Prefabrication, as a means of customer co-creation, can offer great opportunities if perceived accordingly. The research evaluates the use of prefabrication within the hospitality sector in the UK and identifies the advantages of, and hindrances on, its application as a tool to encourage client participation in the design process. A mixed methodology has been used to gauge the general attitudes towards prefabrication, prevailing technical understanding and knowledge of the concept, its applicability, and its perceived advantages and disadvantages. The research indicates decreased construction times and increased quality as the main advantages and poor current education within the industry regarding prefabricated practices, the archaic nature of the industry lacking trust, reluctance to embrace new and innovative techniques, and the absence of a proven holistic and encompassing evaluation technique to provide accurate and reliable comparisons between differing construction methods as main obstacles on the way. The study facilitates the identification of key factors associated with stimulating more efficient use of prefabrication within the UK construction industry. The outcomes will help the industry to develop and evolve to suit the needs of, and overcome the constraints imposed by and on, today’s clients towards a more customer-centred construction industry.

KEYWORDS: modern methods of construction, modern prefabrication, new modularisation, customer co-creation, value co-creation, mass customisation.

INTRODUCTION

Prefabrication is a term subject to open interpretation within the construction industry, denoting any component or product that is fabricated off-site, transported to and assembled on site. In its broadest sense this could be a clay brick, moulded and blasted in a furnace off-site, and then transported to site and assembled with other prefabricated bricks to form a wall. Curl (1993) attempts to show the vast diverseness of this description by defining prefabrication as ‘the manufacture of building components in a factory or elsewhere before transportation and erection on site’. He then continues to highlight that due to the encapsulating nature of prefabrication as a classifying term, the ‘line between a prefabricated and non-prefabricated house is blurred’ (Curl 2006). White (1965) states that ‘prefabrication need not be linked with mass production as understood in the modern factory’. This is correct in a true definition of the term, but to understand the concept of prefabrication within the construction industry mass production, and more importantly standardisation of elements, need to be carefully taken into account. The classification of the term prefabrication as an
evolving concept can produce controversial opinions and arguments, depending on the depth, timeframe, and context.

Co-creation is arguably a market-driven production strategy which sets out to enhance customers’ participation in the value-chain by developing its extensionality beyond the traditional market definitions. Probably first coined by Prahalad and Ramaswamy (2000, 2004), it was primarily aiming at deployment of customer competence. It eventually turned to address the transition of design/creation process from a closed one inside the firm to a dynamic interaction between customer and the firm to add value. As a result the traditional one-off transaction as the contact point between each customer and the firm, evolved to a continuum of an experience which starts well before the actual purchase takes place but also continues way beyond that. In this sense co-creation is still a new concept in its disciplines of origin and even newer in built environment and construction industry.

**Origins of prefabricated techniques**

Standardisation forms an integral part of Nissen’s (1972) model of modular systems (see Figure 1), and is devised to increase productivity within the industrial sector through effective allocation of resources. CIRIA (1999) describes standardisation as ‘the extensive use of components, methods, or processes in which there is regularity, repetition and a background of successful practice’. These factors, when applied correctly, increase productivity as anticipated by Nissen. CIRIA (1999) further defines standardisation as providing predictability and efficiency, offering significant benefits to differing participants in the construction process, which they ascertain can then be passed on to the end-users.

![Diagram of non-traditional construction methods](image)

**Figure 1: Concept of non-traditional construction methods. Adopted from Nissen (1972)**

Prefabrication is the natural development from standardisation, with the now standardised and defined components requiring assembly. The ideal of repeatedly producing identical prefabricated components that are assembled on site to produce a fully finished product is a concept that is rarely achievable within the diverse demands of today’s construction industry.
Design constraints vary immensely between different projects, with clients and architects visions and requirements, constraints of the locality of site, the environmental implications placed upon the project, and the differing user requirements, influencing the final design outcome.

For the purpose of this research, prefabrication will be defined as “the fabrication of components offsite, prior to transportation and erection on site”. Clarification of the level of prefabrication being referred to within the research is to be provided wherever required.

**Co-creation theories**

Co-creation is a business phenomenon which can facilitate value appreciation for both consumer and supplier. The concept is centred around the ideal that as suppliers learn more about the customer, more opportunities become available for improvement of the design of the relationship experience and to enhance co-creation with customers (Payne, Storbacka & Frow 2007, Payne et al. 2009). A premise for co-creation is that involved parties will acquire a deeper understanding of the interaction from both perspectives, enabling them to optimise the value gained by both parties. In this sense, co-creation is “outside in” in that it starts from developing an understanding of the customers value creating processes, and aims at providing better support for value achievement for all parties (Payne, Storbacka & Frow 2007). Co-creation is a highly individualised process, with each person’s uniqueness affecting the process (Etgar 2007). It is about placing human experience at the centre of the design process and developing partnerships to maximise the value gained (Ramaswamy and Gouillart 2010).

Claiming that the definitions for co-creation (and co-design) even in online sources such as Wikipedia are few and far between, Sanders and Stapper stake (2008) take co-creation to refer to any act of collective creativity, i.e. creativity that is shared by two or more people. Co-creation as a concept in any scenario must not be limited to a two dimensional interaction. All stakeholders involved in the process must be included and take value from the facilitation of the concept for successful implementation (Ramaswamy and Gouillart 2010). Lawer (2006) suggests eight styles of firm-customer knowledge co-creation (see Figure 2).

**Figure 2: Eight style of firm-customer knowledge co-creation (Lawer 2006)**
Within the construction industry these stakeholders may include the client, supplier, main contractor, sub-contractor and manufacturer. The definition and quantification of value is a complicated and highly personalised phenomenon due to the vast diversity of interpretations across varying sectors and parties. The value created for each stakeholder within prefabricated processes will also vary greatly, and will be intrinsically linked to the experience of their individual process as well as the entire process itself from conceptual design to operational maintenance. Management of the interaction of stakeholders is key and will allow them to decide and manage how they work with each other through a structured process is an effective example of this. Direct interaction is essential to fully develop the concept and realise value for all.

Customer co-creation in the building industry
Co-creation is considered as a sub-strategy of mass customisation. Chronologically (mass) customisation is an historical development of mass production which was developed subsequent to American System of Manufacturing (Pine 1993, Piroozfar 2008) as an industrial respond to the growth in the demand due to the industrial revolution which made a shift from traditional niche production an inevitable destiny (see Figure 3).

![Figure 3: The production paradigm from craft to mass customisation](image)

The concept of co-creation is novel enough in its very generating disciplines that leave a great black hole in existing literature and calls for practically and efficiently clinging to the notion of knowledge transfer to use those outcomes in building industry. However, there are still lessons to be learnt from other pioneering industries in the field.

Customer co-creation needs to be devised with advanced technologies. Not only does this necessity comprises of ICT as a means of real-time communication with customer, but it also includes high level of modularity in its modern meaning in design, fabrication and assembly paradigms as used in manufacture industries.

With the current pace of change as demanded by the market, no more is the customer role only to present their needs, requirements and preferences in their brief of the final product. The design, fabrication, assembly triangle is seeking to limit the rigidity within the circle and offer as much flexibility to the customer as possible (see Figure 4).
These will include customer participation in the real design/fabrication/assembly process wherever applicable. This has revolutionised the old linear process between design, fabrication and assembly in manufacture industry or what was perceived as design, construction, delivery triumph in construction industry for centuries. In this new correlation the customer finds a more substantial standing quite close and similar to the role of other generative parties within the production process of space, as demonstrated in Figure 5.

In co-creation what forms the core debate is that each and every product regardless of their size, nature or specification can be broken down into two boundaries: One in which there exists flexibility of design supported by the corresponding technologies in fabrication and assembly stages; known as open area, and the other in which change and modification is restricted to the non-customer co-creators i.e. the designer, fabricator and assembler. This is known as closed area.

The concept of open/closed areas of a product platform (see Figure 6) becomes more important in construction industry (compared to other manufacture and service industries) because of the concrete nature of the final product in construction industry. However, what contradicts with this very fact is that the added value in building industry is not merely determined by the performance. Despite other industries, in building industry in many cases the value is measured through aesthetics and representation. Nevertheless, the more the technology advances, the bigger the open space and the smaller the close area become.
In this sense prefabrication has been studied as a means of enhancement of the product platform by promoting the modern concept of modularisation. This will provide the production process with more open areas than before to be communicated with the customer and engage them in the production process more interactively and more efficiently.

RESEARCH METHODOLOGY

With prefabrication in the centre of this research, a study was designed and carried out to figure out the extents to which MMC’s are used in the UK construction industry, and the potentials to enhance this level as a facilitator of customer co-creation. The research sample consisted of eleven professionals currently operating within the UK construction industry, with an average experience level of 17 years. Representatives from the design, manufacture and construction sectors of the industry participated. The research was conducted in two stages. Using a pilot questionnaire general attitudes and opinions were gauged, and a semi-structured interview was used to further develop an understanding of the reasons for the current levels of use of prefabrication within the hospitality sector, and the hindrances and stimulants for increasing this.

RESEARCH FINDINGS

Advantages of prefabrication
The main perceived advantages of the use of prefabrication were clearly identified as time savings and quality improvements, whereas the main disadvantages are shown as increased costs and resources (see Figure 7). The two advantages identified are supported by the work of Goodier and Gibb (2007) and Tam et al. (2007), who ranked increased quality first, with reduced construction time second. Gibb and Isack (2003) also identify time and quality as the main benefits, with their research conducted in the client sector. This consistency in the data collected within the four research projects may be used to draw the conclusion that the main perceived benefits of prefabrication are consistent throughout the industry as time savings and an increase in quality.
Identification of the actual benefit realised from a reduction in construction time was not addressed within the responses to the questionnaire. The British Research Establishment (2001) suggest two main advantages of ‘faster’ construction; a reduced impact on the local environment and the ability to rapidly erect a weather tight building shell, allowing internal ‘fit out’ works to be instigated earlier in the project programme.

It could be assumed that the responses to the questionnaire indirectly referred to economical benefit to be gained from reduced construction periods, for example savings on preliminary costs, but with no direct reference this claim would be unjustified. The limited spectrum of response when discussing the advantages of prefabricated techniques within the research may suggest a lack of co-creative awareness within the construction industry. Value gain may not necessarily be derived directly from an identified advantage; for example a satisfied client may well return to a product or supplier for future projects on past experience. Through the client’s initial value appreciation, value is in turn appreciated by the supplier at a later date.

**Education and evaluation of construction methods**

75% of interviewees stated that a client will almost always have a preconception on the use of prefabrication prior to inviting tenders from the design team. It was widely recognised within the research that a good understanding and knowledge of all potential methods is required to substantiate this; an attribute that it may be claimed is not possessed by those influencing projects at this stage. The research also cited that the client will almost always have decided upon a construction method prior to appointment of the main contractor. The research identifies the potential for a symbiotic relationship between the client, design team and contractor; with the client’s requirements, architects technical knowledge, and the contractors experience and practical knowledge facilitating optimum efficiency. The realisation of this directly correlates with the definition of co-creation provided by (Payne, Storbacka & Frow 2007, and Payne et al. 2008), in that as stakeholders learn more about each other, more opportunities become available for value gain. The Egan Report (1998) identified that at the time of writing ‘current processes do not use contractors and suppliers knowledge in
The research suggests that this remains prevalent within the construction industry today, with all respondents claiming that advice is sometimes or almost always sought; but all paying reference to the timing and utilisation of this advice. It is unanimously claimed within the research that advice is not sought at the earliest possible stage, with a perceived hierarchy within the industry placing contractors at ‘the foot of the ladder’. It is clearly evident that the potential for co-creation within the prefabrication sector exists, but the barriers and hindrances to its inception and acceptance as an adopted phenomenon were prevalent throughout the research. These were centred on an archaic industry, reluctant to adopt new and innovative techniques, preferring instead to remain with ‘tried and tested’ methods, displaying an inherent lack of trust, and determined not to engage with perceived risk.

This correlates directly with the work of Goodier & Gibb (2007), who identified seven methods of education regarding prefabricated techniques currently employed within the construction industry; four of which being of a formal nature. This classification however does not validate the authenticity or accuracy of the information being portrayed. Statements within the interviews suggested that promotional material can conceal a lot of the obstacles and applicability criteria that are essential knowledge tools in the successful selection and implementation of construction methods. This demonstrates a clear example of poor attitudes with regard to co-creation, with a one dimensional perspective adopted seeking to make an immediate gain for one sole party. With the lack of identification with research originating from an independent party, seeking to reveal a true and accurate representation of prefabricated practices and techniques, from a cross section of professionals from across the industry, it is evident that this research is either not being conducted or is not being channelled to the ‘front line’ of the UK construction industry. The prevalence of informal education routes, as identified within the research, also indicates a lack of available valid and specific information regarding prefabrication, with many studies centred upon the perceived benefits and advantages rather than proven and achievable results. This again points to poor co-creative attitudes within the industry, with manufacturers focussing on a ‘quick, off-the-shelf, one-off sale’, rather than engage in mutual development of a product that provides value for all parties. The concept of co-creation is focussed upon an understanding of other stakeholders needs and definition of value, rather than a specific product or concept. The research, supported by the findings of Goodier and Gibb (2007), reveals that the industry at present identifies a direct correlation between increase in education levels and adoption of prefabricated techniques. This may be true in a pure marketing sense but for the phenomenon of prefabrication to truly fulfil its potential in any scenario, co-creative processes must be adopted.

The independent nature of accurate learning is reinforced through the respondent’s identification with practical experience based learning. This method allows individuals to review and assess procedures and activities in first person perspective in a ‘real world’ situation, providing relevant and supported conclusions. This process of constant review and feedback was identified as being present within companies by two of the respondents, but not so outside of the organisational confines. Three respondents called for sharing of practical experience based knowledge and information, with this being identified as key to developing the use of prefabrication as an efficient and effective construction method. The values of understanding each parties experiences again suggest the scenario lending itself extensively to co-creation, but none of the research participants truly identified with the mutual benefit achievable through all stakeholders within a project. All respondents within the research stated that an increase in formal education routes would catalyse an increase in the use of prefabrication, again suggesting that provision for education at present is poor. This correlates directly with Egan (1998), who identified a lack of provision for research within
the construction industry. The BRE (2001) summarise the importance of knowledge within the selection of prefabricated techniques by concluding that the procurement of such systems is often a matter of relevant parties being aware of the systems that are available.

**Traits of the current UK construction industry**

The research identified an archaic UK construction industry, reluctant to adopt new and innovative techniques and change. A resistance to early decision making, developed from the timing of information production and flow within a more traditional project, is associated with by the respondents; with previous identification within the research of the need for an early design freeze in successful projects adopting prefabricating techniques facilitating a conflict of interests. Respondents stated that design teams ‘prefer’ to develop items of works concurrently and retain the freedom of change upon reflection during the preceding works, rather than to produce a defined scheme with little or no flexibility available post design freeze. This is an example of the indoctrinated and rigid form that the UK construction industry exists within, and respondents identified with the difficulties involved in breaking away from these. The one dimensional attitudes, abrasive to any co-creative intentions, are again evident here. Mental-preconditions within not only the industry itself but clients were evident within the research, with respondents supporting the findings of BRE (2001), who state that the adoption of prefabrication is hindered by the perception of the requirement for traditional brick houses, by revealing an association between the industry and ‘good old bricks and mortar’. The basing of skills training and research around such perceptions is highlighted within the research, relating directly to the need for provision of relevant and independent research works. Egan (1998) identified with these issues twelve years ago, and yet still they are prominent and influential to the steering of the UK construction industry today.

The economically based analytical practices commonly adopted within the industry not only correlate with the archaic labelling, but also with the lack of uptake of prefabricated techniques. Through relating all achievable gains to economic measurement, and so limiting the stakeholders that include this in their definition of value, the potentials for any co-creative experiences are destroyed. Previous research by Blismas et al (2006), Gibb (2001), Sullivan (1980) and Pasquire et al (2004) all associate with the difficulties in accurately itemising the economic comparisons between traditional and prefabricated techniques. Associated costs are identified as being the main hindrance to a traditional standard method of measurement approach; within the unit cost of prefabricated products are included the overhead costs of the factory and transport, where as in a more traditional approach of in situ construction the preliminary costs are rarely attributed to each individual element of construction. A further example of this would be the cost savings associated with waste reduction. Respondent’s within the research identified with the potential for cost savings deriving from reduced waste, but without the contractor conducting detailed analysis on their existing practices and the waste produced, it was stated that the financial gain from managing this cannot be quantified. This elementary analysis of cost within the industry was evident throughout the research, with all interview respondents associating with it. Pasquie et al (2004) relate to the “historically powerful tendering framework in which tenders are assessed and decisions made primarily on the grounds of cost and time” which still plagues the industry. It was identified within the research that it was not only the economic structures of the clients that may require review, but also those of the suppliers and manufacturers. Prefabricated units often require a large portion of the cost to be provided for prior to inception of manufacture. This statement reveals the beginnings of co-creative thinking, with other stakeholders identifying with the client’s needs as well as their own. This may well be attributed to the
fact that the client is seen as the source of ‘value’ for the contractor and design team who are employed, and so the ‘client’s gain is their gain’.

**Value appreciation**

The accurate representation of the value of prefabrication was identified by one of the interviewees as a major hindrance to the adoption of such techniques, citing the use of bathroom pods as an example. The benefits of reduced waste and reduced site trades in one confined area were identified, with the difficulty in attributing a definite value to these meaning that the saving could not be quantified. The definition of value is in itself a dynamic and highly influenced phenomenon depending on the project scenario, constraints, and success factors. The basis of co-creation is the appreciation of value in differing scenarios, and to different parties. Through identifying this lack of measurement of value in bathroom pods, the respondent is inadvertently associating with a lack of holistic understanding within the construction industry of the needs and values of other stakeholders. The value taken from a reduction in wet trades on site needs to be understood in terms of logistics, rather than a monetary figure. Without the appreciation of the tasks and constraints that the contractor may have to work within, it is impossible for a client to disregard prefabricated techniques on the face of perceived economic expenditure. The industries current classification of value relates directly back to its economical driving factors as previously identified. Blismas et al. (2006), Pasquire et al. (2004) and Egan (1998) all associate with the inappropriateness of purely economical comparisons of construction methods, rather than holistic value based comparisons. Blismas et al. (2006) concurs with and summarises the ineffectiveness of current measures, and the need for task specific definition of value by stating that ‘a more holistic and thorough value-based comparative is required by the industry to ascertain the true benefits of off-site-production for particular project settings’. Co-creation takes this ideal further by including an understanding of each stakeholders characteristics in this analysis also, which would allow true mapping of the value to be gained.

It is highly unlikely at present, given the identified fabricated relationship between unit output and cost, that these savings are considered during the comparison of construction methods. The inclusion of resource consumption analysis within comparisons was further developed by one of the interviewees, who referred to studies conducted by individual contractors on waste production. It was stated that resistance to adopt prefabricated techniques was often centred on companies that had not carried out detailed studies on the potential economic savings achievable through waste reduction, specific to their activities and processes. A further comparison is often conducted by contractors reviewing the potential for waste production analysis; that of research cost against potential savings. An initial investment is required to conduct such research, with Egan (1998) identifying with a lack of provision for this investment; ‘it (the industry) invests little in research and development and in capital. In-house R&D has fallen by 80% since 1981 and capital investment is a third of what is was twenty years ago. This lack of investment is damaging the industry’s ability to keep abreast of innovation processes and technology’. With the UK construction industry currently operating within a recession in the UK economy, it could be argued that this capital required for research and development within individual contractors is simply not a viable investment at present. Such research, combined with a holistic analysis tool, would allow for the production of more complete and balanced data regarding the use of prefabrication; identified by Blismas et. al (2006) as being key to the development of its use. It is this constant development of raw data processed through a holistic and independent comparison tool, combined with mutually conducted research developing stakeholders understanding of how value is appreciated by differing parties that will provide the basis for sound and justifiable decision making processes.
Sharing and utilising resources
The research reveals a reluctance to seek consultation at an early stage by clients and their design teams, especially from contractors and suppliers. Gibb and Isack (2003) concur with this, identifying that ‘only a few firms overtly involve the supplier in this decision making process, and then as part of the team’. They also found that clients identified with this need for early consultation, but in practice this was rarely followed through. This depicts an evident lack of trust within the industry, with clients preferring to keep the decision making process in-house with economical, ethical and privacy motives.

The findings of the research differ greatly from those of Gibb and Isack (2003) with regard to clients seeking consultation. 90% of clients were identified as having taken advice by the outline conceptual design stage within Gibb and Isack’s research, whereas it was identified within the interviews that clients often make decisions regarding the use of prefabrication early in the design stages, with 75% of interviewees stating that this decision is taken prior to consultation with specialist manufacturers or main contractors. Gibb and Isack’s research was conducted within the client sector, meaning that either the industries perception of client’s active seeking of knowledge is inaccurate, or the client responses to their research were the theoretical correct practice and potentially not the actual processes adopted within the industry today. The lack of evidence of consultation is directly linked with the lack of trust within an archaic UK construction industry, with clients fearful of the financial and competition based implications of sharing information with other parties within the industry. The importance of a comparison tool between construction methods is augmented by this reluctance to confer and consult, with clients retaining decision making processes requiring tools and processes to assist with these. This model of individual analytical processes contradicts co-creation extensively, and appears to reflect the attitudes present within the industry today. It may be suggested that especially within the current climate market risks may outweigh potential gains, but with no understanding of other stakeholders needs, a one dimensional and individualistic assessment of construction methods will not produce justifiable, accountable, and appropriate outcomes.

CONCLUSION
We discussed how, if redefined with the time and context specific needs and requirements, prefabrication can facilitate co-creation in building industry. With this as a core of this discussion then we moved on to discover why this crucial enabler of co-creation in building industry stands where it stands; with very low profile, low application and as underdeveloped as it is at the time being in building industry. The research set out to discover what is perceived as the advantages and disadvantages of prefabrication. The main advantages of prefabrication were found as decreased construction times and increased levels of quality within the finished product, in comparison to more traditional construction methods. Within the research the main hindrances to the successful and effective use of prefabrication were identified. Education levels within the industry were identified as being poor, with a significant lack of formal routes of education provided for and an evident deficit in impartial and founded information regarding prefabricated techniques. The UK construction industry also demonstrated an inherent resistance to new and innovative techniques through the adoption of minimalistic and elementary unit based comparison methods. Whilst conducting comparisons between prefabricated and more traditional techniques, it is evident that the concept in its entirety is not considered; but instead certain individual elements that do not reflect the true encompassing value of the concept. A severe lack of trust is prevalent within the UK construction industry between all parties, with the provision for open and symbiotic
knowledge and information sharing relationships non-existent. The potential benefit of these appears to be offset by the perceived risk of detrimental effect, be it in a commercial, social, or practical form. The research identified the potential benefits and optimisation of current practices that could be realised through the establishment of these symbiotic relationships, but co-creation as a concept can never be realised whilst the exposed preconceptions and inherent traits are present within the UK construction industry. The reasons for this evident reluctance to adopt co-creative practices within the UK construction industry need to be explored, and the viability of the concept within the industry considered. With any new and innovative phenomenon there will always exist the issue of ‘who jumps first’; which party is willing to openly share information and encourage others to adopt a similar mutually agreeable exchange.

Client decision making over the construction method to be employed directly relates to these findings, with it stated that this is often conducted without consulting suitable expertise, and without possessing sufficient knowledge to do so. These uninformed and irrational decisions are very hard to influence and change by an outside party, rendering any consultation sought post decision making processes futile. Comparisons between different construction methods are currently based on the assessment of individual components, rather than the concept as a holistic working phenomenon, and so at present do not provide substantiated or accurate outcomes. Current techniques focus solely on economic factors and include non-economic phenomena into inaccurate monetary comparisons.

With it evident that clients within the UK construction industry prefer to keep decision making ‘in-house’ the development of a proven holistic and encompassing evaluation technique that is accessible and applicable to all relevant projects is extenuated, to allow clients to retain a certain element of decision control. The research identified that an increase and improvement of the knowledge base across the industry with regard to prefabrication would improve awareness of the concepts potentials and applicability, and enable decisions to be undertaken upon a more valid and factual grounding. The research closely associated with the requirement for collective decision making to compliment the realistic benefits of a symbiotic process. Alleviation of the lack of trust within the industry is essential for the potential of any co-creative relationships being forged to be realised, with the significant benefits of these identified within the research.

Throughout the research two key factors have remained prevalent in the realisation of prefabrication as a efficient and effective construction method; increase and improvement in the current knowledge levels through an increased availability of accurate and founded comparison data, and the development and provision for an accurate and industry-wide accepted evaluation technique regarding the selection of construction methods. The potential for co-creative symbiotic relationships has been identified, with the enormous benefits of these to all parties evident. The identification of a requirement for valid and independent research to improve education and knowledge levels shows the beginnings of appreciation towards the concept of co-creation, and subsequently promotes a sustainable and developing prefabrication industry based on a mutual understanding of all stakeholders requirements.

It could be suggested that the multidimensional nature of the construction industry, with all projects and stakeholders imposing and requiring differing constraints, may impact upon the viability of the adoption of co-creation. On the contrary, a rapidly evolving and changing industry requires re-evaluation for each and every scenario encountered, and co-creation provides a concept and basis for a thorough and accountable analysis from all perspectives.
Prefabrication provides a suited and appropriate tool for the evaluation of the effectiveness of co-creative techniques within the UK construction industry, but the dynamic nature of projects with regard to scale, scenario, constraints, and stakeholders will ultimately determine the suitability and adoption of such techniques.

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