately, in all the literature studied there was no data about Romania, but this opens up new research opportunities.

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