ENABLING AND CONSTRAINING CAUSAL POWERS FOR RESEARCH AND INNOVATION IN THE SOUTH AFRICAN HIGHER EDUCATION

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ABSTRACT
This article highlights the critical importance of research and innovation in higher education, using South Africa (SA) as a case study. It analyses discourses that enable and constrain research and innovation. Margaret Archer's social realist theory and stratified construct of structure, culture and agency is employed to understand various emerging transformation discourses exerting enabling or constraining causal powers for research and innovation. The interplay between structural, cultural, and agential milieus is investigated to better understand the urgency towards research and innovation. With this understanding, academics might locate their agency in the global and local contexts, create ideal conditions and build corporate agency for strengthening research and innovation. Universities with limited resources, should not reinvent what already exists, but should responsibly borrow key aspects that would thrive in their own contexts. However, it must be cautioned that no system of the world can exist as an end without deficits and flaws.
Keywords: research and innovation, enablers and constraints, funding frameworks, higher education, agency

INTRODUCTION

The importance of research and innovation for emancipating national and local development is unquestionable. This is particularly true for Africa and South Africa given the social, economic and political challenges that bedevil the continent. However, research and innovation in SA cannot be analysed in isolation from the broader global political, social and economic histories and transformation. Umesiobi (2006) argues that SA and its higher education institutions must locate and assert themselves in the global network by producing research skills and technological innovations for successful economic participation, political democratisation and national reconstruction.

Therefore, this article highlights the importance of research and innovation within the changing higher education context in the Southern African Development Community (SADC) region, using SA as a case study. I analyse discourses that oftentimes enable or constrain research and innovation. I employ Margaret Archer's (1996) social realist theory and stratified

construct of structure, culture and agency to understand various emerging transformation discourses exerting enabling or constraining causal powers for research and innovation. I further analyse the interplay between national and institutional structural (including policy, funding models, frameworks, strategies, programmes, systems), cultural (for example, ideas, knowledge, values, beliefs, ideologies and theories), and agential setups/milieus (key agents – both primary and corporate) to better understand the urgency awarded to research and innovation. Finally, selected policies, documents, research and innovation models, strategies and examples and literature on higher education in SA are analysed.

Archer argues that any social world comprises various parts stratified as structure, culture and agents. From a social realist perspective, structure and culture manifest themselves as discourses which condition and influence the environment thus enabling or constraining agents (people) to use their properties and power to change things. In this case, structure and culture transformations will condition academic and research environments (including universities, research institutes) to enable or constrain researchers/academics to engage or not to engage in research and innovation. Discourses at the global, national and policy, institutional and individual levels which influence research and innovation at higher education institutions are examined.

A selection of dominant discourses is critiqued to establish how they have reproduced the current *status quo* of research and innovation, structures, culture and practice. These discourses include national policy and its influence in creating enabling or constraining research spaces; the effects of globalisation and neo-liberal movement on the academic enterprise and its freedom and autonomy to pursue its core functions; emergence of managerialism in higher education; changing academic work and the emergence of new identities and roles; as well as pressures for academics to undertake research with a socio-economic emancipatory and innovatory flair, rather than research for its own sake.

Archer's social realist conceptualisation of the terms structure, culture and agency is employed to understand how these concepts underpin research and innovation activities within universities. The various documents analysed provide insight into firstly, available structures and how enabling and constraining they are; secondly, espoused and enacted research and innovation cultures; and thirdly, the agential conduct displayed by those who are entrusted to participate in research and innovation (researchers and academics).

Understanding these positions is important in assisting participants to locate their agency, understanding their roles in creating ideal spaces/ conditions and identifying corporate agents who must develop and strengthen research and innovation in their contexts. However, developing countries with limited resources should not try to reinvent what already exists, but

should responsibly borrow critical aspects that would thrive in their contexts, as no system of the world can exist as an end without deficits and flaws. Even countries with well-established structures are still on a fact-finding mission to elevate their research outputs and to solve their problems through research and innovation. Evidence is in the unsolved social problems and the number of programmes, funding agencies, regulatory policies, and research incentive structures, to mention only a few enablers in place to support research and innovation efforts. Research outputs and innovations are nowhere concomitant with these efforts.

METHODOLOGY

This article aims to investigate interplay between the structural, cultural, and agential milieus to understand the urgency awarded to research and innovation (see diagrammatic representation in Figure 1). The research process entails analysing selected policies, documents, research and innovation models, strategies and literature on higher education in South Africa. Archer's framework was ideal for this study because it allows an analysis of various discourses, structures, cultures and agential aspects necessary for research and innovation in the SA context.

THEORETICAL FRAMEWORK

Margaret Archer's (1996) realist social framework and stratified constructs of structure, culture and agency are employed to make sense of the various emerging transformation discourses exerting causal powers that enable or constrain research and innovation.

Although many scholars in higher education have widely used Archer's theoretical framework to explore teaching and learning, little or no evidence is found in the literature of its use in understanding the realities of research and innovation, which are undoubtedly critical in the pursuit of the higher education mission.

The framework reveals that it is the constant interactions between the different contextual strata namely, the institutional or organisational structures, culture and people that result in achieving intended goals within a particular context. The existence of structures without a conducive supportive research culture and people with required competencies will not result in the aspired transformation in research and innovation. I, therefore, align my argument about success and progress in research and innovation (evidence of best practice and impact) with this perception and argue that the Archerian framework is not only applicable to this study but can be used to improve research and innovation. It provides a lens for use in understanding the underlying causal powers, and discourses in favour of, or against the advancement of research and innovation. The success of research and innovation within institutions is dependent on the
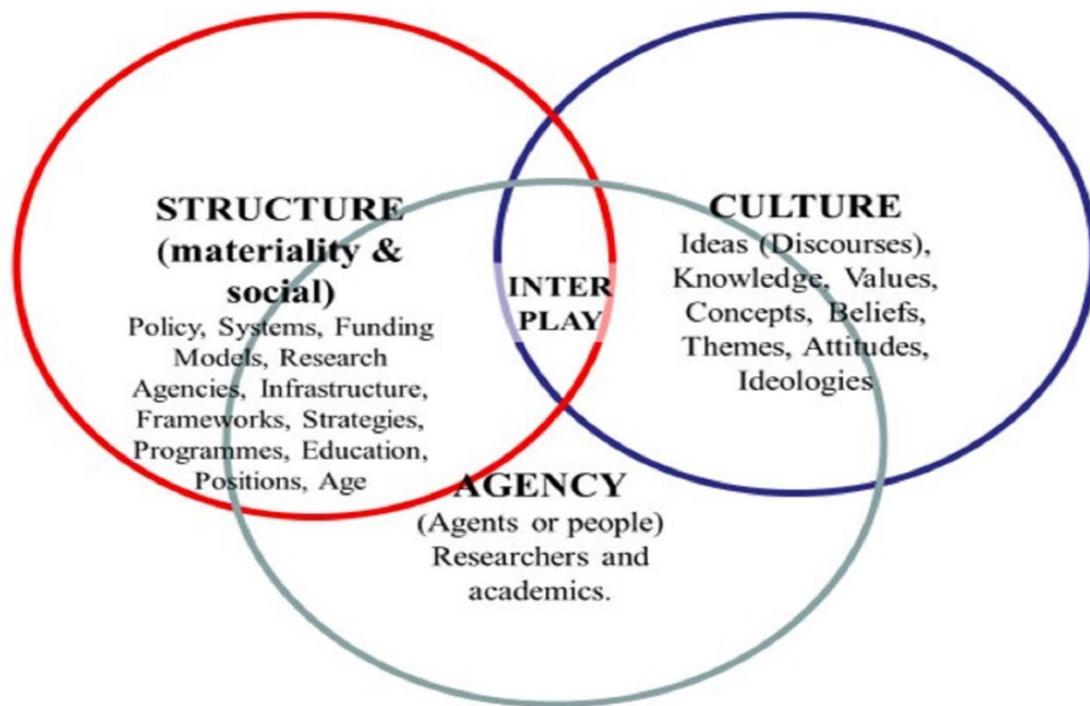
Figure 1: The relationship between research and innovation structure, culture and agency. (Source: Adopted and adapted from "Perspectives on quality assurance and enhancement in the South African Higher Education: Opportunities and challenges", by Monnapula-Mapesela, M. 2018, *Unpublished paper presented at the West East Institute Conference, Rome, 13–14 November 2018*).

following main aspects, namely the institutional structures (for example resources, policies, funding), the prevailing research cultures and practices, availability of agents/people/experts (innovators and researchers) and the agency held by these agents and their institution to commit to research and innovation undertakings. In the absence of a theory or conceptual framework, it is difficult to determine why some universities are seen to have best practices while others struggle.

CULTURE

In the same way that culture influences teaching and learning environments in higher education, it has its fair share of influence in shaping research and innovation environments at various national, institutional, and individual levels. With this argument, I align with Archer to explain underlying reasons and enabling cultural undertones which create conducive or constraining spaces for research and innovation at various universities. A set of ideas, knowledge, values, beliefs, ideologies, and theories often get exhibited through certain discourses commonly used by people in particular contexts. All these comprise a particular culture with a tendency to enable or constrain people's actions. Thus, the following section focuses on selected discourses

that potentially influence knowledge production and innovation at research institutions and organisations in SA.

ENABLING AND CONSTRAINING DISCOURSES

At national and global levels, I place focus on the influence of government policy discourses; effects of globalisation and neo-liberal movement on research and knowledge production; changing academic work and the emergence of new identities and roles; as well as funding discourses as important factors with significant and potential effects on the research and innovation initiatives in SA and other SADC countries (see Figure 2).
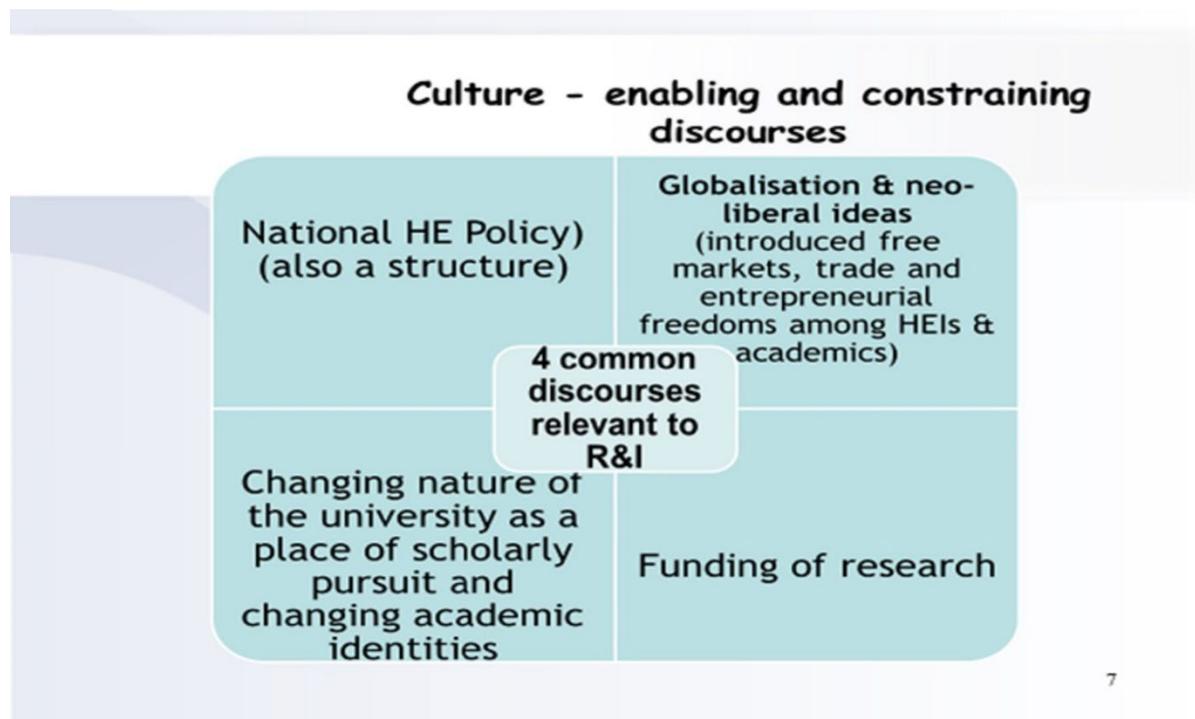

Culture – enabling and constraining discourses

National HE Policy) (also a structure)

Globalisation & neo-liberal ideas (introduced free markets, trade and entrepreneurial freedoms among HEIs & academics)

4 common discourses relevant to R&I

Changing nature of the university as a place of scholarly pursuit and changing academic identities

Funding of research

7

Figure 2: Enabling and constraining cultural discourses. (Source: Author's own compilation from literature review).

Government policy discourses

At national level, the South African government has a plethora of policies which outline the country's espoused goals, objectives and values for research and innovation and further guide institutions and researchers to engage in impactful research. The number of policies, however, does not necessarily translate to implementation, but policy is argued by Archer (1996), to be a powerful enabling structure that influences change and modifies people's actions, when such people have agency and required properties (competencies and attitude). Policy has a far-reaching influence in breaking dominant ideologies that continue to stifle the country's socio-economic development and transformation agenda.

Among these policies are funding policies, which outline grants and funding resources

that are available for supporting research, as well as avenues to access such funding. Access to funding is highly competitive. While some institutions and researchers worry that the strictly-rationed funding limits their scope of research, some find the processes for accessing funding laborious. Policy and funding play an important role in higher education and influence academic's response to the core university functions (research, teaching, learning, and community engagement).

Through policy, political leaders challenge universities with various demands, including the need to reform, be accountable; increase access and improve student success; meet national needs; do more with fewer resources; sustain themselves financially; raise third stream income and the number of research outputs, to mention only a few demands that are remodelling universities and academic identities. Universities are turning into commercial entities to cater for their individual financial needs and ensure sustainability, and in the process, they drift in focus from their traditional "public goodness" to "private good" (Monnapula-Mapesela 2017, 22). Enders (2000) and Abeles (2001) argue that universities have shifted towards greater market and state control, emphasising competition and increased productivity or "performativity", a search for market trends, and commercialisation of products and services. The implications of commercial and market discourses on the academic enterprise often erode universities' identity and pedagogic adroitness and ability to be creative and innovative (Monnapula-Mapesela 2002). All universities, regardless of their, type, size, age, historical background, resources, human capital, or status, find themselves in a melting pot where they are forced to compete as equals in their research and innovation endeavours.

Effects of globalisation and neo-liberal movement on research and knowledge production

According to Maton (2014), the periodic knowledge economies that happened over five decades ultimately led to knowledge being treated as a market commodity intended for selfish private interest rather than development of poor communities and social justice. Badat (2015), on the other hand, blames this shift on neoliberalism, and political economic practices that assume that entrepreneurial approaches could liberate universities and position them to compete in free markets and trade. These ideas impact institutional practices, roles and functions and shift their focus from their core mission to treating universities as businesses rather than places for scholarly activity (Badat 2015). While I agree that these discourses could consequently stifle the agential roles of agents who could focus on research and innovation, others may argue that the same forces have the potential to ensure that research efforts are accelerated, albeit for reasons other than to enhance teaching and learning or respond to socio-economic problems

and national development.

Open markets have enabled Africa's higher education system to benefit from free movement of and collaboration with highly esteemed academics and researchers across the globe. The downside has been "brain drain" of talented academics and researchers who opt to go to countries where they can get better recognition, rewards for their work and a better life.

Changing academic work and the emergence of new identities and roles

Over the years, academics' identities have changed, because of historical reasons, which privileged research over teaching, bequeathing it a higher status and rewarding those academics and universities who are at the frontiers of knowledge, research and innovation, and whose work is exceptional. Recognition of deserving researchers is acceptable. However, there are those academics who concern themselves with research for various reasons, including consultancy work, often awarding little attention to research that can enhance curriculum and pedagogic practices of their disciplines. The monetary incentives and prestige that have been linked to research, have created a culture and discourses referred to Quinn (2012) as "research-is-what-counts", that prioritise research over the other key university functions.

"Contrary to the expectation that incentivising researchers would help address the world's problems, improve research and innovation practices, and revitalise the country's economic development, outcomes still remain minimal" (Monnapula-Mapesela 2017, 14). Current efforts do not seem to steer the development of the country into the aspired future (Vision 2030, RSA National Development Plan) (NDP 2012). Only a few universities, referred to as the big five, and certain research-intensive universities, continue to lead the higher education sector research output and receive recognition in the higher education "research rankings" (Times Higher Education World Rankings 2015–2016). These institutions have some common structural, cultural and agential features. They are well-resourced, previously advantaged institutions which recruit the best professors and students nationally and internationally. They also get a larger portion of research funding. According to the Human Sciences Research Council report of 2007/2008 (HSRC 2008), research resources are concentrated at the big five universities, which hold 65 per cent of the Universities' research and development expenditure, 50 per cent of researchers, and 56 per cent of the total doctoral students. All these factors support and enable research and innovation activities in these few universities, while the majority of SA's universities are not as privileged and therefore undertake research and innovative activities under constrained conditions. This skewed system will continue to constrain Government's efforts to address socio-economic problems and national development.

Funding discourses

An engagement with various documents revealed a plethora of funding structures established to support the research and innovation agenda. I argue that the research and innovation space is over-regulated and thus most structures intended to enable could stifle or constrain the good intentions. Among the common funding discourses are funding cutbacks and government and research institutions' disproportionate and conflicting short-term incentive structures. "Financial resources have declined due to among other things, inflation, devaluation of currencies, increase in interest rates, economic and political turmoil, as well as structural and systemic adjustments" (Altbach and Teferra 2004, 25). According to Altbach (2000), such cutbacks in government subsidy have serious implications for academics' conditions of work and remuneration structures. As a result, academics have been compelled to engage in "fund-raising and entrepreneurial activities through close association with donor agencies, which have strict rules and prescriptions for accessing funding" (Monnapula-Mapesela 2017, 22). The intentions of donor structures are applaudable, but "they are rigged with bureaucracy and laborious templates and forms which steal the time that academics should use to engage in their core academic functions" (Monnapula-Mapesela 2017, 22). These bureaucratic requirements act as deterrents for venturing into research. They stifle enthusiasm, creativity, agility, and flexibility – notions that are synonymous with innovation. Even with the many grand structures discussed in the following section, it is not clear whether the country presents best practices worth emulating by neighbouring countries, whether there is a supportive culture and agents. If so, whether there are any positive interactions between these and available structures to activate agential powers towards increased research and innovation activities.

STRUCTURE(S)

At the national and policy level, there is no doubt that SA has many supportive structures for research development and the promotion of innovative practices. However, many countries may find it difficult to compete with SA's grandiose policies.

This section interrogates some critical government departments, policies, and funding agencies that underpin the country's research and innovation system. I discuss the importance of research partnerships and collaborations as important enablers. The role of the following four key structures in research and innovation funding will be highlighted, key government departments, key policies, key funding agencies, partnerships and collaborations. The SA government encourages collaboration between all its departments.
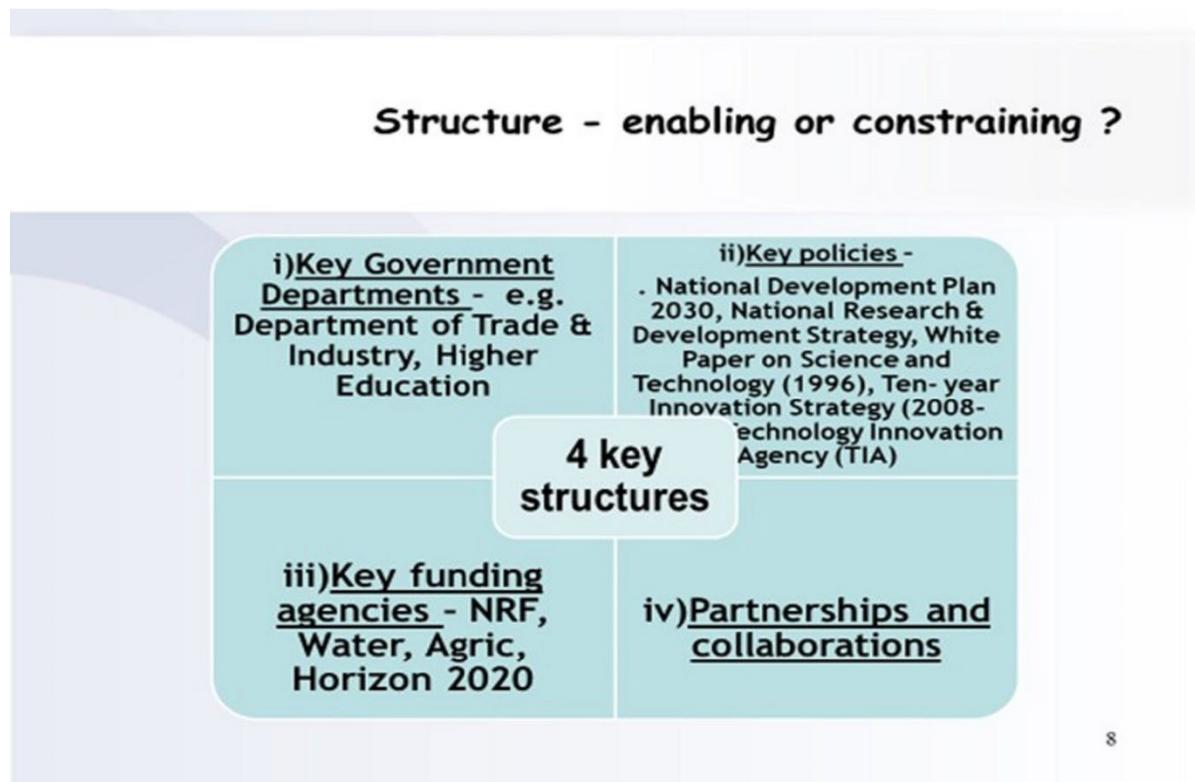
Figure 3: Enabling and constraining structural factors. (Source: Author's own compilation from literature review)

GOVERNMENT STRUCTURES

Three critical government departments with enabling roles in research and innovation will be discussed in this section, namely the Department of Science and Technology (DST), the Department of Higher Education and Training (DHET) and the Department of Trade and Industry (DTI).

The Department of Science and Technology (DST) plays a significant role in promoting scientific research and overseeing how the SA's relatively well-developed science system is managed. Good scientific research has a potential to give rise to innovation. In this regard, DST "seeks to realise the full potential of science and technology in social and economic development through the development of human resources (HR), research and innovation. DST further promotes South African science and innovation by funding research and development at public research institutes and universities. The Department also establishes new institutions and supports instruments for Science, Technology and Innovation" (RSA 2007).

The DHET is a key funder for research in higher education in SA. Its strategy for funding is input- and output-based, even though the latter is most often used. The DHET provides grants, bursaries for postgraduate students and subsidies for research outputs, which include (books, accredited articles, and conference proceedings). However, the output funding system is not void of problems. Institutions must submit their research outputs annually to DHET for

evaluation against its list of accredited articles. Institutions are then awarded a subsidy to the value of R120 000 per accredited article. Completed postgraduate studies are also recognised for funding, with over R300 000 for any successful doctoral study. At most universities in South Africa, individual researchers or supervisors get a small share of this institutional subsidy as an incentive. Unfortunately, universities are free to disburse funding in ways they choose, and this results in disproportionate incentives for academics at different universities. Furthermore, as part of the unintended consequences of the incentive systems (especially regarding article outputs), there is the exacerbation of self-serving conduct by academics who view these incentive systems as money-making schemes. Unethical engagements include, production of research with no problem-solving value, co-publication with whoever is available to pay, poor quality of research outputs (including doctoral graduates), as well as manipulation of evaluation, assessment and peer review activities.

According to the White Paper on Science and Technology, entrepreneurship is a catalyst and means to enable and achieve economic growth, innovation, and development for SA (RSA 1996). The Department of Trade and Industry also works closely with various government departments and institutions to action policies and programmes, which provide businesses with "the necessary finance and non-financial support to make their ventures sustainable and prosperous" (www.thedti.gov.za).

KEY POLICIES AND FUNDING STRATEGIES

Key policies guiding research and innovation in SA include the National Development Plan (NDP) 2030, the National Research and Development Strategy (NRDS), the 1996 White Paper on Science and Technology, the South African 2009–2014 Medium Term Strategic Framework (MTSF), 2007 Ten-Year Innovation Plan (TYIP) (2008–2018), Technology Innovation Agency Act, no. 26 of 2008 (RSA 2008), Publicly Financed Research and Development Act (IPR Act) to mention only a few. Each policy provides clear guidelines on how various research institutes and universities can support government's research capacity development and innovation intents. Access to these policies is open to all.

The Government's espoused values for improving education, training, research and innovation have been aggregated in the (NDP 2030). This plan provides a roadmap for issues of critical concern affecting long-term development of the country. It emphasises a focus on building the capacity of academics who would improve the quality of higher education teaching, learning, research, and innovation. To achieve this, universities must attract a diverse student body for undergraduate and postgraduate studies, from across the world and pay greater attention on inducting them into research and knowledge creation. Government, through

industry partnerships and increasing research and innovation spending, encourages and supports universities to pioneer cutting edge research, science, technology and innovation outputs. It has set clear targets for research "human capital development" (Ramoutar-Prieschl and Hachigonta 2020) and hopes that universities will produce significant numbers of doctoral graduates per million per year before this plan expires in 2030. It hopes to "increase the percentage of staff with PhDs in the HE sector from 34 per cent to 75 per cent and the number of students eligible to study towards Maths and Science-based degrees to 450 000 by 2030" (NDP 2030). Great milestones have been achieved to date, but more work must still be done by universities to support these bold grandiose aspirations by the South African government.

However, it is important to ask difficult questions about whether these targets are realistic and achievable and are not just responses to "performativity" expectations or whether they will produce the research and innovation needed to solve the country's problems. Other things that are not yet clear are what milestones have been reached to date in addressing the targets above? Whether all research institutions and universities have adequate resources and capacity to support the government's wishes, lest they become "a pie in the sky".

The *National Research and Development Strategy (NRDS)* (RSA 2002) advocates an integrated approach to HR development, knowledge generation, investment in infrastructure and improving the strategic management of the public science and technology system. It promotes the development of relevant policies to promote research, development and innovation at universities and enhance the impact of science, technology and innovation in society.

The other policies also play a critical role in strengthening the country's innovation capacity. They emphasise the need to "build on the existing range of strategies and programmes that support innovation, research and development in the private and public sectors, emphasising biotechnology and pharmaceuticals, space science and technology, energy security, and other opportunities presented by climate change" (RSA 2002).

The TIA and the IPR Act are also key enablers intended to assist researchers with commercialisation processes and "protection of intellectual property rights" (RSA 2008).

RESEARCH COUNCILS AND FUNDING AGENCIES

Several Research Councils in SA are responsible for supporting and funding research and innovation, and access is open to all. Examples include the Southern African Research and Innovation Management Association (www.sarima.co.za), a membership organisation of research and innovation managers that operates at institutional, national and international levels, and across the value chain, supporting creativity, research development, innovation,

commercialization and enterprising. SARIMA enables researchers and innovators by maintaining active engagement with innovation development and management activities, which include capacity development interventions, collaborations, multilateral programmes and projects. All these provide a solid enabler and platform for research growth in the South African region.

Another important funding programme has been the Horizon 2020. This was one of the most significant EU Research and Innovation programmes, which had about €80 billion of funding available over 7 years (2014 to 2020). The programme promised breakthroughs and leading discoveries by enabling researchers to showcase their creativity in the laboratories and complete the value chain by taking their creative ideas to the marketplace.

Horizon 2020's focus on both research and innovation with its emphasis on excellent science, industrial leadership and tackling societal challenges, helped to somewhat improve economic growth. While Horizon 2020 has been open to everyone, it would be interesting to see its impact on big and small organisations, institutions and individual academics during its final years.

PARTNERSHIPS AND COLLABORATIONS

Partnerships and collaborations are great enablers for research and innovation at universities. They are a potent way in which government advances research and innovation and taps into other possible funders other than itself. Through the DST, government promotes partnering and collaboration between government departments, business and industry, institutions, SA and international organisations (RSA 2018). According to the NDP 2030, not only should South Africa spend more fiscal resources on research development, but institutional setups also need to improve the link between research, innovation and business requirements (NDP 2012). The Government has a strong belief that building appropriate research infrastructure, increasing the number of collaborations and sharing of resources with various organisations, including the private sector would raise the level of research development and innovation required to solve socio-economic problems. Contrary to this wish, information on existing SA programmes compiled for dissemination in Europe through the SAccess, shows that enacted processes, innovation instruments, agendas and strategies need to be better aligned for maximum achievement of the good intentions. Better coordination, identification of obstacles and synergies between research and innovation are imperative going into the future European Union (EU 2016).

Research partnerships also yield mutual benefits between HEIs and industry or between academics, industry, community or international partners. There is a broad spectrum of these

intellectual linkages which benefit researchers, institutions, and postgraduate students in various ways. Some of these partnerships still feature as dominant structures depending on the vested interests of the collaborators. Frequently cited returns of research partnerships include cost-sharing, easy access to resources and skills, development of resources base, easy access to the market (Hagedoorn et al. 2000, in Umesiobi 2006), and sometimes research is practised on-site or where the need is located.

INSTITUTIONAL STRUCTURES

a) Institutional strategic research plans

Research is a key strategic priority at all universities regardless of their typology (whether traditional, comprehensive or university of technology). Universities are expected to have strategic research plans, and most have research units and dedicated staff to support academics in research endeavours (Goldman and Salem 2015). These research structures are developed in close alignment with national research policies and plans. The government provides funding to support research infrastructure and the pursuit of research at universities. However, only a few of the 26 South African Universities can safely argue that their research efforts are recognisable. The majority have pockets of good practice, while a few, which are often referred to as the top five, are not only regarded as research-intensive but are leaders in research. However, being a top research-intensive does not necessarily imply strength in innovation. Many universities are still grappling with the idea of innovation and commercialisation, and how to achieve close synergy between research innovation and commercialisation.

b) Incentive models

The conduct of individual researchers has been under the radar for some time. Between the 80s and 90s attention was focused on institutional analyses to understand whole institutional conduct towards research and innovation (Geuna 2001). A whole host of "macro" and "micro" decisions and incentives have been made or developed to influence academics and researcher's behaviour and socialise them into increased research productivity (Langa and Zavale 2015). Many universities have resorted to using monetary incentives to entice their academics to improve institutional research outputs. Ironically, these incentive structures have not activated the desired research agency among most academics. While all academics understand knowledge creation as a disciplinary function, the use of incentives as a driver for this scholarly activity to increase outputs has not changed the status quo. However, it has brought much controversy in many universities and research systems in and beyond the borders of South

Africa. In South African universities, if a researcher publishes in an accredited journal, peer-reviewed journal or conference proceedings recognised by the Department of Higher Education and Training, their institution receives a subsidy for that research output. Depending on the university, researchers may be awarded a portion of this money as an incentive. In cases where academics can take the money, this becomes tax-deductible, while others opt to place the money in a research account to further fund their research development.

c) Rating of researchers (https://nrfsubmission.nrf.ac.za/nrfmkii/)

A culture of rating researchers is common in many countries. In SA, the National Research Foundation (NRF) uses it as a national indicator for excellence in research. This allows researchers to apply for incentive funding from the Foundation, and this is calculated based on the researcher's rating. The rating is recognised globally and places the researcher in good standing amongst peers and for outside funding. Evaluation of rating is done by national peer reviewers who assess an individual's research completed in the past 8 years. The rating system categorises researchers into five groups, A, B, C, P and Y (University of Stellenbosch (US) Guide 2020). These range from the highest acclaimed, A rating, to Y rating, which acknowledges researchers who are in the early careers of their research, but who display potential, and have, in under 5 years published their doctoral work and demonstrated growing leadership in their fields. A researcher with A rating is recognised by international peers in their field as a leader for high quality impactful contribution in research. In order for researchers to enjoy these statuses, they need to maintain sustained productivity and research involvement. Y researchers are "40 years and younger and have held a doctorate or equivalent qualification for less than 5 years at the time of application and are recognised as having the potential to establish themselves as researchers within a five-year period after evaluation" (University of Stellenbosch (US) Guide 2020).

Potential candidates must apply on an online system argued by many who have gone through the process or tried to apply to be an onerous, time-consuming process, which can last for 1 to 2 weeks. Other expectations for rating could be argued to depend on how networked a researcher or academic is, who, and how many people cite their work. Although the rating system has existed for more than a decade, not many SA researchers are rated, especially black researchers. As of January 2020, about 4100 academics were NRF-Rated, and only 19.27 per cent were black (NRF 2014).

d) Institutional units/departments and support staff

All SA universities, regardless of their type and focus, have internal structures for supporting

research and innovation. There are departments or units for research and innovation, and in some cases, these units focus on establishing partnerships. Units of this nature are headed by Deans or Directors who report directly to a Deputy Vice-Chancellor (academic and research, research and innovation, or partnerships). These units are differently resourced and have varying numbers of staff who enable academics and researchers in research development through workshops on writing research proposals, postgraduate research development, and application for funding and rating, to name only a few programmes. These units also help track research outputs and report them to their universities for evaluation and management of academic research performance for use by the DHET to evaluate institutional performance and award incentives/research subsidies.

Using Archer's concepts of structure, culture and agency, key questions to ask in this regard are: Why are these structures influencing only a few academics and researchers to increase research undertakings? Are these more constraining than enabling? Are these sufficient to evoke or activate causal powers and properties for positive agential behaviour among academics and researchers? Are institutional cultures receptive to these structures?

Most incentive structures have been found to compromise academic integrity since they are susceptible to abuse by researchers who quickly shift their focus to enriching themselves rather than doing research for innovation or improvement of teaching and learning.

Due to reproduced social and political categorisations of universities in SA into the "haves" and "have not", the distribution of resources and capacity is highly skewed, impacting the critical mass of corporate research agents. Langa and Zavale (2015) concur that structurally, there are still not adequate conditions and incentives to drive academics to engage in a more prolific knowledge production culture.

AGENTS (ACADEMICS AND RESEARCHERS)

At the core of successful research and innovation is qualified, knowledgeable staff with agency. I argue that universities thrive on different types of agents, classified according to Archer (2000) as primary and corporate agents. Primary research agents would be academics and researchers who understand their role in contributing to and influencing research and innovation. They have the power to transform themselves into corporate research agents able to articulate their research needs and organise themselves to undertake meaningful research activities. They make use of structural and cultural opportunities availed to them.

This section categorises research agents and discusses perceived agential roles they should or are playing. A group of renowned researchers who understand research as integral to their academic roles, do it naturally and produce impeccable research and publications. They

understand their agential roles and use their intrinsic properties and causal powers to gain the research benefits that go beyond just improving their teaching and offering them status and recognition amongst their peers. Another group is only comfortable with teaching and learning, has perfected themselves as good teachers, and often misses the important link between teaching and research, and the need to draw on research to influence their pedagogical practices and curriculum review. I call the third group strangers to the academic world because they do not understand why they should undertake research. They do research under duress or because research is part of performance appraisal or promotion. Such academics will opt to meet the minimum performance standards or targets or do no research. These agents are never stimulated by their environments. Their properties and causal powers remain dormant regardless of how good national and institutional support structures and cultures are.

More questions remain unanswered regarding research and innovation agents in higher education. These include whether they understand what innovation is, and whether they have the authority and requisite competencies (skills, and knowledge) to pursue research and innovation. Personal experience in higher education research has taught me that research outputs and publications in higher education in SA come from the minority of academics in the system. Many still lack agency and commitment. More focus is thus needed to activate the causal powers of potential agents within universities and create spaces for engaging in research and innovation discourses. Most universities have an obvious innovation "chasm" between human capital, structures, culture and research and innovation activities (Du Pre 2009). The innovation chain is often incomplete thus hampering expectations. Therefore, I propose the following model for innovation and research that takes into cognisance available structures, enabling culture, key influencing discourses and the agency of staff. The interplay of all these factors cannot be ignored.

CONCLUSION

My analysis of research and innovation structures, cultures and agency within higher education in SA, led to the following conclusions. First, structural modalities (funding frameworks, models, strategies) for intended research, innovation and morphogenesis abound. However, this does not imply that these will bring the habitual action and an appropriately conditioned environment for the agents (individual and collective) to change the research and innovation status in all 26 universities. At the success of any research and innovation structure lies the ability of the agents to engage in "critical agential reflexivity" (Archer 1995). This reflexivity stimulates consciousness of roles, responsibilities and intentionality to access and use available opportunities.
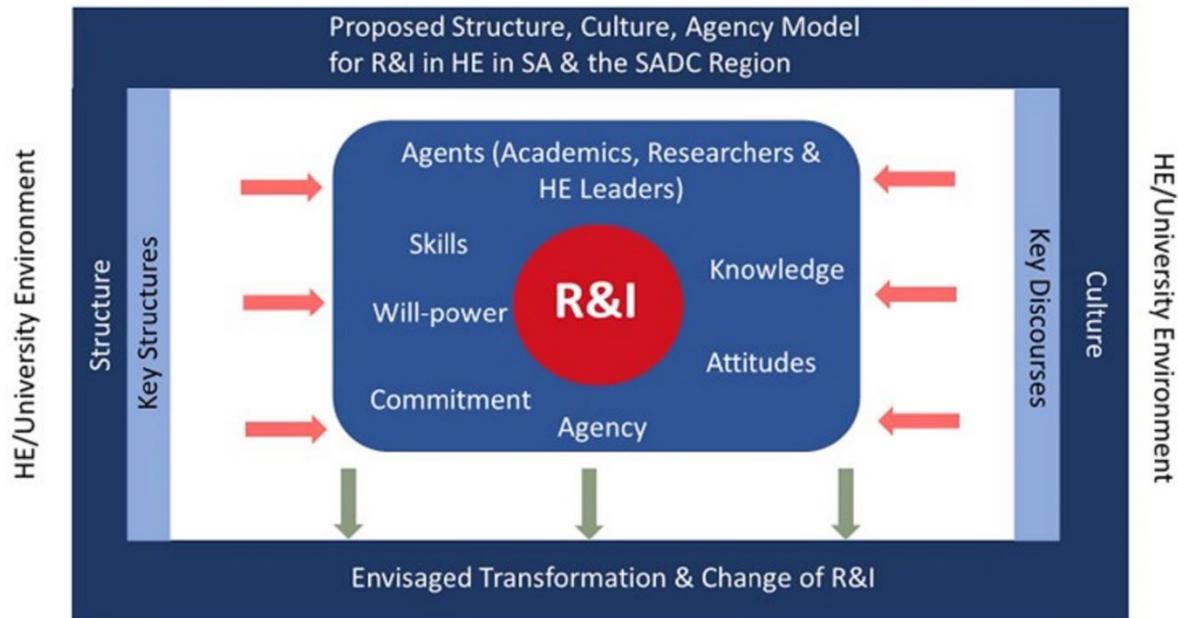
Figure 4: Proposed Structure, Culture and Agency Model for Research and Innovation in Higher education in South Africa **(**Source: Author's own compilation from literature review)

Second, there is no doubt that SA has a plethora of models and innovation programmes, which include funding programmes and agencies. However, these are not easily accessible to all researchers. They are not equitably distributed, and most programmes are like "a pie in the sky".

Third, although all SA universities can be argued to be primary agents, the system is unfortunately highly skewed. Opportunities seem to be much more accessible to the big five and a few other universities, which can spontaneously organise themselves into corporate research agents, while their counterparts are not as privileged. This is evidenced in the ability of these universities to compete for and get large research grants, thus maintaining their status in the world rankings.

Fourth, all universities, especially those lower in the research food chain, can learn from this analysis and should engage in explicit consideration and analysis of systemic (structural and cultural) and agential aspects and contexts to understand better and uncover underlying enabling and constraining mechanisms for research and innovation in their unique spaces. A good understanding of dominant discourses that exist globally and within institutional cultural systems is imperative, as these have a potential to condition innovative spaces in enabling or constraining ways. Constraining discourses need to be challenged to attain the aspired change and innovation.

Lastly, all SADC countries and universities should ponder these questions: Where do they

feature in all these? What are the individual countries' research and innovation mandates and agendas? What structures exist or are accessible to researchers? Who are the research agents/actors? Do universities have the critical mass of agents? Are they key or corporate agents? How can they be supported to activate their properties and causal powers? What kind of systemic cultures prevail? Are their structures and cultures "enablements" or "constraints"? How do they influence the environment to support research and innovation?

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