

Flexible Architecture: The Cultural Impact of Responsive Building

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Abstract

This paper explores the genre of flexible architecture - buildings that are intended to respond to changing situations in their use, operation, or location. This is architecture that adapts rather than stagnates; responds to change rather than rejects it; is motive rather than static. It is a design form that is by its essence crossdisciplinary and multi-functional and consequently, is frequently innovative and expressive of contemporary design issues. By revealing its basis and the factors that are determining its development, the value and relevancy of flexible architecture to contemporary problems associated with technological, social and economic change can be revealed.

Human beings are flexible individuals who are mobile, creative, and capable of operating in a wide range of environments. In the not too distant past the capacity for speedy response to change was the key factor in the survival of the species. Recent changes in society forced by culture, economics, technology, and ecological considerations are instigating a new examination of the way we create the buildings that support life and work.

This paper explores the characteristics of flexible architecture by examining the design decisions that lead to culturally responsive buildings. It examines the underlying factors that generate a sense of place and why traditional and historic building patterns have been successful in creating genuinely adaptable architecture. It relates the characteristics of flexible architecture to Open Building principles and examines the effect that such design can have within the different levels in the built environment. The paper focuses special attention on contemporary architecture by examining the recent work of the Japanese architect Toyo Ito, in particular his recently completed Matsumoto Performing Arts Centre, Nagano Prefecture, Japan. Based on conversation with the designer and first-hand study of the building, the specific factors that make this new design a valuable resource in the search for flexible architecture strategies are explored. Features such as the incorporation of changeable elements, the creation of multi-purpose spaces, and the freedom of operation are examined in relation to the ambitions of the designer to make a culturally responsive environment that connects directly with the people who use the building.

This paper expands on the author's previous research into the foundation areas of this topic, in particular the genre of portable architecture, the impact of technology on the development of architectural form, and the development of experimental and innovative house design in the twentieth century.

Keywords: flexible, responsive, adaptable, architecture, building

Introduction

In June 2004 I was fortunate to meet with the Japanese architect Toyo Ito in his Tokyo office to discuss his recent work on new projects in Japan and Europe. Out of many things that we talked about, one in particular stood out. Ito described how many of his earlier buildings had been designed in the modernist tradition in which he was trained. The aspiration in this form of architecture is to aspire to a lightness of geometry and minimalism where more and more ‘non-essential’ features are taken away in order to achieve a state of purity. In a wonderfully frank and perceptive statement Ito explained that although this created undeniable beauty, at some point it had become clear to him that it also meant that people would also be taken away. He had therefore developed a parallel design route that had now taken precedence in his work – the search for a fluid architecture that only becomes complete once people inhabit and use the building.

This aspiration is a key principle in the generation of flexible architecture – a term used to describe buildings that are designed to respond easily to change throughout their lifetime. The benefits of flexible architecture are considerable: it remains in use longer, fits its purpose better, accommodates users’ experience and intervention, takes advantage of technical innovation more readily, and is economically and ecologically more viable. It also has greater potential to remain relevant to cultural and societal trends (Kronenburg 2002). This paper seeks to establish the human cultural context for flexible architecture, relate it to the established principles of Open Building, and through the examination of recent built projects focus on some of the characteristics that may be of value in the creation of a new generation of contemporary flexible building designs.

Human beings are flexible creatures. We move about at will, manipulate objects, and manage to operate in a wide range of environments. There was a time, not too long ago in evolutionary terms, when our existence was based on our capacity for movement and adaptability - indeed; it is to this that we owe our survival as a species. After a few thousand years of more or less sedentary life, it could be that flexibility is once more becoming a priority in human development and that technological, social and economic changes are forcing, or at least encouraging, a new form of nomadic existence based on global markets, the world wide web, and cheap, fast, transportation.

The success of architecture is directly connected to its flexibility. People use their homes and workplaces in their own individual way. Altering your environment to your own requirements is a common characteristic of transforming a building from an anonymous space into a specific ‘place’. The German philosopher Martin Heidegger argued convincingly that a building is not a place – it simply brings a place into existence (Heidegger 1993). Günter Nitschke also maintained that time is a key factor in the generation of place (Nitschke 1993). In order to be at home somewhere you have to live there, the appreciation of place in the building or landscape emerges over time. So for architecture to work it has to be experienced; lived in, worked in, used, over time. The creation of a perfect piece of architecture, fully complete in all its working components at completion is therefore clearly impossible. Time in use will generate the essence of place

that mature architecture requires, with the application of the occupants' gained experience and subsequent adaptation, an essential ingredient in this success (Kronenburg 2002).

The essence of *Homo sapiens* success as a species has been our adaptability. Human beings have always made tools that respond to our needs and are changed and improved with regard to developing situations. Flexible design has been a constant component in human design activity. Amongst the most sophisticated of our tools have been the buildings that provide shelter for our activities at work and rest but also provide for our spiritual and cultural needs. The combination of resourceful creatures that have varying needs has resulted in an astounding range of responses to this problem and on careful examination one can perceive that there are very few global constants in the design of buildings. Building form changes depending on a whole range of regional factors including climate, location, available resources, culture and society. Traditional architecture incorporates a wealth of flexible building forms that are adaptable to the varying conditions of life. Buildings that have been designed and created using local resources and knowledge inevitably provide more appropriate solutions than imported ones, and because designers, builders and users are often the same people (or closely associated) the issues of reuse and adaptation are well understood (Oliver 1975). Inflexible design, particularly in developed cultures, has arisen when designers' knowledge and objectives have become separated from users' experience and needs, resulting in inappropriate, inflexible and unloved architecture.

Figure 1 *Yurta* – a mobile, flexible, traditional building

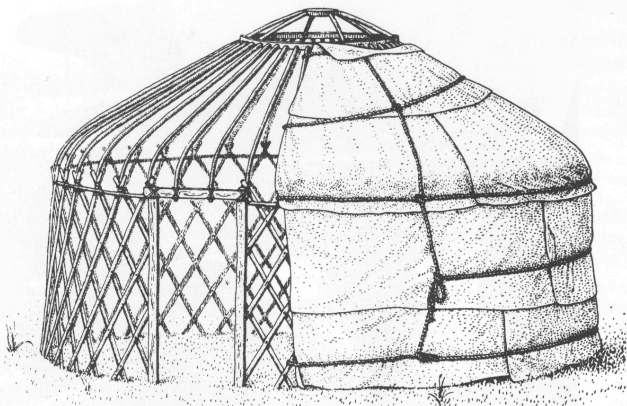


Figure 2 19th century flexible furniture



Of course, all buildings are flexible to a degree, doors open, furniture can be moved, curtains drawn, lights switched on and off. These flexible elements are generally assumed to be essential features that allow a building to operate – though designers seeking to freeze their process at handover have removed even some of these freedoms (for example environmental controls, opening windows, and movable furniture). It is therefore surprising that until comparatively recently the history of the vast majority of building design was based around the creation of multi-functional spaces that could be used in

different ways dependant on the occupants, the location, the season, and the time of day. This was particularly so of the dwelling - a workplace in the day became a domestic space for relaxation in the evening and a sleeping place at night. Furniture and services were mobile and multi-purpose. Tables became beds, storage became chairs and stairways, and room heaters became cookers. It is only in the last three centuries that European houses have adopted specific functions for separate rooms (Rybczynski 1987). Though in some parts of the world the flexible dwelling remains common, for most of us releasing the flexibility of the building we inhabit requires considerable effort, inconvenience and expense because the way it has been built has not allowed for the possibility that significant changes may be required. However, lifestyle change is now becoming the norm rather than the exception. Home and work is becoming more about a set of activities than a specific geographic location and people are demanding more choice in not only how they live but also where they live. Different ways of living and working are resulting in the demand for buildings that must be flexible for ecological and economic reasons as well as social and cultural ones. Architecture needs to fit its users' needs better, be easier and more economic to operate, and when change is necessary, avoid the waste associated with difficult demolition and rebuilding.

These pressures on contemporary built environment design are recognised in the principles adopted by the advocates of Open Building policies. Toyo Ito's statement about his ambitions for his architecture relates directly to one of the key principles of Open Building, that the realisation of the built environment is the result of collaboration with many people with many different sorts of skills. It also supports the concept that a new design is not finite at the point of delivery to the client but is part of an ongoing continuous process of use, adaptation and evolution under the influence of users and inhabitants. A key idea in Open Building is that environmental design operates at a number of related but distinct levels of complexity ranging from the city to the individual room. In this scenario flexible architecture is most significant at the level of the building and the levels subordinate to that such as an apartment would be within a residential building and a room within the apartment. However, its impact extends to higher levels too, particularly at the neighbourhood level but also, on occasion at the city. For example, the Beaubourg Cultural Centre (1977) in Paris was designed by Renzo Piano and Richard Rogers for a specific function as a multi-media arts complex. However, its organisation and relationship with the surrounding area was such that it completely changed the nature of its neighbourhood through the physical introduction of new open space, new routes to the locality, but also through the economic and cultural changes it brought. This one building was the catalyst that changed a neglected and undesirable neighbourhood into a vibrant and developing community. The fact that it was also a revolutionary building in constructional, aesthetic and operational terms had a significant bearing on its impact, which it can be convincingly argued, extends to the city of Paris and beyond (Kronenburg 2001).

Toyo Ito's Sendai Mediatheque (2001) has had a similar extended impact, which although less dramatic, is perhaps no less significant in that it is a more sensitive approach, tuned to local rather than international audiences. Though designed for a specific site with a specific limited function this building has had an important effect on

both its neighbourhood within the city of Sendai, and the city's image as communicated to the rest of Japan. The site for the Mediatheque is on an extension of one of the city's main roads but some distance away from the main commercial and business district. The building's presence and its success in attracting local and visiting users has extended the commercial viability of this street so many new businesses are now opening there. Ito has stated that the Mediatheque was the first building in which he successfully fused his ideas about creating beautiful spaces that are also flexible enough for adaptation and change based on experience and developing demands.

The building consists of a series of flat floor plates surrounded by an opaque and clear glass wall and supported by a group of steel lattice 'trees' made from steel tubes of different undulating shapes. The centre of each tube is open allowing light and space to move between levels, though some of them also contain lifts and services. Each floor has different though linked uses – library, information technology centre, exhibition spaces, meeting rooms, café, and shop. All the spaces are fully accessible within the building and open plan wherever possible, and a large number are multi-functional. Much of the furnishings and partitions are easily movable. When walking around you can browse books and magazines, eavesdrop on people watching films in open plan booths, take in a flower-arranging class, or an art exhibition. Yet all the time you are also constantly aware of the city around you, its different levels giving different views as you ascend to the top floor where the roof-scape opens up to the countryside beyond.

Figure 3 Sendai Mediatheque exterior

Figure 4 Sendai Mediatheque ground floor



Ito's most recently completed building is the Matsumoto Performing Arts Centre in Matsumoto, Nagano Prefecture, Japan completed in March 2004. Ito's design was chosen in a competition against ten other teams by a unanimous jury including a client who had thought very hard about the building's function and siting (Ito 2004). The building's main programme is centred around two theatres with 240 and 1800 seats respectively and a range of rehearsal spaces, studios, workshops and a restaurant. The large hall is a key venue for the annual opera performances staged during the Saito Kinen Festival held each

summer though it must also accommodate a wide range of other performances. The small hall is principally a community theatre for use by the people of Matsumoto rather than professionals. The site is a difficult one, long and thin, surrounded by nondescript buildings and car parks, its presence on the main street restricted to its smallest end. Furthermore, the high ground water in this location and the fact that many local buildings still used individual wells for water supply meant that below ground building would not be possible. The Centre's location is not dissimilar to the Sendai Mediatheque, the street being an extension of one that runs to the city centre, but currently without buildings of significant merit or public functions.

Figure 5 Matsumoto PAC exterior



Figure 6 Entrance ramp to upper floor

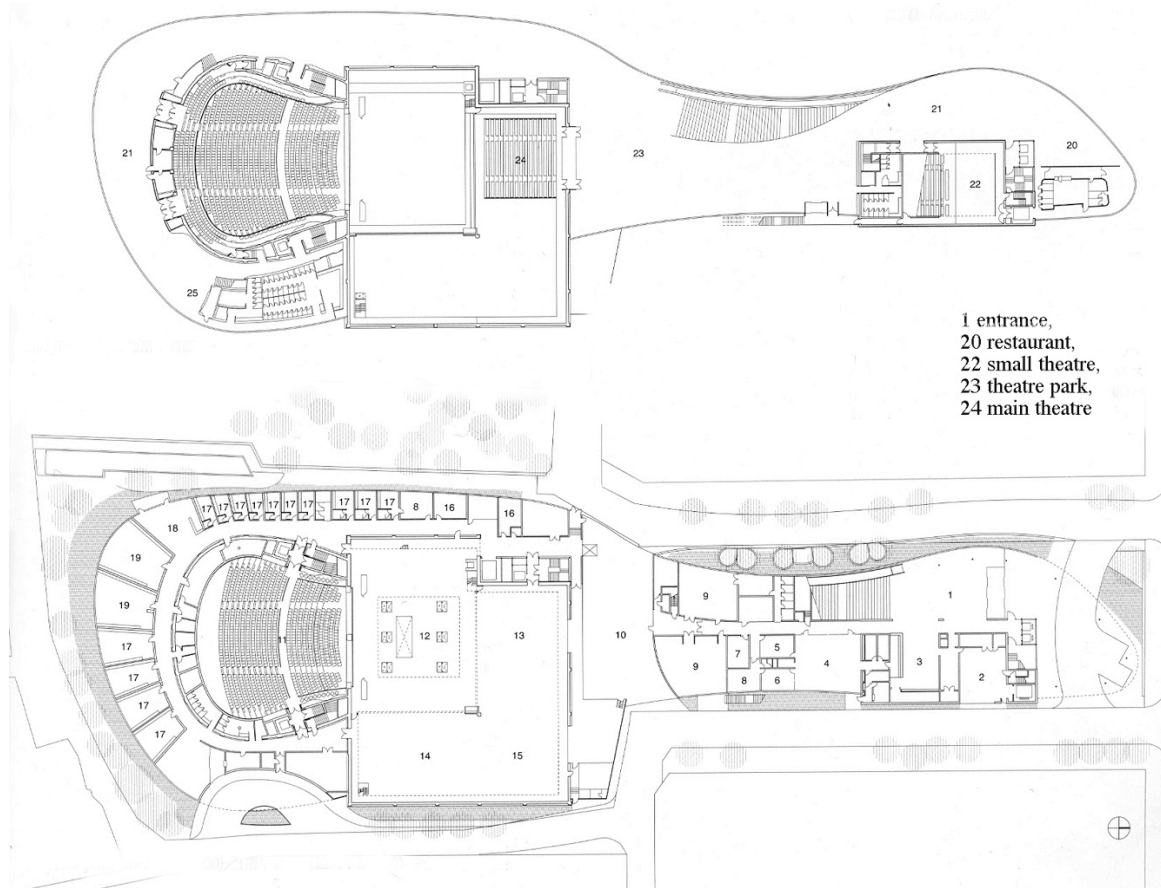


Ito's response to this range of problems had to deal with two critical issues. The first is not untypical of many large new urban buildings; how to deal with situating such a building effectively alongside its neighbours whilst creating a civic presence for an important public function. Normally theatres have a hierarchical presence on the site – front of house with its entrance, circulation, hospitality etc. at the street access side; back of house with its deliveries, workshops, and rehearsal rooms at the rear. This particular site made that difficult to achieve and so the designers situated the main theatre in the centre of the site and the auditorium to the rear, with the entrance and minor theatre and rehearsal rooms to the front. This unusual disposition also helped solve Ito's other main objective – to create a building that would be adopted by its users and visitors and capable of adaptation and response to their developing needs.

Entry into the Matsumoto Performing Arts Centre is into a large multi-level space, box office and reception to one side, with a curved wall on the other that flows beside a gently ramped stairway and travelator that leads to the upper floor. The visitor ascends through this space in a sweeping movement that gradually opens out into a linear volume that Ito has dubbed the 'theatre park'. In front is the rear wall of the main auditorium, a large glass wall giving a view down to the stage. Behind, the square box of the small theatre protrudes into the space. Beyond this is the restaurant that faces onto the street. The curved wall encircles all the public spaces of the building in an organic form that is a

continuous volume that provides access to both theatre auditoria, restaurant, foyer and entrance, but also creating an ambiguous and amorphous place in its own right. On top of this space is a public roof garden onto which the rehearsal rooms face.

Figure 7 Matsumoto Performing Arts Centre Ground and First Floor Plans



Though the large spaces of this building are very simple in form great care has gone into their detailed design. The carpeted floor has been graphically processed to indicate changes in shade in relation to furniture and building structure. The colour patterns in the auditoria form a shaded matrix that visually reflects the acoustic and illumination qualities of the space.

Most remarkable is the great curved wall which consists of glass-reinforced-concrete panels with seven kinds of recycled glass inlaid from inside to the outside surface in a random pattern. This provides a soft natural light diffused in a natural manner but also a unique wall surface, smooth and continuous, that reflects its shape and the pattern and articulated colour shading of the interior surfaces.

Figure 8 Theatre Park

Figure 9 Main Theatre



This building exhibits Ito's approach to allowing the users to respond and adapt the functionality of the architecture in a number of new and sophisticated ways. He creates forms and spaces that utilise new technology to expand the possibilities of what the building can do but also to increase its capacity to adapt to future changes. He communicates ideas about the architecture in a clear and direct manner to its occupants so that the messages can be understood by them and developed further. He creates a building that responds to its very specific problems in a unique way thereby creating a form of architecture that is special to its site and programme.

Figure 10 Mobile furnishings

Figure 11 Rehearsal room/roof garden



There are, however, three special ways in which this particular design responds to the issue of creating a flexible architecture that have general application:

Changeable Elements: Spaces that are nominally dedicated to a specific function (thereby fulfilling the present brief for the building) are also designed to support and even encourage other methods of use. The large theatre has a ceiling that can be lowered to give different acoustic conditions or a more intimate auditorium. Behind the stage there is a large area of adaptable seating to allow different audience perspectives or the incorporation of an on-stage choir. The back-stage area has a glass wall to allow views into the auditorium from behind a performance. The small theatre has an extendible stage, removable seating, and a choice of natural lighting or full blackout for different

types of performance. These changeable elements encourage the users of the building to be creative in finding ways to help it serve their needs.

Multi-Purpose Spaces: The building makes use of space in a multi-function way. All theatres need breakout space from the auditorium to allow the audience to circulate from entrance to bar to performance. The Centre's two theatres merge this space into a continuous fluid volume that expresses no particular function but suggests many – extra informal performance space, exhibition, meetings and events. Seating, ticket and refreshment stalls, cloakroom facilities are all provided with mobile furnishings. The servicing of this environment in terms of natural and artificial light allows for different sorts of activities to take place. The 'theatre park' is a space where anything could happen – an art show, a conference, a crafts workshop, a dance, or a wedding.

Freedom of Operation: Careful planning and organisation of spaces in the building design encourages greater freedom of movement for the visitor and greater interaction with the user. As a community building it is essential that local people feel that they have access to the facility. Like the Sendai Mediatheque, Ito has created a series of interconnected spaces, a much more difficult task considering the enclosed functions of some of the spaces required in the Matsumoto programme. This has been done by creating new sorts of spaces that are genuinely valuable public areas from what would normally be identified solely as circulation. The 'theatre park' is the most important of these, connecting readily accessible functions such as the entrance, box office, and restaurant with the theatres. However, the roof garden is also important in this regard providing views into the rehearsal rooms and back over the city and its surroundings. The public are also visible from the street, primarily in the restaurant and the roof garden, communicating to the passer-by that this is a readily accessible building. This is a building design that encourages people to come in and see what is happening and then to use it in many different ways.

Ito's Matsumoto Performing Arts Centre exemplifies many characteristics of a new viable form of flexible architecture that corresponds with Open Building principles. Though it is a building which establishes cultural identity for the people of the city which it serves, and thereby permanence and continuity, it has allowed, and even promoted the opportunity for changing uses from the day it opened. It is designed to respect the wishes and needs of the people for whom it has been built, both the professionals who will operate and utilise the building and the community who will also make use of its facilities as audiences or performers. Its potential for success lies in that it is designed to be a responsive tool but one that also has its own distinctive character – the measure of its achievement will be in the way its use develops over years to come.

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