CUSTOMER SATISFACTION IN RESEARCH: DO THEY KNOW WHAT THEY WANT?

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Abstract

This paper outlines attempts in the UK to set a research strategy for construction based on consultation with the industry stakeholders particularly in the field of construction management. Different approaches are explained including the UK governments `Technology Foresight' exercise, the industry led `Latham Report', the 'Egan' report and the Research Councils for Universities `Innovative Manufacturing Initiative'. From first hand experience of some of these programmes the author distils some key lessons about client demand for research.

The paper then discusses other issues related to research strategies including an argument that it may be useful to focus on what we don't know, rather than incremental improvement from our present position, if major future advances are to be made. An attempt will be made from feedback prior to the symposium to establish major areas of research currently under-active and in need of addressing.

Keywords: Customer Satisfaction, research strategies, technology foresight, research planning, research priorities

Introduction

This paper addresses the problem of ascertaining client demand for research, through consultation, in a volatile period of industry and technological change. The complexity of modern projects and the fragmented nature of the industry means that it is often not clear who is the client or what objective is being targeted. Even if the objectives are stated, it is not always clear what mechanisms and technologies will make them achievable. Nevertheless there is a growing sensitivity to the need for research and innovation in order to establish major improvement. The paper focuses on **the process** of establishing demand for research, rather than the content and discusses the effectiveness through recent examples in the UK.

Background

Management and creative design seem to be the high ground which appears unassailable for the new technologies currently making major in-roads into the activities of the traditional professions. These technologies are challenging not only the portfolio of work undertaken, but who is responsible. If the technology de-skills some, it can empower others. They can enhance their skill base and consequently extend their span of control. Those who made their living from that skill find themselves relegated to technical support. Those who add the skill to their activity find themselves more influential and able to

take a more holistic view of the task which has to be addressed. The changes taking place are revolutionising the remit of all participants, their relationship with one another and the process and tools by which they undertake their work. This has created instability and uncertainty and a different kind of manager who has to deal with a situation which is less predictable and a position where the skill and knowledge base upon which he or she has to call is defined more by the technologies at their command than by that persons chosen profession.

In construction management the last decade has seen a blurring of the traditional boundaries. Who 'leads' a project is not defined by professional designation; procurement paths are becoming more flexible and less adversarial to suit the new environment; integration and unification are either the motivation or end result of the change process; responsibility for cost management and risk can extend well into the occupational life of a project affecting both designer, contractor and client; global patterns are emerging for investment creating rapid market demand or decline. Perhaps the only area where the old culture is well preserved is in site operations where the old craft culture still remains in all but the most innovative of high-tech building designs. Even here the shift to off-site manufacture of components and the increased mechanisation of on-site assembly has made substantial changes to labour productivity and the knowledge levels required to construct the built environment within the developed and developing nations.

Against this background of turbulent change, those engaged in research and those with responsibility to fund and direct it have found themselves trying to establish their priorities in order to satisfy their perceived clients. Assuming that research resources are strictly limited and assuming that short and long term benefits are required, where do we put our research effort to get maximum return? Where is our greatest ignorance and where does a remedy to this ignorance give greatest return on the investment required? This is not an easy question to answer. It may be that our major ignorance is knowing where to look for improvement and identifying where our knowledge does not exist. The attempts to respond to this problem have been considerable. The last fifteen years in the UK have seen a plethora of reviews, research strategies, consultations and reports all trying to give some direction as to where our effort should be placed. Every professional institution, every government department and every funding agency has been engaged in this process with motives that range from altruism to self preservation. Interestingly very few have started from the position of `What don't we know' but rather more have started with the concept of `How do I resolve this problem that I face at this moment'. Consequently most suggest incremental ways forward which take as their starting point the current position. Often this is described as `innovation'. This, of course, reinforces the inertia of the industry to change and leaves competitor nations the opportunity to re-model (or in the case of developing nations to start from scratch) without the baggage of the past. The world is littered with examples of rapid advancement encouraged by the freedom to act free of the models of a past generation. This is not to argue against incremental innovation but rather to allow this type to develop in parallel with a fundamental re-think of what we do and why we do it.

To illustrate these issues I refer to four UK initiatives which have attempted to lead and influence the research agenda. In each case it has been a government department or organisation which has been instrumental in initiating or facilitating the study, but the implementation has been through a combination of industry and research community representatives. UK Government policy in recent years (although this may be changing with the new government) is for industry, as the `client', to lead in these matters and for academics to be in the minority or even excluded. In virtually all these initiatives the drive has been increased competitiveness in world markets and wealth creation. The following outlines the methodologies and approaches taken.

Technology Foresight

This initiative was launched by the UK Government in 1993 and the aim was to identify areas where new developments will yield the greatest long term social and economic benefits to the UK, ie `Quality of Life' and `Wealth Creation'. The results of the study would guide government and industry decisions on funding research and development. It was also intended to encourage companies to alter the ways in which they manage their Research and Development and innovation policies. Fifteen panels representing sectors of the economy were set up of which construction was one. (OST, 1994). For the purposes of this paper, looking at the manner in which the `client' is engaged, it is the process and the results which are of interest.

The process for this initiative started with a period of consultation through workshops engaging over sixty members of an `expert pool' taken from all sections of the construction industry, academia, government and research and development organisations. These workshops provided a background on developments likely to affect the industry over the next ten to twenty years. Questionnaires were also used to gather information related to trends and issues, the resulting commercial opportunities and the technologies and innovations required to take advantage of these. The broad issues arising from this consultation were: social and environmental factors; cost reduction and life cycle costing; international competitiveness; and improved contractual relationships. These issues then formed the basis for a wider Delphi survey engaging over eight hundred people across the country representing a broad cross section of potential industry and academic stakeholders. Each of the major issues could be seen to have a construction management dimension, although to different degrees. The Delphi study was based on a set of eighty statements or issues relating to the construction industry's future. These were grouped under the general headings of buildings in use; changing client demands; design; finance and funding; land use; materials; productivity improvement; quality of life; regulations; safety and security; and sustainable development. From the responses the key trends and areas for focus were identified. Interestingly transport and environmental issues topped the list for those related to `Quality of Life' and financial and standardisation issues dominated `Wealth Creation'. From these responses a panel of twenty one members, (including five academics) prepared a programme of priorities for future policy. These were divided into `Engines for change' and `Key opportunities'. As finally published these were as follows:-

Engines of Change

i) Promoting learning and learning networks though improved and more appropriate, education and training
ii) Setting up mechanisms to ensure all players in the construction process are kept well informed and their activities fully co-ordinated by means of advanced information and communication technology
iii) Introducing a national financial policy that encourages and fosters long term investment and economic growth
iv) Creating a culture of innovation through the joint efforts of the government, education, industry and institutions

Key Opportunities

i) Customised solutions from standard components
ii) Applying advanced business processes to construction
iii) Adopting a `constructing for life' approach
iv) Benefiting society and the environment through construction developments
v) Creating nationally competitiveness infrastructures

It has to be said that the statements listed above (after the committee process of discussion) do tend to lack precision, although more detail is provided in the text (OST 1994). From the perspective of construction management item ii) under each heading is probably of most direct significance, although all will be influenced by and impact upon management activity.

The `Latham' Report

This report was a review of Procurement and Contractual Arrangements in the construction industry supported by the government and funded by several of the key industry bodies (Latham 1994). Although not specifically a review to set a research agenda, nevertheless it has major implications for the industry by identifying where change is necessary. In turn this suggests the further work which is thought important to realise improvement in construction processes and therefore of major interest to the construction research community. Its terms of reference were to consider current procurement and contractual arrangements and the current roles, responsibilities and performance of the participants. This was to be undertaken with particular regard to processes; methods of procurement; responsibility for production, management and development of design; organisation and management of the construction processes; and contractual issues and methods of dispute resolution. It would also take into account industry structure; fair and transparent competition; a fair balance of interests and risks borne by the client and various parties involved in a project; the requirements of public accountability, value for money and EC legislation; encouragement of enterprise; current developments in law; and relevant comparisons with the structure and performance of the construction industry in other countries. All this was to be undertaken with the objective of making recommendations to Government, the construction industry and its clients regarding reform to reduce conflict and litigation and encourage the industry's productivity and competitiveness.

“The method adopted was akin to that of a committee of enquiry taking evidence and then drawing conclusions. Many leading persons and organisations provided such evidence from which Sir Michael Latham, as he is now, could distil key requirements.

The result was thirty clear recommendations on the way forward and twenty two tasks with the bodies responsible for taking them forward identified. Perhaps those aspects which have had the greatest publicity from a research perspective are the call for `zero defects' in construction and a 30% decrease in the cost of construction by the year 2000. These together with other issues have been addressed by a new body, led by industry, but inaugurated by government, called the Construction Research and Innovation Strategy Panel (CRISP) which now acts as the key body for influencing future research strategies in the construction industry - at least as far as government is concerned. CRISP has set up a number of working groups which have combined the recommendations of technology foresight with those of the Latham report. These groups are Environment; IT; Motivation; Performance; Process; and Regulation.

Implementation is through funding agencies and industry led groupings setting up projects or funding themes to which the research community can bid.

The ‘Egan’ Report

Following closely on the heels of the ‘Latham’ report a ‘Construction Task Force’ was set up by the UK government to provide a follow through into implementation of key innovation within the industry. Although not specifically following ‘Latham’, ‘Latham’ provided the background for both its motivation and its proposals. The report from this task force called ‘Rethinking Construction’ (DETR. 1998) is to be covered elsewhere in this symposium and will not be repeated in this paper. In terms of the process adopted by the task force, the key elements were a strong ‘client-led’ team (which drove the agenda from a clients perspective); the collection of evidence from individuals, organisations and case studies; examination of examples from other universities; and a report written to challenge the industry.

The report is strong on aspiration of what the construction industry can and ought to achieve and it contains pointers to the future. A key recommendation is to ask for volunteer 'demonstration' projects in which the principles behind the 'Egan' report are implemented, sponsored by clients, and the performance monitored. At the time of writing over seventy major projects have been identified for this purpose. It will be interesting to see what generic knowledge is distilled from this process which can be made available for others to use and build upon. There is a real danger that the knowledge gained may be anecdotal and unstructured, thus making it hard to transfer to the rest of the industry.

The Innovative manufacturing Initiative: EPSRC

Coincidentally many sectors of industry had realised at around the same time as these studies were underway, that a fundamental flaw in research funding had been the focus on the business processes which would implement the changes expected of technology and aid the achievement of many of the objectives set by studies such as those above. Process issues tended to fall between the boundaries set by the funding research councils and often engaged inter-disciplinary working not conducive to the traditional pattern of engineering research. The growth of the concept of re-engineering, particularly in the automobile industry, led to the call for a new funding programme which would address these issues in a systematic way in important sectors of the economy. One of these was construction within the general framework of what was called the `Innovative Manufacturing Initiative (IMI)'. The IMI provided funds within this general theme of `Construction as a Manufacturing Process' and asked the research community to bid for funds. This freedom produced a variety of bids and subsequently awards with a number of foci. These include re-engineering (in general), benchmarking, process modelling, information support (and in particular visualisation), protocol development and integration. More recently it has been recognised that with this ad-hoc approach there is a danger that there can be an over-emphasis in a few areas (usually those that are easiest to define and where expertise already exists) and other areas are left comparatively barren of activity. Consequently a `road map' of activity has been drawn up showing the active and neglected areas to show where future funding should be placed.

It is a little too early to say whether this programme has been successful, but there are some encouraging signs. For example a new process protocol for the industry has been developed by Cooper (1998) based on the concepts of process engineering, virtual reality demonstrators have been created, and useful new procurement paths have been suggested.

The Lessons

The four programmes described above are some of the most important within the UK context and each has an impact on the future of research into construction management in the UK. However there are many others. These four have been described to reveal a pattern which is useful to analyse. Technology Foresight was introduced to show how a large proportion of the Industry could be engaged in determining priorities and expectations, largely from the industrial community. The Latham report was industry led and tackled what was perceived to the major problem of procurement and contractual arrangements. However its major recommendations on cost reduction, and zero defects would appear to be outside the original remit. The IMI programme arose from a general need for UK industry to remain competitive and an attempt to find a solution within the re-engineering of processes. It relies heavily, however, on the research interests of the research community who bid for funds. The Egan agenda seeks to ensure that an agenda for continuous improvement is adopted by the industry.

Hindsight is a wonderful thing and looking back, good and bad practice can be seen in the way each of these initiatives addressed the issues. Technology Foresight brought many in the industry to face the need for research for the first time, but the manner in which the Delphi exercise was undertaken proved less

than helpful and it was left to the steering group to determine its main findings. The Latham report focused on problems which may have been of the industry's own making, but nevertheless provided specific targets to which the industry could aim. The IMI (Construction as a Manufacturing Process) initiative relied on serendipity to produce good results, but may be focusing on areas in which the research community already has a track record.

In a paper of this length it is not possible to do justice to a complete analysis of what has happened and the lessons that can be learnt, but the following are the observations of the author who was engaged at first hand in many of the approaches taken:-

. Asking research priorities from leading industrialists tends to result in a focus on management problems because this is what they do in their everyday business life and they are acutely aware of the problems in this area.

. Asking industrialists about what research to fund can lead to short termism and a concentration on incremental improvement which may miss `the big picture'.

. Industrialists tend to be defensive of the status quo and encourage a reductionist approach to advancement.

. Similarly academics tend to perceive the world from their own research perspective and often find it difficult to move to another viewpoint or see the problem holistically or be aware of the cost/benefit issues with regard to value from research.

. Very few people are trying to map where we are truly ignorant!

. The concept of 'building blocks' of knowledge which are rigorously documented to provide the foundation for future research is not well established in construction. Some of the modelling undertaken in knowledge engineering and information engineering would be helpful to construction management.

. Defining the whole building problem through a robust classification system which allows systematic study and refinement has yet to be done. Consequently much research is ad-hoc, unable to be linked to other research and difficult to understand or maintain.

. A willingness to look at other industries could reveal new insights for construction.

. The global market and the growing use of standardised components has to be a feature of research into planning and management process.

Construction Management as a Discipline

In determining a research agenda for a discipline a key starting point must be its definition. This will determine its boundaries and its focus. Construction management, unfortunately, is not well defined and the term means different things to different people, especially across international boundaries. Even the term `construction' can embrace many different perceptions. The key questions are usually whether it includes `design' and whether it includes the management of the `firm'. The term in its most restrictive sense would be referring just to the site processes associated with the erection of the building, but not many researchers would take that rather limited view. A search through several standard texts in

preparation for this paper revealed a reluctance for authors to provide any formal definition at all. Even working commission 65 of CIB (Construction Management) does not have a definition and is currently debating where the boundary between mainstream management research and construction management should be. Most of the textbooks concentrate on site planning, supply chain management, human resource issues, cost and value etc. They are also beginning to address procurement and contractual issues, project management, IT support and management of the firm. CIB W65 conferences, at least, would cover all these issues, but other working commissions also cover these matters. Without a consensus on definition it may not be possible to claim construction management as a discipline.

One thing is certain, the subject impacts upon a whole range of issues and in its widest possible definition is required to implement and action virtually every area of construction activity. Some focus is required if the subject is to progress. Proposal 5 of the CIB W65 Strategy Review (Barrett 1997) suggests the following broad areas:-

- Policy consideration
- Projects
- Companies
- Processes

However this may be an attempt to steer away from other working commissions as much as to reinforce the appropriate content for `Organisation and Management'. It would be helpful if this symposium could attempt to provide a definition for which there is a consensus.

Perhaps the most satisfactory way of attempting a definition is that suggested by Walker (1996) referring to the operational definition of management offered by Cleland and King (1983). They suggest that `management' identifies the criteria of organised activity, objectives, relationship among resources, working through others, and decisions. This would embrace most, if not all, perceptions of what the subject entails, but as a research agenda it is of limited value. Walker (1996) goes on to provide a definition of construction project management as:-

`The planning, coordination and control of a project from conception to completion (including commissioning) on behalf of a client requiring the identification of the clients objectives in terms of utility, function, quality, time and cost, and the establishment of relationships between resources, integrating monitoring and controlling the contributors to the project and their output, and evaluating and selecting alternatives in pursuit of the clients satisfaction with the project outcome.

For project management this gives a comprehensive list of factors under which research could be categorised. It does not however seem to reflect, even for a `project', the current developments in `build, own or transfer' procurement methods which would go beyond what is traditionally meant as commissioning or aspects of management such as organisation structures or facilities. Perhaps one way forward is to categorise those aspects of management which are project/building/ construction specific and those which are not. The latter, it could be argued, are for research purposes primarily generic to all management and quite properly the province of the management and business schools. It is only where there are matters specific to construction that our community should claim possession and leadership. These specific issues are likely to relate to the almost unique place for production, ie the building site, and the nature of the industry structure based on its craft origins. However, even here the transformation of other industries might well provide lessons for construction.

For those aspects which are specific to the construction industry it may be advisable at one level to classify in chronological terms, and at another in terms of holistic systems or technologies which permeate through the time dependant views. A matrix can then be developed which can provide clarity to the map of current and future activity. Table 1 is indicative of these issues. Again the focus is that of the project and the impact on organisational structures would not fit too easily. Even with the limited number of 'boxes' shown it is not a trivial task to determine a research agenda for each. In addition the mere fact of classifying in this way may constrain and lead to a reductionist view which may be counter to a search for a dramatic holistic improvement. The table is not meant to be comprehensive or exhaustive, but merely a starting point for discussion. It would be interesting to know where colleagues at this symposium think there may be high, medium or low activity at present. This may reveal where research needs to be undertaken and where we should be distilling, formalising and gaining consensus on the work already done.

It also raises the question as to our ignorance. It is not likely that this approach will tell us what we don't know. We come to such tables with pre-suppositions, assumptions, restricted knowledge and constrained experience which are a `baggage' to the research definition problem. From an incremental improvement point of view, these constraints are useful - they keep us within the existing paradigm. If an expectation of major improvement is required however, then they create inertia and restriction to the thought processes. Our ignorance may well be a function of our ability to think beyond these accepted limits. Many of the major improvements in the automobile and electronic industries have come about by taking a completely new and novel view of how these industries can be managed. Is it too late for construction?

Evaluation

There is an important part of the research process which sometimes gets forgotten, but is fundamental to the establishment of a discipline which wishes to have a serious research community. Research futures depend on having a rigorously evaluated knowledge base from previous research experience. Without this the community either starts from scratch again, builds on false foundations or relies on other disciplines to provide the basic knowledge infrastructure. Undoubtedly in construction management, mainstream management research is bound to play a major part in its progress.

The requirement for a rigorously tested knowledge base for construction may at first glance appear in conflict with the requirement to think outside existing structures and assumptions. It is true that paradigm shifts (Kuhn 1970) do occur outside of current models, but they still call on part of the knowledge base (usually disaggregated from the main body of knowledge) to achieve the major advance. It is usually a new juxtaposition rather than all new knowledge that creates the new viewpoint. It is this latter point which is a driving force behind interdisciplinary research leading to new concepts creating new perspectives outside of the remit of any one discipline.

The difficulty for construction is the lack of a forum which can undertake the evaluation and to a lesser extent the methodologies to do so. There are some methodologies developed (eg Lansley 1994) but they are often created for a specific organisation and type of research. Unlike the physical sciences there is no authoritative reference point which allows the cataloguing and indexing of research to avoid duplication and more importantly to test research results. It has been interesting to note however that much of the discipline required in information modelling could be a benefit to the process issues in construction modelling allowing a much better understanding of who, when, what and more importantly why actions occur. These methods often get dismissed by practitioners who see the outcoming models as remote from their everyday work and too time consuming, but they provide the rigour needed for further advancement.

TABLE ONE

A RESEARCH AGENDA MATRIX

	Concept	Briefing	Procurement Planning	Design	Contractor Selection	Construction Process and Commissioning	Operation	Facilities
Process Engineering								
Information Support								
Contracts and Tendering								
Regulatory Framework								
Health and Safety								
Off-site Production and Assembly								
Environment and Sustainability								
Human Resource Management								
Economic Planning/ Control								

They capture and distil what is going on now and they reveal the repercussions and benefits of change. In a more receptive industry environment, which will surely come as the information revolution develops, these approaches with be of enormous advantage to the research community. In particular they demonstrate quite well where we do not understand something because it is then difficult or even impossible to model it. In other words they begin to reveal our ignorance!

Conclusion

This short paper has attempted to point out some key issues in determining client needs and how they can be satisfied with agreed research programmes. It has not attempted to define what the research might be, but to discuss some of the principles, with examples, of what is being done now and what should be done in the future to achieve a research agenda for a global research community. To some extent our current approaches to the problem are almost exclusively targeted on incremental improvement from our existing empirical knowledge base. "How do we resolve the problems we face today?" is the key question behind most methodologies. The author is not against this method as one approach. However we must recognise that by doing so we may be in blissful ignorance of what is possible and what changes are required to provide major shifts in our level of performance within construction management. We need models to reveal our ignorance and provide a firm foundation for advancement. We need to import good practice from other industries which have evolved at a faster rate than construction and we need imagination, the essential ingredient for true advancement. We can live in ignorance and possibly bliss, but at some stage we will be called to account by the clients we seek to serve.

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BIOGRAPHICAL SUMMARY

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Current Responsibilities

. Pro-Vice-Chancellor - Research and Postgraduate Studies - University of Salford

. Head of Research and Postgraduate College - University of Salford

. Member of Council for Education in the Commonwealth

. Member of Construction Research and Innovation Strategy Panel

. Member of Building Research Establishment Council of Foundation of the Built Environment (University College representative)

. Member Sector Target Advisory Group for Construction on EPSRC Innovative Manufacturing Initiative 1994-1996

. Chairman HEFCE Research Assessment Exercise, Built Environment and Town Planning Panels 1996

. Inaugurator of UK National Centre for IT in Construction, involving many external organisations, government and six leading universities.

Recent Responsibilities

. Member of RICS General Council
1989-1993

. Member of RICS QS Executive Board
1989-1993

. Member of UK government `Technology Foresight' panel for construction
1994-1995

. Chairman of Surveying, University of Salford
1985-1993

. Chairman of RICS Research Committee
1988-1993

. Member of Council of UK Parliamentary University Group 1995-1997

. Chairman of UK Science and Engineering Research Council Construction Committee
1989-1994

. Chairman of UK Science and Engineering Research Council Construction Management Steering Group
1989-1994

. Member of Science and Engineering Research Council Engineering Research Commission
1991-1994

Publications

. Author, co-author and editor of 15 books and major research reports in the fields of Building Economics and Information Technology. These include the standard text `Cost Planning of Buildings' now in its 6th edition (published in Japanese, Malaysian and Chinese) and Quantity Surveying Techniques: New Directions, published in 1990.

. Member of the editorial board of several leading international journals

. Presented more than 130 papers world-wide in over twenty five countries including many keynote addresses.

. Most cited author in an analysis of the first ten years of publication of the leading journal `Construction Management and Economics' undertaken in 1993.

Research

Major interest in information technology and has undertaken and managed several research projects in this field including:-

. Research Director of £500,000 RICS/Alvey research project into expert systems for the construction industry which was the only Alvey community club project to produce a commercial product within 2 years of completion. This product entitled ELSIE for the strategic planning of construction projects has now sold over 800 licences in the UK. It is the first commercial expert system to be produced for Construction Project Management.

. Research Director of £930,000 DTI project to establish a `Client Centred Methodology for developing Expert Systems in small and medium sized practices'.
This research project has produced four further commercial expert systems and a published methodology which is being fed back to the IT community.

. Research Director of several other expert systems projects funded by various SERC committees including house planning, maintenance planning and intelligent authoring of construction contracts to the value of £400,000.

. Research Director of £200,000 SERC project to develop an integrated database for Design, Procurement and Construction Management using object oriented techniques and case tools. This project is supported by the Royal Institution of Chartered Surveyors, Royal Institute of British Architects and the Chartered Institute of Building.

. Research Director of £365,000 EPSRC project to establish a UK National Centre for Virtual Environments.

. Chairman, National Industrial Centre for Virtual Environments including £7.7 million Millennium funded project linked to "Lowry Centre" Salford Quays.

Research Quality

. Member of Built Environment research assessment panel in 1992 UK Research Assessment Exercise.

. Presenter of UK View of Quality Assessment in UK Universities at national seminars in Germany, Portugal, Holland and Italy.