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A landscape study of South African dissertations in the field of human settlements between 1994 and 2019

ABSTRACT

Almost 2 424 (or 1,4%) of the 176 654 digitally published theses and dissertations from South African institutions of higher learning contain "human settlement(s)" or "housing" as catalogue keywords. This paper presents a landscape study of such theses and dissertations completed since the dawn of democracy in South Africa. The goal was to identify gaps in research – both topically and geographically – in order to guide future research direction in the field of human settlements' curriculum enhancement and system-wide capacity building.

The objective was to locate the originating institutions and the geographic study regions, document the nature and range of study topics by thematic category and to visualise changes in these factors over time. A purposively selected sample was studied to identify the broad need which the dissertations seek to address, and mapped to research designs and research methods. The research design consisted of a systematic desktop review.

Method: Data on South African theses and dissertations were obtained from the National Electronic Theses and Dissertations (NETD) portal and sorted by keywords and publication date. Quantitative data analysis was performed. A representative sample of dissertations and theses was selected for qualitative analysis. Originating institutions and (where obtainable/ applicable) study regions were geographically mapped. The study revealed areas of research focus, mapped according to topic and region. Findings from this paper provide the groundwork for further investigation into research gaps and needs as identified from practitioners' perspectives, in order to establish alignment.

Introduction

April 2019 marks 25 years since the dawn of democracy in South Africa. During this time, South Africa's public academic institutions have played an important role in building professional capacity to challenge, lead and support the production of housing and human settlements (collectively HHS). Accumulating housing backlogs and escalating service delivery protests (Department of Planning, Monitoring and Evaluation (DPME), 2018), much of which is centred on the demand for housing and utility services are testament that the sector is not meeting the needs, or at the very least the expectations, of its citizens. Reflecting on current and recent professional capacity building efforts may be instructive on how the academic sector can gear itself to make the most valuable contribution to the discourse on our future human habitats.

What is known about the current "landscape"?

In some respects, for example, policy development, the contribution of higher education to the HHS sector over time has been well-documented (Tissington, 2011). In other respects, for example, whether and how academia has contributed to sector innovation or is preparing a generation of practitioners to address grand challenges, such as climate change, anticipating population growth or meeting development goals is less clear. In part this may be because HSS scholarship is fragmented; dispersed across institutions and between academic disciplines. Resources such as HEMIS[1] provide little insight into the number and nature of HHS studies. The authors therefore turned to the published outputs from academia over the preceding 25 years, to provide a "landscape" or high-level quantitative and descriptive national overview of academic discourse and its material topical, geographic and methodological contributions to the field.

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[1] The Council on Higher Education (CHE) receives Higher Education Management Information System (HEMIS) data from the Department of Higher Education and Training and collects data from StatsSA and makes this publically available through VitalStats publications and the performance indicators project (CHE, 2019).

Data

The National Electronic Theses and Dissertations (NETD) portal hosts a homologated catalogue of openly accessible theses and dissertations[2] from 22 of South Africa's 26 public academic institutions. For this paper, the term "dissertation" will be used to denote both dissertations and theses[3]. The NETD displays dissertation titles, date, author, and a link to the host institutions database with an abstract, the name of the student's institution, and a statement of the degree being fulfilled. A link to the dissertation full-text is generally, but not inevitably, provided. The number of catalogued items is rapidly increasing, and at writing, the NETD catalogued 176 654 items, with an estimated 86% relevance[4] rate.

Method

The NETD was used as the primary data resource for this paper. A search for dissertations in the field of human settlements was done using the search terms "human settlement(s)", "housing" and "house". This yielded a total of 5 397 eligible titles since 1994. Of these, many contained the keywords but were not relevant to the field of human settlements[5], and were eliminated, yielding 1 795 titles of interest. Quantitative data analysis was performed on all titles of interest. A representative sample of dissertations was purposively selected for more in depth quantitative and qualitative analysis.

Limitations of the study

The number of dissertations uploaded to the NETD as a function of total dissertations produced is not known.

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[2] Some texts suggest that in the US the terms *thesis* and *dissertation* correspond with outputs produced in pursuit of master's studies and doctoral studies, respectively, whilst the opposite nomenclature is applied in the European Union. In general in South Africa, and in the NETD database the terms are used interchangeably.

3 Sefako Makgatho University (health sciences); Mangosuthu University of Technology; Sol Plaatje University; and Mpumalanga University are not represented on the NETD.

[4] "Relevance" being within the years of interest and with duplicates removed, as estimated from analysis of a 17% subset of the total dataset.

[5] For example, under the search term "house" titles relating to research on house flies were included
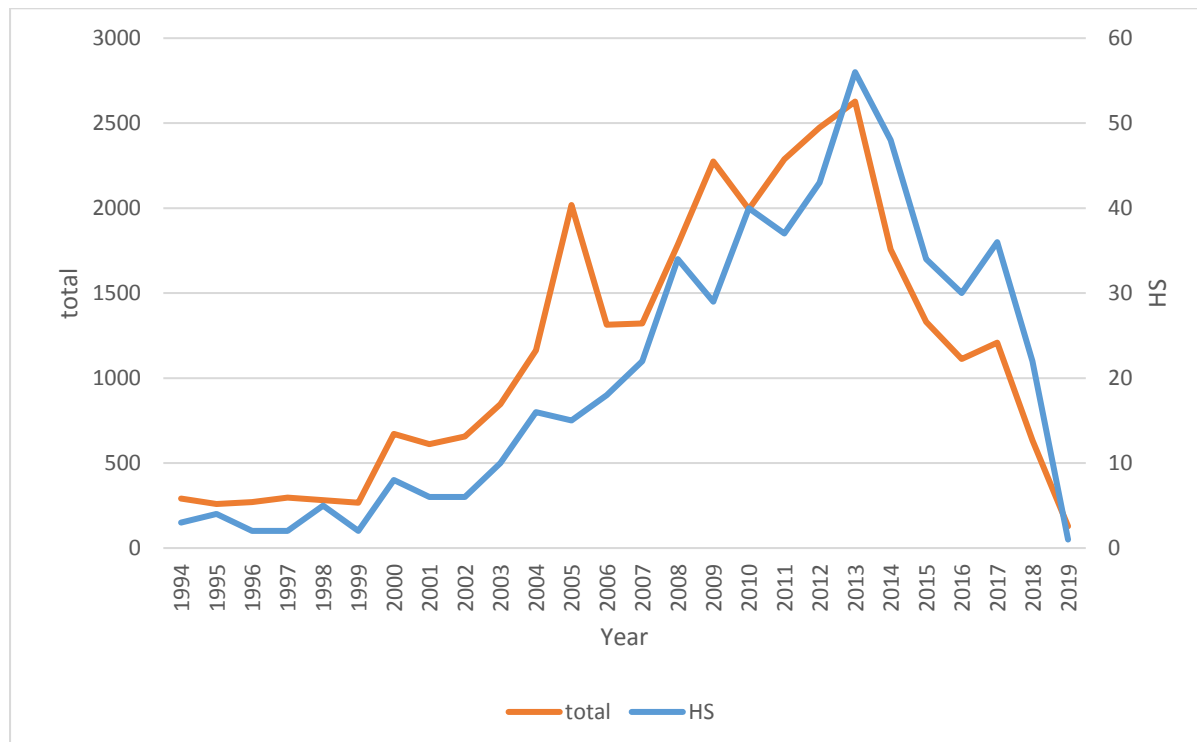
Figure 1: Number of HHS dissertations per annum and total number of dissertations (Data source: National Research Foundation (NRF) & CHELSA, n.d.)

Figure 1 above shows the number of HHS titles per year since 1994, as well as the total number of dissertations in NETD. It is apparent from the data that there has been an exponential increase in papers in HHS, peaking in 2014, and then reducing. The overall trajectory of HHS titles follows a similar trajectory to all papers. Given that the number of catalogued items is rising daily, the authors surmised that the recent reduction in published papers is attributable to the lag in uploading dissertations onto the NETD site. The increase in output observed in the graph until 2014 approximates exponential growth, which can be understood in the context of a national average increase in enrolled university students of 5.47% per annum (MacGregor, 2014).

Figure 2 below shows HHS as a percentage of all dissertations, which shows strong increase trend over time, from 1.54% in 1995 to 3.48% in 2018. HHS therefore has become steady rise in popularity as a topic of study nationally over 25 years.
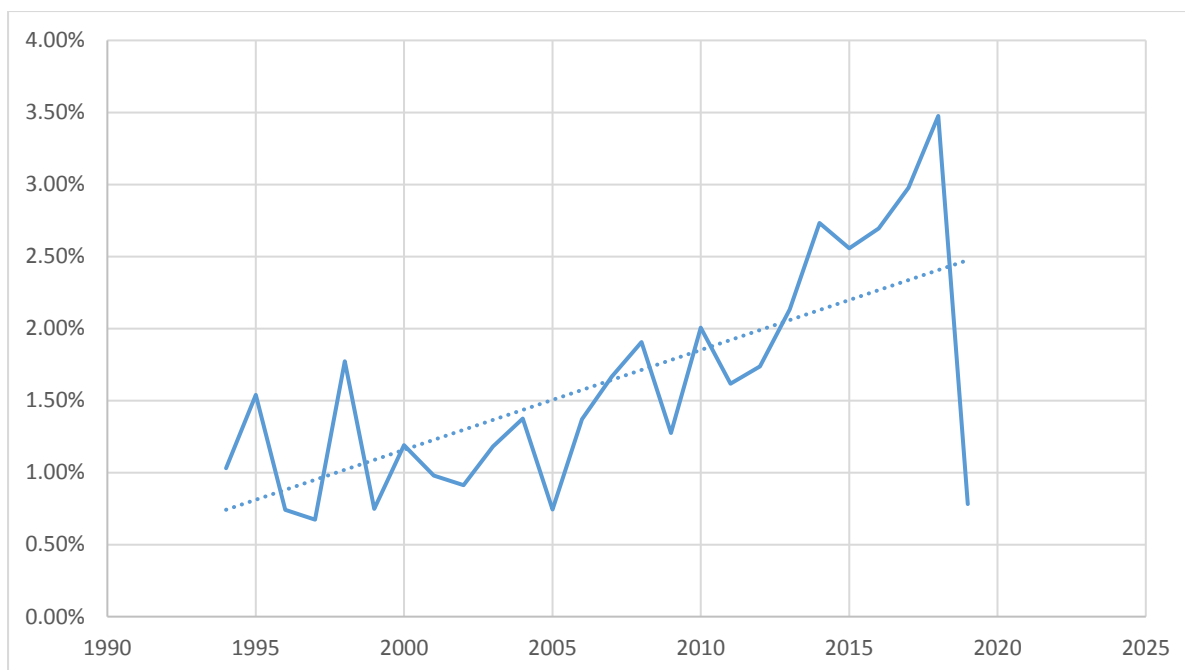
Figure 2: HHS dissertations as a percentage of all dissertations (Data source: NRF and CHELSA, n.d.)

The data was sorted into a number of themes, relating to a cross-section of social, economic, environmental concerns of contemporary academic interest, in order to identify common areas of research as well as gaps in the field of HHS. The themes were categorised and plotted against years to establish trends in the research over time. The categories, themes and search keywords are shown in Table 1.

Table 1: Categories, themes and search words (Data source: NRF and CHELSA, n.d.)

Category	Theme	Keywords
Housing type	RDP housing	RDP, subsidy, subsidised, low income
	BNG housing	BNG, breaking new ground, middle income
	Real estate	Real estate
	Informal settlements	Informal settlements, slum, shack
Drivers	Climate change	Climate change, global warming
	Biodiversity	Biodiversity, ecology
	Development goals	SDG, NDP, development goal, new urban agenda

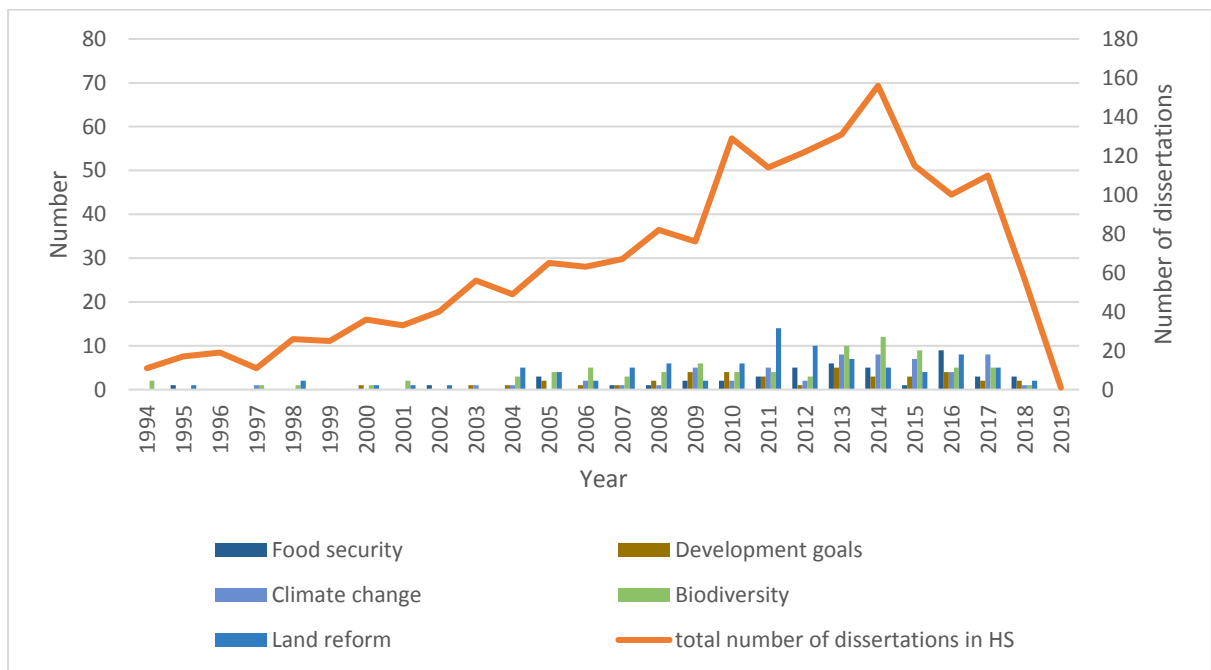|		
	Food security	Food security
	Land reform	Land reform
Implementation	Partnerships	Partner, public private
	Investment	Invest, finance, funding
	SADC	SADC, Southern African Development Community
Interest areas	Sustainability	Sustainable, sustainability
	GIS	Geographic information system
	Water	Water source, water supply
	Energy	Energy source, electricity
	Smart housing	Robotics, artificial intelligence, fourth industrial revolution
	Fire safety	Fire

Figure 3: Frequency of search terms in category of Drivers (Data source: NRF and CHELSA, n.d.)
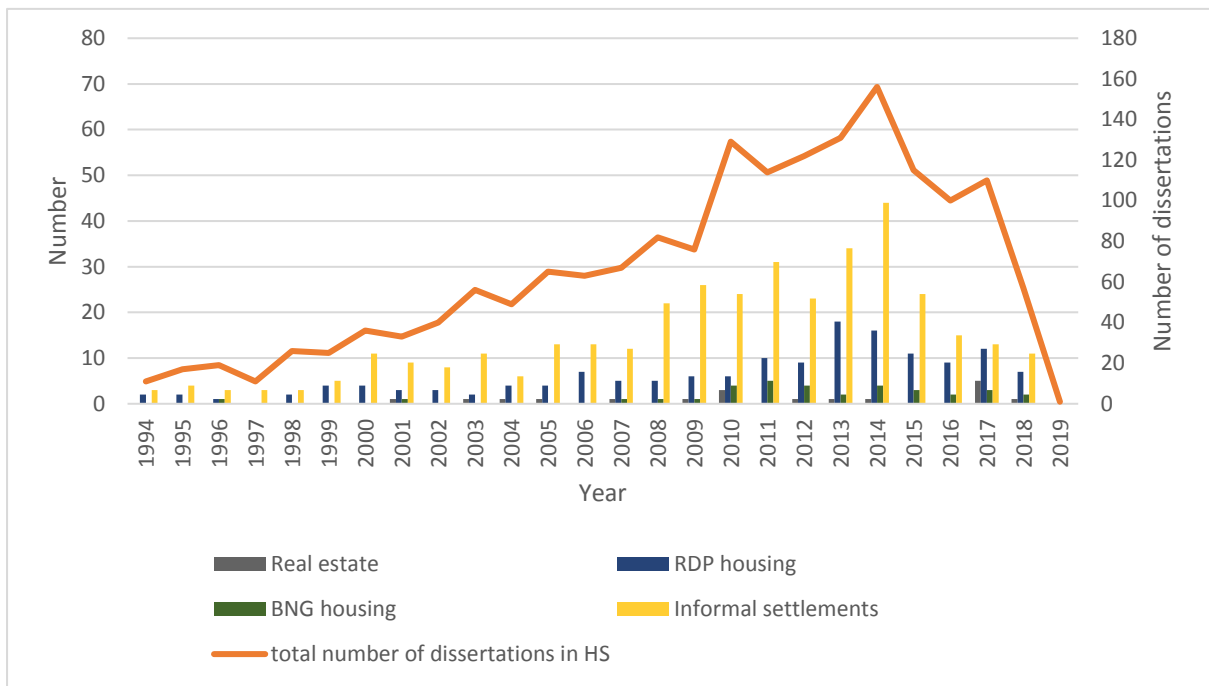
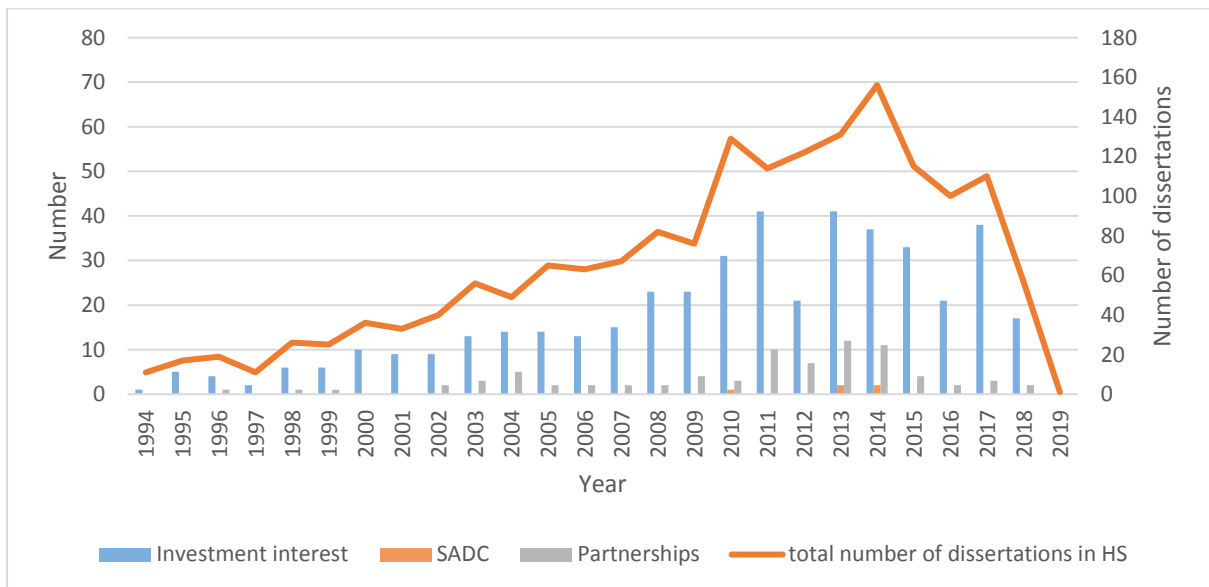*Figure 4: Frequency of search terms in category of House Type (Data source: NRF and CHELSA, n.d.)*

Figure 5: Frequency of search terms in category of Implementation (Data source: NRF and CHELSA, n.d.)
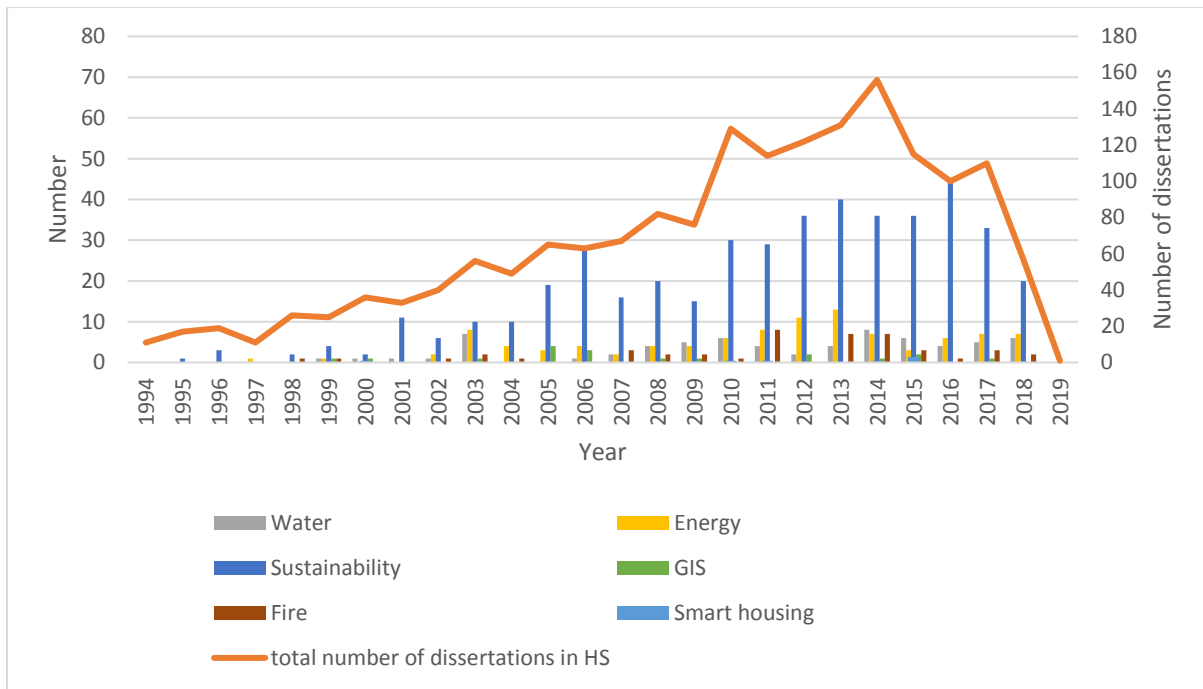
Figure 6: Frequency of search terms in category of Interest Areas (Data source: NRF and CHELSA, n.d.)

Figures 3-6 above are represented on a consistent scale for ease of comparison. It must be noted that there is in some cases an overlap of categories. For example, a paper that appears in a search under the keyword "climate change" may also appear in the search results for the keyword "biodiversity". The total number of dissertations in HHS (reduced in scale on the vertical axis) has been superimposed on Figures 3-6, for ease of reference as to the relative frequency of themes as a portion of all published HHS dissertations.

Topics of interest

When considering "House Type", (Figure 3) it is clear that there is a significant interest in research regarding informal settlements. On the opposite side of the spectrum, there is extremely low research interest in real estate, which is a topic of study associated with higher end of the income spectrum. The research interest in housing correlates with economic lines – the most research has been done on the lowest income housing bracket and the least on the highest income bracket.

When considering the "Interest Areas" category (Figure 6) it is evident that, apart from sustainability, which is an overarching theme, both energy and water are dominant. Overall, however, there is a relatively low number of papers in these areas.

Sample analysis

From within the 1 795 titles of interest, a search was conducted for the terms "science", "technology" or "innovation", to yield 241 titles (13%) for quantitative and qualitative analysis. The term "science" appeared in 113 of the titles, by virtue only of the degree being satisfied[6]. 13 titles appeared in the search with reference to degree or various universities of technology. Upon investigation, it was found that "science", "technology" or "innovation" was used as a descriptor for applied methods in over 90% of the remaining papers. "Engineering" appeared in only three of the titles. This means that science, technology or innovation were the focus or topic of study in the catalogue in only eight of the 1 795 HHS papers.

Abstracts from the representative sample were analysed with reference to the topics of interest described in the section above and represented on a heat map, shown in Figure 7. The heat map plots frequency of terms appearing in dissertation abstracts against the originating institutions.

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[6] For example Master of Science; Ph.D. (Social Science) etc.

	Water	Energy	Sustainability	GIS	Smart housing	Fire safety	Partnerships	SADC	Investment	Climate change	Biodiversity	Development Goals	Food security	Land reform	RDP Housing	BNG Housing	Informal Settlements	Real Estate
Cape Peninsula University of Technology	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Central University of Technology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Durban University of Technology	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0
Nelson Mandela Metropolitan University	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1	1
North-West University	1	1	3	0	0	0	0	0	0	2	2	1	0	0	0	0	1	0
Rhodes University	2	1	7	1	1	1	0	4	1	3	8	0	0	0	2	0	4	0
Stellenbosch University	1	1	6	0	0	1	1	1	1	0	1	3	0	1	7	0	5	1
Tshwane University of Technology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
University of Cape Town	1	1	8	1	0	3	1	7	4	6	5	0	1	0	4	0	11	0
University of Fort Hare	0	0	2	0	0	0	1	2	1	0	0	1	0	2	0	0	0	0
University of Johannesburg	1	1	0	0	0	0	0	1	0	0	0	0	1	0	0	0	0	0
University of KwaZulu-Natal	0	1	13	5	2	0	2	8	3	0	3	0	2	2	1	0	12	0
University of Limpopo	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
University of Pretoria	0	0	6	0	0	0	3	0	4	0	0	0	1	0	5	1	3	1
University of South Africa	1	1	0	0	0	0	1	0	0	0	1	0	0	0	1	0	2	0
University of the Free State	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
University of the Western Cape	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
University of the Witwatersrand	0	0	5	1	1	0	0	2	2	0	1	1	0	1	1	0	1	0
University of Venda	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
University of Zululand	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vaal University of Technology	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Walter Sisulu University	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8	8	52	9	4	5	9	25	16	11	21	7	7	7	21	2	42	3

Figure 7: Sample themes and originating institutions of HHS dissertations in South Africa (1994 – 2019) (Data source: NRF and CHELSA, n.d.)

As was found in the broader study discussed earlier, results were biased very strongly towards urban settlement studies, with particular focus on low-income, affordable housing, informal and government subsidised housing typologies. Education featured fairly consistently as a topic of interest. Five dissertations used a variety of housing typologies for comparison studies. The term "mixed-use", which is emerging as an important strategy in addressing housing needs did not appear in the sample set. Gender was a focus of three of the sampled papers.

Research methodologies

The majority (n=209) of the 241 titles sampled were case studies. Most dissertations reported a mixed (quantitative and qualitative) methods approach, with surveys, structured interviews and semi-structured questionnaires being the most common methodology deployed, followed

by observations, particularly for studies related to socioeconomically disadvantaged demographic groups. Key informant studies were favoured for topics related to studies in real estate. GIS and spatial modelling was commonly used as a supporting instrument. Four studies reportedly made use of simulation. Experimental research methods were very rare (n=8), whilst remote sensing was applied in five studies and artificial intelligence was a focus of one paper. The majority of sampled dissertations were cross-sectional and contemporaneous (n=209); with a small number of longitudinal, three cross-sectional historical (archaeological) studies; and the remaining longitudinal, historical studies.

Originating institutions

The sample was analysed to identify the originating academic institution with published dissertations referencing science, technology or innovation in HHS in the preceding 25 years. It was found that the number of dissertations varied significantly between institutions, even when adjusted for numbers of publication from the institutions. Seven institutions have published no dissertation in the field of HHS[7] on NETD, whilst others are very prolific. Nine of the 22 institutions have catalogued doctoral degrees in the 25 years under review. No correlation between the number of doctoral theses and master's theses is observed, although all institutions publishing doctoral theses have also published master's theses.

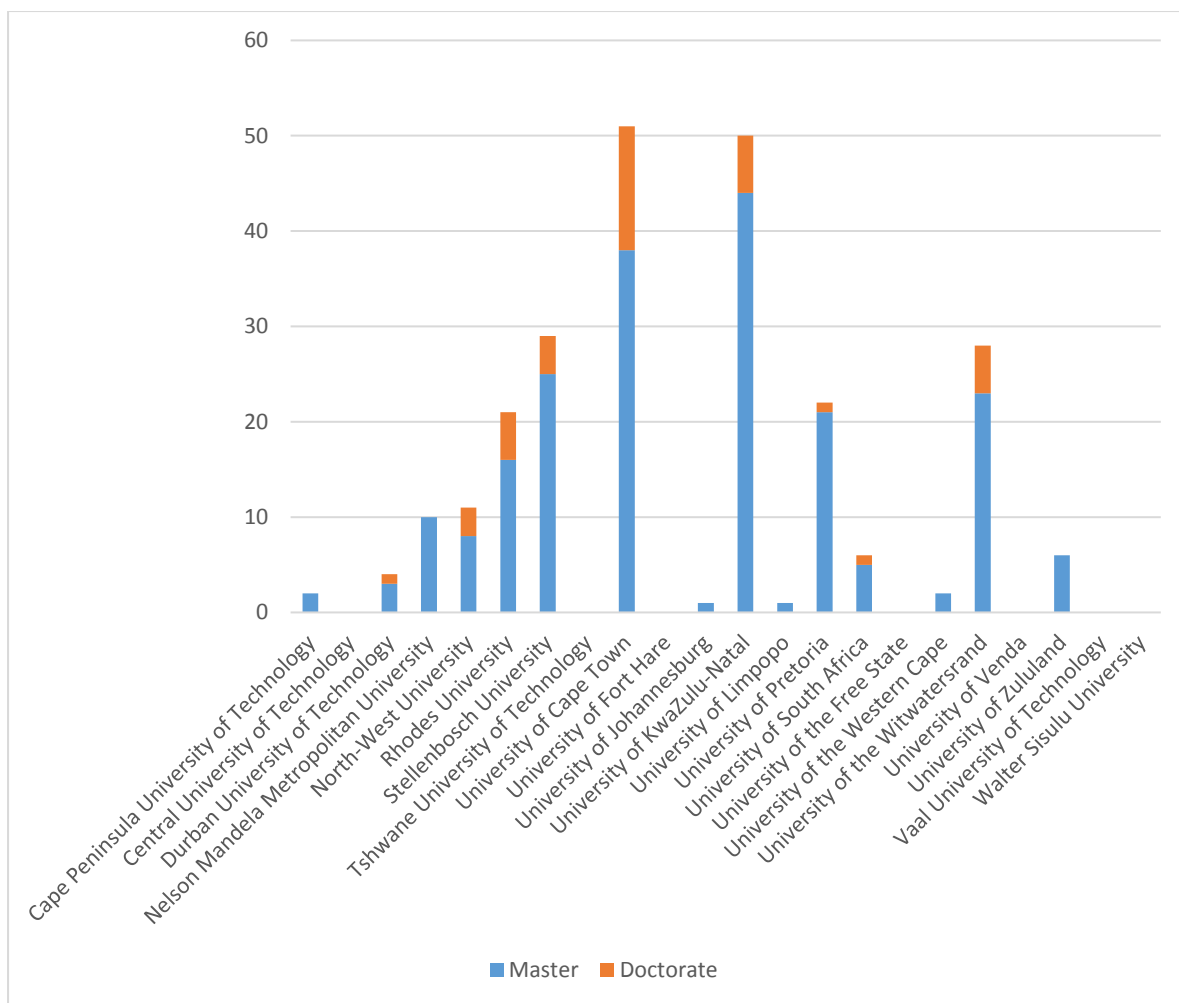7 These institutions did feature "non- HHS" dissertations

Figure 8: Number of HHS dissertations on NETD of South Africa's public universities (Data source: NRF and CHELSA, n.d.)

Study locus

Loci of study for the sample set were determined for 220 of the dissertations. For the remaining 21 dissertations the study was of a laboratory, or theoretical nature and not "place-dependant". Only one of the dissertations sampled had the study locus outside Africa[8]. 12% (n=30) of the dissertations sampled had a study locus beyond South Africa's borders, mostly in the SADC region[9]. These authors speculate that many of the SADC studies are undertaken by students whose ordinary or original place of residence is in the country of study, and that these studies are related to South Africa's status as a regional study destination. 26 of the studies located in

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[8] Study locus; Auckland, New Zealand.
[9] Ghana n=1; Tanzania n=2; Zambia n=2; Namibia n=7; Botswana n=2; Lesotho n=2; Swaziland n=1;

Mocambique n=2 and Zimbabwe n=11

the context of South Africa, were national in scale. The remaining studies varied from individual institutional/ household study, to neighbourhood scale, to provincial scale. Study locations were plotted on a map, as shown in Figure 9. In the South African studies, strong correlations between prolific academic institutions, which are located in major centres, and locus of study is evident. The study showed that studies in rural settlements, service towns and regional centres were rare, and, where present, focussed on the human/natural interface and were of ecological interest.
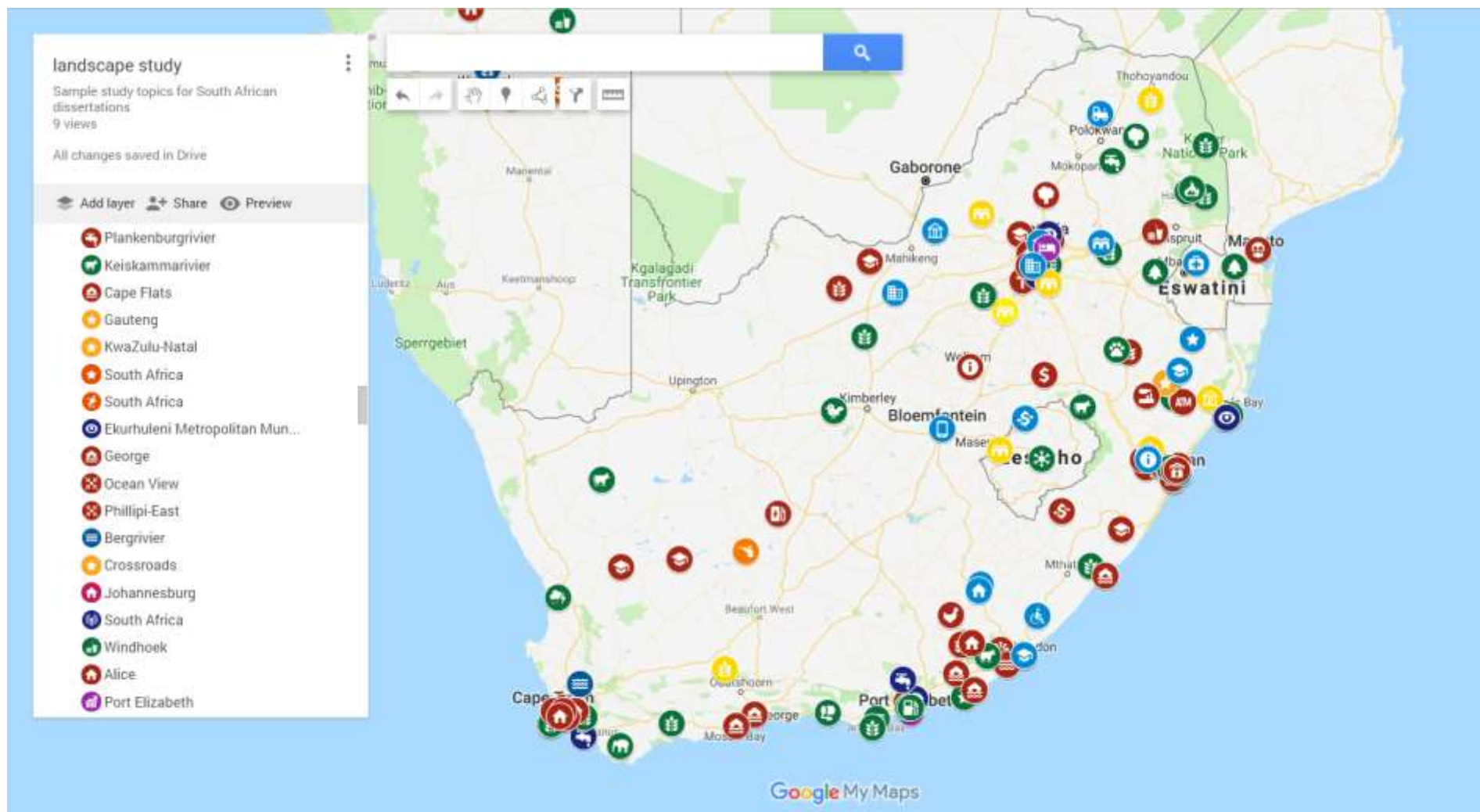
Figure 9: Sample loci and themes of HHS dissertations set in South Africa (1994 – 2019) (Data source: NRF and CHELSA, n.d.)

Discussion

The analysis above shows that the majority of current dissertation studies are focussed on housing and human settlements in settings of marginalised socioeconomic status. An academic contribution to discussions mixed typologies is absent. It is observed that studies in dissertations on partnerships are lacking. Rust, Zack & Napier (2009) propose the idea that focusing on low cost housing for people who earn below a minimum income inevitably distorts the market making it difficult for (for example) the private sector to build and mortgage affordable housing. This idea underpins the approach taken in the official HHS policy Breaking New Ground agenda (BNG) to considering the residential market as a whole. But whilst there is academic debate on whether improved residential mobility in South Africa is possible (such as through a "housing ladder"), in the situation dominated by state supply (Napier & Gavera, 2011), there is a dearth of dissertations investigating this theme.

It is clear that sustainability has emerged as a popular and enduring topic of study. The analysis above shows that the majority of current dissertation studies are located in areas of convenience, which may reduce the opportunity for academic dissertations contributing to rural challenges, such as averting the hollowing out of rural settlements, which is anticipated by the Green Book (Council for Scientific and Industrial Research (CSIR), 2019). Science, technology and innovation have the capacity to be disruptive and transformative.

There is generally a lack of science, technology and innovation topics. There appears to be a high reliance on qualitative methods with subjective inputs and a very small footprint of experimental design methods.

Conclusion

Interest in the field of HHS study is growing and output is growing at a faster rate than general rate. On face value, 1 795 paper over the course of 25 years seems to be a major contribution to the field of HHS. There is a wide variety in topics of interest. On closer inspection, there is a pervasive homogeneity in geographic study locus and methodological approach to HHS dissertation. It seems possible that there is an inherent opportunity cost in the case studies approach as applied by a majority of HSS dissertations, in that, focusing on the existing situation, may be at the expense of experimenting with transformative ideas.

Recommendations

A follow-up study on the HHS sector would provide a useful benchmark to determine whether a.) practitioners in the HHS sector completed dissertations on the topic, and b.) whether the dissertation studies have prepared students well for their professional activities in the field. Further research and dialogue on the apparent homogeneity in methodological approach, as well as study locus, and the extent to which this best addresses the sector needs would be very useful.

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