

Architectural Design Management – a practical reflection on the development of a domain

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ABSTRACT

Architectural Management has evolved from a small number of seminal works published in the 1960s into an important knowledge domain today. This domain is underpinned by a growing body of theoretical knowledge which is valued by practitioners for its contribution to the improvement of planning, design and execution of projects. In the Netherlands, for example, a substantial number of design management tools (over 75) were developed by the Architectural Design Management Systems (ADMS) programme of the TU/e over the past decade. Much of the international work on architectural management has been developed via the CIB's W096 Architectural Management, supported by a growing number of PhD thesis, academic papers and a small number of books. Architectural Management has expanded and changed in response to the demands of clients and users, the continuous growth in complexity of our built environment, and the focus on whole life cycle/sustainability issues. Concomitant with this is the need for better collaboration, communication and integration, facilitated by developments in ICT and a better application of management. The aim of the work presented in this paper is to concisely review the development of architectural design management to identify the most pertinent issues for researchers and practitioners. These are then discussed in the light of the current and future challenges facing the Architecture, Engineering, Construction (AEC) sector. The paper concludes with a framework for further exploration of specific aspects with the aim of further developing architectural management.

KEYWORDS

Architectural Management, design management tools, knowledge domain, research.

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INTRODUCTION

Architectural Management has evolved from a small number of seminal works published in the 1960s into an important knowledge domain today [Emmitt 1999]. This field as it was identified by Nicholson [1992] is underpinned by a growing body of theoretical knowledge which is valued by practitioners for its contribution to the improvement of planning, design and execution of projects. Much of the international work on architectural management has been developed via the CIB's commission W096 Architectural Management (published in conference proceedings), supported by a growing number of PhD thesis, articles in peer reviewed journals and a small number of books. From a review of the literature it is evident that architectural management has expanded and changed in response to the demands of clients and users [Bertelsen & Emmitt 2005; Lindahl & Ryd 2007], the continuous growth in complexity of our built environment [Gray & Hughes 2001], and the focus on integral design [Zeiler *et al.* 2009] and whole life cycle/sustainability issues [Mangent *et al.* 2009]. Concomitant with this is the need for better collaboration, communication and integration, facilitated by developments in ICT [Wilkinson 2005] and a better application of management. The recently published book written by members of the CIB W096 commission, *Architectural Management: International research & practice* [Emmitt *et al.* 2009] provides useful background to the development of the discipline, while providing a number of insights into aspects of theory and application. The book is an important milestone for the commission, being the first published by the commission's members since its inception in 1993. The work could also be seen as an important catalyst for the continued evolution of architectural management. The aim of this paper is to review the development of architectural management by focusing on the output of the Architectural Design Management Systems (ADMS) programme at the University of Technology Eindhoven (TU/e) in the Netherlands. From this it is possible to identify some pertinent issues for researchers and practitioners and future trends for the development of architectural management – the theme of this conference.

POSITIONING – ARCHITECTURAL DESIGN MANAGEMENT SYSTEMS (ADMS)

Architectural Design Management can be regarded as a specific domain of knowledge in which the ADMS programme at Eindhoven University has gained knowledge and experience during the past 12 years. ADMS is one of the post-MSc technological designer programs of the 3TU.School for Technological Design, Stan Ackermans Institute. The aim of the 3TU.School is 'to maximize innovation by combining and concentrating the strengths of the three Dutch technological universities in research, education and knowledge transfer' (www.3tu.nl/en/). Graduates of a program receive the certificate PDEng (Professional

Doctorate in Engineering). Trainees for the program need to be approved to enter and will become a paid member of the University staff for two years. The 3TU.School is subsidised by the Dutch government and a programme gets a fee based on successful finalising of that programme by a trainee. Each trainee finishes with a nine months in-company assignment for which a company has to pay a fee based on the salary of the trainee and its guidance.

Since the inception of ADMS in 1996 a substantial number (over 75) in-company assignments were executed in which design processes on organizational and inter-organizational level of design teams for complex buildings and urban development were analyzed and processes were modelled by the use of business science methods [Aken *et al.* 2007], to improve effectiveness, efficiency and design quality. Architectural in this context is meant to focus on the design qualities of the built environment to which architectural designers and more specifically architects contribute.

In general, the target of the ADMS investigations are focused to analyze complex, real life design processes on perceived bottlenecks, and searching for causes and explanations to be able to solve the problem [Aken *et al.* 2007]. Problem solving within ADMS is focussed on redesign a design process by reordering and systemise a process, delivering a design management tool for a specific design organization. Complexity concerns both the technological complexity of the artefact, through to the design and organisational complexity of the project teams, which are configured for the planning, design and execution of the designed artefact. Process redesign concerns the systemizing, structuring and modelling of design processes or parts of that and the development of a management tool. These assignments concerns: (a) the execution of case-studies during the program (mostly executed in small groups), and (b) by the individual execution of the final in-company assignment. By performing such an assignment, a trainee has to show competences and abilities to execute such business oriented research independently, although coached by a scientific team. The assignments were executed for a variety of organizations and firms: large, well known architectural offices, combined architectural-engineering firms, consultancy firms, and advisory firms for building physics services and installations, project developers, care taking organizations, municipalities, county government, national operating real estate agencies and hospital related organizations.

Architectural design management needs to be recognized as an essential phenomenon in the project's business playing field of concerned, contracted parties and actors in the planning and design process for new accommodations of organisations: clients and users. The corners of this playing field, as ADMS recognizes and discriminates [Otter 2008], are: client(s) and users; management of the project; architect(s) and specialist designers; building contractor and sub-contractors (see Figure 1). In the playing field, project management is identified as a party holding a specific corner in the field, which acts depend on the configuration of the design

team and the contract for collaboration between the different parties and actors to achieve the project goals within limited time to an agreed budget. Architectural offices usually deal with design management depending on their capacities, competences and the contract with the client for delivering services [Emmitt 1999; DNR 2005]. It is not uncommon for clients to hire project managers that are independent from the other stakeholders (architect and contractors), to act as the client's representative [Gray & Hughes 2001].

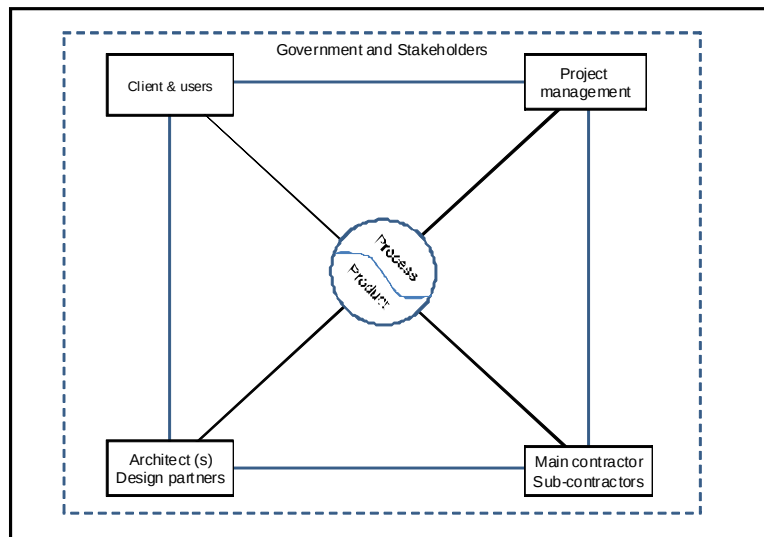


Figure 1: *Playing field of collaborating parties in building and construction*

Large architectural offices mostly have the capabilities to perform architectural and project management tasks. Balancing between design and project management tasks is necessary in such collaboration as the planning and realization of the Luxor theatre in Rotterdam [Demmers *et al.* 1998], the planning and redevelopment of the Glass palace Schunck in Heerlen [Friedl *et al.* 1999] and more recently the redevelopment of the Westraven offices in Utrecht [Erkelens *et al.* 2005] and the development of the Mosa Forum in Maastricht [Beckers *et al.* 2008]. In the playing field the circles of design object and design process are overlapping and might conflict in concern and interest [Doorn *et al.* 2005]. Within this approach, on the diagonal connection between the design and management corners, the interest field of design management can be discriminated (Figure 2). The line represents the connection between product (designer's corner) and the process (management corner) and focused both to the design content and to the collaboration, tasks and planning. A design process can be managed and controlled either by project managers or by designers having management tasks, depending on the position, responsibilities and task of a design manager [Gray & Hughes 2001; Hendrata & Scheltens 2003]. The overlapping field in the middle is a symbolic reproduction of the conflict in the management view that might appear due to

differences in approach by a project manager and a design manager both dealing with design problems and possible solutions from a different viewpoint and working for different organisations with various concerns.

Project management and managers tend to lower uncertainty and risks in the beginning of the design process, using decision making to get more clearly sight on the result while design management and coordinators in general are dealing with iterative design processes searching for the best opportunities and increasing architectural values [Prins 2009]. Such processes are focused to the artefact to design, searching for better insight to the Client's brief and expectations, first developing concepts to derive a better insight in the object to be designed and how to deal with it from newly derived perspectives. The linear time oriented decision making process create tension with the iterative design process as Figure 2 shows. Specifically, in teams configured for integral design in which the sharing and accumulation of knowledge, communication, negotiation and visualizing ideas, tuning of design, and team stimulation are essential for successful results [Emmitt & Gorse 2007; Goossens 2008].

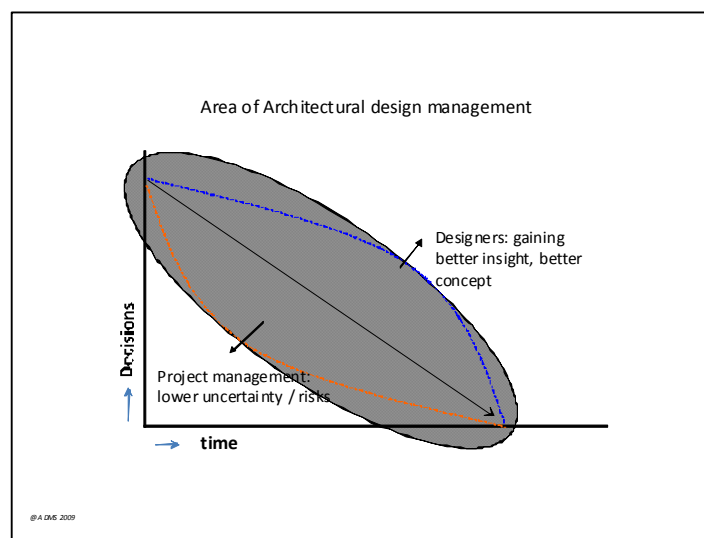


Figure 2: *The area of architectural design management*

DESIGN MANAGEMENT ON ORGANIZATIONAL AND INTER-ORGANIZATIONAL LEVEL

On an inter-organizational level, investigations of the functioning and management of multidisciplinary design teams were performed for six different companies: a real estate agency, a governmental agency on regional level, a consultancy firm, one of the largest project management companies in the Netherlands, a healthcare firm and for one of the

professional research boards in the Netherlands in cooperation with a consultancy firm. Compared to the in-company assignments ADMS delivered in the first five years (1998-2002), a move in subjects and companies occurred. In the first five years assignments were performed in the area of ICT use on organizational and inter-organizational levels, yet no assignments regarding ICT were executed in the following five years [Otter *et al.* 2007; Achten *et al.* 2008].

A shift in focus can be observed to the inter-organizational level and for companies operating in the early design phases for starting a project. During the early years a lot of contracts and collaboration were based on the traditional contract model between the client and its main participants. A contract usually was made with the architect and the building contractor. In most large, complex projects an independent project management company was contracted by the client. In such multi-disciplinary projects the collaboration between the architect, the project management firm and the building contractor usually was not based on a contract (Figure 3). The in-company assignments executed during the last five years show differences concerning contracts and collaboration. No focus to ICT use and assignments on organizational level, but much more organizations and companies, who operate in the early design phases for initiating projects, defining the program and configuring the team using various types of contracts [Erkelens *et al.* 2005]. The traditional triangle, centred to the client and users of the facility is changing in large, complex projects. Instead of centring to the client it is management oriented.

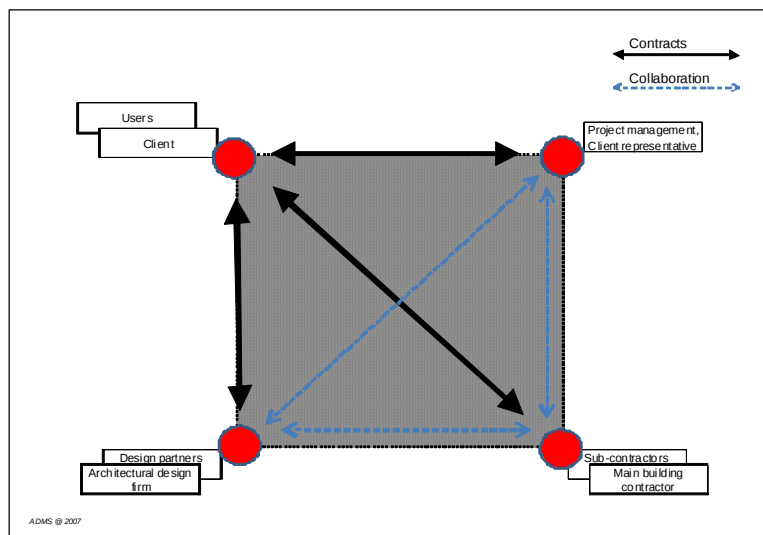


Figure 3: Traditional contracting and collaboration

CHANGES IN CONTRACTS, MANAGEMENT ORIENTED

Project development nowadays gets more focused to deliver design concepts or to deliver products based on repetition and variation on a basic product concept. Development focusing to the organization of the project in the early design phase, for delivering well studied concepts with high architectural values and new scenarios for project private partnerships to deliver and maintain the product during the life cycle. Project development, focusing on variation and repetition of basic concepts, try to optimize the detailed design and the execution of the product using contract forms like design & built or performance based building, but also on DBFMO; Design, Built, Finance, Maintain and Operate [Berning 2008]. Figure 4 shows that such contracts totally change the configuration of teams, their responsibilities and roles, due to the differences in the business case as Gray & Hughes [2001] defined. This also reflects on the different role and responsibility of the Architectural firms involved in such. Also the building's life cycle became an issue during the past years and needs better planning at the start as well as better organizing the realization of the product and contracting participants that are able to provide life cycle services.

Regarding the opinions of the ADMS external advisory board, this change in organizing design and build processes will be intensified in the near future [Otter *et al.* 2007]. This also means that future ADMS assignments might also be executed in the new triangle of design, focused to the capabilities and possibilities the producing firms offer as Figure 4 shows.

The assignment concerning 'Creating spaces of great value' [Jansen Klomp 2008] executed for Rabo Vastgoed and the 'Manual for DBFMO tender procedures' [Berning 2008] executed for Arcadis are examples of such change that will also need investigations and analyses how to stimulate changes in the traditional building culture and how to intensive collaborations between the partners in such projects and contracts. Public private partnerships with a focus to privatizing public spaces, integral design approach with collectively used ICT on both the inter-organizational and organizational level might be subjects for such assignments.

POSITIONS AND RESPONSIBILITIES

Based on the above, it can be concluded that design management need to be identified better as a professional task and role that can be performed independently by a party that is hired by the client, or part of a project management task or as a specific task and role in an architectural office or design specialist firm as Figure 5 shows.

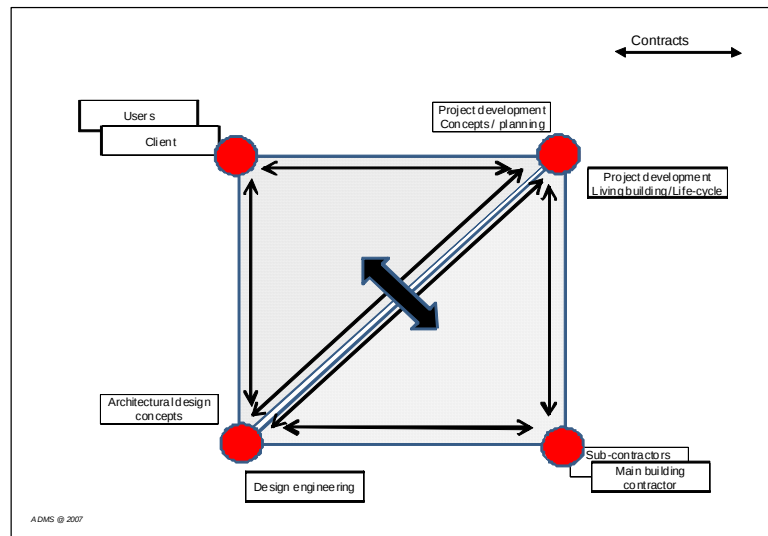


Figure 4: New contracts and collaboration oriented to management

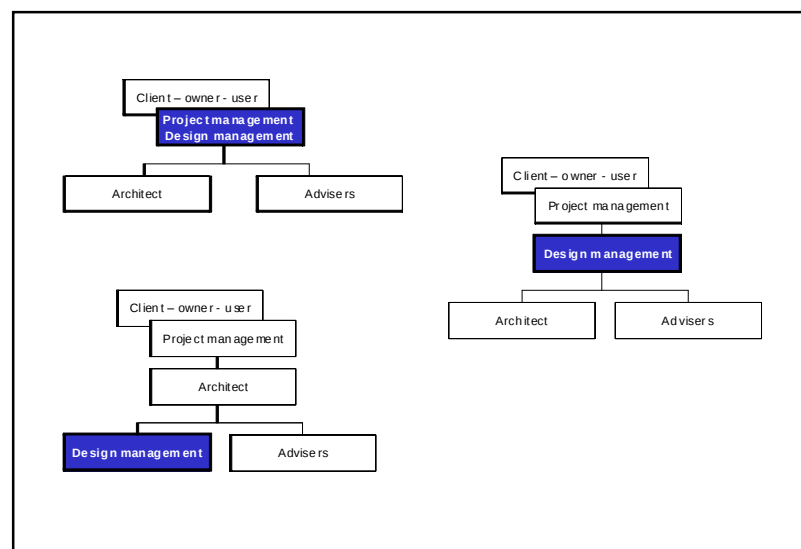


Figure5: Positions of Design management

By improving conditions and appointments by which a design is performed, a situation can be created in which all design participants will optimize their contribution to the design, instead of creating a bureaucratic, too much management tools focused environment of planning, deliverables and costs. In this vision, risk management is viewed at to be a challenge to get the best of the team within the setting of constrains for complex building and construction projects instead of a bureaucratic, paper environment of checklists [Doorn *et al.* 2005].

So, it can be concluded that it is important to prevent project management in the building and construction industry to become too much a checking organization to design organizations involved. Too much attention for the logistics of planning and linear progress of design instead of focusing to understanding, supporting the creation of synergy in design tasks of the various design partners involved to increase design values. Design management in large design firms and architectural offices partly easily becomes a task of the architects because of their close relation to the client; however they might delegate such tasks for quality purposes and for better tuning of the various design tasks of employees working sequent on more than one project.

EVALUATION OF THE ADMS DESIGN MANAGEMENT TOOLS

In 2008 ADMS conducted an evaluation into the implementation of the design management tools developed by the ADMS trainees for their clients in the period 2003-2007. Thirty five firms were visited and interviewed. The evaluation was executed by a former member of the ADMS external advisory board by means of semi-structured interviews that were verified afterwards with the respondents. The advisory board is a critical platform for the program and the eight external members are representatives of well known architectural design firms, engineering and management firms, advisory firms and main contractors. The results of evaluation show that 40% of the tools was implemented successfully and 35% was partly successfully implemented. The tools developed on organizational level were most successfully implemented. The results show a high score compared to other innovation projects in Dutch building and construction. However, for 25% of the tools developed the implementation failed mainly due because the tool was developed to solve a problem on inter-organizational level that is hard to solve and implement in such temporary organisations.

The evaluation results also showed that most firms discovered through the assignment what architectural design management really is about, and admitted that their view on the assignment at the start was poor. To improve this and to avoid misunderstanding by clients of the assignments, the ADMS management team now meets with the client more intensively at the start of the assignment, to explain and assure their client that such an assignment need to be regarded as an innovation for the firm that will change present tasks and processes. In this view the assignment is the start of an innovation project that need to have a project manager in the firm who also is responsible for the implementation of the tool developed by the ADMS trainee. Also discussed at the start is the type of guidance needed for the assignment and the workload for the firm.

CONCLUDING OBSERVATIONS

Based on the experiences gleaned from the ADMS programme it appears that the performance of design management is greatly dependent on the size and complexity of the project, the configuration of the team, and the design management competences of the architects.

Although doing business research is important within the ADMS programme to gain insight into complex planning and design processes, it is first and foremost an educational programme focussing on educating young high performers. By teaching them how to gain the right competences in the field of architectural design management enabling them to analyse, diagnose, reorder and model design processes affecting design quality. Gaining the business knowledge, skills and abilities to model design processes and to perform well in the design process as a responsible party is paramount. Through such education and the evaluation of the implementation we have found that designers can perform better because of greater insight and knowledge of design processes of complex building and construction projects, supported by knowledge of the latest business science developments relevant for building and construction projects. The evaluation of the implementation also showed the successfulness of such innovation in practice.

The authors' experience, combined with feedback from the ADMS trainees, suggests that there is a need for more and specific literature on architectural management. Obvious areas in need of further development and articulation relate to:

- (i) the philosophy and theory underpinning architectural management, and
- (ii) appropriate tools and their application.

Many of the case studies performed by the ADMS students have potential to be published in English, and this is one area that could help the continued development of the architectural management knowledge base. Early work on architectural management has helped to establish the domain. Future work should seek to explore in greater depth the theory and application of architectural management as a distinct domain. In this regard, CIB-W096 Architectural Management has a role to play in guiding and stimulating future research and engaging practitioners and educators to discuss and share good practice in architectural management.

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