

Chapter 10

Adopting a Systems Thinking Philosophy to Improve Processes and Practices in Higher Education Institutions

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Abstract

This article is based on a research project that was conducted to explore the applicability of systems thinking philosophy in the Universities of Technology (UoTs). Given the environment in which organisations operate, it becomes necessary for them to continuously improve their processes and practices to remain relevant and competitive. The environment in which organisations operate has been described as unpredictable. Organisations in all the sectors have to deal with chronic and complex challenges. UoTs are not immune from these challenges. Some of the challenges UoTs have to deal with include pressure from the industry, demands from the student body and also transformational requirements from the government. These are complex matters that require a holistic view or understanding from the decision-makers to provide effective responses or solutions. Systems thinking is considered as a critical philosophy to promote innovation, engagement and knowledge development in the higher education sector. Exploring an alternative management philosophy for higher education institutions was informed by a number of factors that have impacted the business of higher education. Hence it was important to conduct this study.

Systems thinking has been identified as an effective management approach that is effective in dealing with complex challenges. The concept of systems thinking is used predominantly in the private sector. Hence the study is exploring the application of systems thinking in the UoTs. A mixed methods approach was adopted to conduct the study. Cross-sectional survey design was employed as data was collected in a one-phase approach. This means both qualitative and quantitative data were collected at the same time. In line with the cross-sectional design, the sets of data were analysed separately but the interpretation was essentially done concurrently. As a result, convergent design was adopted. A self-administered questionnaire was administered to a sample of 322 participants. The sample was drawn from a total population of 1977 Durban University of Technology (DUT) and Mangosuthu University of Technology (MUT) permanent employees. A stratified and simple random sampling technique was adopted. The main findings indicated that functional silos are prevalent in the UoTs. As a result, people (university staff) focus on departmental and faculty goals instead of broader institutional goals. Participants were of the view that systems thinking would help UoTs to respond effectively to complex and unpredictable challenges. The results also highlighted opportunities and possible challenges for the application of systems thinking in the UoTs. This study provides insights to inform operational strategy and policy in the UoTs. Cross-functional collaboration has also emerged as a critical factor that should be promoted in the UoTs. Importantly, the study deals with the gap in the systems thinking literature where currently the focus is more on the private sector, and other sectors have received limited attention from researchers in terms of systems thinking.

1. Introduction

This chapter is premised on the understanding that Higher Education Institutions (HEIs), like any other organisation in the public or private sectors, operate in an environment that is characterized or epitomized by what Rensburg et al.

(2014) call 'intense competition'. Therefore, this chapter is written from a Systems Thinking (ST) perspective in order to deal with complex challenges while remaining competitive in a globalized and interconnected world. The chapter captures Systems Thinking as an alternative management approach that could assist Higher Education Institutions in achieving their strategic goals. This approach helps decision-makers to consider a number of critical factors during the decision-making process. In their quest for excellence in research, participation in internationalisation, innovation and knowledge production, Systems Thinking is optimal for Higher Education Institutions. In essence, this chapter looks at ST in relation to research, internationalisation, innovation and knowledge production in HEIs, especially in Africa. Higher Education Institutions on the African continent are role-players in a global world. Analyzing higher education on the African continent, Kwandayi and Chivasa (2021) point out that very little has been done to study higher education as a discipline in Africa and as a result, the quality of higher education is poor. This point needs serious attention if HEIs in Africa are to be competitive locally and internationally. Van Assche et al. (2019) elaborate that as environments continuously change, management and those responsible for decision-making have to be adaptive. From the higher education perspective, universities are dealing with a wide range of challenges as they operate in an environment that is continuously changing (Dreguez et al., 2021).

This chapter demonstrates how Systems Thinking could be used to foster an organisational culture at the university that inspires every stakeholder to play their meaningful role in achieving institutional goals. In terms of institutional goals, the focus of this chapter is on four specific goals, namely innovation, research, internationalisation and knowledge production. These four specific goals are discussed in greater detail in the following sections. The discussion is in the context of the Systems Thinking approach. According to Meyer and Pretorius (2021), Systems Thinking is a perspective that takes into consideration that a system is made up of

various necessary and interrelated components in which the *relationships* between the components are as critical as the components themselves. Systems Thinking is defined by Hassan et al (2020) as a holistic approach that is used to understand how elements of a system interact and interrelate. This definition provides a basic understand of what ST is. In fact, elements of a system interact to achieve a common goal. According to Stroh (2015), ST is a team sport whereby stakeholders with diverse perspectives work together, sharing their aspirations, their viewpoints and experiences.

From a university perspective, interrelated components will be faculties, academic departments and administration, in a broad sense. In other words, emphasis is on the understanding that the components of a systems are interrelated, interconnected and they interact to achieve a common goal. In the Systems Thinking perspective, organisations are regarded as systems. This understanding demonstrates the link between ST and organisations. Higher Education Institutions are regarded as organisations that exist for a specific purpose in society. Moreover, universities are under constant pressure to meet the needs of their stakeholders. University stakeholders generally include government, students, parents, accreditation bodies, industry, funders, workers and councils. Systems Thinking can be used to deal effectively with complex challenges that cannot be solved using the traditional or conventional approach of reductionism (Meyer & Pretorius, 2021). Therefore, it can be argued that Systems Thinking is topical for HEIs. In addition, Brits (2011) concurs with the view of interrelated and interconnected elements that function as a whole, which is in fact applicable to universities as organisations.

This chapter provides practitioners, scholars and decision-makers with insights that provide a holistic perspective to deal with complex situations and allow for flexibility when there is a need. Davies and Jones (as cited in Walters, 2020) describe universities as organisations that are complex, dynamic and that should be able to adapt in an unpredictable environment. Therefore, the management

approaches adopted should assist universities in responding to the needs of their stakeholders and remain competitive. Internationalisation in higher education and the new trends are also some of the factors that require a holistic understanding of how universities should be managed. In the literature, the Systems Thinking philosophy is considered to be an effective management philosophy to deal with complex and unpredictable challenges in both the private and public sectors. Interdependence, interrelatedness and interactions are the core aspects of ST, and this understanding is critical for policy and strategy formulation. Moreover, this understanding is vital at the level of a university as an entity and also at a sectoral level (the higher education sector locally, nationally or globally). Traditional or mechanistic management approaches have proven to be ineffective in dealing efficiently with the kinds of demands that modern universities are facing. Walters (2020) agrees that the importance of change in higher education is being recognized and well-captured in higher education literature. Hence, Systems Thinking has been identified as a tool to manage such change effectively from a holistic thinking point of view. Walters (2020) further accentuates that educational institutions are dynamic organisations expected to change.

Effective management approaches are therefore critical for HEIs to remain relevant and successful in an environment that has become globalized. According to Webber (2018), universities are knowledge producers. Therefore, it is critical to create an internal environment where every unit within the university works towards a common goal. There are many key focus areas in terms of university operations where a sense of shared purpose becomes critical. Key to promoting a sense of a shared vision is to adopt the Systems Thinking concept. This is a concept that is predominantly used in the private sector but given the complex challenges faced by universities and the demands they have to respond to from various stakeholders, exploring alternative management approaches is critical. It is in this context that Systems Thinking and its applicability in higher education is being explored. This chapter begins

with highlighting the challenges and trends in the Higher Education sector, followed by a section that deals with unpacking the Systems Thinking concept generally, and in the context of Higher Education Institutions specifically. Finally, the chapter covers ST in the context of the key strategic areas of a university, as mentioned earlier in this chapter.

2. Systems Thinking as a catalyst for collaboration beyond functional boundaries

This section provides the basis for Systems Thinking being considered as an alternative management concept in higher education. According to Stroh (2015), conventional thinking is suitable only for simple or linear situations, whereas ST is for complex and non-linear situations. Systems Thinking allows stakeholders to play their roles effectively for the success of the whole system (organisation), instead of only for their benefit as individuals (Stroh, 2015). This creates a conducive environment for stakeholders to work as a collective and to collaborate beyond functional boundaries. On the other hand, organisational silos hinder the successful sharing of information and necessary resources for an organisation to become successful and remain competitive (Bento et al., 2020). These authors further state that in essence, silos create barriers to communication across functional areas within organisations. Van Niekerk (2016) acknowledges that reductionist and mechanistic thinking is prevalent in university environments. It is clear that ST is the only option to succeed in innovation, internationalisation, research and other key focus areas in a university context. Cilliers and Greyvenstein (2012) succinctly state that silos in organisations not only refer to what is known as conscious structure, but also relates to the unconscious state of mind (mentality). Therefore, the silo mentality has a negative impact in terms of cross-sectional collaboration and organisational effectiveness. In essence, conditions in which organisations operate require a multi-perspective approach, which could be achieved through Systems Thinking. An overarching ST philosophy is relevant to bringing various units within the organisation to

work together. Hence, Sivam et al. (2019) posit that individuals with the necessary knowledge and skills play a role in generating innovative initiatives. In addition, they argue that the goal of each organisation is to remain competitive and conquer competition.

3. Tenets of Systems Thinking

Tenets of the Systems Thinking philosophy include interconnectedness, interactions and interrelationships. The understanding of these tenets is critical for the practical application of Systems Thinking in an organisation.

Interconnectedness

In Systems Thinking, everything is connected to everything else, and this perspective provides a holistic worldview (Sterman, 2002). It has also been posited by Oosthuizen and Manzini (2022) that a system comprises interconnected components. At a practical level, this understanding is critical because what happens in one component of a system will essentially have an impact on other components of the system. This understanding is also important for decision-making and policy formulation. Systems Thinking is also an effective philosophy to manage change at an organisational level.

Interactions

System elements interact to achieve a common purpose. In an organisational context, various departments or units should work together to achieve the broader goals of the organisation. This understanding fosters a culture of knowledge-sharing across functional boundaries. Knowledge-sharing is critical for an organisation to achieve competitiveness.

Interrelatedness

Systems Thinking recognizes systems as a collection of critical elements that are interrelated and in which the relationships between such elements are important (Meyer & Pretorius,

2021). This aspect of ST promotes a holistic understanding of the operations in organisations and their impact on society and other social systems. It is eloquently stated by Haynes et al. (2020) that interrelated and independent parts of a system are linked by a common goal. This tenet serves as catalyst for promoting a sense of shared purpose.

4. Application of Systems Thinking in the context of Higher Education

This section discusses Systems Thinking and higher education at two levels. The first level deals with operationalizing ST in a university as an organisation. The second level discusses ST in the context of a university as a role-player in local, national as well as international higher education environments. Universities in Africa are not only competing amongst themselves on the continent, as Pamella (2021) argues that African universities compete with universities globally as well. Through the application or adoption of Systems Thinking, Higher Education Institutions are able to improve their services and differentiate themselves from their competitors (Dunnion & O'Donovan, 2014). The authors further highlight that functional specialization in the university context creates challenges as there is no cross-sectional collaboration. Mhlongo (2021) acknowledges that the culture of functional silos is prevalent in UoTs, which are part of the higher education landscape. Systems Thinking opposes traditional management approaches. As a result, the command-and-control approach is in many ways ineffective to deal with the complex challenges that require a systematic or holistic understanding and holistic intervention (Dunnion & O'Donovan, 2014).

Given the new trends in the higher education landscape globally, institutions of higher learning are expected to fulfil a wide range of new roles beyond their traditional functions (Ntshoe & Selesho, 2016). Being innovative is certainly important for HEIs to meet the diverse needs of their diverse stakeholders. According to Bess and Dee (2014), researchers

have recommended reforms in structure and changes in organisational culture in order to improve organisational effectiveness. Bento et al. (2020) acknowledge that it becomes impossible to achieve organisational goals where there are organisational silos.

It has been common practice for HEIs to adopt management concepts used in the private sector. This is influenced by a number of factors, for example funding, meeting the needs of stakeholders and remaining competitive. Higher Education Institutions are regarded as organisations and in a Systems Thinking context, organisations should be viewed as systems. This understanding helps members of the organisation to appreciate that in fact various units, departments or sections in an organisational context should work together to achieve a common goal. Systems Thinking could thus be used in HEIs as an overarching philosophy to eradicate compartmentalization and functional silos. The following sections demonstrate the influence of ST in helping HEIs to improve their key focus areas. These include innovation, research, internationalisation and knowledge production.

5. Gaining a competitive advantage through Innovation in Higher Education Institutions

Innovation is critical to remaining competitive, achieving organisational effectiveness and sustainability. According to Sivam et al. (2019) innovation is a key resource in gaining a competitive advantage and in assisting each organisation to be successful. Hence, Calitz et al. (2018) emphasise that organisations, including Higher Education Institutions, should do everything possible to ensure sustainability. Fomunyam (2020) opines that HEIs in Africa have a role to play in generating innovative ideas for operating effectively in an interdisciplinary environment. This is crucial for flexibility and being able to adapt to a continuously changing world. According to Bester (2017), UoTs are under constant pressure to produce graduates who are entrepreneurially minded. This

is generally the case even with the other types of HEIs. In a university context, innovation is critical at the level of the university processes and practices, as well as at the level of the quality of graduates. This is to ensure that university graduates are innovative. Hence, Owusu-Agyeman (2021) argues that the concept of innovation remains topical for Higher Education Institutions as they need new ideas to continue improving the processes and practices to meet the needs of their stakeholders. This becomes important as there are many factors that force HEIs to be innovative. According to Ruano-Borbalan (2019), innovation in higher education has become a global goal. An overarching Systems Thinking philosophy is topical in order to create a conducive environment that promotes participative processes to enhance innovation in Higher Education. Principles of ST provide a conducive environment for innovative ideas to be shared across the organisation. Where Systems Thinking is adopted, knowledge is easily shared and members of the organisation collaborate beyond functional boundaries. This point is espoused by Gerstein and Friedman (2016): that the problem with functional silos is that it becomes difficult to share knowledge and collaborate beyond functional boundaries. Systems Thinking creates a solid foundation for every stakeholder, unit and department to work towards a common goal. Although innovation is one of the key focus areas in a university, Jakovljevic (2019) argues that South African universities still have barriers that hinder innovation. However, innovation is vital for economic growth, responding effectively to societal challenges, and the formation of new industries (Sivam et al., 2019). This highlights the important role that Higher Education Institutions are to play in terms of innovation. Mashau et al. (2018) posit that universities must become innovation facilitators as they should provide a conducive environment to explore and exploit entrepreneurial activities that lead to the development of new products, as well as improved processes.

6. Research as a key strategic goal of a university

There is a strong emphasis on research and improving research output in Higher Education Institutions. According to Overton-de Klerk and Sienaert (2016) research plays a critical role in reputation-building for HEIs, as well as in terms of university rankings. Kwandayi and Chivasa (2021) raise a critical point that universities from Africa have not been doing well in terms of university rankings globally. They also acknowledge that research as a field of study has received necessary attention in higher education (Kwandayi & Chivasa, 2021). In addition, Overton-de Klerk and Sienaert (2016) argue that as a result, research remains a critical element of a university's brand value. Hence, HEIs are regarded as places for knowledge development, research and community development (Salajan, as cited in Owusu-Agyeman, 2021). Moreover, research plays an important role in providing useful information for decision-making purposes in Higher Education and other sectors. This is a point espoused by Weber (2018). Hence, research in higher education should broaden the narrow understanding of the multifaceted role of higher education. This broader understanding should take into consideration other critical areas in which higher education plays a role, including societal and economic factors. As Bester (2017) succinctly states, Higher Education Institutions are being judged by the ways in which they respond to the social and economic needs of society. Various stakeholders rely on university research to provide the necessary knowledge for economic growth. Therefore, Systems Thinking can play a role in promoting research activities across all sectors of a university. Through research, it is possible to find solutions to problems. In line with Systems Thinking principles, Naidoo et al. (2019) suggest that research should be implemented using inter-disciplinary and trans-disciplinary partnerships. Goujon et al. (2016) emphasise that the relevance of higher education is critical as it plays a role in the development of scientific knowledge for economic and social development.

New research agendas are being defined around the green and blue economies and the fourth industrial

revolution. These can provide tangible benefits when research is implemented through inter-disciplinary and trans-disciplinary research partnerships (Naidoo, et al., 2019).

7. Universities as key role-players in a globalized, interconnected world

Student mobility remains a critical measure of internationalisation and there has been an increase in student mobility in all regions (Muyaka, 2019). According to Haarnen and Saarti (2020), higher education in Africa has also been integrated into the global higher education landscape. This is a phenomenon that involves many stakeholders and a number of other factors. The internationalisation of higher education can be described as a complex phenomenon because of the number of stakeholders who should play a role, namely scholars, students, governments or host nations, academic institutions and parents (Kumar & Aithal, 2020). Other factors that should be considered during the decision-making stage include infrastructure, industry interaction, technology, employee expertise and innovative teaching methods (Kumar & Aithal, 2020).

Systems Thinking therefore becomes a philosophy to unify all these stakeholders to work towards a common goal. In this context, ST becomes relevant at the level of each stakeholder and also at the level of stakeholders working as a collective to deal with the successful internationalisation of higher education. The successful internationalisation of higher education depends on each stakeholder playing their part effectively and taking into consideration all other important factors. Systems Thinking becomes the only management philosophy to promote holistic thinking in the context of the internationalisation of higher education.

It is through Systems Thinking that each stakeholder understands the bigger picture. The general understanding is that the world is interconnected, and Higher Education Institutions are made up of interconnected administration and academic sectors. Interconnectedness, interrelatedness

and the interaction of various parts or elements of a systems are what ST is about. These are the principles of the Systems Thinking philosophy. French and O'Leary (2017) describe higher education as something that is being “marketised”. They further postulate that Higher Education Institutions across the world are under constant pressure to respond to globalization, the massification of higher education and dealing with complex demands from stakeholders. According to Kumar and Aithal (2020), the quest for quality and innovation in higher education has been identified as a major factor for the internalisation of higher education. Furthermore, Mlambo et al. (2020) are of the view that globalization and the world have become interconnected, which has resulted in rising student numbers as they exploit study opportunities internationally. Kwandayi and Chivisa (2021) assert that HEIs should be managed effectively in order to meet the needs of society.

8. Understanding the role of Higher Education Institutions in the development of new knowledge

In an era characterized by complexity and uncertainty, Hurst and Du Ploy (2021) aver that the role of higher education should not be a focus only on the measurable outcomes of learning, but also on producing graduates who are responsible citizens. In other words, the role of higher education is beyond empowering graduates with technical and theoretical expertise. Higher Education Institutions are in fact regarded as enterprises that produce new knowledge. Jung (2020) describes knowledge as a critical driver for economic growth, especially in a global environment. He further argues that HEIs play a crucial role in knowledge production. Powell et al. (2017) describe a university as an entity that plays a crucial role in constructing and transmitting knowledge. Hence, it is necessary to consider a number of factors when the university curriculum is being re-calibrated and renewed. Meeting the needs of multiple stakeholders has become a key factor for HEIs. To do this successfully, inter-disciplinary and multi-

disciplinary practices should be considered during strategy formulation and decision-making. Looking at Systems Thinking in the context of managing change, Banerjee and Lowalekar (2021) emphasise that this could be achieved through the co-operation of multiple stakeholders.

The adoption of Systems Thinking is a strategic option for innovation, knowledge production and research in the Higher Education sector. Those in positions of authority in Higher Education Institutions need to have the requisite skills and qualities to succeed in a higher education landscape that has nefariously complex and unpredictable challenges (Walters, 2020). According to Lee and Kuzhabekova (2019), those who are responsible for policy development and those who lead institutions rely on research and new knowledge to gain national and institutional visibility. Highlighting the role of higher education in the development of new knowledge, Lee and Kuzhabekova (2019) point out that knowledge plays a role in ensuring economic growth and social development. Hence, Systems Thinking will serve as a catalyst to facilitate the understanding that university operations have impacts beyond producing graduates. In addition, HEIs play a role in producing new knowledge to solve societal problems. Manthalu and Waghid (2019) assert that higher education in Africa is critical in order to achieve global competitiveness.

9. Conclusion

This chapter provided necessary insights for every stakeholder and decision-maker in the higher education landscape to appreciate Systems Thinking as an effective alternative to reductionism. It is a philosophy that deals effectively with complex matters. In the words of Stroh (2015), Systems Thinking creates a sense of shared purpose amongst parts or elements of complex systems. In ST language, everything in a system is connected. Lynch (2017) is of the view that the education system is struggling to effectively address the needs of a hyper-connected society. Sadly, this hyper-connected society is continuously evolving. According to Jhaj (2019),

institutions of higher learning have to deal with complex challenges which are unique in the history of higher education. These challenges include competition and transformation. Systems Thinking is therefore relevant to achieving organisational effectiveness in all the key aspects of university operations. It provides a holistic understanding of how various departments and faculties need to function collaboratively in order to achieve common and broader university goals. Being innovative, increasing research output, producing knowledge and becoming an effective player in a global world are some of the key focus areas for universities. Therefore, Systems Thinking is relevant to understanding the interconnectedness of every aspect of a university's operations. Gerstein and Friedman (2016) make the valid point that flexibility is vital for organisations to survive in the digital age. This chapter discussed Systems Thinking in order to inspire holistic thinking in addressing the complex challenges in higher education. In a turbulent higher education landscape, recycling ineffective management practices is not a strategic option. Hence, Pretorius (2019) posits that it is important to approach performance improvement in an organisation from a systems and business perspective. The author of this chapter is of the view that Systems Thinking could be used to foster a culture of innovation, research and the development of new knowledge in Higher Education Institutions. In essence, the author believes that through Systems Thinking, Higher Education Institutions would be able to improve their processes and practices to remain relevant in a globalized space. Steynber et al. (2020) concur that the management approaches used in Higher Education Institutions are inappropriate, therefore flexibility is critical. In essence, this suggests a need to adopt management approaches that allow for flexibility in responding to challenges that are complex and unpredictable. Mhlongo (2021) acknowledges that the adoption of Systems Thinking would in fact be a strategic option for Higher Education Institutions.

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