Four value propositions for architecture education

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Abstract: This paper proposes four managerial and business techniques that architects and their practices can benefit from. The 2008 global economic downturn and follow up financial crises has triggered the author to engage with small scale design firms to becoming more productive in the production of architecture. The overarching value proposition is that professional practice needs to stay relevant in today’s economy and for better ways to educate architects. To this end, four managerial competencies and business capabilities familiar to the author have been brought into the design studio space including: (1) Value Management, (2) Stakeholder Management, (3) Building Information Modelling and (4) Reflective Practice. These are key elements among the emerging set of competencies put forward in this paper.

Keywords: architecture practice; strategic thinking; domain competencies; professional development

1. Management for Architects

The image of architecture is well engrained as the art and science of creating spaces and environments for humans to inhabit. An architect is defined as the chief and builder from its Greek roots (arkhi-, chief; tekton, builder), as the person who plans, designs and oversees the construction of buildings. However, in a contemporary sense architects are losing professional ground and competencies. The need to increase practical, technical and academic advances in the training of architecture is important, especially in a fast changing world. The overarching value proposition in this papers calls for the need to uptake, and in other cases to reengage with, professional competencies that can benefit architects and their clients. There are also emerging technological competencies such as Building Information Modelling (BIM) to embrace emerging work paradigms in the 4.0 revolution such as those discussed by Susskind & Susskind (2015); and Kuprishka (2014), in order to harness competencies and capabilities in a rapidly changing economy (Rifkin 2011; 2014 and Schwab 2016). This paper looks at internal practice competencies and capabilities such as those discussed in Heintz and Aranda-Mena (2012 and 2016) rather than looking towards business development and marketing plans.
2. Project Management for Architects

Tracy (2013) defines PM as the discipline of initiating, designing, planning, executing, controlling, and closing the work of a team to achieve specific goals and objectives within a project vision. Effective decision-making is also a core component in PM practices. Nevertheless, there is an aspect to management which is less linear and more organic, especially when dealing with people, their values, preferences and idiosyncrasies and that is why management is beyond a mechanistic or predictable set of rules or events. Today’s knowledge about project management directly applies to the practice of architecture and this paper addresses the challenge to bridge PM into mainstream architectural discipline. While, in the non-English speaking European context, architects might naturally apply PM principles and techniques, and accept that much of it is learnt “on the job”, in the English-speaking world, such as in the UK, the USA and Australia, PM is more often seen as outside the architectural domain, in education, practice and research. Thus arises the value proposition on bringing PM across to architecture in the latter context.

PM research embraces techniques from the social sciences. In other words, many of the PM investigations are about people and processes, and the results linked back to projects. Keywords often seen in PM research include decision-making, risk, work packages, with PM research findings being about team performance, knowledge management, reflective practitioner reports (Schön, 1983), knowledge transfer, creative cognition, which are all areas as much aligned with the human condition, as with to how to harness projects and to successfully deliver them.

A good point of departure would be to tailor and integrate PM into design thinking, for instance looking at Lawson’s seminal work on the psychology of architects and designers (Lawson 2005) and design in mind (Lawson 1994). Architecture practice takes place, not only with the internal practice managerial aspects but also externally in client and stakeholder management. How architects could engage with these aspects will be discussed with the aim of encouraging the adoption of better management methods, tools and techniques. However, what might work for defence, telecommunications or manufacturing projects might not be the best fit for architecture projects in which artistic sensitivities also play a role, although care must be taken to avoid using the artistic stance as a defensive ploy to avoid change. For every example of a difference between the practice of architecture and another discipline, there are probably many more examples to be found of inherent similarity. Architecture has the opportunity to expand its domain by moving away from a self-image of exclusivity.

2.1. Value Management

Edwards (2013) refers to value management (VM) as the set of principles that help to maximise project outcomes not simply in terms of costs but in the overall project value. VM as part of a management technique can be useful to architects. VM can help all stakeholders to (1) establish a shared-clear vision of project requirements and outcomes, and (2) identify clear objectives so as to (3) guide teams to achieve common goals and maximise project values (Edwards, 2013). Examples of VM (and thus value creation) are about maximising project outcomes, thus generating more value for each stakeholder. VM is just one of several management techniques used in Project Management. The decision to undertake a project has far reaching consequences including time, effort and money. The objective is to produce valuable assets or services (Edwards, 2013). In the case of large scale or government projects this aim is known as achieving Value for Money (VfM) (McCully 2014)
Project clients expect their project teams, including consultants and contractors, to deliver VfM. Contrary to common understanding, VfM is not solely about cutting costs but identifying and achieving project value through ensuring mutual understanding of:
- The value being sought
- How the value is to be achieved, in other words the objectives to be fulfilled.

In some cases, better VfM can be achieved by actually spending more; although this is admittedly a rarer occurrence. McCann et al. (2016) argue that better value can be achieved by clarifying objectives; and then exploring alternative ideas or solutions and testing the ideas against pre-determined criteria before finally implementing the best value option. Smith et al. (2001) defines three priorities to satisfy client needs and thus, manage expectations:
  - understanding the project priorities and business objectives;
  - providing advice which assists client to gain competitive advantage;
  - being client oriented rather than project focussed.

Since the 1990’s the Royal Institution of Chartered Surveyors (UK) has highlighted the importance of the strategic stages in the development of project solutions; advising institutional clients to engage with advisers who are willing to challenge the status quo including understanding of the project priorities and objectives; providing advice which assists clients to gain competitive advantage; and being client oriented rather than project focused (Cook and Chatterjee, 2015). Although a radical departure for architecture and design professionals, there has been a level of acceptance in this area including a shift from project/design values to social/client values. Clients will eventually validate the question of VfM and its criteria; however they can also be short-sighted and look for short-term high-gain solutions that are not necessarily in the best long-term public interest (Smith 2001).

A common threat risk factor in projects is the lack of clear vision, clear objectives and adequate project definition. Institutional clients may launch a competition or call for Expressions of Interest (EOI) to which some architects might respond without questioning the quality of the briefing documents or the clarity of client objectives for the project. For both public and private projects, briefing documents have been found too often be too open – lacking specificity; misleading or vague and in cases incomplete. Whether or not this is true for any project, it clearly shows that better understanding about clients and their needs is paramount. Developing better understanding through briefing documents and architectural programs using better technologies such as Building Information Models is an area architects could embrace. For instance, in architectural public sector development and interventions, Volker (2010) investigated ‘deciding on design quality’ for public commissions in the European context. Her work investigates the way architects are selected in public design competitions and the decision making processes of adjudication panel members - often a ‘black-box’ aspect to clients, the profession and the general public. In her results issues of transparency, objectivity or equality clearly emerge; identifying the following problems at various project stages:

(Pre)selection phase:
- unclear selection criteria
- high/too many requirements
- too many candidates
- careless request for participation

Tender phase:
- No/little financial compensation for design work
- No/little interaction between client and designer
- Delay during procedure

Award phase:
- Unclear/not well considered award criteria
- Indistinct user and citizen participation
- Mixture of politics and procedures
- Negotiations after announcement of winner

(Volker, 2014)

On the other hand Silberberger (2012) found that architectural competitions often overlook the value proposed by many of their entries as competition juries are often biased and decisions are made subjectively. In his work Silberberger investigated techniques to assist the jury panel to profoundly scrutinise and challenge the assumptions on which the competition brief is based, thus allowing a fit-for-purpose solution space in the competition. The resulting revision would allow a revision of the brief in itself through the jury’s interaction with the entries. It is argued that in this way the client, stakeholders and the panel itself will better achieve expectations, value for money and honourable responses back to the submissions (Volker, 2014 and Silberberger 2012).

In the private sector development, more tangible benefits are demanded as clients usually want to achieve VfM outcomes (McCann, 2016). However, best value and VfM concepts and definitions are often misunderstood as value is not the same as cost. A low cost that delivers a low value project outcome often ends up as a loss for its sponsor (although possibly being highly profitable for some stakeholders). Lowest cost commensurate with highest value is the solution space that clients want to be in. However, this may not be good for the private sector as it pushes contractors to build quickly, often at less quality and with lower safety standards. A mid-range cost and high-value is a scenario objective which can help to bring a project to a more successful outcome. Architects traditionally focus more on the quality of the end-outcome, than the other factors such as risk, process, project duration, although increasingly on life-cycle sustainability. In less conventional projects, such as heritage or sustainable projects, other criteria may also be important in achieving VfM including: abstract/intangible values e.g. heritage, appearance including aesthetics, status, and marketability.

In the case of **operational values**, aspects of life-cycle and key performance indicators (KPIs) are taken into account including: environmental performance, return on investment, productivity/functionality.

**VM into action:** Edwards (2013) provides a framework for a VM workshop/process, which typically is developed over two to three full-day workshops. In practice the VM workshop might usefully extend longer as there are cases when it is important not to rush decisions. More often than not, however, such workshops are limited to one day or less. The VM workshop structure might incorporate four initial phases including:
- Information phase: What is it? What does it do? What does it cost? And what is it worth?
- Speculation phase: What else would do the job?
- Evaluation phase: How well does that work?
- Development phase: How much will that cost?

These are followed by presentation of findings, decision-making and implementation. During the initial information phase, the client and the team try to clarify objectives. What is the client trying to achieve with this project? These are the “**To...+ verb + object ...**” statements.

In class workshops, students are encouraged to address the questions systematically:

1. What is it? E.g. is it a gallery + cultural precinct
2. What does it do? E.g. identify and establish primary function using a verb + noun approach, e.g. *transmit* (verb) and *light* (noun) as the required function for a window.

3. What does it cost? E.g. a monetary value to represent the cost of the component in the finished project.

4. What is it worth? E.g. here is where value for money sits (wherever possible expressed as a cost per unit of delivered function or as a unit of delivered function per $1 of cost).

During the early design process speculative alternative ideas are proposed, but these are not discussed or formally assessed until the VM Evaluation Phase is commenced. The VM evaluation phase will explore each alternative idea through three initial assessment filters including Level 1 Filters: Objectives (does this alternative satisfy the objectives?), Level 2 Filters: Functional Performance (does this alternative deliver better, or the same, performance as any other?), Level 3 Filters: Unique implementation constraints (what prevent the adoption of this alternative on this project?). Cost assessment of alternatives is undertaken in the following Development Phase of a VM workshop, where economic considerations are brought to bear, and the functional worth of alternatives is established so that comparisons can be made between them and with the original design solution.

**Procedure:** As part of the VM process one purpose is to maximize the creation of alternative solutions in order to identify those, which provide better VfM for the client. In this way the Value Management process aims at establishing primary objectives, secondary objectives and desirables. Speculation is then invited to provide alternative ways of achieving those objectives. Judgement of these options is left to a later stage, however the initial stages are ‘inductive’ from particular points to generic points in a way that team members are pushed to think outside the box, either individually or in teams. Contrary to the common belief and even practice, brainstorming (as the best technique for speculation) can also take place individually as the result of introspection and reflective thinking. Creative thinking also take place in moments of tension or constraints for instance, some of the students mentioned that economic recession encourages (and in some cases forces) industry to be more creative and more productive, preparing ground for innovation – “necessity is the mother of invention” (Belski et.al 2016).

### 2.2. Stakeholder Management

The concept of the stakeholder was initially conceived by ‘the Stanford Research Institute’ in 1963. A seminal publication by Edward R Freeman in 1984 defines the concept of stakeholders as those individuals or groups who can affect or may be affected by a project. In successive years there has been some contention as to how to define stakeholders, debate has ensued regarding some definitions (IPMA 2011). Mitchell, Bradley & Wood (1997) progressed the stakeholder concept further by identifying three main characteristics that stakeholders must hold; (1) power to influence; (2) legitimacy of relationships; and (3) urgency of the claim, which then reads as a group or person with a vested interest in the success of a project and the environment in which it operates. Stakeholder management is about the arranging and dealing with the combination of people and processes to deliver a particular project. People or project teams would typically include members of a consortia, client or client representatives and external or third parties such as members of a particular community or ‘end-users’ to a project or facility. Bourne (2016) investigated stakeholders and risk. Her major contribution is the technique she calls “The Stakeholder Circle”. Although the technique is effective, the guiding principles are not always clear, teaching studios encourages students to re-design the Stakeholder Circle in meaningful ways (to
them) and the mapping of their projects. In this way the original work and Circle diagraming techniques developed by Bourne & Walker (2005) have been adapted for the purpose of education. The stakeholder circle diagraming technique (Bourne and Walker, 2005) develops a visual mapping tool to demonstrate how stakeholders impact at a project through various project stages thus defining the level and probability of stakeholder impact during project delivery. Additionally they point out that the larger the project, the more complex the planning and analytical techniques required. Although the importance of stakeholders and their contribution to project success seems to be well covered in the literature, along with a number of ways to identify and categorise stakeholders, Missioner and Loufrani-Fedida (2014) claim that there are a number of limitations to the subject matter, namely: a lack of methods and tools to identify stakeholders and their interests; and a lack of appreciation for the dynamic nature of both stakeholders and the project throughout its lifecycle. Notions of project success evolved in the 1980’s and 90’s to include aspects of the project team and the relationship between the strategic management and the operations of the project, however still missing was the inclusion of the implications of the external stakeholders (Missonier and Loufrani-Fedida 2014). Current perspectives are developing a stakeholder-focused assessment of project success. Turner & Muller (2003) developed four key success conditions for projects:

1. Success criteria need to be confirmed with the key stakeholders prior to the start of the project and repeatedly throughout the project.
2. A collaborative working relationship is needed between project owner and project manager.
3. The project manager should have enough authority and flexibility to deal with unforeseen circumstances as they see appropriate.
4. The owner should take an interest in the performance of the project.

Turner and Muller (2013) suggests that current theories regarding stakeholder perceptions of success are insufficient and do not provide the industry with usable tools and methodologies. Mok et.al (2015) suggest that a stakeholder’s perception of success may have little to do with the project’s performance regarding budgets, schedules and quality levels. Assessing the success or failure of a project is typically done just after completion, however it is important to realise that there are many stakeholders who will assess the project time after completion if that is the case project success would have a completely new set of project values e.g. other than time-cost-quality, particularly if intended as KPIs. Architects can certainly drive the agenda for project success by increasing competencies in coordination projects including stakeholder management with institutional clients.

2.3. Building Information Modelling

Building Information Modelling (BIM) has made great advances in the architecture profession, especially for architectural programming, spatial needs analysis, overall project documentation and coordination. BIM certainly is plying a key role in the way the architecture profession is transforming, it only takes a glance at job advertisements in the profession to see that BIM is a must for new recruits. BIM is rapidly evolving and software applications are quickly emerging as cloud services rather than stand alone applications. On the other hand, traditional document management, local storage and revers will disappear. Interfaces for document and project management solutions have taken ‘a large chunk’ of the commercial market, at least in the architecture, engineering and construction (AEC) industry sector. In the public sector Volker (2014) discusses the need to improve value matrices to increase transparency and accountability for public commissions. One way to do this is by bringing more
project metrics and building information (parametric) modelling is one way to do this, in the shape of better and more accurate design documentation and early project analyses such as cost, energy and space planning. BIM can save architects time at early project stages allowing time for exploring creative and value propositions and testing them concurrently with other team members or project stakeholders. To achieve high design standards and architectural outcomes, the profession needs to protect the time that it takes to develop and test ideas at the early schematic project stages. BIM can facilitate this and then become the practical vehicle for project information delivery to stakeholders.

The use of BIM across projects is still to see its wider adoption not just by the architecture profession but also by engineering consultants and construction contractors. One of the barriers to more widespread adoption is the need to develop managerial and technical competencies. The perceived tendency by designers, architects and creative professions is to protest that BIM hinders creativity and inventiveness, and that BIM “locks” architects to come up with preconceived forms and ideas. This is not the case. In fact, a larger number of architects have continued to improve their creative output by embracing BIM at a much earlier stage in the design process and allowing changes and variations to take place without taking a toll on project delivery criteria (Aranda-Mena 2016).

2.4. Reflective Practice

An adaptation of standard steps for reflective practice into architecture would include (1) explanation of basis of assessment, (2) general summary of significance, (3) significance of individual or discretionary components from landscape (or cityscape) to architectural elements and building parts and, (4) the more recent drive to catalogue and protect the non-tangible heritage where the empty spaces and the activities that happen in them are what is to be protected (O’Keefe and Prott 2011).

RP is a generic term, which explains a method by which professionals engage to explore their projects, jobs and life-experiences in order to lead to a new understanding and appreciation. Reflection involves a number of skills (such as observation, self-awareness, critical thinking, self-evaluation and taking others’ perspectives) and has the intended outcome of integrating this understanding into future planning and goal setting (Mann et al., 2009). Different models of reflection described in the literature are usually iterative (a particular experience triggers reflection and results in a new understanding or decision to act differently in the future); or vertical (describing depth of reflection), or some combination of both.

What is the evidence base for reflective practice? How do students engage in the process of reflection? In addressing the final question, four methods of facilitating reflection will be outlined: journal reflection, reflection on a critical incident, reflection following professional development, and reflection on a clinical encounter. As early as the 1930s, the educator Dewey stated ‘there can be no true growth by mere experience alone, but only by reflecting on experience’. However, it was only much later in the 1980s that reflective practice (RP) started to be widely discussed following Schön’s seminal work (Schön, 1983). There is now a growing body of literature supporting the importance of reflective practice (RP) across professional fields including architecture. This paper highlights the importance of introducing deep reflection as part of teaching pedagogies in architecture education. Allowing adequate reflection time as a job routine in such a way that becomes a habit of professional practice and for life-long learning.
3. Game Changer for Architects

Four “game-changers” can be detected. On their own, none of the following is innovative, or provides new thinking. A different story emerges when combining all of them and integrating them with traditional architecture design studios. By doing this, architects are forced to think more carefully about project governance; project processes; project appraisal; and project delivery. Conclusions point towards a potential “game changer” with respect to the competencies of emerging architects, including the ability to identify value add potential for no added cost in projects via Value Management (VM), to engage and manage complex client organisations via Stakeholder Management (SM); to improve project documentation and life-cycle design via Building Information Modelling (BIM) to effectively use and appreciate digital modelling tools and technologies in order to survive in an increasingly competitive market and finally, to engage in Reflective Practices.

1. On value management (VM) there are a number of opportunities for the architecture profession to embrace the use of Value Management techniques. The author will continue working on adapting Value Management techniques for use by architects, urban planners and designers. The economic and rational thinking of the VM process does not need to overshadow the creative, innovative and idea generation processes with which architects are familiar but to support it. On the other hand the tools and techniques from across disciplines should complement each other.

2. On stakeholder management (SM) including project communications. The clear and direct applicability of SM and similar techniques to better coordinate and manage projects was presented and discussed, firstly within the project team, then to better understand the clients and requirements, and finally to better co-ordinate and communicate issues with a wider audience. Stakeholder and client Management will continue to be an area in which architects need to excel. Stakeholders will be the extension of the client-body, in other words, client organizations will continue to become more complex and architects will need to develop better and stronger communication capabilities and people skills to deliver projects. Moreover, architects will need to lead on this front if they want to see their designs being built.

3. The area of Building Information Modelling (BIM) is not just a technological innovation, but is revolutionising the way architects practice and collaborate with team members. BIM is finding its way into core professional competencies in the UK, the USA, Singapore and Australia (AIA, McGraw-Hill report). The benefits of using BIM include a better and more accurate approach to designing for life-cycle; increasing the level of understanding and accuracy of how a project might perform (or not) from a number of dimensions such as thermal, lighting, acoustic, ventilation and safety performance, functional aspects such as accessibility, durability; and assessing and improving more subtle, non-performance aspects such as occupier preferences. The use of BIM is a very exciting technological advancement for architects and its full potential has no reached its peak. Rapid improvements on display such as augmented virtual reality (AVR) technologies smart phones and tablets could for example, easily show what is to happen to an building, locations or old structure for instance. Coupled with 3D laser scanning via a drone and 3D printing for an actual set of models as the resulting outcome. Finally, BIM platforms are rapidly moving to the Cloud, meaning that architects, engineers, contractors and clients will be collaborating on line in an “integrated” fashion and concurrently. This is a particularly exciting area for architecture as BIM brings the architect back to the driving seat, in
other words, it is increasingly clear that the entity which controls the information, controls the project. However, the race is on, and disciplines such as Knowledge or Information Managers are emerging and taking on these roles.

4. Reflective practice might be a way to effectively adopt and integrate the above three value propositions. Reflective practice strategies present relevant ways to integrating this as to understanding the future of the profession (Mann et al., 2009). Different models of reflection described in the literature are usually iterative (a particular experience triggers reflection and results in a new understanding or decision to act differently in the future); or vertical (describing depth of reflection), or some combination of both. What is the evidence base for reflective practice? How do practitioner and students engage in the process of reflection? Using a metaphor: ‘reflective practice would be like looking into the rear mirrors while driving in order to safely move forward’.

This paper has presented three management techniques to bring architectural practice into alignment with current, expected standards, and has suggested that reflective practice might be the means of practical integration for them. This could benefit the progression of the architectural profession, not only in the practice sense but also in terms of architectural education. Each of the methods and tools discussed in this paper is not new in its own right. What is innovative is the integrated approach in merging them all together and adding them into traditional architectural curricula. Traditional design practices are certainly valued but should also be challenged. This paper has highlighted that management techniques and technology platforms should be more widely embraced in architecture education.

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