Chapter _02
Literature Review

In this chapter, research will establish a possible answer for the sub-questions posed in chapter one. Areas for improvement are specified and countered with a potential solution. Finally, a conclusion is drawn to propose a theoretical solution for dealing with the problem statement.

The following strategies were obtained from various sources and illustrate a variety of theoretical and practical positions; however, each proposes an interesting method to deal with the static nature of architecture.
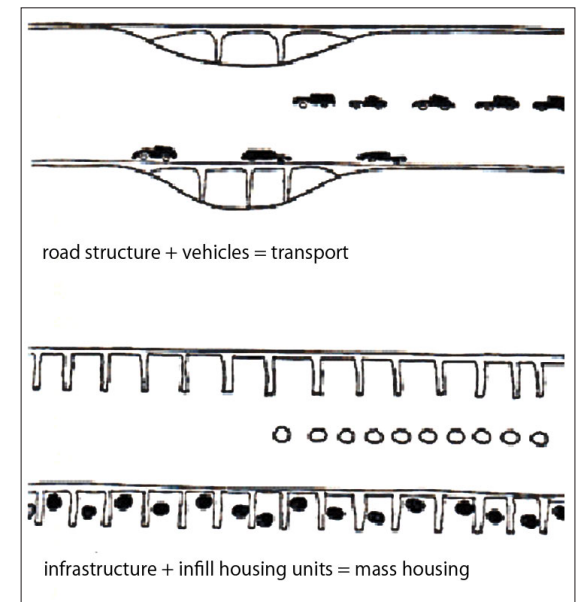
Nature and Architecture

Darwin's evolutionary theory postulates that the survival of any organism depends on a self-organizing system that can only survive through continual interaction and adaptation to the given environment. Homeostasis should be established to balance external and internal conditions; this process of achieving equilibrium will constantly change due to external fluctuations (Abel, 1998: 563-4). This concept of evolution within architecture is not a new occurrence and provides a fundamental foundation for understanding the dynamics of urban and architectural discourse.

Support Structures

Various architectural concepts support this theory, where a support act as a structure capable of elevating dwellings from ground level, thus allowing the independent units to be altered and disassembled apart from other dwellings (Habraken, 1999: 78). Considering the verticality this method solves urban problems such as urban sprawling, however the large scale threaten the delicacy of urban organisation and living conditions such as accessibility.

According to Habraken (1999: 122) these structures distinguish between the ordinary and extraordinary, thus "allowing industrial development to take place; but at the same time they bring both together under the umbrella of an industrial apparatus. They also distinguish between industrial production and site labour." *(Ibid: 122)*

fig. 18 N.J. Habraken, the comparison between an infill package in a support structure and a car on the highway, 1965

road structure + vehicles = transport

infrastructure + infill housing units = mass housing

Modularity

Usually based on the properties of dimensions, modularity is the break-down and standardisation of a structure into various elements. Jones (1992: 35) state that any successful design rely on the modules of which it consist of, he suggest that any design intention rely on some sort of modular organisation from musical notations to words of a language. Modularity is often disregarded for the thought of it being simplistic and fixed, but it is important to note that the combination of a variety of well combined modules establish a successful whole allowing for **"either behavioral or morphological plasticity"** (Mendell, 2005: 49).

fig. 19 Shugakuin Imperial Villa: modular dwelling for the Japanese Emperor (17th Century)

Piecemeal Growth

All urban communities, public spaces and buildings have evolved around the concept of piecemeal growth. Christopher Alexander explains this phenomenon as the development that proceeds in small steps, where spaces are recreated due to the adaptation towards function and site (Alexander, 1975: 67). This adaptation leads to a related whole due to internal and external factors that have been resolved, even though the individual parts are quite unique as independent elements.

This solution is relevant in any development strategy because the focus is on the concept of repair rather than replacement. As Christopher Alexander explained how the growth is considered in smaller contexts, the various elements need to respond with its own environment to establish a balanced whole.

fig. 20 Siena, Italy. Developed according to Piecemal growth

fig. 21 Panopticon, 1790. Jeremy Bentham

Polyvalence

Relating to the behaviour of flexibility, polyvalence is the way in which a given space can accommodate different programs with little or no physical re-arrangement. Some authors suggest that this can be achieved by only adding additional space to the proposed (Mendell, 2005: 52). Rem Koolhaas argues that **"Perhaps the most important and least recognised difference between traditional and contemporary architecture is revealed in the way that a hyper monumental, space-wasting building like the Arnhem Panopticon proves flexible, while modern architecture is based on a deterministic coincidence between form and program."** (Hill, 2001: 351-365)

It is important to realise that architecture and the flexibility thereof cannot accommodate any transformation, but only the allowance for different even opposite spaces can be considered as triumphant.

fig. 22 Museum of the Moving Image Hospitality Pavilion

Open Building

Open Building separates the functional layers of an entwined project. Kendal (2001: 145) explains that 'Open Building' principles consider flexibility to a large extend. The aim of open building is creating environments that have additional value than their intended use. The building's life cycle is strongly considered throughout the design process, allowing for future alterations. The concept of open building consists of two independent parts, a permanent part known as the shell or base, and a more flexible 'Infill' part. This notion is reasoned by means of the standardisation approach that allows for flexibility (Mutchler, 2006: 31). Architecture consists of different dependent layers, and the accessibility between these layers evaluates the quality of flexibility.

Mobility

Architectural mobility consists of various forms that prove a method of flexibility at different scales. Kronenburg (2000: 1) is bewildered by the resistance to impermanence of previous generations. From transportable environments to kinetic furniture Kronenburg mentions although the notion of mobility have been in use since the existence of humankind first began to built, it is only starting to show its appearance in the modern architectural trends.

Achieved by, manipulating the relationship of different components (fixtures), between functional spaces (rooms), or between context and building (whole building). Mobility in architecture can be related to the organisation of an organism's anatomy: from the movement of blood cells to organs to the entire body. However the important aspect is the classification of what is fixed and what elements allow for movement.
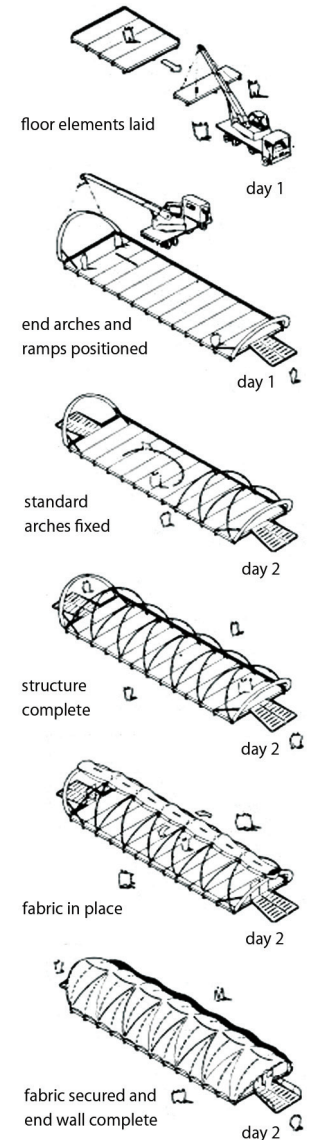

floor elements laid
day 1

end arches and ramps positioned
day 1

standard arches fixed
day 2

structure complete
day 2

fabric in place
day 2

fabric secured and end wall complete
day 2

fig. 23 assembly procedure

Areas for Improvement

From the gathered theoretical ideologies concerning flexibility, there are limited areas for improvement concerning the conceptual basis for an adaptable built form. However architecture should be simplified; dismantled to the basic necessity and the various elements should be examined as a design within itself (Mutchler, 2006: 4).

The proposed theoretical solutions provide a fundamental basis for the conceptualisation of architectural flexibility. Nevertheless the implementation of theory in the 'real' world has to prove viable to various external factors including cost, time and quality. Still the quest for any architectural practice is to provide buildings that; are more cost effective; are faster to erect; and have a pleasing aesthetic quality. But in addition satisfy the need of the current client as well as the 'unknown' future client by utilising as few resources as possible. This ideology contradicts the thought of what is usual and expected, embarking for innovative design solutions.

Solution

The complexity of architectural problems should have a basic resolution that should be accepted by a large variety of society. Understanding and reasoning should inform this approach. Buildings and urban areas are essentially for the living experience. However, the economy, time and money speculate architectural trends rather than the architect or urban specialist.

Gregotti (1996: 64) state that "**big picture**" design notion is overwhelming the current society, thus raising a concern to any design profession and questions the role of the architect in essence. Importantly it should be realised that for the 'big picture' to succeed, the design in a whole is dependent on smaller parts that varies from connections to the exploration of space.

These spatial explorations should coincide with the specific given environment and ultimately inform the design form.

Mutchler (2006: 15) suggests that a 'lean' architecture can have an effective impact because it deals with monetary aspects as well as proving time efficient throughout the building process. 'Lean architecture' as suggested by Mutchler is the dismantling process of complex design forms, and dealing with the complexity of the dismantled elements prior to the whole. This approach can be observed as architecture on a smaller yet more detailed level.

Visually observing the built environment through time, it is evident that architecture grows as technology grows. Contemporary architecture relies on technology to aid the complexity it provokes. The practical implementation of concepts have become endless. However Kieran and Timberlake (2004: 8) implies that these contemporary forms can come at a price.

Modern architecture does not rely on form or style; it is more about innovative design strategies to fabricate environments that can have the same impact as technology can produce.

"The computer is a tool, not a partner. An instrument for catching the curve, not for inventing it"
- *Frank Gehry* - (Friedman, 2002: 4)

Conclusion

From the research gathered, it could be concluded that flexible design strategies provide an opportunity to resolve a variety of evolving societal needs rather than narrowing the possibilities down to a perfect solution to an immediate problem.
Flexibility can be catered for by observing the built environment as living organisms that are interlinked with its surrounding environment, and not as objects that are defined by rigid spatial organisation. If this approach is established, the evolution of buildings should adapt to the ever changing social and cultural needs of modern society.

Adaptation and flexibility should be defined as a relative term. Where these concepts depend on various resources such as materials, assembly and construction methods, and programme necessities. Flexible design strategies responding to a specific environment underpins the way a building proves flexible.

Architecture has developed to be an ideal of excessive customisation dealing with individual clients' needs. However this uniqueness is still achieved by the utilisation of standard, off the shelf components.

Due to escalating building cost, design often results in standardisation and less choice. Thus the role of the architect is constantly challenged to attain uniqueness. Mass customisation proves to be the best possible solution to deal with this problem. Not to be confused with mass production, this method provides a unique solution for each client due to the subjective organisation of components.