
Architects' use of electronic information

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The Occasion

This report presents the interim findings of the first two years of a doctoral research project titled, 'The identification and evaluation of the use of electronic based information sources in architectural practice.'

Abstract

There has been little recent research on the take up of electronic information sources (as distinct from CAD/CAM) by architects. Profitable use of appropriate information by individuals shows scope for the future. Preliminary research here shows the extent of information use has to be considered in relation to size of firm and factors covering organisation, function and process. These, and other complications, will be addressed in the remaining phases of this research project.

Introduction - the original idea.

Central to the original idea for the research was recognition of the rapid change in communication media now used to deliver information. Over the last twenty years a major shift has occurred with hard copy becoming secondary to electronic sources. The result is an electronic based information rich environment, which, if we are to believe the information providers, can provide the right information, in the most suitable format, using the most appropriate media for the recipient.

Yet within the context of the research area little appears to have changed in two key areas. First, it would appear that the underlying content or representation of the information is essentially the same. With only the medium of delivery changed, indeed, most of the electronic document systems available are still mere scans or literal translations of the existing hard copy. Second, some indication has still to be determined of the level of integration reached within existing working practice by the new delivery mechanisms and the information which they carry.

Architectural profession

Architecture represents a profession which, both through training and its working practice, has emerged as an information rich culture: as such it should provide a receptive and productive focus for the research. Central to architecture is the processing and production of information. The individual architect is primarily an information processor, receiving input in the form of pure information, i.e. the brief, legal requirements etc. The architectural product is information on how to construct the building with no physical component adopted other than the medium of communication.

Of particular significance to the research, is that over the last two to three years the profession has been the target for marketing and development of electronic based information sources which promise to go beyond mere replication of printed sources to the integration of information with the tools of working practice. Yet as a profession where information is an inherent part of the

culture, and where the availability of electronic based information sources is expanding, studies on information use and the effectiveness of electronic media designed to support them is still an underdeveloped area. (Green 1992)

Information studies - architecture

Studies identifying the adoption and utilisation of information within architecture are surprisingly few and dated. The emergence of functional and process driven models of information use dominate the literature. Honey (1969) using a functional approach, identified a model of information flow related to identification and specification of parts or components within a project, leading to a gradual refinement of information need as the project moved from statements of performance to the identification of the information required to satisfy them. Written at a time when the use of information technology was still in its infancy Honey astutely identified that :

“... architects can be helped by presentation of information which will indicate design requirements clearly, reveal possible solutions rapidly and comprehensively and enable wider evaluation of solutions.”

The slightly later work of Bishop (1972), reflects the strong influence of the profession's process driven RIBA Plan of Work. (RIBA 1982) The result is a linear model of the design process where the role of the participants is to receive, process and prepare information for the next stage. Studies by MacKinder and Marvin (1982), widely recognised within the profession as the most relevant and comprehensive research to date, concentrate again on the linear, process driven model of the working patterns of architects and - more significantly - on the hard copy information sources indicative of that era.

Electronic information sources in architecture

The literature review revealed a distinct gap in current research relating to the use and effectiveness of electronic based information sources in architecture; material in the commercial press tends towards product reviews

of dubious quality and impartiality. The electronic document systems available are merely sophisticated versions of their hard copy equivalents, as typified by Barbour's *Construction Expert*, the ASC *Architects Standard Catalogue* and *British Standards* and the Royal Institute of British Architect's *Product Selector Plus* and Construction Information Service. Products such as the National Building Specification's (NBS) *Specman* and *Annotation Manager* illustrate the development of software which reflects the process oriented working patterns as dictated by the profession's ruling body RIBA (1982). The literature review highlighted two key areas which the first phase of the fieldwork would investigate :

- the relationship between information use and use of electronic based information sources
- how the design of the information sources links to the individual architect and working practice.

Methodology

The earlier referenced studies used as a basis for their research a combination of interviews, case study and observation. Acknowledging that architecture is a specific sub-society where the group and individual perceptions mirror the education, history and culture of the profession, the methodology adopted had to reflect this within the context of investigating the new electronic medium. In order to understand the situation being studied it was considered essential to investigate the perspective of the individual architects who in effect 'create' that social context. Running parallel to this is the importance of recognising that the individual's interpretation may vary considerably relating to their position within the practice. Depending on the individual architects' points of view they may exhibit different motives and perspectives from which they view their environment. (Mead 1991)

To investigate this area from the perspective of a singular research paradigm would be naive. Information by definition is multi-disciplinary crossing the traditional boundaries of academic debate, and subsequently the research exercise must access a variety of methodologies within such disciplines.

This first phase of the research targeted a sample of twelve regional architects to allow cross checking and validation of emerging themes. Working from the RIBA regional directory and personal contacts, small privately owned businesses were targeted (employing between one and forty), as representing the majority of practitioners within the profession. The data collection used a qualitative study of semi-structured interviews with a job architect, combined with quantitative data from simple rating studies.

The questionnaire was broken down into three main sections. Section 1 obtained a profile of the office and personal activities with which the interviewee was familiar and confident. The aim was to obtain a profile of the office structure, the interviewee's role within it and the general office environment which influenced them. Section 2 focused on information use in general, looking at general information sources used during the design process. Using a chart listing common information sources used in architecture the interviewee was asked to rank the importance of the sources during the detail design and production stages - ranging from essential to largely irrelevant - and the frequency of use. The final section guided the interviewee to consider identification and utilisation of electronic based information sources. Starting with a general question on the level of information technology used within the practice and leading to more detailed questions on purchase of electronic based information sources.

Within each section general questions were first asked to ensure that the interviewees were familiar with the area under investigation, leading on to more specific questions. Where appropriate prompting occurred to develop the area under discussion and allow the interviewee flexibility to expand areas where they considered this necessary.

Analysis of the findings

The literature search identified little prior knowledge in the area under investigation. The research therefore aims to identify and establish a new perspective on an unknown situation. The methodology adopted had to provide a framework for the data collection and subsequent data analysis to facilitate the emergence of a theory during the process of data collection and grounding the theory on the actual data. As existing studies in the area were limited and concentrated on the hard copy medium, a quantitative approach to validate existing findings or to produce a replicable study was inappropriate. Using a qualitative approach the data collection and analysis allowed themes to be identified as to how architects define themselves, their activities and their use of information within the environments in which they operate.

Provisional findings:

Practice Adoption of electronic based information sources appeared to be related to the current level of information technology provision. This in turn was linked to where the practice perceived itself within the traditional professional classifications of number of employees, turnover, nature and value of projects undertaken. A strong correlation emerged between the way the practice perceived itself within the market place and the strategy adopted towards utilising and implementing the sources.

With regard to the actual nature of information, a grey area emerged relating to what the individual architect viewed as an information source. The analysis identified a distinct split between those products viewed primarily as library/information services i.e. *Construction Expert*, *Technical Index*, *Construction and Civil Engineering Index*; and those regarded as information tools such as *NBS Specman*, *Barbour's Construction Expert*, the latter allowing you to take the basic information and add value.

Diagram 1a. Simple hierarchical development of practice categories.

budget/speed



**reliability/
practicality**



reputability

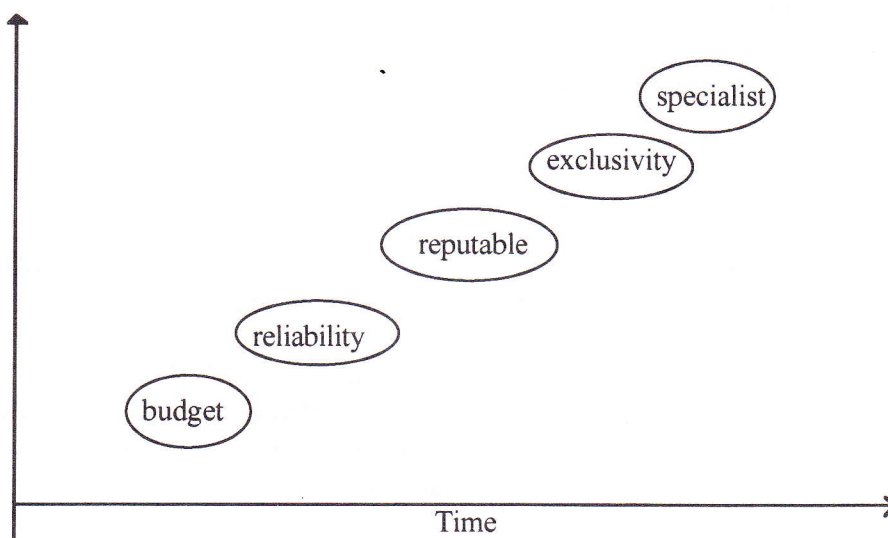


exclusivity



specialist

Diagram 1b. Categories of firm over the function of time.

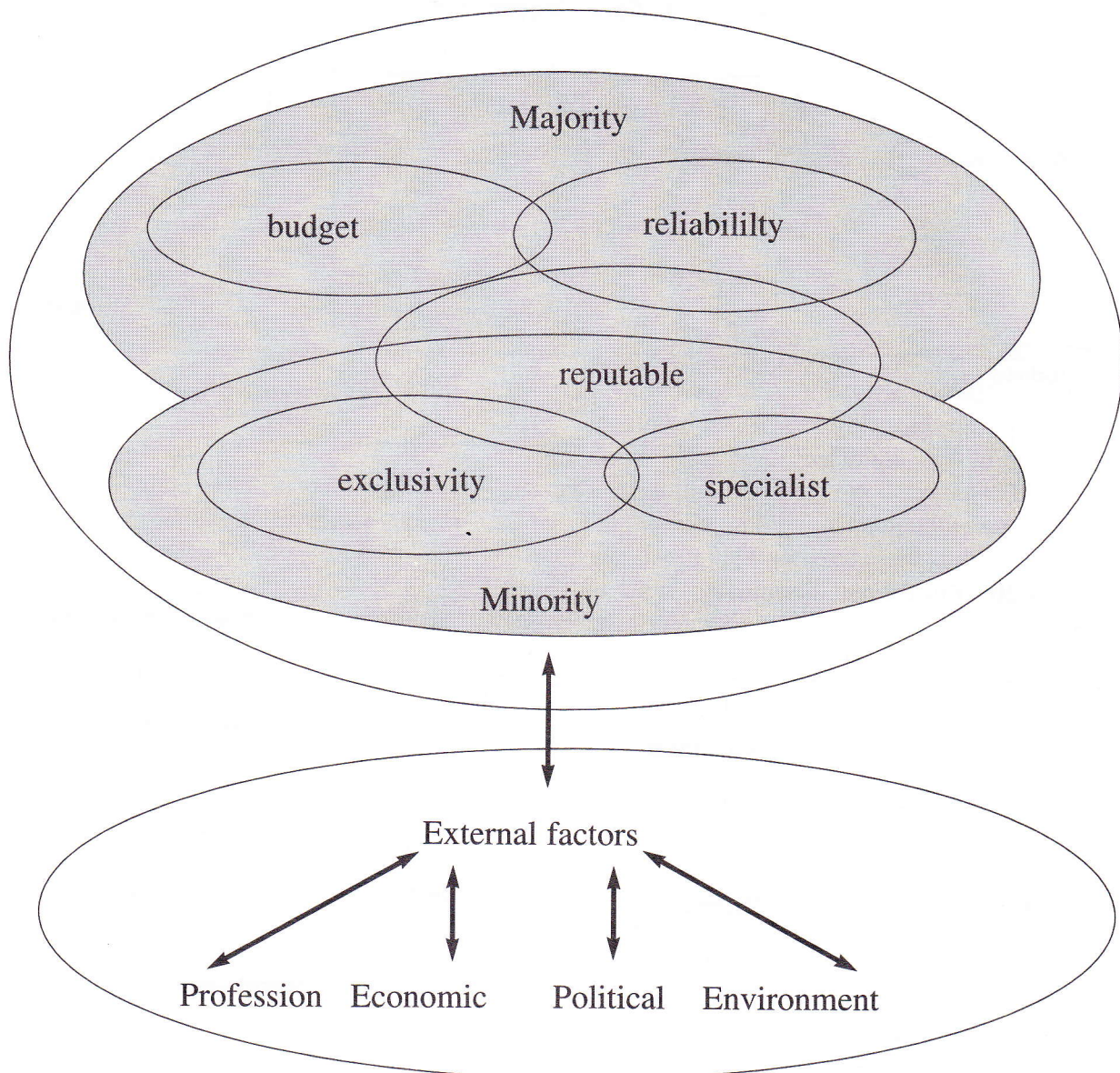


A correlation also emerged between the practice's position within the professional hierarchy, and the actual *nature* of the project undertaken. Diagram 1a illustrates a simple hierarchy developed to incorporate recognition that, over time, the individual architect's knowledge base can change. This in turn can impact on and facilitate the movement of the practice as illustrated by the scenario, Diagram 1b.

Two significant points within the research are highlighted in Diagram 1c *Categories of Firm*. Firstly, it demonstrates the divide between the underlying nature of those practices that represent

the majority of architects and the significant minority whose working practice takes precedence within the profession's reported views. Secondly, although not directly stated, collectively emerging from the interviews was the impact of conformance and compliance. 'Conformance' relates to internal preference dictated by a particular approach or style; 'compliance' relates to the strict set of professional (and often legal) guidelines by which any practice's activities could be and are measured, i.e. budget, building regulations and statutes, health and safety, planning.

Diagram 1c. Categories of firm



Information use in the design process. With regard to information use electronic based information sources are, perhaps unfairly, placed in the same category as the 'traditional' very expensive CAD CAM systems. As such systems were the victims of the recent recession in the industry and associated with very high costs, the resulting impact on decisions to adoption information oriented technology has been significant. Yet in reality, those practices that have incorporated such sources have survived and progressed in a highly competitive environment. This point was clearly demonstrated when interviewing one small practice, with a maximum

of two employees, who - through effective integration and utilisation of information technology and electronic based information products - could compete with significantly larger practices on a regional and national basis.

Further analysis of the interviews with architects identified a set of schemas relating to information use in general and the associated use of electronic based information systems. Where the individual architects saw themselves within these schemas relating to role, function and process [Diagrams 2a-c] determined differences in the use of electronic based information sources.

Diagram 2a. Organisational structure

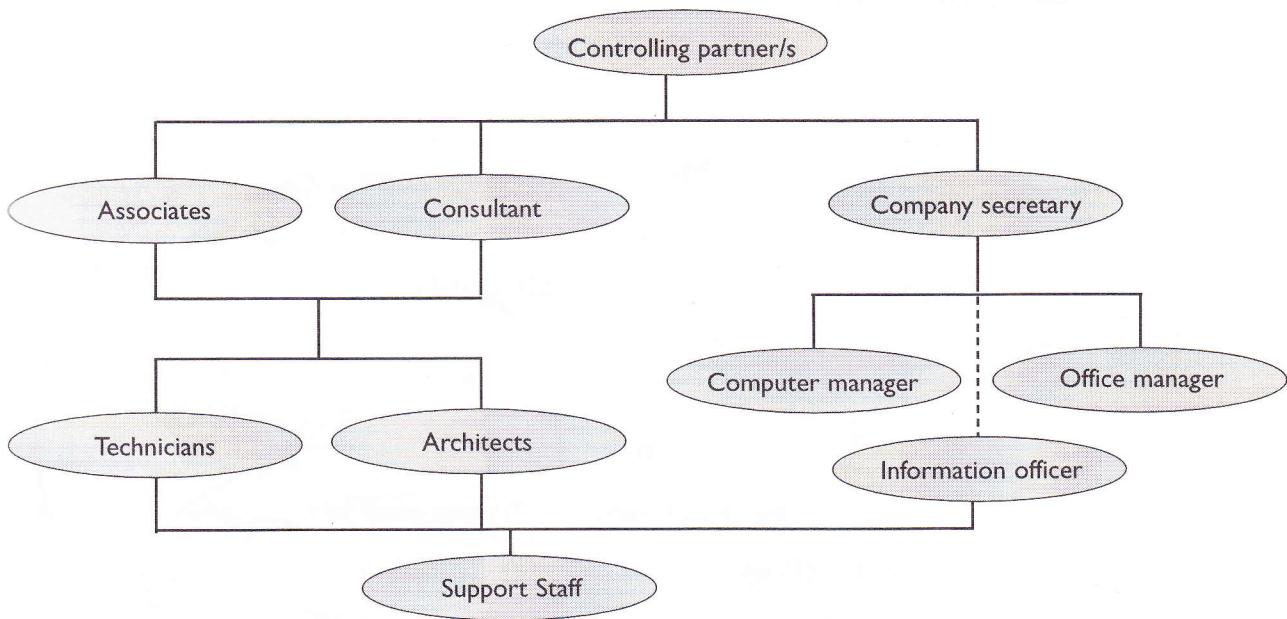


Diagram 2b. Functional structure

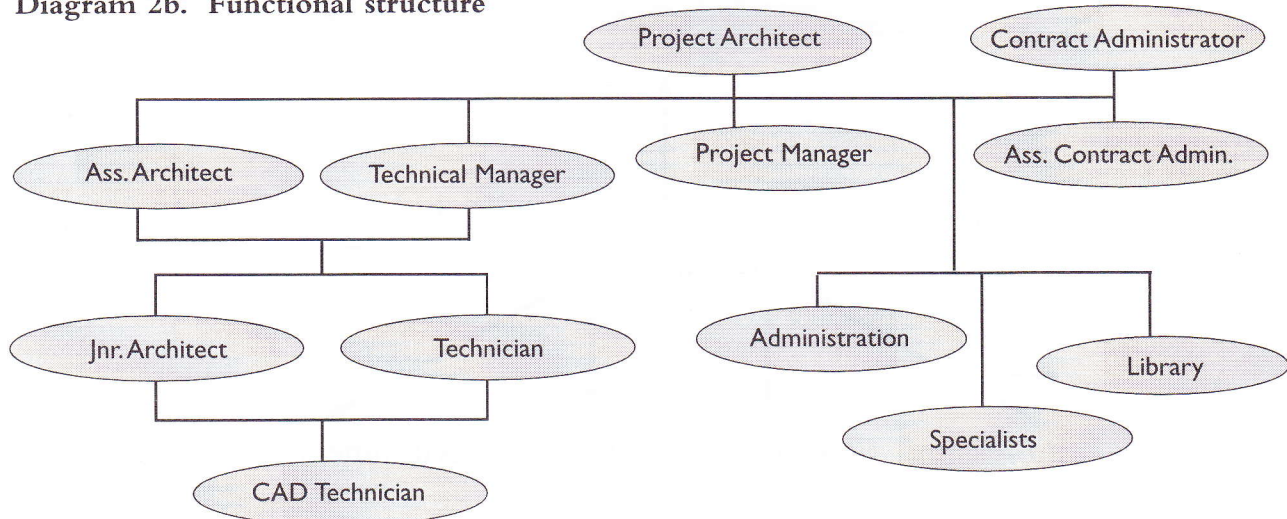
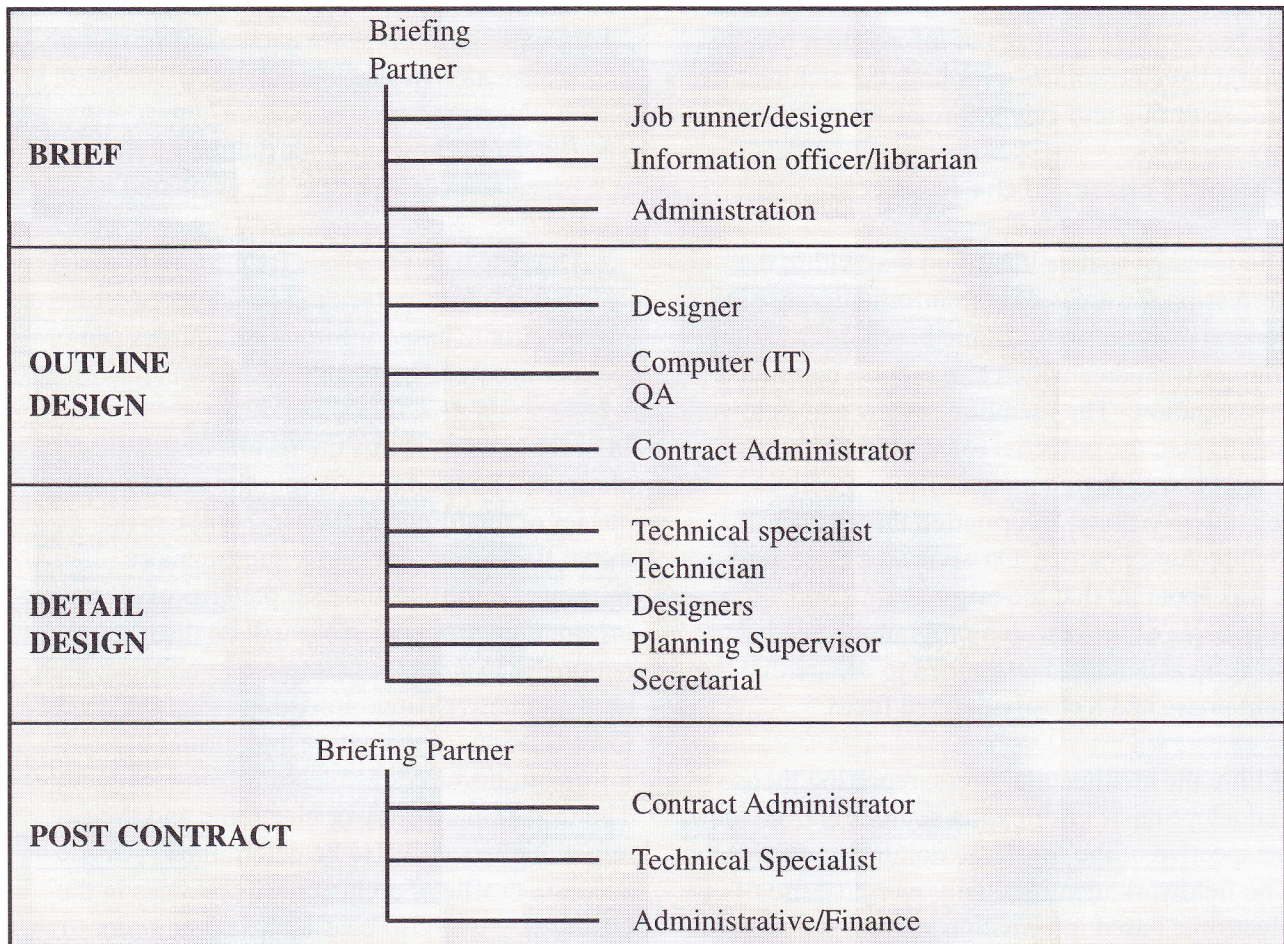


Diagram 2c. Process schema



Two points emerged of significance to the research :

- the individual architect can find himself adopting multiple roles within various design projects
- depending on where architects saw themselves within the schemas at that point in time could determine differing perceptions of information use.

However, in achieving this the boundaries imposed by the profession on working patterns and organisational structures have not only been challenged but perceived by some as threatened. The sources can facilitate greater integration of roles and activities, pointing to the need for the profession to accommodate the re-engineering of established work practise and working patterns. The diverse results indicate

a move away from the linear process models identified by earlier referenced studies. This earlier work conforms to the view of information use within architecture as determined by established professional guidelines and working practice, a view referred to by Harrington (1991) as the resource paradigm. This relates to the consistency of information and its place within recognised formal structures, where each stage has a predictable input and output of information. Within architecture this links very closely to the current methods of working practice as typified by the RIBA Plan of Work. RIBA (1982)

However, the findings of the current research indicate that the simple linear model is no longer appropriate. The emergence of the role, process and function schemas placing information into the domain of the individual architect, relates more significantly to the perception driven paradigm. (Harrington 1991) This model links directly to

the working architect and places information into the ownership of the individual or the group which uses it. The practice would have to own the basic building blocks of information but would have no control over how the architect processes this into new information.

The next phases of the research.

The research to date identified that within the profession the areas of both information use in general and use of electronic based information sources is an area which can support continued investigation. The literature review and fieldwork highlighted the potential to investigate the research area from a number of perspectives relating to culture, information theory and architectural practice. On review of these findings it was apparent that the original aims and objectives of the research programme needed to be re-evaluated and re-defined to ensure that the next phase had a clearly defined focus.

Within the architectural press, reporting the use and adoption of information sources is from the perspective of the few large dominant practices. The fieldwork identified only marginal use of electronic based information sources within those practices regarded as 'typical', that is the small practice employing between 1-5. In addition when they are used and by whom indicated an uneven and uninformed picture of how such resources sat within traditional working practice and what actually constituted information use. What clearly emerged from the findings was the need for an analytical framework to facilitate understanding the relationship between electronic based information sources and working practice. It is these areas which will have a major impact on the future recognition and use of electronic based information resources within the profession and form the basis of the revised programme of work.

The revised research title 'The impact of the use of electronic based information sources on the architectural profession' reflects the main aim of **identifying if a relationship exists between the nature and format of information sources used in architecture and effective working practice.**

The detailed objectives are to:

- Establish if the architect and/or working practice determine the nature and format of information products used.
- Determine how the contribution of electronic based sources is, or can be, evaluated.
- Develop a self analysis framework to assist the architect in deciding how adoption of electronic based information sources can contribute to existing working practice.

In order to achieve this the results of this first phase will be used to underpin the next two phases of the research. Phase 2 will use the initial findings to develop a questionnaire focusing on the use and user patterns of electronic information products. This will be distributed nationally to a random sample of architects, with hard qualitative data. Integral to this will be the identification of the nature and format of information sources available within architecture. The format, hard copy or electronic and their target markets will also be determined. An accurate profile of architectural practices in the UK by size will also be established, in order to confirm the decision of focusing on small practices.

Leading on from this Phase 3 of the research will aim to identify the nature and working practice of small architectural practices. Using a maximum of six practices identified from Phase 2 in-depth interviews will be carried out to identify the nature and type of work undertaken and how this relates to working practice in terms of when and by whom the work is carried out. By this stage the research should be able to establish if the earlier referenced models of information seeking and use are still applicable in the new era of information communications technology.

If the provisional findings that this is not the case are confirmed, the final stage of the research will be the development of a self analysis framework to assist the architect in deciding how adoption of electronic based information sources can contribute to existing working practice.

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