

**INNOVATIVE WAYS OF FUNDING CONSTRUCTION  
RESEARCH: AN IDEAS PAPER**

**by**

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## **INNOVATIVE WAYS OF FUNDING CONSTRUCTION RESEARCH – AN IDEAS PAPER**

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### **Executive Summary**

*Construction research takes many forms, and is undertaken for different reasons. The principal motivations are:*

- *to expand the generic knowledge base of the industry, with the aim of improving design, construction and management practices*
- *to support the development and implementation of public policy*
- *to secure competitive advantage for a firm or sector*
- *to understand or address the requirements of a specific project*

*The potential for attracting more investment from the private sector for each of these forms of research is examined against the background that most funders will wish to see a commercial return from their investment. Three possible routes to enhanced funding of generic research are identified:*

- *a radical reappraisal by professional institutions of their role in funding research*
- *supplementing or replacing existing funding of regulatory research through a charge related to Building Regulations approval or the pricing of Approved Documents*
- *the creation of a more certain market for improved design or process performance through the use of performance targets by major clients or groups of clients.*

*However, these are not thought to have as much potential for enhancing investment in construction research as the vigorous promotion of changes now in train in the construction marketplace, such as the development of more permanent ‘framework’ relationships between clients and supply groups, the Private Finance Initiative and the introduction of key performance indicators for firms. Taken together, these offer the prospect of a better defined relationship between the cost of research and the market advantage and higher profitability that firms will seek through such investment. The conclusion is that CRISP should encourage the development of these new market frameworks and influence research funders to study their creation and operation.*

## **Introduction**

Construction research takes many forms, from highly technical studies of the properties of materials to ‘soft’ research into management relationships and people’s reactions to the quality of their internal environment. It is also undertaken for a range of reasons, and an examination of new funding opportunities must start from a review of these reasons.

I suggest that construction research is undertaken for one of four principal reasons:

- To underpin and extend generic knowledge, with the aim of improving the final product type (building, bridge etc) or the process leading to it
- To support the development or implementation of public policy (notably public health, safety, environmental or consumer protection policies)
- To secure competitive advantage by a firm or industry sector
- To understand or address the requirements of a particular project

Note that these do not include the quest for knowledge for its own sake. By definition, construction research is an applied activity since it is envisaged that the output of the research will be capable of application in construction.

Research undertaken primarily for one of these reasons may, of course, also fulfil the purposes of another category. The better understanding of ventilation requirements may inform both professional guidance (and thus lead to better designs) and new regulations. Generic studies of the construction process may be undertaken both to improve the industry and to improve the value for money obtained from government expenditures.

Possible new sources of funding for each type of research are considered below.

### **Extension of knowledge**

Since this work is generic in nature, the resulting information cannot be easily translated into commercial advantage for any individual firm; it results in a better knowledge base for practitioners. There is therefore little incentive for commercial organisations to fund it and the funding is usually from public sources (e.g. DETR, EPSRC) – as a contribution to the ‘sponsorship’ of the construction sector and often in partnership with collective trade or professional bodies who may invest the time of their members (and some funds) for the benefit of their sector as a whole.

The terms of reference for this study include the suggestion that financial interests might become involved in the funding of such research. However, such interests will look for appropriate commercial return. Discussions with venture capital firms have confirmed that research as such will not attract funding - the research must be part of a business proposition with a forecast income stream and the funding firms will examine closely the capability of the people involved to turn the research into profitable business.

This suggests that, to attract funding from commercial sources, generic research must be capable of being incorporated into an 'information product' such as a software design package. Conventionally, though, the pricing of such products (because of the prevalence of public funding for this class of research) does not reflect the cost of producing the basic information. There would therefore need to be a radical change in the market pricing of such products, and the change might inhibit the use of the best and latest information.

Some private sector funders, however, would not seek commercial returns. The research foundations (Leverhulme, Sainsbury, Wellcome etc) are examples and some have funded generic studies in the built environment. Particularly relevant to this study are the professional institutions whose members would be the immediate users of the results of generic research.

I suggest that professional institutions might play a much larger role in funding research. They typically have, in their constitutions, a remit to advance knowledge and they exist to enable their members to be recognised as professionally competent and to help them maintain that competence in the light of new knowledge and changed market needs. To date, though, the professional institutions in construction have not been major funders of research on behalf of their members; their research funds make a useful but modest contribution to the overall research scene. If there is general acceptance that, to be world class, the construction sector should advance its knowledge and practice through research to a greater extent than at present, the institutions and through them their members should be challenged to turn this sentiment into reality by radically reassessing their funding of research.

It will be claimed that members of professional institutions already devote much time to steering and participating in research programmes. However, these activities are confined to a small minority of construction professionals. The total membership of the institutions represented by the Construction Industry Council is some 350000. Is it out of the question that each might contribute on average £50pa to the development of their industry (which sum would, of course, be tax-

deductable)? Such a sum might be the measure of commitment to the creation of a high performing industry through research. The £15-20m thus made available, even though a small proportion the turnover of professional firms, would make a very great difference to the resource available for better understanding the performance of buildings and other structures, for creating a more sustainable construction sector, for demonstrating and monitoring new forms of organisational relationships and generally for enabling professionals to have the knowledge necessary to anticipate and meet future requirements.

RICS has ambitious plans for a Research Foundation to which it has committed substantial funding over the next three years. CRISP might challenge other major institutions to emulate this.

### **Support of public policy**

The second category of research is a principal area for funding from DETR, HSE or other government funding sources. By definition, though, the results of such research are in the first place intended for application by Government; moreover, the knowledge gained is likely to be published as a basis for securing consensus and endorsement of the policy initiatives or regulations proposed. These factors inhibit private sector funding and traditionally, this work is 100% funded by Government. This also minimises the potential for influence from funders who might have a vested interest in the outcome.

In Canada, joint industry-government funding supports research related to the Building Code and in principle this could be introduced in the UK. It might be attractive to industry groups to contribute to such research and thereby to gain insight into the findings at an early stage, but there would need to be robust steering and management arrangements to avoid accusations of undue influence.

Alternatively, the pricing policy of the resulting official documents might be re-thought. At present, the cover price of Approved Documents bears no relationship to the cost of the research that contributed to their production. Neither do the fees for obtaining Building Regulations approval, although these are set to cover the administrative and inspection procedures involved. It would in principle (and subject to statutory provisions) be possible for the cost of the documents or the approvals to make a partial or complete contribution towards the cost of the underpinning research. DETR were not able to provide me with a figure for the total fees paid for Building Regulations approval in the course of a year and so I am not able to relate this to the annual cost (some £5-6m) of Building Regulations research, but a combination of a modest increase in the cover price of Approved Documents and the fees for approvals would, I suggest, raise a comparable sum.

The aim, of course, would be to release DETR resources that could then be used for other construction research purposes. I recognise that (a) this is a form of ‘hypothecated taxation’ which is never favoured by Treasury and (b) that there is a serious risk that Treasury would merely claw back the sums raised by such a route. However, it should be considered as a variant on the ‘levy’ proposal adopted as CIC policy in 1994.

CRISP members will perhaps be aware that a similar system operates in New Zealand where there is a levy on all building permits for developments over a threshold sum. This is charged as a percentage of the estimated contract sum. The resulting funds support research for the general benefit of the industry and are not confined to regulatory issues. Levies for research exist also in Belgium and the Netherlands; these are based on labour costs (*cf* the CITB levy). The proposal put forward above avoids the need to secure a formal industry request for a levy (which could be introduced under current legislation) but of course raises other issues of public policy and might require amendments to legislation.

### **Securing competitive advantage**

The third category of research is dominated by product and materials producers who can gain competitive advantage by creating a better or novel product through research. The knowledge generated can be protected through patents and commercial security and an income stream secured. Elsewhere in the construction sector, though, the relationship between investment in research and subsequent market advantage is obscure (see comments below on the structure of the industry). Thus, while the industry is widely criticised for not investing in research, firms are in general being very rational in deciding to use their discretionary resources in other directions. The relationship between the certain cost of research and the uncertain financial reward inhibits investment. Collaborative funding schemes, with or without a public sector contribution to the cost, are a means of reducing the cost for an individual firm. An alternative approach is to make the return more calculable.

This means establishing a more certain relationship between research investment aimed at improving design or production performance and the likelihood of sales. A client or group of clients could, for example, set out performance criteria beyond current practice and undertake to purchase from suppliers who met such criteria. These criteria need not be confined to the performance of products or components; they could be related to delivery, environmental etc targets or to aspects of performance of the complete building. A designer might be challenged to source all materials from

with a certain radius or to have a minimum proportion of recycled material. A contractor might have to meet stringent noise limits. The investment by suppliers in research to assist them meet the criteria could then be related to the potential payback from the client's immediate and subsequent business.

This is not a novel concept; there are existing initiatives which move in this direction. The Amphion housing consortium has brought together several housing associations to provide a market for 1000 units of housing over the next three years, with members of the consortium arranging their programmes to provide for relatively even demand. This is an attractive business proposition and in principle should stimulate suppliers to undertake research in order to meet the consortium's requirements and their steadily more demanding performance targets. It is not clear that this has been the effect in this particular case but the principle of grouping demands in order to create a more attractive market proposition has been demonstrated. The 'framework' agreements now being negotiated by major clients and the contractors selection scheme introduced by the Design-Build Foundation may have the same effect, although in those cases the investment in research may come as a result of needing to meet increasingly demanding performance targets after the award of the contract rather than before.

By increasing the prospect of subsequent business, such moves can also help to bring external sources of finance into research – see earlier comments. Conventional investors will wish to see a commercial return from any investment and this can only be obtained if there is resulting market. Indeed, it might be possible for client groupings to use their influence with financial interests (which is likely to be greater than that of relatively small consultancy or research bodies) to effect introductions or obtain more favourable terms. Since the output of such research is likely to be relevant not just to the initial client, but elsewhere, it becomes 'generic' after the initial application. Client groupings, therefore, offer a possible route to bringing new resources into at least some forms of generic research.

### **Project-related studies**

The fourth category of research is that undertaken for the better understanding of a particular project or to develop new approaches to solving specific design or construction issues in a project. It is not formally recorded in research statistics but is very significant in leading to innovative approaches to design and construction. Since the immediate beneficiaries are the participants in the project there is no incentive for any other funding to be introduced unless it appears that a generic product might emerge or the issue is one of public interest (e.g. a new approach to meeting a safety requirement).

This, though, transforms the work into one of the other categories of research. Two comments might be made: first, it seems likely that the move to competitive tendering of design fees and away from fee rates has diminished the ability of designers to undertake such research and this might be further explored by CRISP. Secondly, the mechanisms for disseminating the outcomes of this form of research to the rest of the industry are undeveloped; this means that the industry does not obtain the best return from the resources employed and ‘reinventing the wheel’ is prevalent. CRISP might examine whether new information channels could be developed.

### **The impact of current developments**

Previous sections have identified some possible approaches to enhancing private sector funding of construction research. The scope for innovative funding is, however, highly constrained by the traditional structure of responsibilities of the industry. This problem is not confined to the UK; other countries share the same difficulty in securing private sector investment in construction research. A CIB Task Group is examining the construction innovation systems of different countries but so far it has not revealed strikingly new approaches which might be emulated in the UK. The one exception is Japan where the principal contractors invest heavily in research. While there are many reasons for this, both economic and cultural, the Japanese example demonstrates the importance of industry structure to a firm’s appraisal of the case for research.

In the UK, the construction sector is characterised by highly fragmented supply chains, with responsibilities established through contractual arrangements and, too often, adversarial relationships. This traditional framework has provided little incentive for research. Outside the products and materials sectors, construction firms have not been able to see financial benefit from a better generic understanding of either the final product or the processes of construction – in contrast to specific studies related to an individual project. They have had no assurance of repeat orders for a certain type of building and (apart from legal claims) their future profits did not depend on the performance of the building over its life. With a few notable exceptions, clients have selected design teams for a specific task and the combination of designer and contractor has not been retained for subsequent projects. Thus institutional learning has been inhibited, and there has been little incentive to develop improved responses to the client’s needs through investment in research.

This traditional picture is now starting to change, driven by changes in the procurement policies of major clients, the ‘Egan’ agenda and the Private Finance Initiative. Taken together, these are creating a future pattern - for at least part of the construction market - of more permanent consortia of designers, contractors and facilities managers who establish long-term relationships with clients

who wish to gain the maximum operational efficiency from a building or facility, but who do not wish to take responsibility for its ownership or management. This leads to:

- a higher probability of repeat business
- the opportunity for different consortia to specialise in different client sectors and building types
- scope for the consortium to realise a profit stream throughout the operating contract and to enhance that profit through better understanding of the performance of the building or facility.

The construction process has therefore gained some of the characteristics of a manufacturing process, where product designs can be refined through experience and research, value can be added by improved understanding of the whole life of the product and the production process can be optimised.

In addition, the development of national performance indicators will for the first time enable clients to compare firms other than on price and KPIs will correspondingly become competitive factors. Managements will seek to compete on KPIs and research will be one of the tools through which they will improve their standing in relation to their competitors.

In my view, these developments offer more potential for increasing research in the construction sector than different forms or sources of funding. They radically alter the traditional relationship between investment in research and the potential competitive benefits, and provide a much clearer link between the investment required to improved understanding and performance and the potential income from that investment. They address the major inhibitor to private sector investment in construction research, namely the absence of clear market advantage or future profit enhancement for individual firms, and have the potential to take the UK towards the Japanese situation which has been created, in part, by long-standing relationships and the ability of contractors to realise profit throughout the whole life cycle of the building.

CRISP should therefore be encouraging the development of these more integrated procurement routes, using its influence on research funders to stimulate more research into how these routes can best be established and operated and into the development of meaningful performance indicators, tailored to the needs of different parts of construction.

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