A typology of designs for housing research: Improving methodological coherence of paradigm, approach and design

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Abstract

Housing research is interdisciplinary involving economics, geography, sociology, architecture, and urban planning and design. It relies strongly on the social and applied sciences, and is therefore subject to policy, theoretical and methodological shifts across these sciences, as well as societal and technological change. These shifts and changes necessitate an expansion and refinement of the traditional spectrum of research designs regarded applicable to housing research, and more careful consideration of concomitant epistemologies and methodologies. We review the methodological literature within housing research, assess the extent to which different designs feature in current housing research, and, using methodological paradigm and core logic as classification criteria, present an expanded and more nuanced typology of designs consisting of 11 prototypes and 42 subtypes. The prototypes include surveys and censuses, experiments, modelling and mapping, textual and narrative studies, field studies, case studies, participatory action research, mixed-method research, intervention research, evaluation research, and meta-research. The typology may serve as a framework for further methodological inquiry and as a heuristic map for researchers to be more creative and considered when designing housing research.

Keywords

epistemology; methodology; typology; research design; housing research

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Authors' contributions

Jacques du Toit outlined the article, conducted the literature review and served as first author. Mark Napier facilitated the author collaboration and proposed this article in response to an earlier conference proceeding by himself and Beth Crankshaw titled *Mapping housing research methods: Enhancing the link between research theory and methods in African housing studies*, as part of the Out-of-the Box Conference Proceedings, held on 24-25 October 2018 at the Council for Scientific and Industrial Research in partnership with the Department of Science and Technology, Pretoria, South Africa. Lochner Marais and Jan Cloete conducted the content analysis. All the authors contributed to the review and editing of the final manuscript.

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1 Introduction

Housing research is interdisciplinary involving, *inter alia*, economics, geography, sociology, architecture, and urban planning and design (Mathews 2016). From about the 1950s, much of housing research was commissioned and funded by governments and multi-lateral agencies, such as the UN-Habitat and World Bank, to help understand and solve social housing challenges (Malpass 1976; Pugh 1994; Pugh 2001; Cole 2006). During this period, housing research was characterised as mostly applied and policy-oriented, positivist in an empirical sense, and to some extent lacking in conceptual foundation (Clapham 1997; Kemeny and Lowe 1998; Jacobs and Manzi 2000). Housing researchers were also criticised for unwittingly satisfying the needs and demands of funders (Allen 2005). The apparent inability of early housing research to develop a more critical and coherent theoretical base can partly be attributed to its applied nature, wide scope, and the broad grouping of disciplines involved (Jacobs and Manzi 2000; Oxley 2001; Napier and Crankshaw 2018).

Despite its largely a-theoretical origins, from about the 1970s through to the early 2000s, housing research was championed by universities with centres for 'housing studies'[1] that offered courses and degrees at undergraduate and postgraduate level respectively. While academics and practitioners associated with such centres have attempted to clarify approaches to housing research to improve its methodological credibility (see, e.g., Tipple and Willis (1991), and Clapham et al. (2012)), the lack of a coherent theoretical base has arguably also contributed to methodological drift – borrowing research designs from the social sciences without due consideration of the spectrum of designs and concomitant epistemologies and methodologies that are actually applicable to housing research. While issues of discipline and theory remain, we argue that housing research may as yet in the current absence of a coherent theoretical base instead benefit from greater methodological coherence of paradigm, approach and design, i.e., research that is at least methodologically more defendable.

This overview of housing research raises the question as to what research designs apply to housing research, especially given rapid societal and technological change, and how to map these designs in a sensible framework. While social sciences methodology is evolving in response to societal and technological change, it appears less so in housing research. Social scientists occasionally develop frameworks and typologies to clarify research processes and methodologies (Leech and Onwuegbuzie 2009; Crowe and Sheppard 2012; Tobi and Kampen 2018). These frameworks and typologies help improve methodological rigour in the social sciences, but are often generic and may miss some of the methodological particularities of specific fields of study. This article therefore presents a typology of designs specifically for housing research that may serve as a framework for further methodological inquiry and as a heuristic map for researchers to be more creative and considered when designing housing research. We first review the methodological literature within housing research to consider methodological debates and to determine the current spectrum of designs regarded applicable to housing research. We then assess the extent to which different designs feature in current housing research, after which we present the typology.

2 The methodological literature within housing research

We reviewed two sets of literature, i.e., methodological texts or handbooks and methodological journal articles. We included articles with an intrinsic focus on methodology while excluding largely empirical articles reporting the application of a particular design or method. Sources were searched using a combination of keywords around 'housing' and 'research design'.

With regard to methodological texts, four texts were identified. The earliest, Vestbro et al.'s (2005) *Methodologies in Housing Research*, is an edited book with contributions by various authors. The book does not put forward a single definition or typology of research designs, but includes contributions on longitudinal surveys, modelling, visualisation, and diagnostic- and impact evaluations as possible examples of housing research more so than prototypical designs. It includes a specific focus on ethnography, phenomenology, single and multiple case studies and comparative case studies, but again as possible methods for housing research more so than prototypical designs. As its title suggests, Maginn et al.'s (2008) *Qualitative Housing Analysis; An International Perspective, Studies in Qualitative Methodology*, covers qualitative approaches and designs such as policy evaluation, collaborative and peer-led research (i.e., participatory action research (PAR)), grounded theory, and especially ethnography. *The International Encyclopedia of Housing and Home*, edited by Smith (2012), covers paradigms mostly associated with qualitative research, including symbolic interactionism, social constructionism, critical theory (critical realism) (Somerville 2012) and feminist research. Contributions, therefore, focus on concomitant qualitative designs such as discourse analysis, textual and linguistic analysis (hermeneutics) (Coolen 2012; Hastings 2012), 'house' biographies, (comparative) case studies (Oxley and Haffner 2012; Robertson 2012), ethnography and ethnomethodology (Luken 2012). Lastly, we included *The Sage Handbook of Housing Studies*

[1] The status of 'housing studies' as a discipline is debated (Allen 2009; Mathews 2016). For the purpose of this article we therefore refer to housing *research* rather than housing *studies*.

(Clapham et al. 2012). Although not a methodological text, a contribution on social constructionism, while in line with the general paradigmatic stance of the texts cited above, suggests a focus on qualitative research and concomitant designs such as textual, narrative and field studies.

While methodological texts or handbooks usually include an outline of research designs to present students and researchers with a spectrum of applicable designs in a field, the texts within housing research appear to focus on the application of specific approaches, designs or methods, rather than presenting prototypical designs along methodological criteria that are conceptually useful for housing research. The latter may be due to the four texts consisting of contributions by different authors. Still, none of the texts include introductory or concluding chapters in which designs are, for example, schematically organised into a framework such as a typology.

With regard to methodological journal articles, we found little in terms of post-positivist or quantitative designs, probably because quantitative research is already well-established in housing. Instead, as the dominance of post-positivist or quantitative research was questioned, articles appeared that argued for a social constructionist turn in housing research (Clapham 1997; Jacobs and Manzi 2000), that has more recently been reiterated (Jacobs et al. 2016). The notion that reality is socially constructed, especially through the use of language (Jacobs and Manzi 1996), drew more attention to housing policy as an object of inquiry and, in particular, discourse analysis as a more critical way to study housing policy (Hastings 2000; Marston 2002).

Despite the social constructionist turn, housing research was still criticised as undemocratic, and attention was drawn to the subjective experience of house dwellers using phenomenology (Allen 2009). Although epistemologically and methodologically different, quantitative designs such as surveys and even field-experiments may also capture experience, while PAR is actually meant to democratise research. PAR has recently been identified as a design that may inform public housing research and practice (Thurber et al. 2020). While phenomenology focuses on subjective experience and how people construct meaning and make sense of their life-worlds, ethnography, a field design originally associated with cultural anthropology, has also gained attention in comparative housing research (Ronald 2011; Stephens 2011), especially on homelessness (Hoolachan 2016), and community development (Blokland et al. 2008). Table 1 summarises the literature review in terms of possible classification criteria for a typology of designs for housing research and prototypical designs regarded applicable to housing research.

Table 1. Summary of the methodological literature review in housing research.

Possible classification criteria for a typology of designs for housing research	Some prototypical designs regarded applicable to housing research
Methodological paradigm (epistemology) Methodological approach (quantitative vs qualitative)	Longitudinal surveys Discourse analysis Biography Phenomenology Ethnography Case studies PAR

Three conclusions can be drawn from the summative review above: Firstly, the methodological literature in housing research, though rich, offers little in terms of an inclusive typology of designs applicable to current housing research that includes contextual (e.g., scientific vs practical), epistemological (e.g., post-positivist vs constructionist) and methodological (e.g., quantitative vs qualitative) diversity in the field. Secondly, considering that many of the designs raised in the literature are discussed in terms of their concomitant epistemologies, it suggests the importance of epistemology or methodological paradigm as classification criterion. Thirdly, with the exception of some literature, for example, Ntema and Marais' (2013) argument for longitudinal surveys to track the

change in low-income housing outcomes, most of the literature argues for qualitative or participatory designs. Given the review, and notwithstanding an established post-positivist and quantitative tradition in housing research that would include surveys, experiments, modelling, and some forms of evaluation research, we infer from the literature that the following prototypical qualitative and participatory designs should at least be included in a typology: discourse analysis, biography, phenomenology, ethnography, (comparative) case studies, and PAR.

3 Towards a typology of designs for housing research

3.1 Assessing the extent to which different designs feature in current housing research

The first step was to consider the extent to which different designs feature in housing research. While social science methodologists present different typologies that are usually based on the control of variables or a quantitative-qualitative split, we used as a point of departure Du Toit and Mouton's (2013) typology of designs for social research in the built environment. Defining 'research design' as a logical plan to maximise the validity of findings and distinguishing between designs on the basis of unique core logics or compact formulas (see also De Vos et al. (2011)), Du Toit and Mouton identify ten prototypical designs, including (1) surveys, (2) experiments, (3) modelling and mapping, (4) textual and narrative studies, (5) field studies, (6) case studies, (7) intervention research, (8) evaluation research, (9) PAR, and (10) meta-research. Each of these is divided into subtypes (e.g., cross-sectional vs longitudinal surveys) to yield a total of 25 subtypes. The 25 subtypes can be divided further into various specialised subtypes (e.g., longitudinal surveys are divided into cohort, panel or tracer studies (Du Toit 2015). The 25 subtypes, however, were used as a denominator for a methodological content analysis to determine the extent to which these designs feature in current housing research.

We sampled the five journals from the main list of the *Web of Science* with the term 'housing' in the title. These included, in alphabetical order, (1) *Housing Policy Debate*; (2) *Housing Studies*; (3) *Housing, Theory and Society*; (4) *Journal of Housing and the Built Environment* and (5) *Journal of Housing Economics*. Covering both quantitative and qualitative research, these journals formed a reasonably representative sample of the breadth of different methodologies used in housing research. A total of 339 full-length articles published in 2018 were sourced from the five journals, excluding editorials, commentaries and notes (N = 339). It should be noted that the sample is not necessarily meant to be representative of all housing research and that *Web of Science* journals may exclude some research from for example younger researchers and the global south. Although findings from the content analysis are quantified, the sample is meant to determine if there is sufficient correspondence between the designs in the Du Toit and Mouton typology and those featured in current housing research in order to decide whether to build upon the Du Toit and Mouton typology.

Two of the authors reviewed the titles, abstracts, keywords and methodology sections for each of the 339 articles independently and coded each study's design in terms of one or more of the 25 subtypes from the Du Toit and Mouton typology. The two coders then discussed any differences in their classifications to agree on a final classification. Table 2 summarises the methodological content analysis in terms of the number of articles per journal, the total number of subtypes classified, the average number of subtypes per article, and the percentage concurrence between the two coders' initial classification as a measure of inter-coder reliability.

Table 2. Summary of the methodological content analysis of housing research.

Journal	Number of articles	Number of research design subtypes classified	Average number of research design subtypes per article	Concurrence on all research designs classified	Concurrence on at least one research design classified
Housing Policy Debate (HPD)	55	75	1.4	37%	51%
Housing Studies (HS)	110	163	1.5	48%	66%
Housing Theory & Society (HT&S)	34	44	1.3	22%	41%
Journal of Housing & the Built Environment (JH&BE)	91	142	1.6	44%	64%
Journal of Housing Economics (JHE)	49	55	1.1	76%	86%
TOTAL	**339**	**479**	**1.4**	**46%**	**63%**

Table 2 shows that from the total of 339 articles, a total of 479 research design subtypes were classified. Thus, several articles, especially in *Housing Studies* and *Journal of Housing and the Built Environment*, reported research based on multiple designs, for example, studies with more than one research question covered by different designs, or with overlapping research designs, for example, case studies or evaluations consisting of subcomponents each with a different design. This multiplicity resulted in an average of 1.4 designs per article. While concurrence was strongest for the *Journal of Housing Economics*, in which many articles are simply based on modelling, concurrence was weakest for *Housing, Theory and Society* and *Housing Policy Debate*. Articles in the latter generally have substantial theoretical depth and report more complex research designs. Here, the designs of several studies had to be confirmed during the post-classification discussion. Table 3 shows the extent to which the different prototypes and subtypes feature across each of the five journals, and Table 4 shows each subtype coupled with an exemplary article from the content analysis. .

Table 3. Extent to which different research design prototypes and subtypes feature in housing research.

Research design		Counts per journal					TOTAL	%
Prototypes	**Subtypes**	***HPD***	***HS***	***HT&S***	***JH&BE***	***JHE***		
Surveys	Cross-sectional surveys	2	8	2	20	0	32	6,7
	Longitudinal surveys	2	0	0	0	1	3	0,6
	Subtotal	***4***	***8***	***2***	***20***	***1***	***35***	***7,3***
Experiments	True experiments (aka laboratory experiments)	2	2	0	0	0	4	0,8
	Quasi-experiments (aka field/natural experiments)	1	0	0	1	0	2	0,4
	Subtotal	***3***	***2***	***0***	***1***	***0***	***6***	***1,3***
Modelling and mapping	Modelling; Simulation	26	41	3	34	47	151	31,5
	Mapping; Visualisation (including space syntax)	2	5	0	5	4	16	3,3
	Subtotal	***28***	***46***	***3***	***39***	***51***	***167***	***34,9***
Textual and narrative studies	Content/textual analysis	1	3	1	2	0	7	1,5
	Discourse/conversational analysis	0	5	1	0	0	6	1,3
	Historiography; Biography	2	4	1	0	0	7	1,5
	Subtotal	***3***	***12***	***3***	***2***	***0***	***20***	***4,2***
Field studies	Ethnography (aka participant observation)	3	4	0	2	0	9	1,9
	Phenomenology	5	22	7	9	0	43	9,0
	Subtotal	***8***	***26***	***7***	***11***	***0***	***52***	***10,9***
Case studies	Single/multiple case studies	7	21	8	30	0	66	13,8
	Comparative case studies	7	6	1	9	0	23	4,8
	Subtotal	***14***	***27***	***9***	***39***	***0***	***89***	***18,6***
Intervention research	Site/settlement analysis and assessment	1	0	1	9	0	11	2,3
	Plan/policy analysis and assessment	11	22	3	14	0	50	10,4
	Subtotal	***12***	***22***	***4***	***23***	***0***	***61***	***12,7***
Evaluation research	Diagnostic/clarificatory evaluation (aka *ex ante* evaluation)	0	0	0	0	0	0	0,0
	Implementation evaluation; Programme monitoring	0	0	0	0	0	0	0,0
	Outcome/impact evaluation (aka *ex post* evaluation)	1	3	0	0	2	6	1,3
	Subtotal	***1***	***3***	***0***	***0***	***2***	***6***	***1,3***
Participatory action research (PAR)	Technical/scientific/collaborative PAR	0	0	0	0	0	0	0,0
	Practical/mutual and/or deliberative PAR	0	0	0	1	0	1	0,2
	Emancipating/enhancing/critical science PAR	0	0	0	0	0	0	0,0
	Subtotal	***0***	***0***	***0***	***1***	***0***	***1***	***0,2***
Meta research	Literature reviews; Research synthesis	2	0	4	0	1	7	1,5
	Conceptual analysis	0	0	2	1	0	3	0,6
	Typology/model/theory construction	0	8	1	5	0	14	2,9
	Philosophical/logical/normative argumentation	0	9	9	0	0	18	3,8
	Subtotal	***2***	***17***	***16***	***6***	***1***	***42***	***8,8***
TOTAL		**75**	**163**	**44**	**142**	**55**	**479**	**100.0**

Table 4. Research design subtypes coupled with an exemplary article from the content analysis.

Research design subtypes	Exemplary article title (with journal in brackets)
Cross-sectional surveys	*Governing comfort in France: from hygienism to sustainable housing XXth–XXIst century (HS)*
Longitudinal surveys	*The growth of control? Changes in local land-use regulation in major U.S. metropolitan areas from 1994 to 2003 (HPD)*
True experiments (aka laboratory experiments)	*Examining housing discrimination across race, gender and felony history (HS)*
Quasi-experiments (aka field/natural experiments)	*Visitor support for growth and funding in public built environments: the case of an arboretum (JH&BE)*
Modelling; Simulation	*Parents' housing careers and support for adult children across Europe (HS)*
Mapping; Visualisation (including space syntax)	*The impact of flood risk on the price of residential properties: the case of England (HS)*
Content/textual analysis	*The social structure of mortgage discrimination (HS)*
Discourse/conversational analysis	*House price inflation in the news: a critical discourse analysis of newspaper coverage in the UK (HS)*
Historiography; Biography	*At home in home care? Contents and boundaries of the 'domestic' among immigrant live-in workers in Italy (HS)*
Ethnography (aka participant observation)	*Housing rites: young people's experience of conditional pathways out of homelessness (HS)*
Phenomenology	*'They took the land, now we're fighting for a house': Aboriginal perspectives about urban housing disadvantage (HS)*
Single/multiple case studies	*Reproducing housing commons. Government involvement and differential commoning in a housing cooperative (HS)*
Comparative case studies	*Assessing social quality of sheltered independent housing: challenges of scale and group mix (JH&BE)*
Site/settlement analysis and assessment	*Talking while walking: an investigation of perceived neighbourhood walkability and its implications for the social life of older people (JH&BE)*
Plan/policy analysis and assessment	*Welfare through regulatory means: eviction and repossession policies in Singapore (HS)*
Diagnostic/clarificatory evaluation (aka *ex ante* evaluation)	None identified.
Implementation evaluation; Programme monitoring	None identified.
Outcome/impact evaluation (aka *ex post* evaluation)	*Achieving economic self-sufficiency through housing assistance: an assessment of a self-sufficiency program of the Housing Authority of Champaign County, Illinois (HPD)*
Technical/scientific/collaborative PAR	None identified.
Practical/mutual and/or deliberative PAR	*Community participation as a tool for conservation planning and historic preservation: the case of "Community As A Campus" (CAAC) (JH&BE)*
Emancipating/enhancing/critical science PAR	None identified.
Literature reviews; Research synthesis	*Confronting urban crisis and opportunity in the 1990s: An insiders' view on how Fannie Mae's housing research helped reset policy and remade cities (HPD)*
Conceptual analysis	*Homelessness as capability deprivation: a conceptual model (HT&S)*
Typology/model/theory construction	*Kemeny revisited: the new homeownership-welfare dynamics (HS)*
Philosophical/logical/normative argumentation	*The politics of "parental co-habitation": austerity, household, and the social evils of dependency (HT&S)*

Table 3 shows that modelling and mapping is the most used prototype, making up almost 35% of all designs, particularly in the *Journal of Housing Economics*, which included 51 modelling and mapping classifications based on only 49 studies. The prominence of modelling reflects the important role of economists in housing research. The increasing availability of secondary datasets following significant investments by governments in longitudinal household surveys over the last few decades probably contributes to the relatively large percentage of modelling and mapping. In turn, the availability of private and public institutional datasets offering secondary data may also contribute to the relatively small percentage of surveys (about 7%). The prominence of existing datasets suggests the need to adapt the original Du Toit and Mouton typology to include designs based on secondary research.

Case studies is the second most used prototype, making up almost 19% of all designs. Geographers, in particular, use case studies. Although Kemeny and Lowe (1998) argued that comparative housing research had become a major field of study, comparative case studies make up only about a quarter of all case research.

Considering that 12% of articles reported government-commissioned research and 28% reported funded research, policy analysis was understandably the third most used subtype, making up about 10% of all designs. As pointed out above, housing policy research has been described as a-theoretical (Kemeny 1992). While the relationship between theory and method is beyond this article, and although the content analysis did not seek to assess the theoretical depth of policy research, a typology may well acknowledge the largely applied or practical context of policy research. Hammersley (2000 p. 227) prefers the term ‘practical’ and identifies the aim of practical research to “provide knowledge that will be of immediate practical use”, with the audience as “practitioners, policymakers and others who have a practical interest” in the research. While such acknowledgement does not legitimise a-theoretical research, it does, however, allow scope for practical research. The role of theory may be more indirect or at least different compared to scientific research. Lastly, phenomenology also stood out at 9%, highlighting the normative turn towards constructionism.

Experiments, evaluations (both 1.3%) and PAR (0.2%) are the least used prototypes. The lack of experiments reflects the critique of a-theoretical research, particularly research that may otherwise have theorised causality or change. While the lack of evaluations, especially impact evaluations, is perhaps surprising considering that government-commissioned research typically involves monitoring and evaluation, the practical nature of evaluations probably limits journal exposure. Again, theorising evaluations may help to increase journal exposure. Considering the normative turn towards critical realism and participatory forms of research in the methodological literature within housing, and considering the emancipatory aims of pro-poor housing research, the lack of PAR is surprising. Yet, other built environment fields, such as architecture and urban planning and design, equally lack PAR (Du Toit and Mouton 2013). Clearly there is a need for a typology to explicate the role and different types of PAR *vis-à-vis* other designs.

The content analysis revealed little in terms of novel prototypes in response to rapid changes in information and communication technologies (ICTs). Only six studies used social media for data collection. A few studies reported innovative methods around data collection and analysis, including an online experiment and analyses of emails and data from digital applications.

To conclude, all of the subtypes from the Du Toit and Mouton typology, except for certain subtypes of evaluation and PAR, feature in current housing research reported in the sampled journals, suggesting a reasonable fit between the spectrum of designs in the Du Toit and Mouton typology and those featured in actual housing research. The spectrum of designs shows housing research to be methodologically diverse yet balanced. Based on insigHT&S from the literature review and content analysis, we adapt the original Du Toit and Mouton typology to construct an expanded and more nuanced typology of designs for housing research.

3.2 Constructing a typology of designs for housing research

Table 5 shows a newly constructed typology of designs for housing research.

Table 5. A typology of designs for housing research.

Methodological paradigm (with methodological approach in brackets)	Prototypes (with core logics in brackets)	Subtypes
Post-positivist (Predominantly quantitative)	Surveys and censuses (Generalisation/Correlation)	Cross-sectional (online) surveys Longitudinal (online) surveys Secondary data analysis (SDA)
	Experiments (Causal attribution)	True experiments (aka laboratory experiments) Quasi-experiments (aka field/natural experiments)
	Modelling and mapping (Prediction/Illustration)	Modelling; Simulation Mapping; Visualisation (incl. space syntax)
Interpretivist/Social constructionist (incl. postmodernist) (Predominantly qualitative)	Textual and narrative studies (Hermeneutical interpretation)	Content/textual analysis Discourse/conversational analysis Historiography; Biography (incl. life/housing histories)
	Field studies (Ethnographic/phenomenological interpretation/Imagination)	Ethnography (aka participant observation) Phenomenology
	Case studies (Contextualisation)	Single/multiple case studies Comparative case studies
Critical realist (incl. feminist realist) (Quantitative and/or qualitative)	Participatory action research (PAR) (Participation/Action/ Emancipation/Transformation)	Technical/scientific/collaborative PAR Practical/mutual/deliberate PAR Emancipating/enhancing PAR
Pragmatist (Quantitative *integrated* and/or *triangulated* with qualitative)	Mixed-method research (MMR) (Data integration/triangulation)	Convergent-; embedded-; exploratory-; explanatory-; multi-phase iterative- designs
Non-paradigmatic (Quantitative and/or qualitative, usually in a practical context)	Intervention research (Intervention)	Building/site/settlement analysis (incl. environmental scanning) Plan/policy analysis Normative/exploratory forecasting
	Evaluation research (Evaluation)	Diagnostic/clarificatory evaluation Implementation evaluation; Programme monitoring Outcome/impact evaluation
Meta-paradigmatic (Predominantly non-empirical)	Meta-research	Literature reviews; Research synthesis (incl. meta-analysis) Conceptual analysis Typology-; model-; theory-construction Methodological studies Philosophical-; logical-; normative-argumentation

Note: Adapted from Du Toit and Mouton (2013 p. 128).

We adapted the original Du Toit and Mouton typology as follows: 'Surveys' are expanded to include censuses and a correlational logic, with secondary data analysis (SDA) as an additional subtype, notably the use of digital or interactive data sets from private institutions and public research and statistical agencies. The content analysis revealed some use of social media and digital applications. The use of the latter to collect real-time data from samples or populations such as individuals or households may suggest a particular form of online survey emerging, i.e., a more loosely structured, democratised and digitalised survey compared to typical standardised and objectivist surveys (see, e.g., Bencsik (2018)). Online surveys typically rely on respondent self-selection and can be cross-sectional or longitudinal.

Interpretivist research is also labelled ‘social constructionist’ to reflect epistemological terminology in housing research (Jacobs and Manzi 2000; Allen 2009; Jacobs et al. 2016). Although postmodernism is a nuanced position rather than a standalone epistemology, and although it rejects most forms of knowledge claims, even interpretative claims, its focus on deconstructing text as a form of research allows for its inclusion as a nuanced position within an interpretivist paradigm. Under textual and narrative studies, ‘life/housing histories’ is included as a subtype with historiography and biography. Bowes et al. (1997) examined the use of life histories to study housing careers, arguing that life histories may deepen analysis, enhance findings, and contribute to a better understanding of social actor agency. The core logic of field studies is expanded to include the logic of ‘imagination’. Imagination studies is a form of field research or ethnography, in which different possible futures are researched as imagined by individuals or groups. Although not identified in our content analysis, its applicability to housing research is evident, while literature on imagination studies in the built environment is emerging (see, e.g., Davis and Hatuka (2015)).

Critical social science is renamed ‘critical realist’, again to reflect epistemological terminology in housing research (Marston 2002; Allen 2009; Somerville 2012). As with postmodernism, feminism is also a nuanced position rather than a standalone epistemology, given its critique of knowledge claims from a feminist perspective. Satsangi (2013) combines critical realist and feminist standpoints in housing research, allowing for the inclusion of a ‘feminist realist’ position within a critical realist paradigm. The logic of PAR is expanded to reflect the emancipatory and transformative nature of participatory forms of research, which is particularly applicable to pro-poor housing research (Allen 2016).

Although the original Du Toit and Mouton typology does not include mixed-method research (MMR), and although the content analysis revealed little in terms of MMR in which quantitative and qualitative data are truly integrated or triangulated (Leech and Onwuegbuzie 2009), MMR is nevertheless added as a prototype under a pragmatic paradigm (Morgan 2014), with generic subtypes as identified by Leedy and Ormrod (2015). The addition is for inclusiveness and because housing research relies equally on both quantitative and qualitative data, thus actually providing ample scope for MMR. Again, there is a need for a typology to explicate the role and different types of MMR *vis-à-vis* other designs. In terms of prototype and uniqueness, the unique core logic of MMR is identified as ‘data integration and triangulation’.

While the original Du Toit and Mouton typology classifies intervention and evaluation research under a pragmatic paradigm, here it is classified separately as ‘non-paradigmatic’ given the instrumental rather than epistemic imperative of intervention and evaluation research. Intervention and evaluation research are associated with quantitative and/or qualitative approaches and is indicated as usually conducted in a practical context. As argued earlier, policy analyses and evaluations for example are best classified as practical rather than scientific research (Hammersley 2000).

Under intervention research, ‘building’ is added to site/settlement analysis to accommodate housing structures, and ‘environmental scanning’ is included as a subtype (Napier and Crankshaw 2018). With rapid technological and spatial change experienced globally and especially in Africa, forecasting possible future states of housing is likely to become more important (Napier and Crankshaw 2018). ‘Forecasting’ is therefore added as a subtype under intervention research. Glenn and Gordon (2009) distinguish between normative forecasting (a desirable future) and exploratory forecasting (a possible future). Napier and Crankshaw (2018) identify specialised subtypes such as scenarios, relevance trees, and mission flow diagrams, which fall outside the scope of the typology. As argued earlier, the practical nature of evaluations limits journal exposure, and although the content analysis revealed no diagnostic or implementation evaluations, all three subtypes are retained for inclusiveness and considering their applicability to housing policy research. Lastly, under meta-research, research synthesis is expanded to include ‘meta-analysis’, and ‘methodological studies’ is added as a subtype.

The rapid development of ICTs or 4.0 technologies, notably Big Data, and the potential such technologies hold in terms of data, raise questions about novel research design prototypes for housing research (Napier and Crankshaw 2018). Still, the methodological literature within housing research is as yet very limited regarding the role of ICTs. Potts (2020), for example, analyses the role and impact of ICTs on urban planning ontologies, epistemologies and methodologies, and concludes that ICTs are "driving a shift towards a more interactive, intelligent, self-organising, and interconnected planning paradigm", but is silent with regard to the implications for research design. Moreover, Sturgis and Luff (2020) analysed the use of survey data in the social sciences between 1939 and 2015, expecting a decrease in surveys given the advent of Big Data. Their analysis revealed the emergence of a small proportion of articles reporting Big Data, but no associated decline in surveys. Instead, the use of surveys increased, with a substantial increase in the use of secondary survey data, i.e., SDA, while many articles reporting Big Data coupled such data with survey data. Perriam et al. (2020) also point out unforeseen ethical and methodological issues with collecting and storing social media data through the use of Application Programming Interfaces (APIs). In fact, API access appears increasingly restricted and regulated by social media companies.

Considering the definition of research design as a logical plan to maximise the validity of findings, and the main classification criterion of core logic, we argue that ICTs do not as yet appear to offer a unique research logic and prototypical *design* other than those in the adapted typology, and that the role of ICTs is as yet best seen on the level of *method*, particularly in terms of digitalised and interactive data collection, storage and analysis. To illustrate, the use of Big Data to make inferences about populations can, to the same effect, be classified as SDA (with the logic of generalisation and correlation), or as modelling and mapping (with the logic of prediction and illustration).

4 Conclusion

Given the interdisciplinarity of housing research and rapid societal and technological change, we argued for an expansion and refinement of the traditional spectrum of research designs regarded applicable to housing research, and more careful consideration of concomitant epistemologies and methodologies. We reviewed the methodological literature within housing research, assessed the extent to which different designs feature in current housing research, and, using methodological paradigm and core logic as classification criteria, presented an expanded and more nuanced typology of designs consisting of 11 prototypes and 42 subtypes. The typology may serve as a framework for further methodological inquiry and as a heuristic map for researchers to be more creative and considered when designing housing research, especially by improving coherence between methodological paradigm, approach and design. The typology may also help to standardised methodological terminology in housing research, as well as interdisciplinary research involving other built environment fields such as architecture and urban planning and design. While the typology serves as a heuristic map to navigate a broad methodological terrain, it is not meant to be necessarily exhaustive or mutually exclusive in terms of applicable designs. We furthermore acknowledge that there are different conceptions of research design and different ways of classifying such designs.

The critique of a-theoretical research however remains an issue in housing research. While the typology helps to clarify the relationship between methodological paradigm, approach and design to improve methodological coherence, further methodological inquiry and typology refinement are necessary to possibly also clarify the relationship between theory and research design in so far as housing research is concerned. Further inquiry is also necessary on the changing role of science policy, ICTs, 4.0 technologies and citizen science, and the implications for the design of housing research.

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