

# Methodological research in architecture and allied disciplines

## Philosophical positions, frames of reference, and spheres of inquiry

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### Abstract

**Purpose** – The purpose of this paper is to contribute an inclusive insight into methodological research in architecture and allied disciplines and unravel aspects that include philosophical positions, frames of reference and spheres of inquiry.

**Design/methodology/approach** – Following ontological and epistemological interpretations, the adopted methodology involves conceptual and critical analysis which is based on reviewing and categorising classical literature and more than hundred contributions in architectural and design research developed over the past five decades which were classified under the perspectives of inquiry and frames of reference.

**Findings** – Postulated through three philosophical positions – positivism, anti-positivism and emancipationist – six frames of reference were identified: systematic, computational, managerial, psychological, person–environment type-A and person–environment type-B. Technically oriented research and conceptually driven research were categorised as the perspectives of inquiry and were scrutinised together with their developmental aspects. By mapping the philosophical positions to the frames of reference, various characteristics and spheres of inquiry within each frame of reference were revealed.

**Research limitations/implications** – Further detailed examples can be developed to offer discerning elucidations relevant to each frame of reference.

**Practical implications** – The study is viewed as an enabling mechanism for researchers to identify the unique particularities of their research and the way in which it is pursued.

**Originality/value** – The study is a response to a glaring dearth of cognisance and a reaction to a growing but confusing body of knowledge that does not offer a clear picture of what research in architecture is. By identifying key characteristics, philosophical positions and frames of reference that pertain to the research in architecture and associated disciplines, the findings represent a scholastic endeavour in its field.

**Keywords** Design, Architecture, Built environment, Research methods

**Paper type** Conceptual paper

### 1. Introduction

In today's rapidly transforming academia, knowledge construction, production and reproduction are increasingly valued and are now regarded as salient qualities of research processes that examine environmental and societal challenges facing the built environment and that seek opportunities those challenges create. Thousands in architecture and allied disciplines worldwide are involved in research activities on a routine basis. They have chosen their careers to construct and cultivate diverse forms of knowledge on contemporary thematic issues of interest to the academic and professional communities. Nonetheless, except for a few undertakings (Franz, 1994; Groat and Wang, 2002; Preiser *et al.*, 2014; Lucas, 2016), there has been a glaring dearth of cognisance of the key characteristics, philosophical positions and frames of reference that pertain to methodological research in architecture and associated disciplines together with a scarcity of the scholastic endeavours involved in remedying this. Consequently, recent concerns about the recognition of what constitutes methodological research in architecture within higher education present new opportunities for academics and professionals to strengthen their understanding of research, its relationship with pedagogy and professional practice, and its overall role in advancing knowledge that genuinely benefits architecture and built environment professions.



There have been, and still are, continuous debates within architecture and allied disciplines about the role, nature, attributes of research. Discussions among academics and professionals suggest that architects and other design and built environment professionals seem to be at odds. While many still think of researchers as individuals in white smocks and thick glasses searching for the inscrutable and the mysterious, others present clouding arguments about the role and essence of research. This is associated with a growing but confusing body of knowledge that explicitly raises the question of “what is architectural research” or “what is architectural design research” but does not offer much other than blurry answers. Bryan Lawson (2015) made a very perceptive argument about one of the recent contributions in the field: “*Design Research in Architecture: An Overview*,” edited by Murray Fraser (2013): “This is certainly an interesting and stimulating read and it offers a fascinating glimpse of the personal development of many of its authors. It represents a strong set of beliefs that design and research can be intertwined but it remains confused and muddled about the central questions. It is a shame the authors feel the need to focus exclusively on architecture. At times one gets the feeling that this book is really about architecture and ways of seeing and promoting it rather than about either design or research. Unfortunately the total result is a confusing mishmash that is insufficiently disciplined and rigorous to further progress research in design” (Lawson, 2015, p. 129). This, in essence, reflects the reality of the current state of affairs with respect to many of the writings on architectural or design research.

This paper attempts to decipher methodological research in architecture and allied disciplines on a more strategic and conceptual basis. Building on the earlier contributions of Franz (1994), Groat and Wang (2002), and the author’s own research and writings on the role of research in architectural and design pedagogy (Salama, 1998, 2008, 2012, 2015), the paper constructs a conceptual understanding of research. Ontological and epistemological interpretations are utilised for examining three key philosophical positions: positivism, anti-positivism and emancipationist. Reviewing classical writings and more than hundred contributions in architectural and design research, six frames of reference were identified: systematic, computational, managerial, psychological, person–environment type-A and person–environment type-B. Accentuated by these frames of reference, technically oriented research (TOR) and conceptually driven research (CDR) were categorised as perspectives of inquiry, which were scrutinised and their developmental aspects were explored. By mapping the philosophical positions to the frames of reference, various characteristics and spheres of inquiry within each frame of reference were revealed. Additional spheres of inquiry were inferred as branching various frames of reference, but mainly from the person–environment frame of reference: traditional dwellings and settlements research, quality of urban life research, and educational and pedagogical research. The study concludes with a number of qualities that depict an overall understanding of methodological research in architecture and allied disciplines.

## 2. Philosophical positions/systems of inquiry

While discussing the very few efforts on methodological research in architecture and allied disciplines goes beyond the scope of this analysis, it is important to refer to the classical work of Groat and Wang (2002), which calls for the need to understand research methodologies hierarchically with respect to systems of inquiry/paradigms, strategies and tactics. This is a very insightful proposition and can be regarded as a response to the inherited tendency of researchers in architecture and allied disciplines to blur or confuse methodologies and systems of inquiry at a strategic level with methods, tactics and tools at an operational level. Groat and Wang propose a ‘cluster of systems of inquiry’ or paradigms as an integrative framework for research, drawing on contributions from methodological studies in architecture and the social sciences. In this context, the systems of inquiry can be articulated based on three philosophical positions.

Following ontological and epistemological interpretations, two important philosophical positions can be examined to better understand the diverse nature of research in architecture and allied fields: positivism and anti-positivism. Ontology is the branch of metaphysics that deals with the nature of reality, while epistemology is the branch of philosophy that examines the nature of knowledge (OED, 2012), its foundation, extent and validity; it examines the way in which knowledge about a phenomenon can be acquired, conveyed and reproduced. Positivism and anti-positivism can be interpreted ontologically and epistemologically as they relate to the built environment (Salama, 2015). For architecture and allied disciplines, how these two positions are translated into a practical understanding of built environment research remains a conceptual challenge.

Positivism, as it relates to ontology, adopts the premise that objects of sense perception exist independent of the researcher's mind: this means that reality is understood to be objective. Epistemologically, positivism views knowledge as being independent of the observer, as objectively verifiable. Positivists believe that the best way to learn about a phenomenon is by the discovery of universal laws and principles. Thus, in positivist thought, the built environment is examined by the researcher as an objective reality with components and parts that everyone can observe, perceive and agree upon. Consequently, adopting positivism is exclusionary as it leads to the suppression of multiple viewpoints, thoughts and voices.

In a stark contrast, anti-positivism, as it relates to ontology, predicates the notion that universal laws and principles do not exist outside of the researcher's mind. In other words, people as individuals and as groups perceive reality differently and that these perceptions are both equal and legitimate. Epistemologically, anti-positivism adopts the understanding that although individuals and groups acquire different types of knowledge about the same phenomenon, the variances are regarded as valid and important mechanisms for mutual acknowledgement (Salama, 2015).

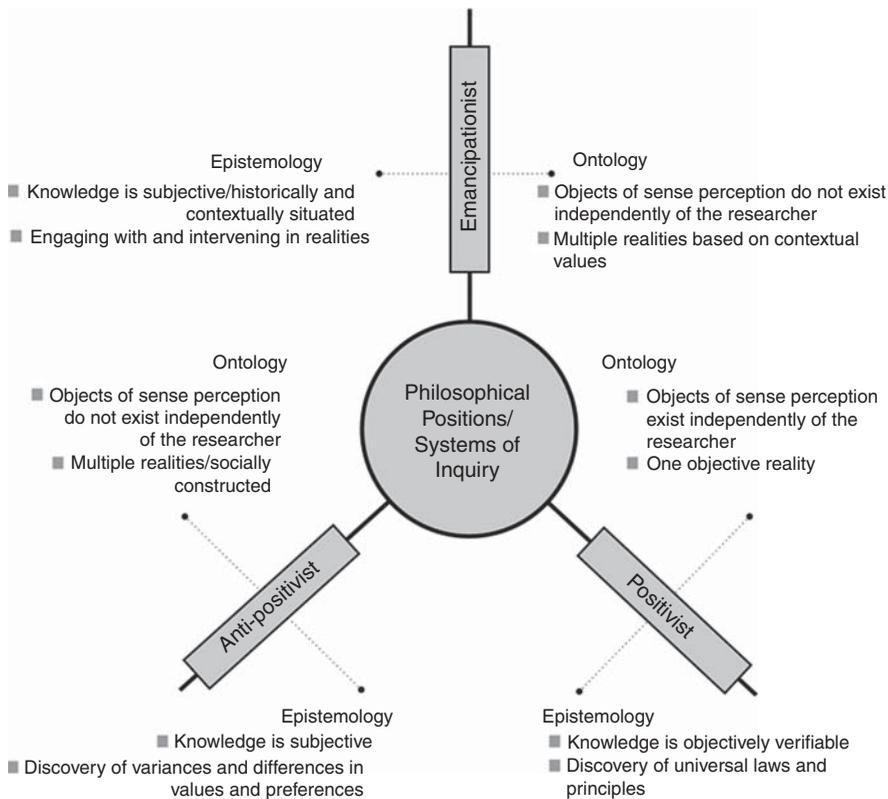
Drawing from critical writings in the social sciences (Denzin and Lincoln, 2000; Lincoln *et al.*, 2011), Groat and Wang (2002) introduce a third position; emancipationist as the most recent position, which, similar to the anti-positivist, covers several emerging research methodologies. Ontologically, emancipationists adopt the view that there are multiple realities that are shaped by the full spectrum of contextual values including social, political, cultural, economic, ethnic, gender and disability aspects. Epistemologically, knowledge is historically and contextually situated where researchers are active participants, not only discovering and analysing realities, but also engaging with and intervening in these realities. The understanding of the preceding three philosophical positions within ontological and epistemological interpretations should be an imperative for starting any research activity (Figure 1).

### 3. Perspectives and frames of reference

Methodological research in architecture and design has been examined in an article published in the mid-1990s by Jill Franz (Franz, 1994). Although the context and content of Franz's categorisation have evolved significantly since it had been developed 25 years ago, certain aspects of the classification skeleton seem to be still valid and soundly inclusive. Underscored by explicit frames of reference, TOR and CDR are two perspectives of inquiry in architecture and allied disciplines and are pertinent to the scope of this analysis.

#### 3.1 *Technically oriented research (TOR)*

Three "frames of reference" appear to characterise the TOR. These are: the systematic, the computational and the managerial. In essence, TOR places emphasis on the process and procedures as the primary basis of effective design (Franz, 1994). Within the systematic frame of reference, the supremacy of consumerism and industrialisation during the 1950s



**Figure 1.**  
Philosophical positions for research in architecture and allied disciplines

resulted in perceiving design knowledge as essential for improving production, developing processes to suit intended qualities in the end product, and implementing designs to accommodate users' needs. Architecture and allied design and built environment disciplines considered "performance" as a goal, leading to a sustained quest by design researchers to make the design process more efficient and effective (Hensel, 2010). Consequently, during the following decades and up to the late 1980s, a "rational" approach to knowledge acquisition, assimilation and accommodation in a systematic design process has dominated design discourse. The works of Alexander (1964), Markus (1972), Broadbent (1973), Sanoff (1977) and Cross (1984) represent principal thinking and examples of the systematic application of technique which instigated a design research culture that advocated a more explicit and transparent design process though underpinned by a linear conception of designing.

While they have evolved relatively in parallel, the systematic frame of reference seems to have paved the road for the computational frame of reference. Researchers viewed designing as a process amenable to depiction into decomposable components, represented numerically, and interpreted and administered by a computing machine and software. The computational frame of reference stemmed from research and theoretical foundations which include cognitive science, expert systems and artificial intelligence (Whitehead and Eldars, 1965; Eastman, 1969; Maver, 1971; Newell and Simon, 1972; Mitchell, 1979). The works of Mitchell (1979, 1990), Gero (1983) and Gero and Maher (1993) demonstrate well-recognised achievements on the utilisation of systems thinking and machine learning

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in design that drifted into two directions. The first is computer aided design (CAD), which aimed at improving the efficiency of processes and products, and the second is knowledge-based design which entailed the understanding of design as a heuristic research process that fostered designers' knowledge of the relationship between potential solutions and performance requirements. These efforts led to the recently developed building information modelling/management (BIM) approach to design (Sacks *et al.*, 2018), which is now used as part of research on the application of the information and communication technologies in design and construction and is adopted as a necessary tool for practice within built environment professions (Kumar, 2015, 2018).

Notably, the systematic and computational frames of reference have gained significant interest within the design research community for several decades as evident in the surge of published research. However, in comparison, the managerial frame of reference does not seem to have attracted the same level of attention given the available body of knowledge in this area. In it, research is centred on the examination of the nature of architectural services, design teams, office management within an architectural practice and project delivery processes. It also involves investigating various aspects of the profession, its position within other design and built environment professions, and the way in which it is perceived by society. The works of Burgess (1983), Akin (1987), Gutman (1975, 1988), Cuff (1991) and Sanoff (1992), and more recently of Fisher (2006, 2010), Awan *et al.* (2011), Till (2013) and Brown *et al.* (2016), represent important examples that scrutinise ways in which contemporary practices can be more responsive to the demands placed on the profession by the society. Likewise, recent research raises questions about the role and types of research utilised within professional practice (Dye, 2014 and Samuel and Dye, 2015).

### 3.2 *Conceptually driven research (CDR)*

Vital to the CDR perspective, two primary frames of reference are explored. The first is a psychological frame of reference, and the second is a person–environment frame of reference. Embracing the psychological frame of reference, design researchers incline to espouse the belief that designing is a process that involves three key qualities. As a “rational” process, it encompasses information processing across various developmental phases, as a “constructive” process it builds on knowledge generated from past experiences, and as a “creative” process it utilises conjectural reasoning (Lawson, 1980; Heath, 1984; Rowe, 1987). In this respect, research is driven by the goal of matching knowledge with the nature of the design problem, its components, context and social and environmental requirements. According to Franz (1994), research focussing on the nature of design problems (Rittel and Webber, 1973), problem definition and solution generation (Simon, 1973; Wade, 1977), and design knowledge (Thomas and Carroll, 1979; Goldschmidt, 1989) reflects endeavours that accept the linear approach of problem solving (Akin, 1986), which perceives people and objects as isolated entities within the design/research process. However, the recent work of Goldschmidt (2014) introduces linkography as a new method for the notation and analysis of the creative process in design, which adopts a “good-fit” approach, drawing on insights from design practice and cognitive psychology.

Within person–environment frame of reference, design researchers place emphasis on the socio-cultural and socio-behavioural factors as they relate to the design process itself and to settings, buildings and urban environments. The increasing awareness of social reality and the growth of community-driven programmes during the 1970s generated interest in collaborative and democratic design processes. Sanoff's (1978, 1984) simulation games, Lawrence's (1987) environmental models and Hamdi's (1990) enabling mechanisms are pioneering examples of how social, cultural, and behavioural issues are investigated within the design process. Aligning with the notion of collaboration in design, researchers focussed on the development of arguments, models, methods and tools (Hester, 1990) that

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could support client/user engagement in the design process. While Sanoff (2000, 2010) continues to pursue his quest for collaborative design research practices following his previously established approach, other scholars, in other contexts, attempt to unfold social and political aspects of the built environment and the way that the future users may shape it (Blundell-Jones *et al.*, 2005) interrogating issues that pertain to how architects can best enhance their partnership with users and the wider society to deliver responsive environments (Jenkins and Forsyth, 2009). In essence, underpinned by the belief that reality for an individual is socially and politically constructed and is primarily determined by social and cultural norms – what is unique in the collaborative approach is the sharing of values and acting collectively on knowledge about how requirements can be achieved and how needs can be met.

Another primary form of research within the person–environment frame of reference places emphasis on the meaning of place and the nature of the user in relation to physical, social and cultural environments. It acknowledges the crucial need for broader inter-disciplinary and trans-disciplinary approaches to inquiry. The work of environment–behaviour studies/research community (EBS/EBR) represents this form of research that has expanded significantly as part of two important organisations: Environmental Design Research Association (EDRA) which operates mainly within the North American context, and the International Association for People-Environment Studies (IAPS) which operates in Europe. Established in 1969 and 1981 respectively, both organisations continue to generate interdisciplinary research that places emphasis on the investigation of user requirements and is conducted by sociologists, environmental psychologists, social psychologists and design professionals (Shin *et al.*, 2017; IAPS, 2018).

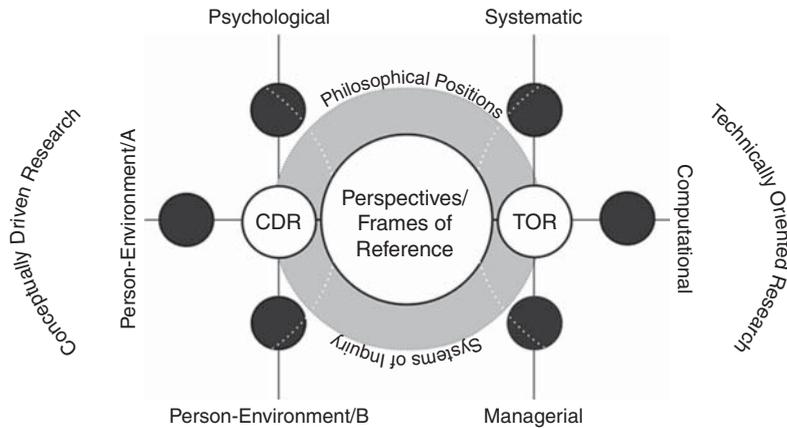
Integral to the person–environment frame of reference research aims at understanding the complexity of human behaviour within the built environment from an experiential standpoint. Examples include examining the psychological factors of place (Canter, 1974, 1977), the reciprocal relationship between culture and environment (Altman and Chemers, 1980), place identity and how it is influenced by feelings and behaviours within certain physical settings (Proshansky, 1990), and the meaning and influence of culture on the built form (Rapoport, 1969, 1977, 1990); an area of research that has gain continuous interest (Rapoport, 2005, 2008). Other areas of research involve examination of social life in urban space (Whyte, 1980), environmental perception, experiential aesthetics, visual research methods (Nasar 1988 and Sanoff, 1991) and wayfinding in complex environments (Passini, 1992; Cooper, 2010), to name a few.

The associated practical repercussions of the person–environment research were materialised in two areas of design research that focus exclusively on users and are viewed as fundamental to the design process, while offering the opportunity for a better-informed decision making on future built environments; programming (Preiser, 1985; Hershberger, 1999) and post-occupancy evaluation (POE) (Marcus, 1972; 1985; Preiser *et al.*, 1988). Research within the person–environment frame of reference applies various tools which stem from social and psychological sciences including archival documentation, attitude surveys, focused and semi-focused interviews, participant and nonparticipant systematic observation, and cognitive and behavioural-mapping techniques.

#### **4. Emerging spheres of inquiry within TOR and CDR**

The preceding conceptual analysis enables a comprehensive, yet inclusive, understanding of methodological research in architecture and allied disciplines. While the analysis discerns TOR and CDR as two distinct perspectives together with their frames of reference (Figure 2), assessing the developments within these perspectives is a separate research exercise on its own. Nevertheless, looking at the recent landscape of academic and professional research certain spheres of inquiry can be perceived as developments of the TOR and CDR.

**Figure 2.**  
Perspectives and frames of reference within methodological research in architecture and allied disciplines



#### 4.1 Developments in technically oriented research (TOR)

The systematic frame of reference does not seem to have developed as a distinct research area beyond the 1990s. The recent body of knowledge, however, suggests that the computational frame of reference has advanced dramatically into a clear sphere of inquiry that demonstrates the renewed interest in virtual reality to visualise, understand, and articulate data to enhance planning, design and construction decisions (Whyte and Nikolic, 2018). This involves a spectrum of sub-areas ranging from CAD/BIM modelling to virtual and augmented reality and from immersive visualisation to the development of virtual platforms for heritage preservation (Goulding and Rahimian, 2015; Abdelmonem, 2017).

The systematic and computational frames of reference appear to have merged into two growing areas of research. The first pertains to environmental sustainability in buildings and environments, as evident in the annual conferences of Passive and Low Energy Architecture organisation and Architectural Science Association. Both are evidently focussing on making the discipline more scientific. This sphere of inquiry includes empirical, experimental and simulation-based investigations, utilising advances in information technologies in developing new insights into passive and climate design, thermal comfort, energy efficiency, low carbon design, daylighting and indoor environmental quality within design processes and for the development of new knowledge within academic research (Zuo *et al.*, 2016; Roaf *et al.*, 2017; de Dear *et al.*, 2018). The second is concerned with Space Syntax approach to forecasting planning and design implications. It incorporates mathematical and configurational techniques utilising computers for the analysis of spatial configurations while enabling architects and urban designers and planners to simulate socio-physical impacts of their designs and plans with a focus on spatial integration, centrality, connectivity and accessibility (Hillier and Hanson, 1984; Hillier, 2015).

The critical nature of research and writing within the managerial frame of reference appears to continue to lessen interest in this area where scholars seem to avoid assessing and criticising the profession and its organisations. This is despite the significant influence of its advocates in attempting to revolutionise the profession and to develop new modes of architectural practice in various ways but with a clear focus on social and political contexts within which the profession operates. The managerial frame of reference, however, has expanded beyond the profession of architecture to clearly advance new spheres of inquiry in integrated design and construction practices, design management, facility management, project lifecycle management and sustainable

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construction (Anumba, 2005; Emmitt *et al.*, 2009). Yet, within conventional academic and professional circles in architecture and design fields, these areas are valued as completely different spheres of inquiry that are related more to engineering but not germane to architecture and urbanism.

#### 4.2 *Developments in conceptually driven research (CDR)*

Similar to the systematic frame of reference, the psychological frame of reference has not progressed into a contemporary research trend given the scarcity of writings in this field. Yet, recent contributions suggest that while not a mainstream sphere, it remains essential given the quality of the leading journal in this area: *Design Studies*, and the birth of the new journal, *Design Science*, though not exclusive to architecture and built environment studies. As a sphere of inquiry it maintains interest in cognition, visual and creative thinking in design, and the way in which designers reason and generate concepts and ideas (Casakin and Kreitler, 2011; Goldschmidt, 2014; Cross, 2016; Oxman, 2017; Darbellay *et al.*, 2018).

The person–environment frame of reference, focussing on collaboration and engagement with users and communities as part of an action design/research process seems to have developed into a distinct sphere of inquiry directly linked to professional practice. This is evident in the recent writings of its pioneers, coupled with interests of governments and local authorities in engaging with communities in regenerating old city centres or shaping new residential communities. It is also manifested in the rising interest of a considerable number of architectural firms to work closely with client groups, as well as in the annual conferences of the Association for Community Design; an organisation committed to increasing the capacity of planning and design professions to better serve communities. The surge of interests in action and collaborative research is palpable in recent writings that articulate cases of and offer guidance on how architects, urban designers and planners can genuinely engage with communities (Malone, 2018; Norton and Hughes, 2018).

With a focus on users and communities in relation to the physical, social and cultural worlds, the person–environment frame of reference maintains its solid foundation on the initial set of themes in the psychology of place, place identity and attachment and the reciprocal relationship between cultural and behavioural factors and built form as evident in the research work of the EBS/EBR community. New themes have emerged over the past two decades to include resilience, social equity, healing environments, therapeutic landscapes and dynamic interactions of environment–behaviour and neuroscience. Older and new themes were applied to various environments ranging from small settings and interior spaces to different types of learning of environments, workplaces and nursing homes, and from small urban spaces to neighbourhoods and cities. The accompanying practical ramifications of the person–environment frame of reference have also developed into new areas. In particular, evidence-based design (Hamilton and Watkins, 2009), and POE which has developed into a recognised sphere of inquiry, namely, building performance evaluation that extended beyond the exclusive focus on the user to address other relevant aspects including assessing energy use, usability, productivity, and functional, environmental, perceptual and social impacts (Bordass 2001; Bordass and Leaman, 2014; Duffy, 2014; Mallory-Hill *et al.*, 2012; Preiser and Nasar, 2008; Preiser and Vischer, 2012).

It can be argued that the person–environment frame-of-reference has supported the growth of social and cultural sustainability sphere of inquiry. On the one hand, cultural sustainability involves efforts to preserve the tangible and intangible cultural elements of society (Wessels, 2013). On the other hand, social sustainability involves various elements already adopted by EBS/EBR academics and professionals including democracy and governance, equity, socio-economic diversity, social cohesion and quality of urban life (James, 2015), which is treated as a growing sphere of inquiry on its own.

4.3 Mapping the frames of reference to the philosophical positions

The philosophical positions discussed earlier manifest ideological orientations of research while the frames of reference discern the guiding principles and spheres of inquiry. In this respect, it is important to conceptually relate these ideological orientations to the frames of reference, in order to characterise the attributes of research areas into features or types guided by the frames of reference and within overarching ontological and epistemological interpretations (Figure 3). Despite the clear distinctive qualities of these orientations, it should be noted that philosophical positions may alternate within a sphere of inquiry or a specific research activity depending on the research focus, the nature and context of the inquiry process, the type of environment and population under examination, as well as access to the information.

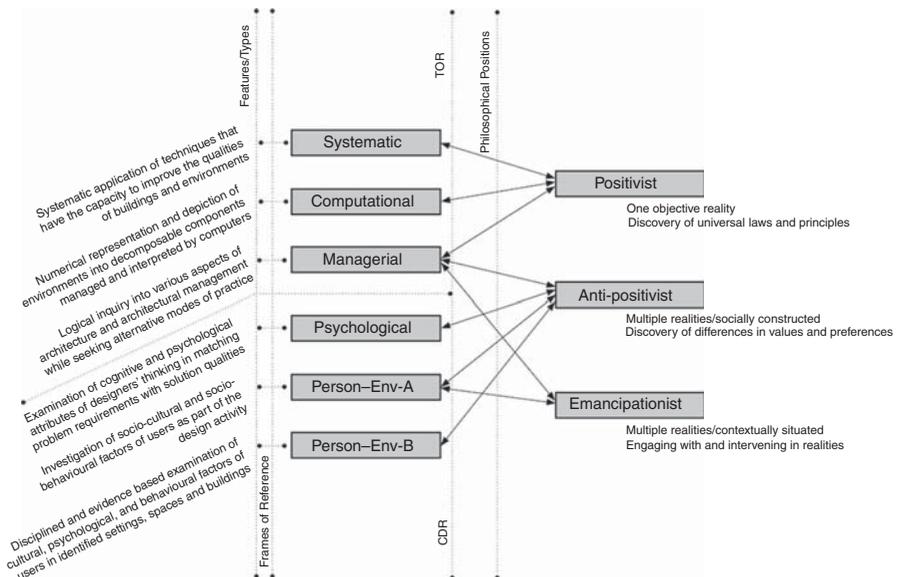
5. Expanding into growing spheres of inquiry

Arguably, research adopting the person–environment frame-of-reference has diverged into a number of spheres of inquiry that can be epitomised in three categories. The first two are traditional dwellings and settlements research and quality of urban life research. Although these areas involve various social, political, environmental, economic and historical dimensions people as individuals, groups and communities remain at the core of research within these areas. The third is educational and pedagogical research in architecture and built environment, which is unconventional in the sense of its acceptability as a growing sphere of inquiry. Due to the diversity of interests and themes within this category pedagogical research seems to be generated by various frames of reference, with a focus on learning, knowledge acquisition, assimilation, production and reproduction.

5.1 Traditional dwellings and settlements research

Over the past few decades, interest in traditional settlements research has become common among researchers within various disciplines including architecture, anthropology, art

Figure 3. Mapping frames of reference of methodological research in architecture and allied disciplines to philosophical positions/systems of inquiry



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history, geography, urban history and planning. This is evident in the biennial international cross-disciplinary conferences of the International Association for the Study of Traditional Environments, which was established in 1988 to act as an interdisciplinary platform for knowledge sharing on cross-cultural and inter-disciplinary understandings of these environments. This is coupled with the semi-annual, highly valued journal: *Traditional Dwellings and Settlements Review*, which publishes quality research findings. The organisation and its pioneers adopt the view that tradition is a dynamic concept for the reinterpretation of the past in light of the present (AlSayyad, 2014). Utilising various tools from the humanities and social sciences, among the areas explored are the ways in which built forms embodies cultural norms, informality, socio-spatial practices especially of minority groups, everyday urban environments, authenticity and the notions of imagined and manufactured heritages and traditions.

### 5.2 Quality of urban life (QoUL) research

While studies on the quality of life (QOL) have emerged in the 1960s and flourished in the 1970s involving the development of economic and social indicators (Pacione, 2003), the spatial dimension was introduced later. The urban element was added as a significant physical dimension within which the social and economic imperatives take place (UoUL). As a sphere of inquiry, it is concerned with the relationship between a person's QOL and their urban environment, which is complex and warrants measuring. This has encouraged researchers to develop QoUL models that articulate a wide spectrum of indicators that influence such a relationship; the development of models has become a subject of studies on its own (Marans and Stimson, 2011; Marans 2012). Research is undertaken at the urban and city scales and involves implementing a range of measurement tools that include trend analysis through census and archival records, satisfaction surveys, interviews and techniques derived from EBS/EBR. As an area of research it is embraced by governments and appears to occupy a key position within contemporary urban discourse.

### 5.3 Educational and pedagogical research

For many decades questioning the realities of architectural education and design studio pedagogy has been a taboo, un-debatable and incontrovertible. The roots of this sphere of inquiry started in the 1950s but with many writings epitomising fragmented and disconnected issues that were often dealt with either by subjective criticism or by undeveloped and even untried solutions. However, as a sphere of inquiry it has developed distinctively since the early 1990s (Anthony, 1991; Dutton, 1991; Teymur, 1992; Crinson and Lubbock, 1994; Salama, 1995). It addresses topical concerns that pertain to the goals, objectives, outcomes, structures and contents, as well as the instructional characteristics and delivery and assessment methods and techniques required for responsive and responsible architectural education. Writings from the late 1990s varied including the dynamics of architectural knowledge (Dunin-Woyseth and Noschis, 1998), responding to contemporary professional challenges (Nicol and Pilling, 2000), calling for a revisionist approach to pedagogy (Salama *et al.*, 2002), delving into a contemporary issues on decision-making, cognitive styles, place-making and digital technologies (Salama and Wilkinson, 2007), articulating cases and successful evidence-based strategies for future teaching practices (Harriss and Widder, 2014; Froud and Harriss, 2015; Salama, 2015). Emerging research is generating vigorous discussions in the literature. Yet, despite this growing interest in this sphere of inquiry, voluminous research and writings continue to be marginalised within the mainstream research (Salama, 2015) and, therefore, can be characterised as unconventional.

## 6. Conclusion

The aim of this paper was to contribute an inclusive insight into methodological research in architecture and allied disciplines and to unravel aspects that include philosophical positions, frames of reference and spheres of inquiry. Following ontological and epistemological interpretations, the methodology adopted involved conceptual and critical analysis which is based on reviewing and categorising classical literature and more than hundred contributions in architectural and design research developed over the past five decades which were classified under perspectives of inquiry and frames of reference. Hypothesised through three philosophical positions – positivism, anti-positivism and emancipationist – six frames of reference were identified: systematic, computational, managerial, psychological, person–environment type-A and person–environment type-B. Accentuated by these frames of reference, TOR and CDR were categorised as the perspectives of inquiry, which were scrutinised together with developmental aspects. By mapping the philosophical positions to the frames of reference, various characteristics and spheres of inquiry within each frame of reference were revealed. Additional spheres of inquiry were inferred as branching from the person–environment frame-of-reference: traditional dwellings and settlements research, quality of urban life research, and educational and pedagogical research.

An understanding of the three relatively contradictory philosophical positions is critical. Likewise, an identification of which position will be adopted is crucial when developing a research framework or starting a research activity. While it is imperative that positivistic approaches are valuable and may be used to discover and convey factual knowledge about various aspects of architecture and built environments, it is essential to acknowledge other aspects that affirm the validity of anti-positivist and emancipationist thinking. Consequently, adopting the more inclusive positions places emphasis upon the social, historical and contextual construction of reality: the values, abilities, preferences and lifestyles of the people who use, perceive, and comprehend the built environment. This validates the co-existence of multiple realities and the associated perceptions, and viewpoints.

The analysis of the frames of reference and sphere of inquiry suggests two distinct yet related types of knowledge in architecture and allied disciplines. The first type is knowledge resulting from research that seeks to understand the future through a better understanding of the past; research that tests accepted ideas. The second is knowledge resulting from research that probes new ideas and principles that will shape the future; research that develops new visions and verifies new hypotheses. Within the framework of these knowledge types, it is maintained that the primary objective of methodological research in architecture and allied disciplines is to investigate designs, buildings and built environments made by human beings – designers or non-designers. Implications can be inferred and articulated with respect to key qualities or concerns.

Methodological research in architecture and urbanism is concerned with:

- The systematic search and acquisition, assimilation and accommodation of knowledge related to design and design activity, how designers think, approach problems, develop solutions.
- The development of expressions, patterns, structures and their organisation into functional wholes.
- The physical representation of buildings and environments, how they perform in relation to who sees them and who uses them.
- What is achieved at the end of a focused planning or design process, how that which is achieved appears, and what it means to its users and the public at large.

- Design and construction processes as human activities, how designers work, how they collaborate with other experts, how they engage with users, how their work speaks to the public and how they carry out these activities.
- The systematic learning about the experiences of the past and how these experiences enable the construction of new knowledge.

While the findings developed within this paper enable a more focussed appreciation of methodological research in architecture and allied disciplines, which pertains to the relationship between an adopted philosophical position, a frame of reference and various characteristics of research approaches, further detailed examples can be developed to offer more discerning elucidations relevant to each frame of reference and the spheres of inquiry involved. Within the confines of the analysis provided, the study is viewed as a call for researchers to identify the unique particularities of their research and the way in which it is pursued.

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