

Adaptable Futures: A 21st Century Challenge

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"A sustainable building is not one that must last forever, but one that can easily adapt to change."

- Peter Graham, Environment Design Guide, 2006, Royal Institute of Australian Architects

This paper presents the current thinking of Adaptable Futures research group based at Loughborough University through a series of diagrams. The aim of the Adaptable Futures project is to facilitate the development of adaptable buildings through research and real-life application. The investigation looks to make clear Adaptability as a definable design characteristic with a principle consciousness towards time and layers.

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 lifecycle.

Time - the design consideration that buildings are dynamic systems that interact with a set of evolving endogenous and exogenous demands that require a capacity to accommodate change (space, function, and componentry) over time.

Layers - the design consideration regarding the organization and interfaces between components of varying life spans and functions.

The diagrams encapsulate a web of inter-related dimensions which tell a story of our exploration into understanding adaptability. They construct a framework and mark a beginning into generating a toolset for thinking about adaptability. *Appendix 1* is an index for the complete set of diagrams used by the project.

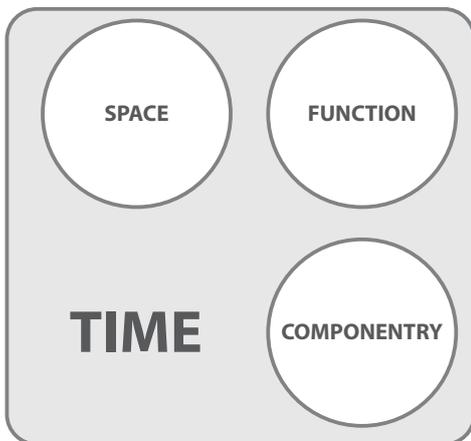


Figure 1: Perspectives

Perspectives (figure 1) regards the inclusion of time into the design consciousness. Moving beyond form-based to a time-based design. There are two distinct camps when considering time in design. The typical one focuses on the durability and aging of materials with the intent that the building will 'age' well. The second and not often addressed acknowledges time pertaining to building performance and the evolving demands a building has to be able to accommodate.

The current push to develop more sustainable places to live and work must consider buildings not as finished works of perfection removed from time, but as imperfect objects whose forms evolve to fit shifts in society through time. This reality forces the designer to engage more actively into the web of demands (political, economical, social, technological, legal, and environmental) placed on buildings.

Process (figure 2) diagrams the cycle which the sources (figure 3) operate over time within the design process. Ultimately, some solutions will materialize while others will be abandoned and stored as design intelligence for future use.

Sources (figure 3) outlines the origins for which adaptability can manifest itself through - *strategies, rules, policy, products, or design intelligence*. The categories are not realized in isolation, but help provide clarity for communication. Their organization relates to the degree in which they are bound in time.

The **Adapting Ables** table (Table 1) links the strategies to stakeholders, scale, time and layers. For clarity, each

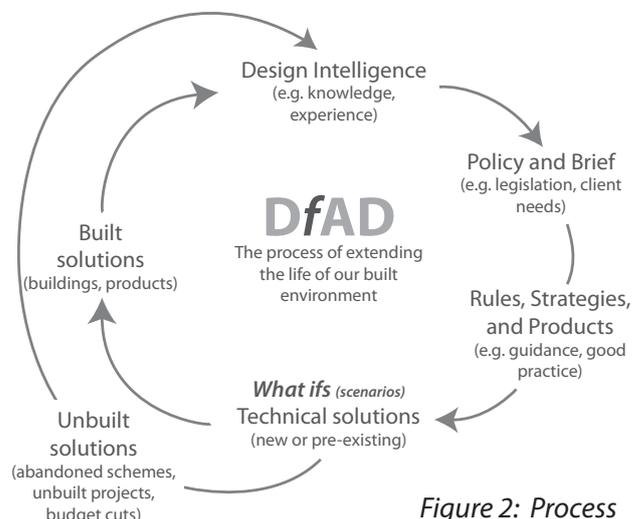


Figure 2: Process

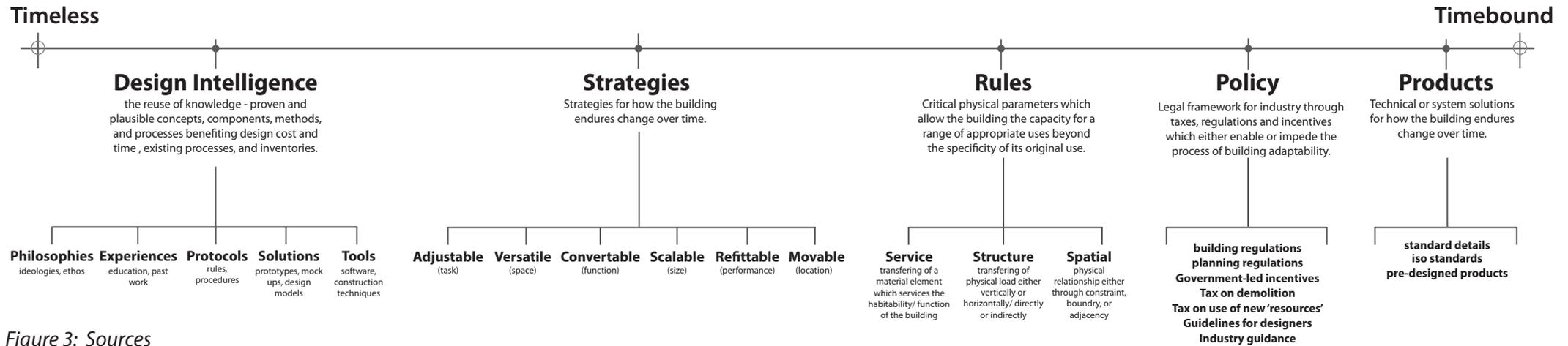


Figure 3: Sources

able	type of change	decision-level	B-E scale	Time (cycle speed)	Brand's layers					
					Stuff	Space	Services	Skin	Structure	Site
adjustable	change of task	user	components	daily/ monthly	○					
versatile (flexible)	change of space	user	components	daily/ monthly	○	○				
refittable	change of performance	user/ owner	components	7 years		○	○	○		
convertible	change of function	user/ owner	building	15 years		○	○	○		
scalable	change of size	owner	building	15 years		○	○	○	○	
movable	change of location	owner	building	30 years					○	○

Table 1: Adapting ables

strategy is defined by a type of change which allows for a decision maker and built environment scale to be associated with each strategy. In general, the strategies operate on different cycles and affect different layers of the building. The magnitude and frequency of the types of changes tend to act inversely (*Figure 4*).

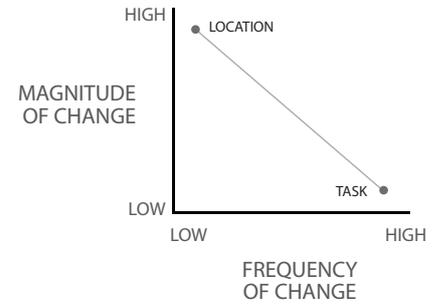


Figure 4: Changelometer

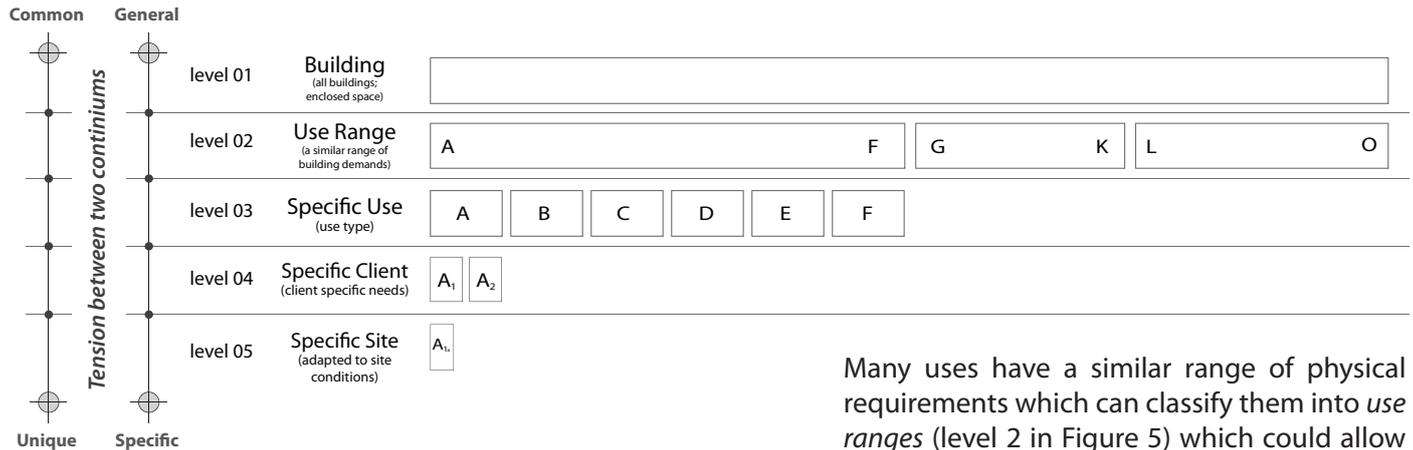


Figure 5: Specificity

Many uses have a similar range of physical requirements which can classify them into *use ranges* (level 2 in Figure 5) which could allow convertability within that range. We also tend to associate a sense of uniqueness with specificity, where a more generic design tends to have less value and get labeled common. The evolution of a new built form is inevitable, but the capacity of that form to accommodate change dictates the forms performance ability and ultimately the length of its life - *Land-scape* (*figure 6*). The two lines represent variations on the cycles of the built stock or landscape. One indicates a building fit at level 2 and the other level 5 displaying a shorter cycle because of a limited capacity to respond to a single business cycle. On the other hand, the level 02 fit building can respond to three business cycles.

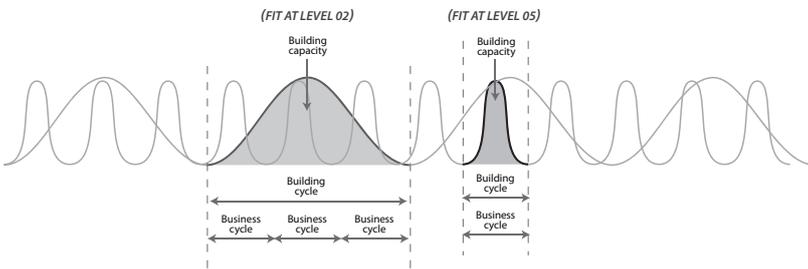


Figure 6: Landscape

Scales (*figure 7*) lays out the varying levels of our built and organizational environments as a reference for understanding at what level and to what extent the dimensions operate at.

Influencers (*figure 8*) is a diagram we are using to attempt to capture who/ what influences the decision making process for a building. For example, how much influence does the designer have with his own set of beliefs and experiences. How much impact/ push does the client or society have on the finished product?

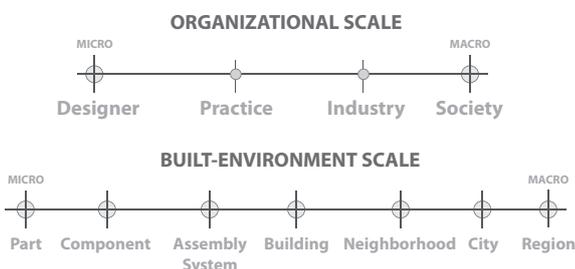


Figure 7: Scales

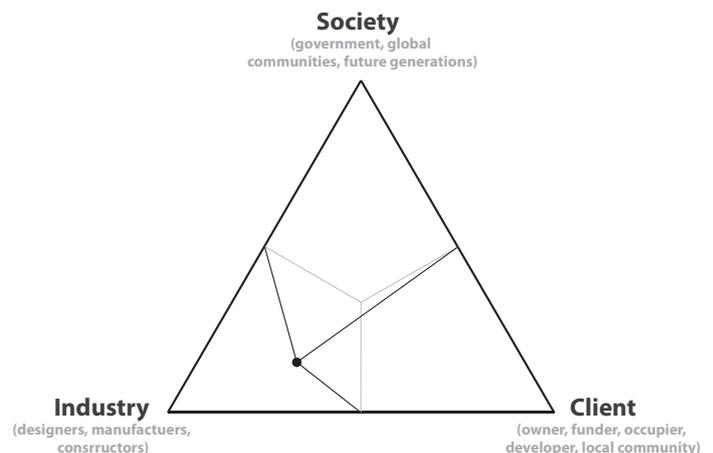


Figure 8: Influencers

Lifecycle (figure 9) looks at the building throughout its life and identifies critical decision points for investment (CDP 01 How much to invest initially?) and scenarios for action at the point in which functional adaptation (potential convertibility) takes place.

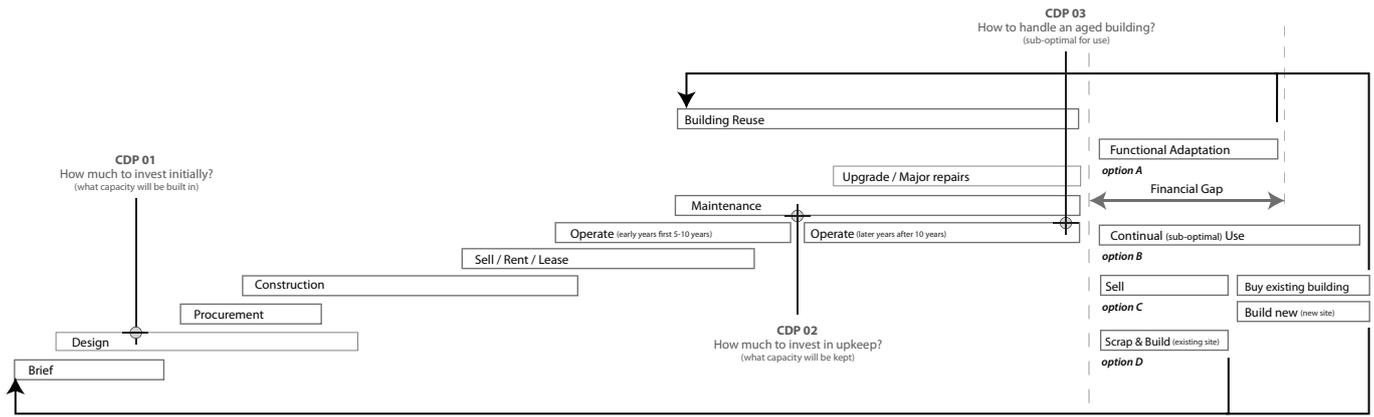


Figure 9: Lifecycle

Framecycle (figure 10) places the strategies in a clock-like position indicating their potential to be used. Filtered inbetween the strategies are various solutions associated with the strategies, and around the outside list some of the benefits.

The framework presented in this paper is an ongoing development of the AF project. We are currently validating the framework through its application with a number of casestudy and partner projects. Thoughts, criticisms, etc. are all welcome.

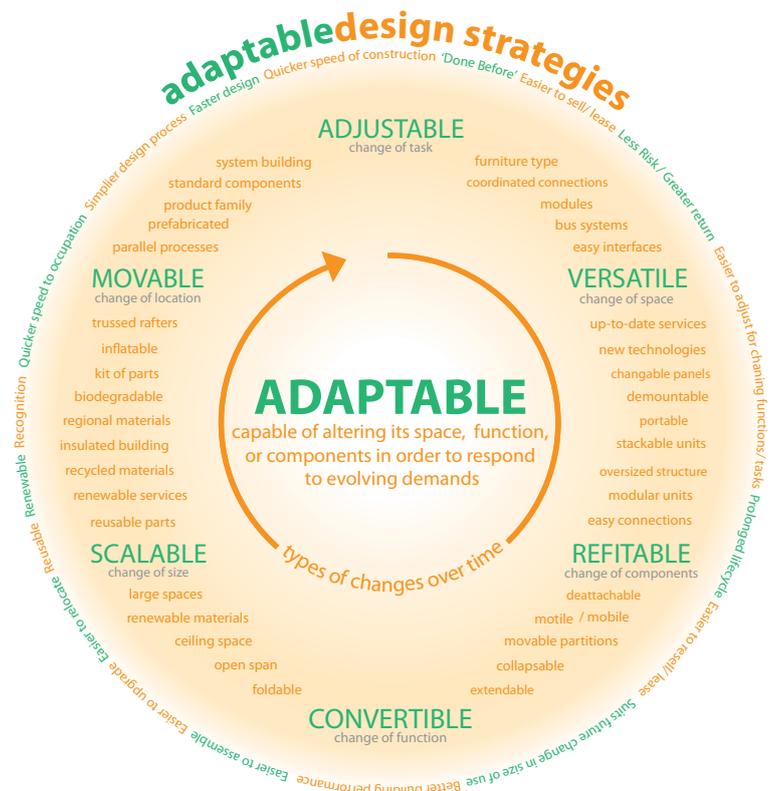


Figure 10: Framecycle

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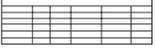
WP1 AF FRAMEWORK

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PARADIGM
TIME, LAYERS
- 

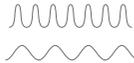
PERSPECTIVES
TIME, COMPONENTRY, FUNCTIONS, SPACE
- 

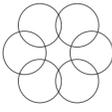
PROCESS
SOURCES (all), TIME
- 

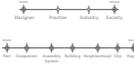
SOURCES
DESIGN INTELLIGENCE, STRATEGIES, RULES, POLICIES, PRODUCTS
- 

ABLES
STRATEGIES, SCALE, TIME, LAYERS, STAKEHOLDERS
- 

FRAMECYCLE
STRATEGIES, PRODUCTS, BENEFITS, TIME
- 

SPECIFICITY
FUNCTION
- 

LANDSCAPE
TIME, SPECIFICITY
- 

PERMUTATIONS
STRATEGIES
- 

SCALES
STAKEHOLDERS, COMPONENTRY

WP2 AF PRODUCT ARCHITECTURE

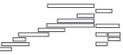
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LAYERS
COMPONENTRY, STAKEHOLDERS, TIME
- 

DEPENDENCIES
COMPONENTRY, SPACE

WP4 AF LIFE CYCLE COSTING

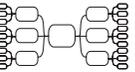
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ECONOMICS
PERSPECTIVES (all), BENEFITS, COST
- 

LIFECYCLE
TIME, ECONOMICS, SCENARIOS
- 

WLA
PERSPECTIVES (all), BENEFITS, COST

WP5 AF BUSINESS CASE

- 

BENEFITS
STAKEHOLDERS, STRATEGIES

WP6 AF DESIGN PROCESS

- 

INFLUENCERS
STAKEHOLDERS
- 

SPECTRUMS
DIMENSIONS

WPs AF TABLES

