FACTORS INFLUENCING THE MARKET FOR BRANDED MASS CUSTOMISED BUILDINGS

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Despite the ongoing promotion of the change agenda within UK construction, the majority of non-residential buildings are still designed and constructed in the same way that they have been for decades. Independently designing on every occasion what are sometimes relatively repetitive designs each time a similar building is ordered is wasteful and inefficient. Substantial savings could potentially be made in both time and resource if the majority of the building could be pre-designed and if the supply chain was already in place. The relatively small part of the building which had not been pre-designed could then be customised to suit both the customer's individual requirements and the environment in which the building will be located, thus offering the potential for mass customised construction. This paper outlines the current non-residential market and the potential for mass customisation. Existing solutions are examined and issues relating to product and process development reviewed. This leads to an appraisal of the potential importance of branding in mass customisation as an aid to developing the market. The impact of the existing reputation of system buildings is also considered in relation to product branding.

Keywords: brand building, customisation system

INTRODUCTION

The concept of mass customisation is not new yet the UK construction industry has yet to grasp this opportunity to deliver greater value to its customers. The government report Rethinking Construction (Egan 1998) clearly identifies this issue: *' We have repeatedly heard the claim that construction is different from manufacturing because every product is unique. We do not agree. Not only are many buildings such as houses, essentially repeat products which can be continually improved but, more importantly, the process of construction is itself repeated in its essentials from project to project.'*

Egan delivered this report in 1998 but CLASP, for example, highlighted the advantages of standardisation in 1959 in the conclusions to their Annual Report (1959)*:'The consortium is now an established and powerful force in building, responsible for a significant number of the country's new schools as well as for a growing number of other public buildings. The second year of operations has confirmed that the consortium with its big orders and its design resources, is the kind of organization most capable of realizing the full economic advantage of factory production methods. It leads therefore towards the more enlightened building industry for which we all strive.'* A review of government funded construction reports between

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1944-98 (Murray and Langford 2003) emphasises the continued presence of these recurring themes in appraisal of the construction process.

The opportunity is seemingly clear. Designing and constructing from scratch, each time a client requires building infrastructure, is wasteful and inefficient. A radical market change is needed where built environment customers experience much greater certainty and value whilst retaining choice, and at the same time enabling constructors to improve their profit margins by sharing the rewards of jointly maximising value. This vision requires the replacement of a significant portion of the current bespoke market for the design, delivery and procurement of non-residential buildings with a combination of standardised and customised product offerings.

This paper details information obtained to date from an ongoing IMCRC funded study entitled 'Building the Brand' at Loughborough University.

MARKET BACKGROUND

The impact of minimising construction costs through more efficient processes is potentially huge. DTI data for the value of new construction from contractors is shown in table 1 (Pottier 2005).

Table 1 Value of construction output new work by contractors in 2004

Facility	Value(£Billion)
Schools, Universities	5.0
Health	3.4
Offices	6.3
Entertainment	3.9
Retail	4.7

Assuming an average cost for office development of £1000/m^2 and a typical development size of 4000m^2, suggests a total of ~1600 office units built in 2004. The majority of these buildings would have utilised bespoke designs, involving the repeat processes identified by Egan (1998) but rarely exploiting the associated advantages.

Information on total floor space gives an indication of regional variations in UK office and retail development (Figures 1 and 2) (Savills 2006).

Figure 1 - 2004 Retail Floorspace/000s sqm

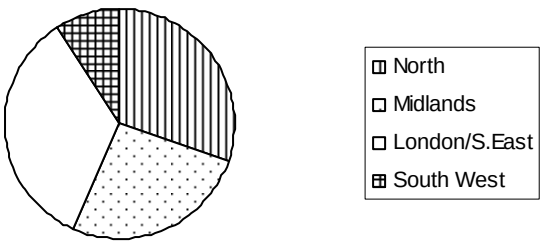
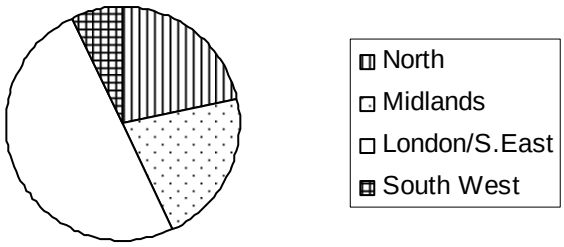


Figure 2 - 2004 Office Floorspace/000s sqm



Although retail space is relatively evenly distributed across the country, London and the South East dominate the office development market. This impacts significantly on the nature of any customised office solution as any generic, base design solution will require sufficient flexibility to deal with regional requirements and supply chains.

Further segmentation of the new construction market has thus far proved difficult due to an absence of structured data. A review of the construction markets is being undertaken to establish (a) who is procuring these new buildings, and (b) a breakdown of building by type and potentially location.

Consultations with 7 property developers were undertaken to develop an outline specification for a customised office building solution, using structured interviews. Perhaps unsurprisingly the most important issue identified was cost – not only would a product have to meet certain cost/m^2 criteria, but reducing time to completion would reduce capital outlay and offer a more rapid return on investment. However, substantial benefit was identified in the reduced construction time and in the greater cost and time certainties (see below on system building).

A product specification was developed which identified limiting values for parameters associated with the following spatial and component criteria:

Space planning	Unit size, tenant size, building proportions including ceiling height, grid and floor plate
Structure and envelope design loads	Floor slab, cladding, curtain wall, column size and
Services	lifts, HVAC, plant location
Finishes	quality, appearance

One observation of specific interest is that the requirement for a high BREEAM rating varied from ‘desirable’ to ‘no interest’.

This specification has been developed further in the ‘Multispace’ design which is aimed at long term adaptable use of a new building in an effort to realise greatest value for the developer as specific property needs fluctuate (Davison *et al.* 2006).

MASS CUSTOMISATION

Mass customisation is well known in many industries outside the construction sphere (Pillar and Muller 2004). Suppliers have to adapt and react much more rapidly to the client’s needs. Mass customisation meets this challenge by offering individually customised goods and services with mass production efficiency. Ultimately mass

customisation offers individually tailored products (Tseng and Jiao 2001). Many authors comment on mass customisation in volume manufacturing and the logical progression to application to new buildings (The Housing Forum 2002). Indeed, the Japanese market for housing uses advanced manufacturing methods which utilise significant learning from the automotive manufacturing process. In addition to being arguably the most advanced motor vehicle manufacturer in the world, Toyota also produces several thousand factory-made houses a year (Toyota 2006).

Parallels have often been drawn between construction and car production, although Egan (1998) states more precisely: 'The parallel is not with building cars on a production line; it is with designing and planning the production of a new car model.' Gann's comparison of housing and car production in Japan indicated that techniques such as 'Just in time' (JIT) production methods and quality circles used in car production were applicable to modular housing manufacture but that the larger number and physical volume of construction components prevented application of the kanban inventory system and effective use of floor space (1996). Importantly, he also identified the trade off between standardisation, to minimise production costs, and flexibility to maximise customer choice.

This cost/flexibility trade-off is identified in the DTI report on construction methods in the German housing market (CIRIA 2004). Each supplier offers a range of standard products with the higher cost suppliers generally offering the greatest degree of flexibility and the lower cost suppliers restricting the potential options available.

These findings have implications for the application of mass customisation to non-residential buildings. The Toyota house uses ~4000 different component types per unit and the Sekisui House around 700, although Sekisui requires >2 million components to satisfy its design options (Gann 1996). Without the repeat volumes associated with modular housing, mass customised office and other sector building solutions would need to be developed which offered flexibility whilst restraining production costs. We suggest that his could be achieved by:

(a) using the platform approach associated with mass car production; or

(b) development of flexible components and fixings which allow sufficient flexibility in building production.

The benefits of production standardisation outside of the housing sphere have been demonstrated in the construction of leisure facilities for a corporate client in the UK (Reynoulds 2006).

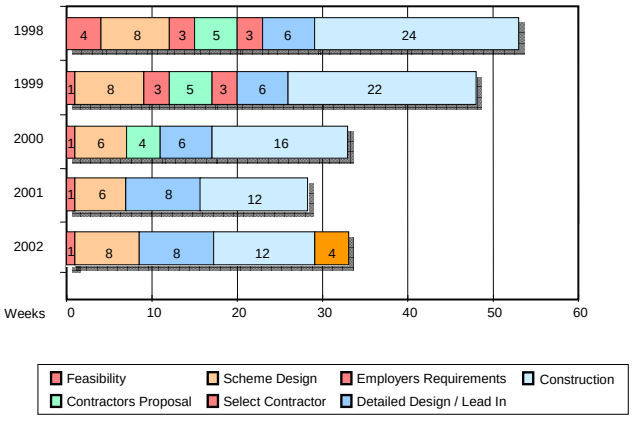


Figure 3 Process improvement in leisure facility production

Despite continual changes to the product design, substantial improvements in productivity were achieved leading to reduced construction time (Figure 3) and reduced cost (Figure 4).

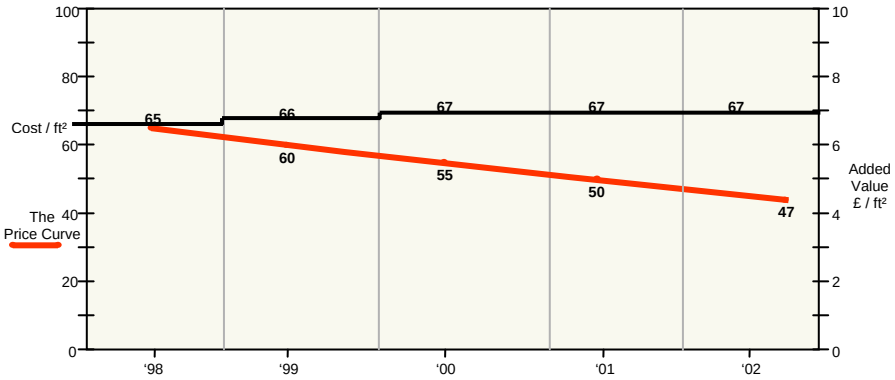


Figure 4 Cost analysis of leisure facility building programme

As would be anticipated, this example demonstrates there are substantial benefits to be gained from understanding and simplifying the design and procurement processes. Techniques such as Design Structure Matrices and Quality Function Deployment have already been developed as tools to improve the efficacy of the design process (Austin 1996, Barber 1998) and should be incorporated into a fully developed mass customised building solution.

From a marketing perspective, mass customisation will be unsuccessful if sold to the client on the basis of customisation alone. The customer needs to be involved in the buying process such that they are apparently buying an individual design to meet their individual requirements. There are advantages to be gained from this approach. The detailed customer interaction allows an in-depth understanding of market requirements, and product can be supplied on demand rather than produced as a stock item (Pillar and Muller 2004).

It is worth re-iterating that as well as choice, a clients interest in procuring buildings through the mass customisation route would require some time and/or cost benefit.

SYSTEM BUILDING

System building (SB) would appear to have potential as a means of achieving the cost and flexibility constraints required of a customised building solution. The housing market in a number of countries outside the UK has used SB for a number of years to facilitate the production of high value properties (Barlow 2003, CIRIA 2004). Although currently utilised to an appreciably lesser extent, standardised systems do exist in the UK for prefabricated housing (Woudhuysen and Abley 2004). However, there are significant negative perceptions associated with the use of SB in the UK, and in particular pre-fabricated housing resulting from historical use, which has the potential to restrict its application in the UK (Robert 2002).

In May 1949, the first high-rise building was opened in the UK, a ten-storey council housing block in Holborn, London. By 1960, over 165,000 precast concrete dwellings had been built, ranging from small single storey bungalows to large high rise (multi-storey) blocks (Glass 2000).

The same decade saw the construction of Ronan Point in 1968 ,a 22 storey, pre-cast reinforced concrete panel high-rise building (Goodier and Gibb 2005). On the 16th of May 1968 a gas explosion in a corner flat on the 18th floor produced a progressive collapse of all the flats on this corner of the structure, with the loss of 4 lives. Inadequate design and poor quality construction were blamed for the collapse.

The scandal that followed the collapse at Ronan Point, combined with the running down of many public tower blocks due to under investment and the poverty of many of the inhabitants, served to undermine public confidence in high-rise precast concrete construction (Lee 2002). Ronan Point was pulled down in 1986 and many other similar blocks have also now been demolished.

The public image of precast concrete suffered significantly, and became closely associated with the social malaise of high-rise dwellings. Precast concrete in housing has therefore become unfortunately associated with the negative aspects of 1960s social engineering, even though it has been shown that the structural failures were due principally to poor understanding of materials technology, poor workmanship and a lack of quality control on site, rather than inadequacies in the actual design or construction technique.

In a recent study of market resistance to pre-fabrication in the housing sector, it was suggested that house buyers are so strongly influenced by negative perceptions of post-war 'pre-fab' that they will resist any innovations in house construction which affect what a 'traditional' house looks like (Robert 2002). A large part of this resistance to innovation in house-building was also found to reside within the construction industry itself. The house-buying public was found not to be resistant to new forms of 'prefabrication and standardisation' *per-se*, but resistance was based upon ideas regarding value.

A market survey of contractors/clients and designers (Goodier and Gibb 2004) suggested that the perceived higher cost of off-site production was the main barrier to its uptake. However the majority of respondents indicated that off-site manufacture did offer benefits in terms of decreased construction time, improved quality and minimised snagging.

The potential use of pre-assembly and standardisation can now be assessed using interactive tools and should form part of a mass customised offering (Blismass 2006). However, we would argue that of much greater importance will be the emphasis given to branding strategies of customised building solutions which are likely to incorporate some degree of pre-fabrication.

BRANDING

Branding is apparent to a limited extent in the construction industry at present, mainly in relation to specific materials and suppliers, the major construction brands being associated with house builders such as Barratt and Redrow. However, there would appear to be significant opportunity to expand the use of branding, in particular in relation to customised non-residential buildings.

A brand can be defined as a name, term or symbol that identifies a product differentiating it from competition (McDonald and Christopher 2003). A successful brand has a sustainable competitive advantage. Despite its 'intangable' nature, a brand offers customers added values based on factors that extend beyond its functional performance. These values differentiate products and help determine customer

preference, and as such brands can have appreciable financial value. Detailed aspects of brand, such as functionality and representationality, are summarised elsewhere (De Chernatony and McDonald 1998).

Our studies have indicated that brand is identified with various aspects of a building offering;

- The building itself e.g. Portakabin.
- The building solution e.g. 'Customised Office Solution' marketed by Laing O'Rourke.
- The architect e.g. the Swiss Re 'Gherkin' in central London designed by Sir Norman Foster.
- The developer e.g. Shaftesbury and their management of property in Carnaby village.
- The components e.g. Velux windows.
- The location e.g. Broadgate.
- The service offering e.g. Regus office offering consistent serviced office space in locations globally.
- Internal company branding in relation to employee retention e.g. Virgin.

Branding associated with buildings may also be used to attract particular types of client to previously unattractive locations.

Thus the use of brand in customised building offerings has to be tailored to the identified market segment, and confirms the importance of market understanding prior to designing a targeted product solution. Brand development is often influenced by the values of both the brand owner and its potential customers.

CONCLUSIONS

A number of conclusions can be drawn from this short review. A clear understanding of the non-residential client requirements and market segmentation is an essential pre-cursor to the development of a mass customised building solution. Despite the identified benefits in housing and other industries, mass customisation has made little progress in application to non-residential buildings. An example leisure facility project demonstrates appreciable time and cost benefits.The public and industry still hold negative perceptions of pre-fabricated buildings, although an increasing proportion of industry recognises the benefits that prefab offers in relation to time and cost certainty. There is an opportunity for strong marketing and branding to reinforce the positive aspects of pre-fabrication. Brand has the potential to play an important role in strengthening standardised building offerings through individual components, the building offering itself and the suppliers of the offering.

Further studies are being undertaken at Loughborough University alongside industrial partners to develop mass customised building solutions.

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