



# Addressing the mismatch: A strategy for creating adaptable office buildings and adding value for corporations

## Part B: Strategy implementation



#### Title

**Addressing the mismatch:** A strategy for creating adaptable office building and adding value for corporations.

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Part A: Thesis

**Part B: Strategy implementation**

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# Glossary

This section presents a list of key definitions and abbreviations that will be used in the research, aiming to assist readers in understanding the topics discussed.

## **Adaptability**

"The capacity to change the building's built-environment in order to respond and fit to the evolving demands of its users/ environment maximizing value throughout its life-cycle"

(Schmidt III, Eguchi, Austin & Gibb, 2009)

## **Adaptive capacity**

"Adaptive capacity of a building includes all characteristics that enable it to keep its functionality during the technical lifecycle in a sustainable and economic profitable way withstanding changing requirements and circumstances."

(Geraerts, Remøy, Hermans & Rijn, 2014a)

## **Added value**

"The contribution of real estate to organisational performance and the attainment of organisational objectives."

(De Vries, 2007 & Den Heijer, 2011 in Van der Voordt, 2016).

## **Flexibility**

"Flexibility is perceived as an adaptive response to environmental uncertainty. More specifically, it is a reflection of the ability of a system to change or react with little penalty in time, effort, cost or performance"

(Upton, 1994 in Gosling, Naim, Sassi, Iosif & Lark, 2008)

## **Functional lifecycle**

"The time in which a facility, or part of a facility, serves the functional requirements of its users and owners."

(Blakstad, 2001)

## **Performance**

"The degree to which a building or other facility serves its users and fulfils the purpose for which it was built or acquired; the ability of a facility to provide the shelter and service for which it is intended."

(Iselin and Lemer, 1993).

## **Sustainable development**

"A development that meets the needs of present without compromising the ability of future generations to meet their needs."

(Remøy, 2010)

## **Technical lifecycle**

"The time it takes for a building, subsystem, or component to wear out or fail. The "time period after which a facility can no longer perform its function because increasing physical deterioration has rendered it useless."

(Blakstad, 2001; Iselin & Lemer, 1993)

# Abstract

## The booklet - Strategy implementation

This booklet constitutes part of the thesis: “**Addressing the mismatch: A strategy for creating adaptable office buildings and the added value for corporation**”.

It presents the implementation plan of the strategy formulated “**The value of Adaptability**”, providing a step-by-step plan that interested parties can follow for the development of adaptable office buildings, as well as any type of building by adjusting it appropriately.

## The thesis

**Purpose:** The purpose of this research is to address the mismatch between the constant change of users’ demands and the static nature of the built environment (supply).

**Aim:** The development of a strategy for creating adaptable office buildings, highlighting the relation between the actions proposed and the value they can deliver to the corporations that implement them.

**Research Question:** How can adaptability strategies be applied in the development of new office buildings to add value for corporations and address the mismatch over time between buildings and users’ demands?

**Practical implications:** The strategy developed through this research can assist: real estate managers in the creating adaptable office buildings based on the core business and objectives of their organisation, developers and investors whose goal is to construct adaptable projects – as adaptability has started to impact real estate financial value- and finally by architects and related engineers, in order to create more adaptable buildings for their clients. The strategy provides the implementer the potential of tailoring it in order to fit their goals and objectives.

**Originality/ value:** This thesis addresses the shortage of future proof real estate, by presenting a comprehensive strategy that can assist the development of adaptable buildings, something that according to Estaji (2007), and Gosling, Naim, Sassi, Iosif and Lark (2008) is still lacking. Real estate constitutes a significant component of corporations. Despite this, combining strategies of adaptability, with the corporate real estate management view and models of added value comprises an unexplored field in scientific research.

**Keywords:** Adaptability, flexibility, strategy, design, corporate, real estate management, added value, competitive advantage, development, architecture

# 1.0 Background

## 1.1 Introduction

Living in an ever-evolving environment, where the pace of societal, economical, technological and environmental changes is rapidly increasing, has impacted the way people live and work (Julistiono, Hosana, Liemansetyo & Wijaya, 2017; Remøy, Rovers & Nase, 2019). Such changes, challenge corporations to find ways of adapting their businesses to the new environments in order to support their core objectives (Lindholm & Leväinen, 2006). As explained by Joroff (1993), real estate constitutes one of the five resource that contribute in companies' goals fulfilment, delivering value to the organisations and enhancing their competitive advantage (Jylhä, Remøy & Arkesteijn, 2019; Lindholm & Gibler, 2005). Consequently, real estate actions are strongly linked to organisations' strategic goals and their core business (Lindholm, Gibler & Levainen, 2006). Buildings are therefore regarded not as ends but as means, whose purpose is to strengthen firms' performance, by optimizing the relationship between the facilities provided and their users (Blakstad, 2001). To meet changing business needs in order to gain optimal performance and efficiency, organisations seek for increased adaptability in their real estate (Batbileg, Fritzsche & Lequeux, 2018). This entails that enhanced building-user relationship performance is one of the most important reasons to increase adaptability (Blakstad, 2001).

Adaptability therefore constitutes an important aspect of the built environment and a core concept of this research. As observed through literature, adaptability is often mentioned as flexibility, though when considering the concept of scale and time these terms are different (Schmidt III, 2014). Compared to flexibility which indicates the capacity of physical re-arrangements and short-term changes, adaptability refers to a building's long-term capacity to respond to the changing demands (Gosling, Naim, Sassi, Iosif, Lark, 2008).

Operating within a complex setting, businesses are regarded as dynamic systems who constantly have to address the evolving exogenous and endogenous demands, heightening the risks and uncertainties they phase (Schmidt III, Austin & Brown, 2009). Considering the strong relationship between the work and environment, office buildings are regarded products of their time (Blakstad, 2001). As a result, time constitutes a significant aspect of how businesses function and the way buildings accommodate their owners' and users' demands (Schmidt III, 2014). Therefore, in order to cope with the evolution, corporations are challenged to increase the level of efficiency and adaptability in their portfolio management (Batbileg et al., 2018; Schmidt III et al., 2009)

The rapid changes in the way people work have a huge impact on the real estate market conditions causing the increase of risks and uncertainties in business operations (Remøy et al., 2019). Real estate comprises an integral part of each organisation, adding value to it, by contributing to its performance and competitive advantage through the attainment of organisational objectives from different stakeholders' point of view (Van der Voordt, 2016). Therefore, the term 'added value' entails the alignment of real estate strategies with the corporation's core business and objectives (Lindholm et al., 2006). As a result, the creation of an adaptable built environment that can constantly respond to the companies' objectives has become a challenge for professionals of the field, whether these are developers, architects or corporate real estate organisations. Continuous changes require flexible environments and compared to societal evolution, buildings are static elements (Remøy, Koppels, Van Oel & De Jonge, 2007). When the buildings are not flexible enough to support dynamic demands of firms, and their functional is smaller than their technical lifespan, then they become obsolete (Blakstad, 2001; Langston, Wong, Hui, & Shen, 2008).

Office buildings vacancy, is a result of a number of factors. One of the most significant determinants of this phenomenon is the buildings' incapacity to meet users' quantitative (e.g. available square meters) and qualitative (e.g. quality standards) requirement, impacting not only their owners' capital but the environment as well (Geraedts, 2008). This circumstance reflects the lack of long-term thinking and poor use of buildings despite the high energy and material requirement for their construction (Nakib, 2010). Aiming to address the environmental issues, governments and the European Union have introduced environmental goals for the upcoming years regarding the energy & raw materials consumption, as well as CO2 emissions. As a result, new sustainable solutions are needed in the real estate environment in order to cope with new demands (Batbileg et al., 2018; PWC, 2018). Considering the environmental challenges and the need of buildings to continuously adjust to the environment and to their users' needs, in order not to become obsolete, adaptation is an essential component of sustainable development. (Arge, 2005; Wilkinson, & Remøy, 2011).

Following the increase of the future's uncertainty and users' constantly changing demands, organisations need to become more dynamic, resulting in adaptable buildings having a greater value within corporate portfolios. Despite the significance of this topic, there is a lack in the research field of a comprehensive strategy for developing adaptable office buildings that can address the mismatch between the built environments and the users' demands, and at the same time considering the added value for corporations.

## 1.2 Strategy objectives

This research is focusing on assisting the creation of buildings that can respond to their users' change of needs. The main goal of this paper, is to provide a strategy that can result in the development of a dynamic and adaptable portfolio for corporations, managing the risk of buildings becoming obsolete due to their low built-in adaptive capacity.

The strategy will explore how the proposed actions can add value for corporations. Depending on their core business objectives, corporate real estate managers can tailor and apply components of the strategy, while expecting the added value for the real estate portfolio and consequently the impact they will have on their organisation's performance and goals (Van der Voordt, 2016). In that sense, the strategy can support the decision making process of corporate real estate managers regarding their firms' future accommodation strategies.

## 1.3 Applicability

Considering the complexity, and the number of professions involved in construction projects, this strategy can be adopted by different actors:

- **Corporate real estate managers**, allowing them to create adaptable, flexible and sustainable portfolio, which will be able to address the changes in the demands and prolong their lifecycle. Adaptability is often related to high initial costs and uncertain returns which would mean that the proposed strategy is focused mainly on the core portfolio of organisations (Schmidt III, 2014). Though as it will be explained later, such strategy does not actually entail high financial risks and could be applicable also for peripheral real estate. The strategy can also provide a tool for organisation to brief the architect -a task which constitutes the most important phase when developing a new idea in order to ensure a good match between the corporate strategy (demands) and the delivered project (future supply)- and control the design and delivery of the project (Remøy et al., 2011; Blakstad, 2001).
- Similarly to corporations, **developers and investors** can apply this strategy in order to construct adaptable projects which they can afterwards sell or lease, as adaptable buildings imply higher future value/ returns (Remøy et al., 2011).
- **Architects and engineers** of the construction sector can also apply this strategy in order to create more adaptable buildings for their clients.

Finally, although this strategy is mainly focused on creating adaptable office buildings, it can be implemented in other types of buildings too, as it addresses aspects that are shared within the built environment. Therefore, depending on their goals and the building type they develop, actors can apply the strategy after tailoring it to fit their needs.

## 2.0 The strategy

Given the rapidly evolving environment that organisations operate in, there is a demand for solutions that allow them to continuously optimise the space they operate in (Lindholm, 2008b). Literature showed that adaptability is one of these solutions. Though, it is still hard for corporations to identify the short and long term values that underlie adaptability.

In order for a real estate strategy to add value to the organisation -both directly and indirectly- it needs to be aligned with its core business objectives and strategy (Lindholm et al., 2006; Lindholm & Leväinen, 2006). **Direct values** usually entail financial aspects which are easy to calculate and determine. On the other hand, **indirect values** are harder to identify. As a result, firms still find it hard to understand the value of real estate strategies for their businesses (Lindholm & Gibler, 2005). This problem has been especially noted in the development of adaptability strategies, as they mainly entail long-term benefits and consequently indirect values.

The concept of generic strategy does not exist, therefore one cannot develop a strategy which is applicable for any corporation (Petrulaitiene & Jylhä, 2015). Corporate real estate strategies need to be aligned to organisational objectives and goals, ensuring that resources are used efficiently and effectively to support a sustainable competitive advantage and consequently the firm's performance (Gibler & Lindholm, 2012). In order to do so, a top-down approach needs to be adopted. The first step of applying a real estate strategy is to clearly define the corporate strategy, vision and objectives. Based on these, firms need to identify and assess the values that real estate can deliver to them, and in continuation link them to tangible real estate design tactics (Khanna, Van der Voordt & Koppels, 2013; Nase & Arkesteijn, 2018).

## "The value of adaptability"

### Strategy explanation guideline

The final strategy developed in this paper is presented on table 2.1 while on section 2.4 one can find the components that constitute the eleven strategy types. In order for the implementers to fully understand the strategy, all the components that define it need to be clearly explained.

The following sections present a thorough analysis of the strategy:

### 2.1 Strategy types (Y - Axis)

Analysis of the eleven strategy types defined in the paper's strategy, table 2.1 (A-K)

### 2.2 Building layers

Analysing the concept of building layers implemented in the paper's strategy.

### 2.3 Forms of added value (X - Axis)

Analysis of the eight forms of added value identified in the paper's strategy, table 2.1.

### 2.4 Strategy breakdown & the added value

This section presents the specific tactics constituting the eleven strategy types and the links with the values they deliver.

### 2.5 Strategy Implementation

A seven step implementation plan that actors need to follow when adopting the strategy.

### 2.6 Guidelines per profession

As this strategy can be adopted by different professionals, this section presents guidelines and recommendation of how corporate real estate managers, architects and developers & investors can implement it.



Strategy types	Significance	Risk	Impact & Risk assessment	Life expectancy	Increase real estate value	Productivity	User satisfaction	Stimulate innovation	Environmental sustainability	Adaptability	Image & culture	Social responsibility
A. Multifunctional	4.4	1.6	2.8	>20	●	●	●	●	●	●	●	●
B. Building characteristics	4.4	1.6	2.7	>20	●	●	●	●	●	●	●	●
C. Oversupply	4.3	2.6	1.6	>7	●		●		●	●	●	●
D. Buffer zones	4.2	2.2	1.9	>3	●	●	●	●	●	●	●	●
E. Demountable elements & dry connections	4.3	1.4	3.1	>3	●		●		●	●	●	●
F. Modular & dividable	4.2	1.7	2.5	>7	●		●		●	●	●	●
G. Circulation & zoning	4.6	1.7	2.8	>3	●	●	●	●		●	●	
H. Movable & portable	4.5	1.5	3.1	3<	●	●	●	●	●	●	●	
I. Location selection	4.8	1.4	3.5	/	●	●	●	●	●	●	●	●
J. Site selection	4.3	1.5	2.8	/	●	●	●	●	●	●	●	●
K. Technology	4.0	3.2	1.3	5<	●	●	●	●		●	●	

- **Significance:** for the buildings' adaptive capacity
- **Risk:** cost over the possibility of taking advantage of each tactic's inherent adaptive capacity
- **Impact & risk assessment:** significance over risk ratio
- **Life expectancy:** longevity of built components in years

- **Large impact** (  $L > 2/3$  - Value added by more than two thirds of the tactics)
- **Medium impact** (  $1/3 > M > 2/3$  - Value added by between one and two thirds of the tactics)
- **Small impact** (  $S < 1/3$  - Value added by less than a third of the tactics)

Table 2.1  
Final strategy: The value of Adaptability

## 2.1 Strategy types (Y -Axis)

The **strategies/ tactics** presented on the former table (3.2.5) were re-structured under **eleven strategy types (umbrella terms)** based on the building aspects they address, as presented on table 3.2.6. For example: undefined spaces, surplus of space, expandable horizontal & vertical, communal space contribute to the Buffer Zone strategy type, and are therefore grouped under this type)

- • **Multifunctional:**

Adaptable buildings need to provide a responsive environment both for the first user and for the next ones too, as well as accommodate alternative functions. Therefore, one needs to take into account aspects such as, the height of the space (e.g. >2.8 m), the position of the columns and the grid span (<7m) in order to have the capacity to accommodate different layouts and functions (Schmidt III, 2014; Arge, 2005; Remøy & van der Voordt, 2014; Geraedts, 2016). Buildings' depth should allow sunlight throughout the whole area. The façade should also function independently from the rest of the building, and be composed of small grid dimensions so that it can be easily replaced. The position and number of elements such as: stairs, elevators, entrances and services, which are hard to relocate and also restrict the number of people and functions that can be accommodated in the building need to be taken into account (more entrances and vertical circulation zones in different parts of the building increase its adaptability)(Geraedts & Prins, 2016; Remøy et al., 2011; Schmidt III & Austin, 2016). Finally, considering the impact that economic upturns and downturns can have for corporations, the building should be able to expand or reduce its size both on the horizontal and vertical axes (Remøy, 2010; Pinder et al., 2017; Geraedts et al., 2014).

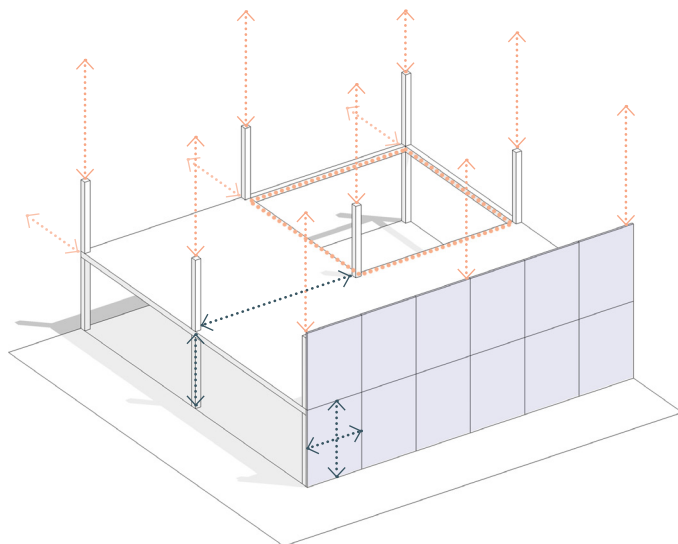


Fig. 2.1  
Multifunctional

- • **Building characteristics:**

In order to be adaptable, buildings should not be over-specified, as changes would be harder to implement (Arge, 2005). The floor depth should be enough to accommodate different layouts (cell offices & open plan offices) and other functions (dwellings) without wasting space (Manewa, 2012; Schmidt III & Austin, 2016; Blakstad, 2001). Building's geometry is another major factor of adaptability. Depending on their identity, corporations might want to be housed in buildings with unique or complicated geometries. Though complicated geometries are hard to adapt. Buildings and especially their exterior, have a significant role in shaping firms' identity. Therefore, when designing a strategy for organisations' core portfolio, which entail buildings that are meant to be occupied for long periods, the façades need to be able to change in a financial and structural feasible manner (Blakstad, 2001). Although such changes do not happen often, adaptable buildings should be able to accommodate them. In addition, in case the first occupier leaves the building the next one needs to be able to change the façades based on the new needs or functions (Geraedts & van der Voordt, 2003). Such an option makes buildings more attractive to future tenants (e.g. curtain walls of office buildings are always preferable for dwellings) (Remøy & van der Voordt, 2014).

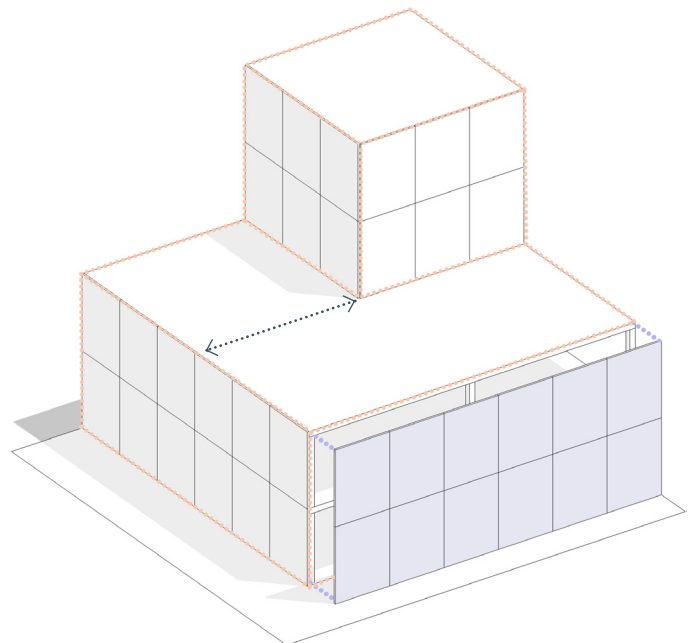


Fig. 2.2  
Building characteristics








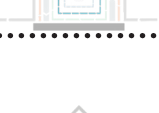



Strategy types	Layers	Strategies - tactics				
A. Multifunctional		• Floor to floor height	• Expandable horizontal & vertical	• Reduction horizontal & vertical	• Facade grid dimensions	• Grid wide span (column layout)
		• Floor depth	• Independent envelope (min. contact points)	• Position: stairs, lifts, entr. & services		
B. Building characteristics		• Building generality	• Floor depth	• Building geometry	• Image & identity (skin)	• Not load-bearing facade
		• Daylight				
C. Oversupply		• Floor to floor height	• Increased load capacity	• Expandable horizontal & vertical	• Surplus of building space & buffer zones	• Capacity surplus services
D. Buffer zones		• Undefined spaces	• Surplus of space	• Expandable horizontal & vertical	• Communal space	
E. Demountable elements & dry connections		• Dry connections (structure & plan)	• Demountable facade	• Demountable walls	• Exposed structure	• Suspended ceiling & raised floors
F. Modular & dividable		• Grid structure	• Modular & Prefabricated elements	• Standardised skin	• Facade grid dimensions	• Adjustable & modular services
G. Circulation & zoning		• Vertical & horizontal access	• Separate entrances	• Wide circulation	• Core- services	
H. Movable & portable		• Standardised & modular	• Folding & adjust. furniture	• Removable & relocatable units	• Demountable wall partitions	
I. Location selection		• Multifunctional location	• Area express culture	• Provision of amenities & services	• Distance to city centre	• Proximity
		• Good quality public places	• Access by public transp.	• Access by car & parking		
J. Site selection		• Surplus of site space	• Multifunctional site - legal	• Expandable location	• Creation of public space	
K. Technology		• App - Lights, temperature	• App - workplace	• Localization		

Table 2.2  
Adaptability strategy component - Preliminary strategy (part A)

### • • • Oversupply:

Oversupply is a proactive measure of designing for future extensions and major changes in buildings. Oversupply of structural capacity, services, floor area and floor height, makes the building more dynamic, allowing it to accommodate large scale changes, demanding uses and higher densities (Geraedts & Prins, 2016; Remøy et al., 2011; Pinder et al., 2017). The building's foundation and structural system need to have the capacity to bear supplementary loads resulted from future functional and spatial modifications, such as extensions both on the horizontal and vertical axes. Services are another key factor of buildings' adaptive capacity. They need to be designed to support growing demands, longevity and expandability (>30% surplus of facilities & shafts). In order to do so, installations need to be exposed and not embedded in the structure (Nakib, 2010; Geraedts, 2016). Providing oversized spaces both in terms of square meters (>10- 30% of surface area) and floor height (>2.8m) can allow buildings to be easier rearranged or transformed (Geraedt, 2016).

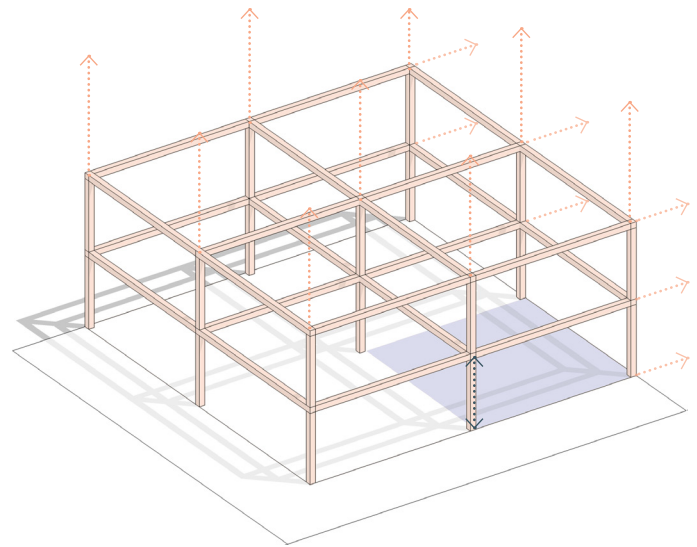


Fig. 2.3  
Oversupply

### • • • Buffer zones:

Buffer zones in buildings can be characterized as a surplus of spaces. They can be used to absorb overflowing caused by frequent spatial changes and avoid overcrowded interiors (Nakib, 2010). They can accommodate quickly the need for extra square meters, without requiring extra financial costs. When developing an adaptable building at least 5% of its total area should be reserved for future expansions (Geraedts & Prins, 2016; Geraedts, 2016). Until these areas are utilized they can function as communal spaces or as undefined areas (Schmidt III & Austin, 2016). In addition, buffer zones can be used to support horizontal and vertical expansion of the building (Schmidt III & Austin, 2016; Geraedts et al., 2014).

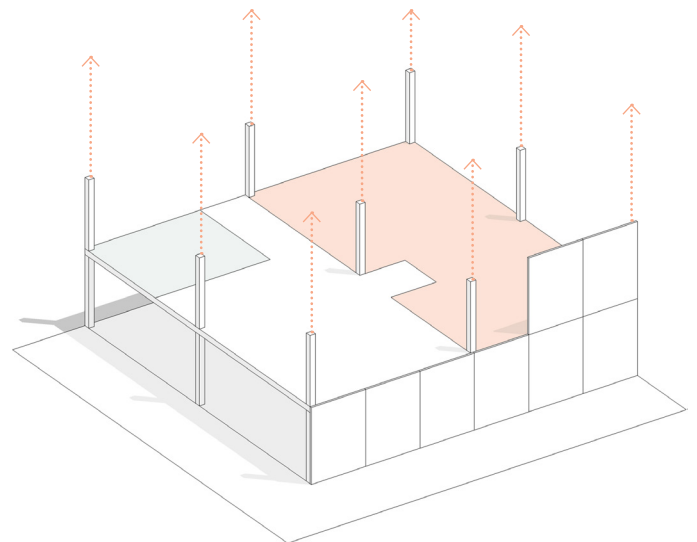


Fig. 2.4  
Buffer zones

### • • • Demountable elements & dry connections:

Demountable elements can be easily separated, removed and replaced, based on the users' demands. Such elements can be façade components, partition-movable walls, suspended ceilings and raised floors (Schmidt III, 2014; Geraedts & Prins, 2016; Remøy, 2010). The use of demountable components can allow easy and quick adjustments in the space from changing the size of rooms to changing their location within the building. The connections between interior elements as well as structural components should be dry connections, allowing the ease of spatial reconfiguration (Nakib, 2010; Geraedts & Prins, 2016; Geraedts, 2016; Sadafi et al., 2014). Dry connections also assist in reducing the time and cost of construction and therefore the environmental impact during construction, making changes easier during small or larger scale alterations in the building (Scuderi, 2019).

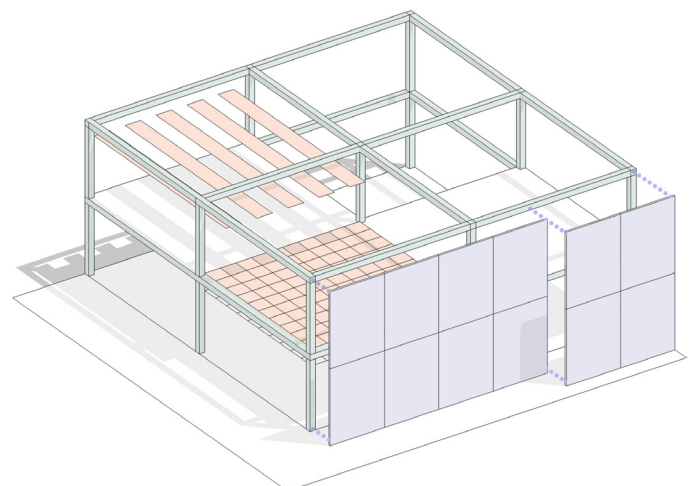


Fig. 2.5  
Demountable elements & dry connections

### • • • Modular & dividable:

Incorporating modular and dividable components in buildings allows the ease of altering (e.g. expand, divide) the space without affecting other layers or functions of the building (Sadafi et al., 2014; Pinder et al., 2017). Using a grid both for as a structural system and for the façades, minimizes the number of columns in the interior and the need for load bearing walls, allowing the use of different spatial layouts. Prefabricated elements and modularity can also facilitate reconfiguration, subdivision and easy arrangement of spaces, assisting the building's evolution in time (Nakib, 2010; Scuderi, 2019). Modular façade system, support the replacement, update and integration of new technological features that suit present demands (Nakib, 2010). Services should also be modular and avoid embedding them in the structure, in order to be easily adjustable based on the demands and for maintenance purposes (Nakib, 2010).

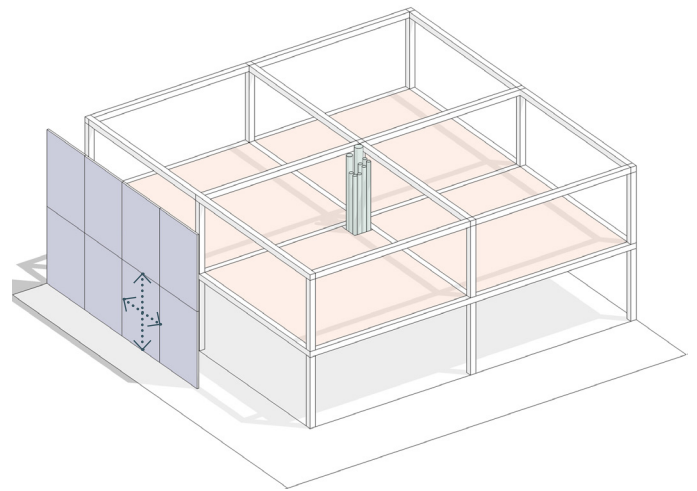


Fig. 2.6  
Modular & dividable

### • • • Circulation & zoning:

Circulation is important for adaptable buildings as it can highly impact the layout and flexibility of the space. When designing the internal circulation it should be seen as part of the overall architectural concept allowing the accommodation of different activities and users. A building's interior circulation can be organised in two ways to maximize flexibility. It can be a fluid and continuous space or it can be designed around the cores of the building, while avoiding narrow and dead end corridors (Nakib, 2010). Placing the services within a building's core, can increase its adaptability, creating more flexible interior spaces that can be easily rearranged and accommodate different functions. Arranging different work units within the central cores, makes easier to rearrange and transform the spaces (Scuderi, 2019). Finally, incorporating more entrances in different parts of the building, provides the potential to house more groups of users/functions, increasing buildings' transformation potential (Remøy & van der Voordt, 2014; Schmidt III & Austin, 2016; Scuderi, 2019; Remøy et al., 2011).

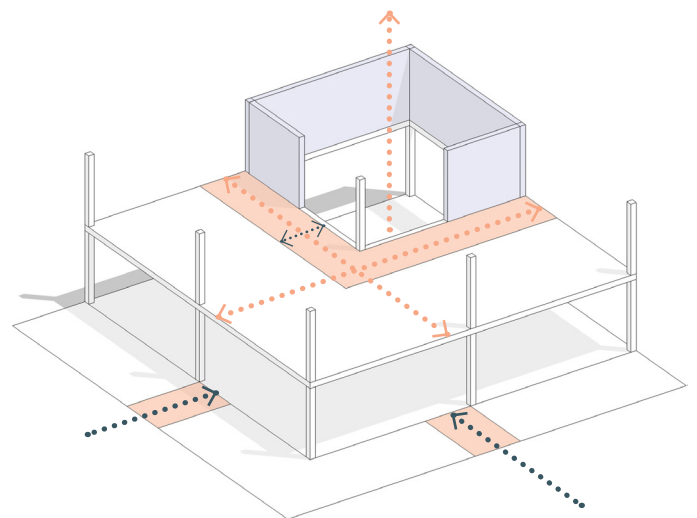


Fig. 2.7  
Circulation & zoning

### • • • Movable & portable:

This strategy type deals with the adaptability of buildings' interior spaces, allowing users to regularly move elements around the space. Movable walls can be quickly and easily rearranged and re-configured for new functions on a daily basis. The wall panels should be able to disappear in open configuration providing a more flexible space (Scuderi, 2019; Geraedts, 2016). In office buildings, corporations are moving towards more open-plan layouts including some additional enclosed units. These units should be demountable allowing them to be relocated within the building and finding the best layout for their operation and needs (Nakib, 2010; Scuderi, 2019; Schmidt III, 2014; Geraedts, 2016; Pinder et al., 2019). In order to accommodate this strategy, efficient circulation and zoning is required.

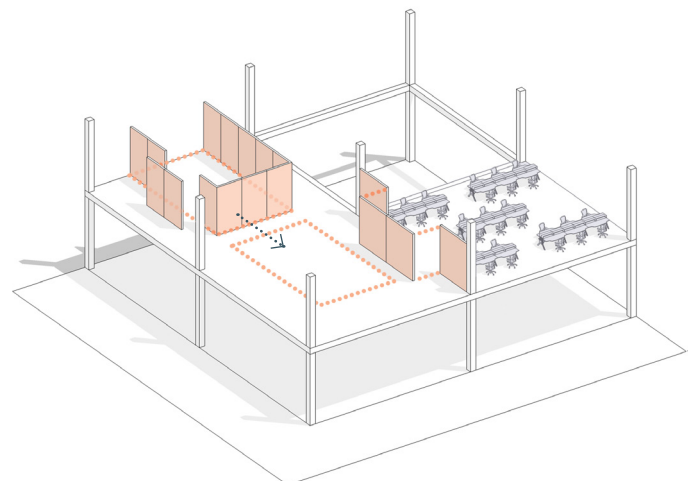


Fig. 2.8  
Movable & portable



### • Location selection:

Location selection focuses on contextual aspects of the selected location. Adaptable buildings are meant to last for a long period of time, therefore locating them in distant, mono-functional business districts must be avoided. Instead, dynamic and mixed-use areas where there is potential to enhance their functional adaptability, are preferred (Remøy et al., 2011). Office buildings in such areas should be designed as intertwined spaces with their environment, enhancing their permeability and accessibility (Nakib, 2010). The buildings should be situated in central locations which express culture and not in purely business districts (Harris, 2015; Remøy, 2010; Geraedts & Prins, 2016). Being located in areas with a number of amenities and services at a close range is valuable both for corporations and their users. Finally, the location should be easily accessible by public transport, car and provide enough parking space (Geraedts & van der Voordt, 2003; Remøy & van der Voordt, 2014). Considering such factors from the buildings' design phase can have a significant impact in their adaptive capacity.

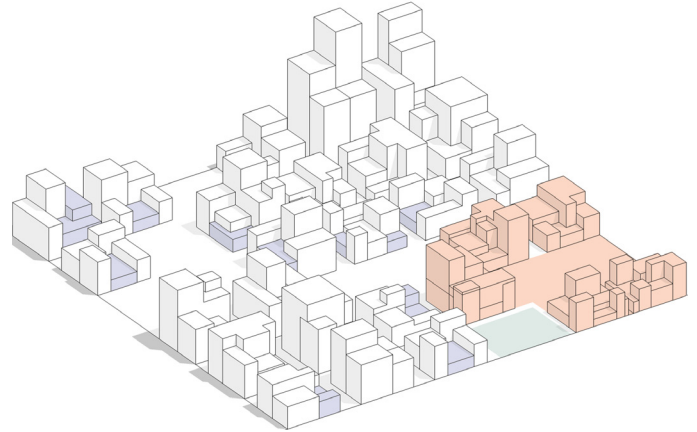


Fig. 2.9  
Location selection

### • • • Site selection:

Site selection is significant for large scale changes. A site with surplus of space, allows a building's expansion in case more area is needed (Geraedts, 2016). In addition, legal aspects such as the maximum square meters and the functions permitted on site, need to be considered (Geraedts & Prins, 2016). A site that under the zoning plan permits multifunctional uses is more attractive for corporations, as retail-public functions can be incorporated on the ground floor-plinth, integrating the building to its surroundings, delivering value to both their users and the general public (Harris, 2015; Geraedts, 2016; Nakib, 2010). The potential of functional change -in case the first occupant leaves- increases buildings' adaptive capacity and consequently its attractiveness (Remøy et al., 2011; Geraedts & van der Voordt, 2003; Schmidt III, 2014; Pinder et al., 2017).

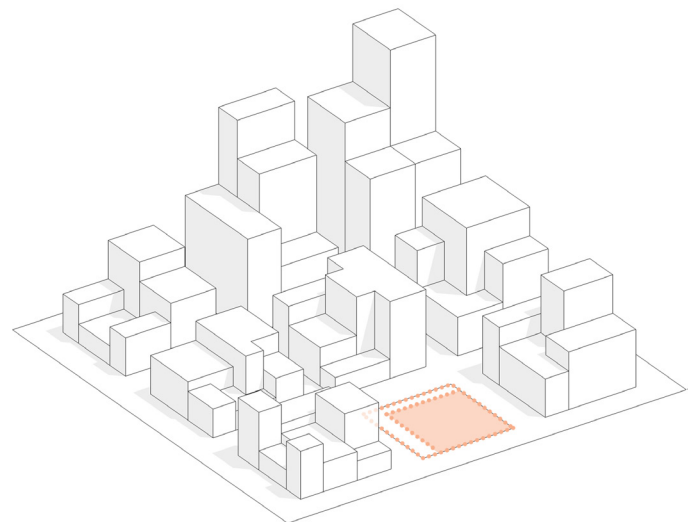


Fig. 2.10  
Site selection

### • • • Technology:

The rising interest for innovative solutions, has stimulated the use of technology as a measure to increase buildings' adaptive capacity. By introducing an App. where users can control the lighting, ventilation, and temperature of their workspace, as well as select the space they want to work from depending on the needs and their tasks - creates a highly responsive environment. Finally, localization is a measure that can improve the efficiency and optimization of the space through sensors installed throughout the building. Although still being at an early stage, the implementation of such measures can result in buildings which is highly responsive to users' daily demands, composing a healthy and productive environment. Apart from the direct benefits that technology has for the owners and users of the building, indirect benefits in the form of data generated can contribute both to buildings' optimization, as well as to a bigger system, where buildings learn from each other

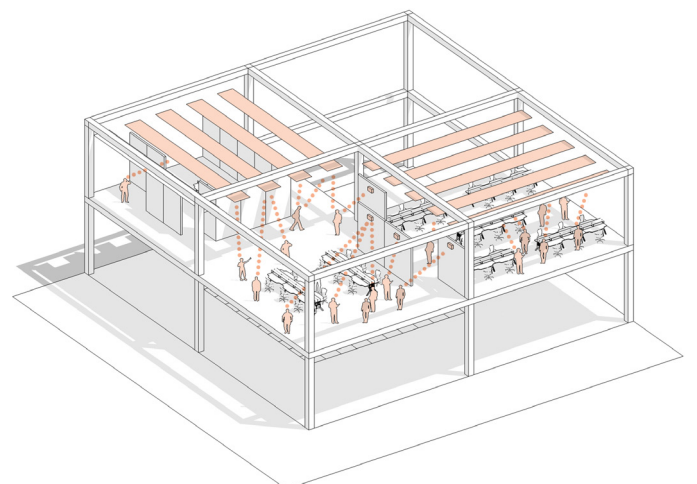


Fig. 2.11  
Technology

## 2.2 Building layers

### The building layers

Adaptability as a mean of extending buildings' functional lifespan and increasing usability has been a highly researched topic within the field of the built environment. One of the main theories that was adopted for the development of the paper's strategy was Duffy's shearing layers, which was later revised by different authors such as Brand and Schmidt III. Based on his theory, buildings should not be measured in material terms but in terms of time and the longevity of the built components (skin can last up to 50 years, services up to 15 years etc.) (Schmidt III, 2014). Buildings should be seen as a set of 'shearing' layers which change in different rates. The more connected are the layers, the greater the difficulty, the financial and time cost of adaptation will be.

Shearing layer	Characteristics	Life expectancy
Site	Site boundaries	Eternal
Structure	Foundations & load-bearing components	30-300 years
Skin	Cladding & roof system	20+ years
Services	Working guts of buildings	7-20 years
Space plan	Interior layout	3 years
Stuff	Furniture	<3 years
Social	Humans in (users, owners) & around the building	Eternal
Surrounding	Physical context (buildings, public space, transportation)	Eternal

Table 2.3  
Shearing layers (adapted from Schmidt III, 2014).

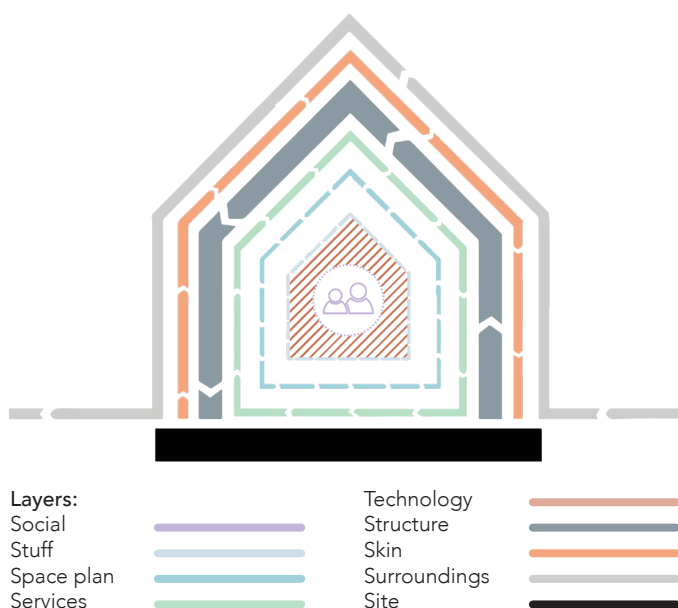


Fig. 2.12  
Revised building layers model (adapted from Schmidt III, 2014).

Strategy types	Layers
Multifunctional	<ul style="list-style-type: none"> <li>Structure</li> <li>Skin</li> </ul>
Building characteristics	<ul style="list-style-type: none"> <li>Structure</li> <li>Skin</li> </ul>
Oversupply	<ul style="list-style-type: none"> <li>Structure</li> <li>Services</li> </ul>
Buffer zones	<ul style="list-style-type: none"> <li>Structure</li> <li>Space plan</li> <li>Social</li> </ul>
Demountable elements & dry connections	<ul style="list-style-type: none"> <li>Structure</li> <li>Skin</li> <li>Space plan</li> </ul>
Modular & dividable	<ul style="list-style-type: none"> <li>Structure</li> <li>Skin</li> <li>Services</li> </ul>
Circulation & zoning	<ul style="list-style-type: none"> <li>Structure</li> <li>Space plan</li> </ul>
Movable & portable	<ul style="list-style-type: none"> <li>Space plan</li> <li>Stuff</li> </ul>
Location selection	<ul style="list-style-type: none"> <li>Surroundings</li> <li>Social</li> <li>Site</li> </ul>
Site selection	<ul style="list-style-type: none"> <li>Site</li> <li>Social</li> </ul>
Technology	<ul style="list-style-type: none"> <li>Skin</li> <li>Services</li> <li>Space plan</li> <li>Stuff</li> <li>Social</li> <li>Technology</li> </ul>

Table 2.4  
Strategy types and associated layers

## 2.3 Forms of added value (X - axis)

Corporations' gradual shift towards value delivery in addition to the underlying complexity of this concept, has stimulated research towards the creation of models that explain how strategic approaches contribute to the value of the firm. It is imperative for firms to understand how their corporate real estate strategies and operating decisions are related to the core business strategy, to ensure that firms are pursuing complementary objectives that will contribute the highest value for the firm in the long-run (Lindholm, 2008a; Gibler & Lindholm, 2012). This section focuses on presenting the different forms of added value that were used for this paper's strategy.

### 1. Increase real estate value

Buildings can be also viewed as capital assets which can be managed to optimize their financial contribution to the organisation. Corporate real estate managers' objectives are to maximize the portfolio's financial value or ensure that the best cost alternative is selected considering short and long-term costs (Lindholm & Leväinen, 2006; Macmillan, 2006; Lindholm, 2008b). This value is related to corporations' core portfolio, which is referred to as a property's book value. Maximizing an asset's value can be achieved through branding, attractiveness, adaptive capacity, durability or location selection (Voordt & Jensen, 2018; Pinder et al., 2011; Anker et al., 2014; Remøy et al., 2019; Koppels, Remøy, de Jonge & Weterings, 2009). In addition, the demand for sustainable buildings is also reflected in sustainable buildings' book value (Remøy, & van der Voordt, 2014).

**Related with:** stimulate innovation, support image & culture, environmental sustainability, adaptability

### 2. Productivity

Productivity is a value directly linked to firms' performance (Riratanaphong et al., 2012; De Vries et al., 2008). Real estate decisions regarding location selection, spatial design and the buildings' ability to respond to users' needs, maintaining optimal operation levels can have a direct impact on the functionality of the space, allowing employees to work effectively and efficiently (Lindholm, 2008b; Lindholm et al., 2006; Lindholm, 2008a). Sustainable buildings, can result in pleasant environments, contributing positively to users' wellbeing and productivity (Gibler & Lindholm, 2012). Responsive spaces that can support user activities and the core business through time, reduce the mismatch between the dynamic demands and the static supply, increasing user satisfaction and consequently their efficiency and productivity (Gibler, Black & Moon, 2002; Petrolaitiene & Jylhä, 2015; Lindholm, 2008b; Den Heijer, 2011). User involvement constitutes one of the main factors in delivering productive spaces, as users are the ones who best know their needs (Gibler et al., 2002). That being said, productivity can be linked with adaptability, satisfaction, collaboration and quality of space.

**Related with:** increase real estate value, productivity, support image & culture, adaptability

### 3. User satisfaction

Employee satisfaction constitutes a major factor of corporations' performance. It highly depends on the real estate facilities provided, and decisions concerning site selection, workplace design and quality, sustainability measures and amenities provided (Lindholm et al., 2006). The responsiveness of the building -allowing users to have control over it- can also have a positive influence over their well-being and satisfaction (Anker et al., 2014). Satisfaction is linked with efficiency and productivity; meaning that the more satisfied the employees are, the more productive and efficient they will be, adding value to the firm by increasing its performance (Lindholm & Leväinen, 2006; Anker et al., 2014; Khanna, Van der Voordt & Koppels, 2013). In order to supply an environment that satisfies the users' needs, users need to be involved in the design process (Khanna et al., 2013).

**Related with:** increase real estate value, productivity, support image & culture, adaptability

### 4. Stimulate innovation

Many firms are knowledge businesses, operating in competitive environments, where innovation constitutes a key value for their survival and growth. These firms need to provide workplaces that support innovative working, thinking and collaboration (Lindholm et al., 2006; Lindholm & Leväinen, 2006). Spaces should be open and flexible in order to stimulate interaction which can lead to innovation (Voordt & Jensen, 2018). Apart from the physical attributes of the building, location selection is also a factor of innovation. Selecting locations where talented labour is concentrated (e.g. Eindhoven, location of Vodafone innovation hub), can add value to the firm, enhancing its image, employees productivity and increasing its competitive advantage and performance (Khanna et al., 2013).

**Related with:** productivity, support image & culture, adaptability



## 5. Environmental sustainability

With the rise of environmental concerns, the emphasis on sustainability in real estate has increased. Corporate real estate management can have a major influence on organisations' environmental impact, by implementing sustainability approaches to their portfolio, reflecting their social responsibility (Remøy, & van der Voordt, 2014; Gibler & Lindholm, 2012). Sustainability can also result in indirect benefits such as increased performance and profitability due to the reduction of operation costs, greater financial returns, improvement of the firms' image, increased employee satisfaction and higher productivity (Gibler & Lindholm, 2012; Jylhä et al., 2019). Sustainability principles entail adaptability and flexibility, providing responsive environments that can last a long period of time, reducing the buildings' ecological footprint (Macmillan, 2006). Due to its significance, neglecting sustainability is not an option for corporations anymore (Jylhä et al., 2019).

**Related with:** improve quality of space, user satisfaction, environmental sustainability, adaptability, social responsibility

## 6. Adaptability

Adaptability or flexibility -as referred by many researchers- has become an important value for corporations' real estate portfolios. Having the potential to respond through time to the business needs, continuously supporting a firm's core strategy can add value to the firm (Lindholm et al., 2006). Adaptability provides the potential to: anticipate and resolve problems quickly, change the organisation's culture, image and core activities and allows firms to explore different layouts that could affect collaboration, satisfaction and innovation (Lindholm et al., 2006; Lindholm, 2008a; Gibler et al., 2002). Having the potential to explore different workplace concepts, can allow firms to optimize the space to correspond to their objectives, values, activities and management style (Anker et al., 2014; Lindholm, 2008b). The ability of buildings to respond to their users' needs can impact their satisfaction, well-being, productivity and overall performance (Petrulaitiene & Jylhä, 2015). Adaptability adds value to firms especially within the core part of their portfolio. Core portfolio, is used to accommodate organisations' core activities and reflect their image (Lindholm, 2008b). Therefore as adaptability value is a sustainability measure it can reflect firms' social responsiveness (Remøy et al., 2019)

**Related with:** increase real estate value, productivity, user satisfaction, support image & culture, environmental sustainability, social responsibility

## 7. Support image & culture

Portfolio constitutes a communication instrument for a corporation's image and values, reinforcing its competitive position in the market (Singer, Bossink & Vande Putte, 2007; Lindholm, 2008b). This can be achieved through buildings' physical design, site selection, workplace strategy and overall portfolio management (Khanna et al., 2013). Location, accessibility and visibility are considered to be key parameters for attracting customers and increasing revenues (Lindholm et al., 2006). A building's physical attributes shape companies' image amongst internal and external stakeholders (suppliers, employees, customers and investors), constituting an indirect way off adding value to the organisations (Lindholm et al., 2006; Lindholm, 2008b; Den Heijer, 2011). Depending on the goals and the image a firm wants to reflect, different strategies can be applied (value based, standardisation, incremental) (Singer et al., 2007; Khanna et al., 2013). Focusing on the core portfolio, such buildings need to be strategically located, constitute a landmark for the organisation's identity, reflect an innovative character and have high degree of adaptability, highlighting the firm's social responsibility and sustainability concerns (Anker et al., 2014).

**Related with:** user satisfaction, environmental sustainability, adaptability, social responsibility

## 8. Social responsibility

Buildings are environments that connect with people -whether they are users or neighbours- creating and enhancing opportunities for social interaction and reinforcing social identity (Macmillan, 2006). Due to their presence and longevity, buildings shape the identity of their context. Therefore, in order to preserve the social value and identity, buildings should be able to last in time (Nakib, 2010). In the corporate environment, buildings' image, reflects and shapes companies' identities (Macmillan, 2006). The environmental problems that have emerged and the rapid pace of change, has increased corporations' demands for sustainable real estate, as it reflects social responsibility, strengthening their identity (Khanna et al., 2013). Not being able to cope with the present demands, can lead to demolishing and re-constructing which could negatively impact a corporation's social responsibility and character (Remøy et al., 2019). Therefore social responsibility constitutes a significant factor for attracting talented employees and customers, having an indirect impact in a firm's performance and profit (Voordt & Jensen, 2018).

**Related with:** support image & culture, environmental sustainability, adaptability

## 2.4 Strategy breakdown & the added value

Strategy type	Significance	Risk	Impact & Risk assessment	Life expectancy	Increase real estate value	Productivity	User satisfaction	Stimulate innovation	Environmental sustainability	Adaptability	Image & culture	Social responsibility
Tactics												
A. Multifunctional	4.4	1.6	2.8	>20	●	●	●	●	●	●	●	●
Floor to floor height	4.8	1.2	4.1	>30	●		●		●	●	●	●
Expandable horiz. & vertical	4.5	2.7	1.7	>30	●				●	●	●	●
Reduction horiz. & vertical	3.0	2.0	1.5	>30	●				●	●	●	●
Facade grid dimensions	4.2	1.2	3.6	>20	●				●	●	●	●
Grid wide span	4.5	1.2	3.9	>30	●	●	●	●		●		
Floor depth	4.5	1.8	2.5	>30	●	●	●	●		●		
Independent envelope	4.5	1.5	3.0	>20	●					●	●	●
Position: stairs, elevators, entrances & services	4.8	1.2	4.1	>30	●	●	●		●	●		
B. Building characteristics	4.4	1.6	2.7	>20	●	●	●	●	●	●	●	●
Building generality	4.5	1.7	2.7	>30	●		●		●	●	●	●
Floor depth	4.5	1.8	2.5	>30	●	●	●			●		
Building geometry	4.2	1.7	2.5	>30	●	●	●		●	●	●	
Image & identity (skin)	4.0	1.7	2.4	>20	●					●	●	●
Not load-bearing facade	4.5	1.7	2.7	>30	●					●	●	
Daylight	5.0	1.3	3.8	>30	●	●	●	●	●	●	●	●

- Large impact (  $L > 2/3$  - Value added by more than two thirds of the tactics)
- Medium impact (  $1/3 > M > 2/3$  - Value added by between one and two thirds of the tactics)
- Small impact (  $S < 1/3$  - Value added by less than a third of the tactics)

Table 2.5  
Preliminary Strategy A - Breakdown

Strategy type	Significance	Risk	Impact & Risk assessment	Life expectancy	Increase real estate value	Productivity	User satisfaction	Stimulate innovation	Environmental sustainability	Adaptability	Image & culture	Social responsibility
Tactics												
<b>C. Oversupply</b>	4.3	2.7	1.6	>7	●		●		●	●	●	●
Floor to floor height	4.8	1.2	4.1	>30	●		●		●	●	●	●
Increased load capacity	4.3	2.7	1.6	>30	●				●	●		
Expandable horiz. & vertical	4.5	2.8	1.6	>30	●				●	●	●	●
Surplus of building space & buffer zones	4.0	3.3	1.2	>30	●		●			●		
Capacity surplus services	4.0	3.3	1.2	7-20	●		●			●		
<b>D. Buffer zones</b>	4.3	2.5	1.7	>3	●	●	●	●	●	●	●	●
Undefined spaces	3.8	2.0	1.9	3			●			●		
Surplus of space	4.0	3.3	1.2	>3	●		●			●		
Expandable horiz. & vertical	4.5	2.8	1.6	>30	●				●	●	●	●
Communal space	4.7	1.7	2.8	>3	●	●	●	●		●	●	●
<b>E. Demountable elements &amp; dry connections</b>	4.3	1.4	3.1	>3	●		●		●	●	●	●
Dry connections (structure & plan)	4.5	1.3	3.4	>3	●				●	●		
Demountable facade	4.3	1.7	2.6	>20	●				●	●	●	●
Demountable walls	4.5	1.5	3.0	3	●		●		●	●		
Exposed structure	3.7	1.2	3.1	>30						●		
Suspended ceiling & raised floors	4.3	1.2	3.7	3	●		●			●		

**Table 2.5**  
Preliminary Strategy B - Breakdown

Strategy type	Significance	Risk	Impact & Risk assessment	Life expectancy	Increase real estate value	Productivity	User satisfaction	Stimulate innovation	Environmental sustainability	Adaptability	Image & culture	Social responsibility
Tactics												
F. Modular & dividable	4.2	1.7	2.5	>7	●		●		●	●	●	●
Grid structure	4.5	1.7	2.7	>30	●		●			●		
Modular & Prefab. elements	4.2	1.8	2.3	>30	●		●		●	●		●
Standardised skin	4.0	1.8	2.2	>20	●				●	●	●	
Facade grid dimensions	4.0	1.3	3.0	>20						●	●	
Adjustable & modular services	4.2	1.8	2.3	7-20	●		●		●	●		
G. Circulation & zoning	4.6	1.7	2.8	>3	●	●	●	●		●	●	
Vertical & horizontal access	4.8	1.5	3.2	3	●		●			●		
Separate entrances	4.5	1.5	3.0	3	●		●			●	●	
Wide circulation	4.5	1.8	2.5	3	●	●	●	●		●		
Core- services	4.5	1.8	2.5	7-20	●					●		
H. Movable & portable	4.5	1.5	3.1	3<	●	●	●	●	●	●	●	
Standardised & modular	4.5	1.5	3.0	3<		●	●	●	●	●		
Folding & adjust. furniture	4.0	1.3	3.0	3<		●	●	●		●		
Removable & relocatable units	4.8	1.7	2.9	3	●	●	●	●		●		
Demountable wall partitions	4.7	1.3	3.5	3	●	●	●	●		●		

- Large impact (  $L > 2/3$  - Value added by more than two thirds of the tactics)
- Medium impact (  $1/3 > M > 2/3$  - Value added by between one and two thirds of the tactics)
- Small impact (  $S < 1/3$  - Value added by less than a third of the tactics)

**Table 2.5**  
Preliminary Strategy C - Breakdown

Strategy type	Significance	Risk	Impact & Risk assessment	Life expectancy	Increase real estate value	Productivity	User satisfaction	Stimulate innovation	Environmental sustainability	Adaptability	Image & culture	Social responsibility
<b>I. Location selection</b>	4.8	1.4	3.5	/								
Multifunctional location	5.0	1.2	4.3									
Area express culture	4.5	1.7	2.7									
Provision of amen. & services	4.7	1.3	3.5									
Distance to city centre	4.8	1.0	4.8									
Proximity	5.0	1.0	5.0									
Good quality public places	4.8	1.3	3.6									
Access by public transport	5.0	1.3	3.8									
Access by car & parking	4.3	2.0	2.2									
<b>J. Site selection</b>	4.3	1.5	2.8	/								
Surplus of site space	4.2	2.2	1.9									
Multifunctional site - legal	4.5	1.3	3.4									
Expandable location	4.2	1.0	4.2									
Creation of public space	4.3	1.7	2.6									
<b>K. Technology</b>	4.0	3.2	1.3	5<								
App - Lights, CO2, temperature	4.0	3.5	1.1	5<								
App - Workplace	4.0	2.5	1.6	5<								
Localization	4.0	3.5	1.1	5<								

Table 2.5  
Preliminary Strategy D - Breakdown

## 2.5 Strategy implementation

This section presents the implementation process of the paper's final strategy. The 7 steps presented below provide the course of actions that the implementers need to follow, illustrating how their real estate can contribute to their firms' performance, allowing them to achieve their goals. A very important remark that needs to be considered throughout the process is to ensure that all involved parties are aware of how this strategy works and follow it..

### Step 1: Identify goals

Considering the market's high competitiveness, corporations' **real estate strategies** need to be fully **aligned** with their **business goals** and **objectives**. Therefore the first step is to clearly identify the firm's main goals and objectives.

E.g. "Z" firm's goal is to enhance their identity.

### Step 2: Link goals to added values

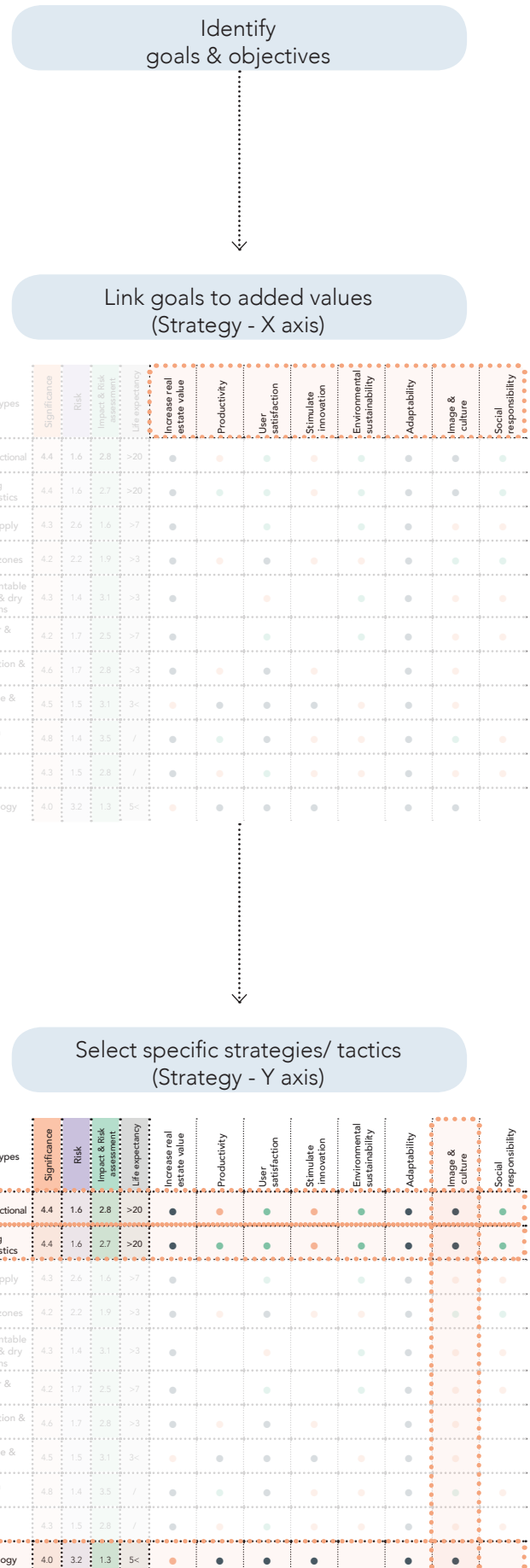
Each of the defined **goals** can be obtained by **breaking them down** and **linking them to different forms of added value**. This will allow the implementers to understand better how their objectives can be attained. On this paper's strategy, as one can see on Table's 6.3.1 X-axis, eight forms of added value have been identified.

E.g. In order for "Z" to enhance their identity, they need to enhance their "image & culture", be more "sustainable" and "adaptable" and increase "user satisfaction".

### Step 3: Select strategy types

After identifying the forms of added value that are associated with the firm's goals, the appropriate **adaptability strategy types** need to be selected. Table 6.3.1 illustrates which of the eight values (X Axis) can be delivered by which of the eleven identified strategy types (Y Axis). The links are illustrated through the use of dots. Based on the colour of the dot (blue, green, orange), one can understand the impact a strategy can have on the specified values (large, medium, small).

E.g. Considering "Z's" objectives, if they decided that "image & culture" is the most appropriate value for them, implementing : "A. Multifunctional", "B. Building characteristics", "C. Oversupply", "D. Buffer zones" and "H. Location selection" can have the largest impact. The rest of the identified strategies can have smaller impact on their demands.





#### Step 4: Select specific strategies/ tactics

Each adaptability strategy type, consists of a number of tactics. After deciding which strategy types (A-K) can be more effective, from tables 6.5 (Final strategy Breakdown A-K) the actors need to **select which of the presented tactics can be implemented in order to achieve their goals**. The first step of this selection process is based on the identified links between these tactics and the added values - illustrated through the balls.

E.g. Focusing on the "Multifunctionality" strategy type, in order to deliver the "Image & culture" value, corporate real estate managers should consider the "Floor to floor height", "Expandable horizontal & vertical", "Reduction horizontal & vertical", "Façade grid dimensions" and "Independent envelope".

#### Step 5: Significance, risk, i & r asses. and life expectancy

Apart from using the forms of added value for selecting the appropriate tactics and strategy types, the "significance", "risk", "impact & risk assessment" and "life expectancy" columns constitute important selection criteria. Depending on the stakeholders using this strategy, each of these selection criteria might be of different value for them and can therefore have an impact on the final decision.

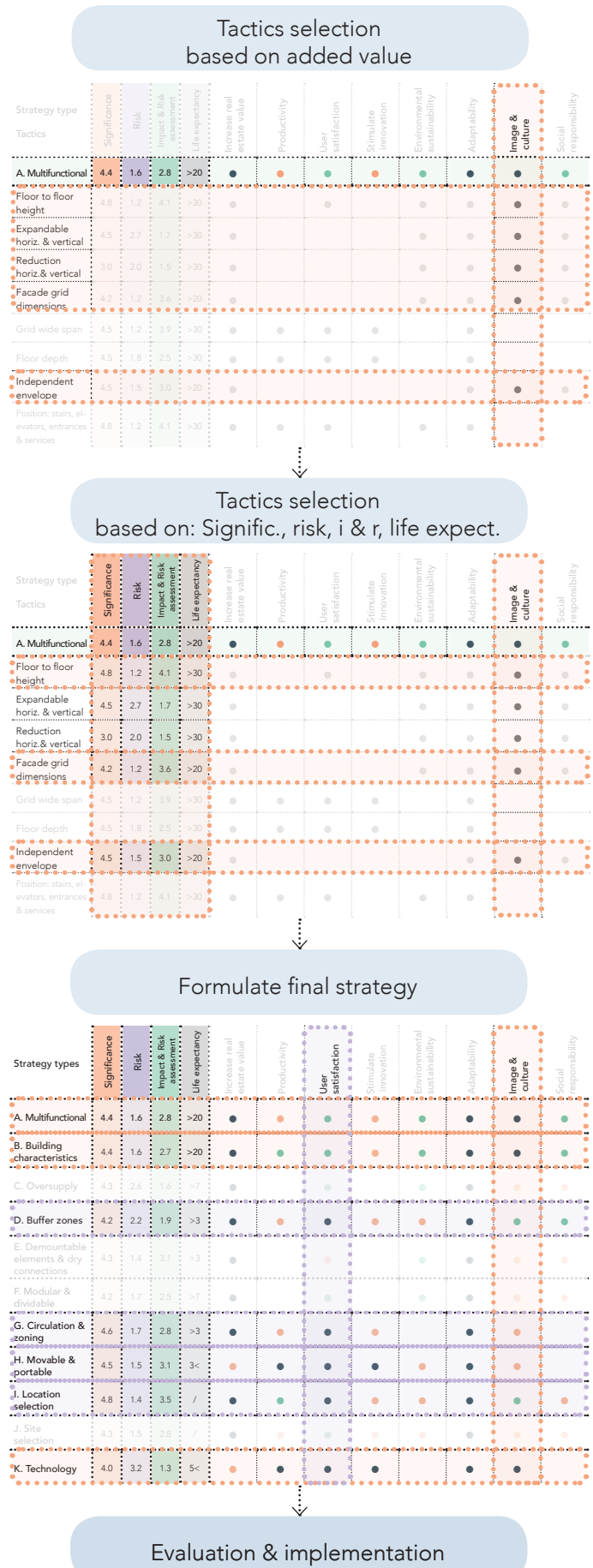
E.g. Following Step 4, five tactics were selected based on the value they can deliver to the implementers' "Image & culture". From these five tactics, "Expandable horizontal & vertical" and "Reduction horizontal & vertical" are of high "risk" and therefore the "impact & risk assessment" is relatively low compared to the other three tactics. Consequently, the actors might choose to focus on "Floor to floor height", "Façade grid dimensions" and "Independent envelope".

#### Step 6: Formulate strategy

In order to create a strategy that can fully respond to the corporation's objectives, steps 2-5 need to be repeated for each of their objectives.

#### Step 7: Evaluate & tailor strategy

The final step of the strategy implementation is of high importance. After defining every aspect of the strategy actors need to ensure that all objectives, added values, strategy types and tactics are aligned in order for it to be concrete and thorough and increase the potential of achieving their objectives. The involved stakeholders will then need to **evaluate and assess the final strategy**, and make any required alterations. The evaluation process is an **iterative and continuous action that needs to take place throughout the briefing and design phase**, safeguarding that all components of the strategy add value to the organisation and actors involved.



## 2.6 Guidelines

### Corporate Real Estate Managers

- In order to effectively apply the presented strategy, **the first two steps are the most crucial**. Actors need to set clear objectives and then analyse them into the forms of added value. This process is important in order to implement adaptability tactics that can actually respond to the companies' objectives.
- As buildings are created to accommodate users' operations, **involving the actual users** of the space from early design stages is important to understand their need and take them into account when formulating the company's goals and objectives. This will assist in the development of a more effective strategy and consequently a better outcome. Considering the constant contextual changes, it is likely that users' demands will change by the time the building is completed. Therefore, **users' should be actively involved in the project's lifecycle until the construction phase**.
- The **implementation of the strategy requires certain level of experience**. Therefore, involving advisors/ consultants or even better the architect of the project (if already known) can be very beneficial. Such actors should have deep knowledge over the construction field and can assist corporate real estate managers through the process of formulating the strategy.
- Organisation can also use the strategy in order to **ensure a good match between the corporate strategy** (demands) and the **delivered project** (future supply)- and **control the design and delivery of the project**, ensuring that the outcome will fit their ambitions. This can be done by examining whether the design tactics proposed deliver the values related to their objectives.
- Project development is a lengthy process where a large number of professionals can be involved. As project progress and teams grow there is a risk of the strategy being gradually left out. In order to avoid such risk, it is important for the corporate real estate managers to **formally introduce the strategy in the very beginning of the project and repeat the process on each phase**, aiming to highlight its value for the project while preserving it to the agenda of the project team.

### Architects

- Architects and engineers of the construction sector can also apply this strategy in order to create more adaptable buildings for their clients. Architects can help or **ensure that the clients have successfully defined their objectives** and have **linked them correctly to the different forms of added value provided** (steps 1-2).
- Based on the results from the first steps, architects -with the help of their clients- need to **identify which of the design adaptability tactics need to be implemented** (step 3-4-5). As this selection is based on a number of criteria (step 5) it is important to **collaborate closely with the client and the involved engineers in order to understand identify and implement the most appropriate tactics**. This selection is not only based on the strategy but also on the architect's design language. Meaning that one must not only focus on the tactics identified in the strategy. **Involving the users** in this stage is also important in order to develop an efficient building that responds to their demands and daily activities, enhancing users' satisfaction and productivity.
- In the tactics selection process, it is important to take into account the **significance of the long-lasting layers' for building's adaptive capacity**. Long-lasting layers related with the Location selection, or Multifunctional strategies should be future-proof as they highly impact building's technical lifecycle. On the same line, investing in quality and creating buildings that respond well to their users' demands then they will love them, care for them and eventually they will last longer; highlighting ones again the significance of users in the concept of adaptability.
- **Legal parameters** have a significant role within the construction industry. All tactics of the strategy presented are highly dependent on the regulation of the country, province or area the building is developed. As this is highly dependent on the projects' exact location, the architects are obliged to consider the legal restrictions when applying the strategy.
- As architects are usually responsible for coordinating the work of different professionals involved in a project, and have a managerial role within teams, **along with their clients they should ensure that the strategy is taken into account by all members** of the project team throughout the design and construction process.
- Finally, architects and related engineers need to **ensure that the designed have developed complies with their client's objectives**. Therefore, evaluating their proposal regularly is important to avoid issues and deliver a project that fits the client's requirements (step 7).



## Developers & Investors

- For developers and investors, one of the main benefits of this strategy is that it **indicates the indirect and long term value of adaptability**. Such buildings are becoming more attractive in the market and this shift has gradually started to be reflected on real estate prices. Consequently, whether the intention is to sell or lease the building, the financial returns will be higher for future-proof buildings.
- Similarly to real estate managers, developers use this strategy as a tool for **controlling and supervising that the design fits their goals and objectives**. By performing regular cross-check and using the strategy throughout the design process can result in a successful outcome.
- Developers need to also be **actively involved in formulating the strategy that will be applied for designing the project**. They need to identify clearly their goals and objectives which together with the architects will need to match with the different forms of added value and later select the design tactics that best fit them.
- When developing and investing in adaptable buildings, having a **future-oriented mindset** is key. Consequently the focus should be on the long-term and indirect benefits of adaptability rather than short-term and cost oriented goals.
- Shifting towards adaptable buildings, entails also lower risks for the future, as such buildings can respond to small and large/ drastic changes such as a crisis (e.g. the "1.5 Meter Dutch Economy" - 1.5m distance between desks, a result of the Coronavirus pandemic) . Therefore, in such cases buildings would have less chances of becoming obsolete as they have the capacity to adapt to new scenarios.

## Building function & location

- The strategy developed is mainly focused on the development of office buildings, and was based on a research conducted in the Netherlands. Though as it addresses aspects that are shared within the built environment and due to the flexibility underlying it, allows it to be applicable for other functions and locations too.
- The involved parties would first need to assess which of the different forms of added value and which of the design tactics are relevant for the type of buildings they are developing. As already mentioned, implementing tactics with longer life expectancy can result into more responsive and future-proof outcomes - regardless of the function and location of the project.
- One of the biggest advantages of the strategy - regardless of the building's function and location- is its ability to create awareness from an early stage, constituting a tool that can be used to make responsive buildings and better architecture.

## 3.0 References

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