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The purpose of the *Kuveza neKuumba - Zimbabwe Ezekiel Guti University Journal of Design, Innovative Thinking and Practice is* to provide a forum for design and innovative solutions to daily challenges in communities.

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Contents

The School as a Multi-layered Platform for Learning and a Community Demonstration Centre

Rutendo S. Zinhu[1], Marlvin S. Malinganiso[2] and Linda Kabaira[3]

Abstract

The Zimbabwean education system has gone through various reforms in search of frameworks that can inspire socio-economic growth as poor economic performance had crippled the country. There is increasing disapproval over the pertinence of education currently given to students. There is need to produce learners who are problem-solving, prepared for sustainable development and enterprising, who contribute to their country's growth. The article explores and discusses the argument that due to the increase in underdevelopment and societal problems, which include poverty and hyper-unemployment, particularly in Africa, the school should be a focal point for the plan of action and a demonstration centre for the community. The study is a qualitative study with a desktop research approach. The study revealed that the school is a multi-layered platform that can echo resistance of the oppressed masses as a community centre for demonstration in this case, decoloniality and Africanisation of the education sector. The study reveals that the school can be a platform for learning through Education 5.0, that has served as a learning method towards innovation and industrialisation, creating graduate attributes and students that can create than seeking employment. The study concludes that the school system remains both a key to learning and demonstration through liberation of the oppressed minds and suppressed histories.

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INTRODUCTION

The 20th and 21st centuries have been characterised as the age of information, social and cultural life become restructured as people evolve into information society (Lambeir, 2005). One of the aims of the educational system in the 21st century is to prepare students to successfully function in the knowledge society. Industrial growth in any country is important to boosting economic growth and citizenry welfare. Therefore, to meet the needs of industry, a competent human capital should be built, by ensuring that tertiary education graduates have job-relevant knowledge, skills and attitudes as exit competences (Matorevhu, 2023). A knowledge economy premised on higher and tertiary education as a major driver of economic competitiveness is important for sustainable development, in both industrialised and developing countries (World Bank, 2019).

Poor economic performance and a lack of a focused national education policy in Zimbabwe saw the country hopping from one policy to the next (Keche, 2022). The development of Education 5.0 has been proposed as the solution to this policy foraging with the aim of creating graduates with innovative job creation skills and industrial worth knowledge to industrialise the country and create a middle-income economy by 2030 (Murwira, 2020). The role of the school actors within them is to mould a passive academic learner or a job seeker but rather one who is prepared for sustainability, future challenges and competencies. The school should be at the centre of innovation in the community. Muzira and Bondai (2020) have alluded that the thrust of an education system like Education 5.0 is on local heritage or indigenous knowledge systems to produce goods through locally available resources.

Education has to shift for a change, a shift in perspective from education that strives to modify behaviour to a participatory approach that includes independent and critical thinking, and encourages students /learners to develop skills for taking action (Jensen and Schnack, 1997). The 1992 United Nations Conference on Environment and Development in Rio de Janeiro identified sustainable education as a way to preserve and develop learning for all that spreads and lasts, in ways that do

no harm to and create positive benefits for others around us, now and in the future (Hargreaves and Fink, 2006). Therefore, the school is a useful opportunity for education for sustainable development based on underlying values that can be examined, debated, tested and applied. Values that bring solutions for the difficulties faced in society include environmental, social and economic issues. This article seeks to bring out the school as a multi-layered platform for learning and as a community centre for demonstration as schools from the Global South continue to search for an alternative discourse that allows for multiple realities.

CONCEPTUAL FRAMEWORK
For this article, the framing comprises the following components: the school as a platform for learning and how it can initiate the action plan and become a demonstration centre for the community. The purpose of this conceptual framework is to provide a basis for analysis. The system concept generally employs a loop to permit both cognitive reflection and practical measurement of the learning process in terms of changes in learning goals, content and instructional methods.

THEORY OF EDUCATION FOR SUSTAINABLE HUMAN DEVELOPMENT
Through the continuous endeavours of educational leaders and researchers in a variety of fields (e.g., Lewis, 2005; Tribe, 2002), sustainability education has advanced steadily as a complexity of overlapping learning initiatives. Nkhata and Breen (2010) stated that "understanding of an integrated learning system is essential if we are to successfully promote learning across scales as a fundamental component of adaptability and management". In reviewing the concepts of functioning, capabilities and agency, as originally outlined by Sen (1989) and Landorf, Doscher and Rocco (2008), offer a framework for assessing ESD-related learning outcomes, teaching practices, curricula, and knowledge and skills acquisition. They redefine ESD as education for sustainable human development to emphasise that education should focus on enhancing well-being, based on a practice of democratic dialogue, and forms of learning that include local cultural and social realities. Accordingly, the educator is responsible for evaluating the contextual circumstances that will impact the students' well-being, and for providing a form of teaching that enables

students to understand their capabilities. Curriculum for sustainable human development goes beyond environmental education while focusing on 'locally determined basic capabilities". The educator's role is to guarantee that the curriculum is built through a process of democratic dialogue, where learners and community stakeholders 'address what students must know and learn to achieve valued functioning. There is a wide body of literature on how ESD is meant to achieve its aims. Hoffman *et al.* (2006) articulate how the four 'pillars of learning', as defined by the International Commission on Education for the Twenty-first Century (Delors *et al.*, 1996), provide connecting parts with Sen's vision to move towards achieved functioning. The four pillars (learning to know, learning to be, learning to live together and learning to do) provide a parallel to Sen's concepts of reasoning, agency, and potential through social capital.

LITERATURE REVIEW
The section presents the body of literature that was reviewed by the study to craft the discourse for this study along the lines of the role of education in communities as education has multifaceted roles in communities from community development to social reforms.

THE ROLE OF EDUCATION IN COMMUNITIES
The school has great potential to develop the community, ultimately, they are community institutions. Intentionally involving community resources, energy and expertise in schools improves learning outcomes for students and has a positive impact on the community. Tractenburg *et al.* (2018) observe that schools provide sustainable learning to communities, that lasts and is retained and maybe transferable after exposure to it and it may involve the process of learning to learn. Dill (1995) observes that schools provide an education that is informed by competitive markets the application of inducements for exceptional innovations and industrial activities and processes of self-regulation through Education 5.0. A visual representation of the community and the various skills people have to offer is an essential way to understand what community resources are available (O'Keefe, 2011).

Chitumba (2013) notes that schools and the education system can be used as a tool for guarding against the invasion of foreign cultural practices and as a medium and form of cultural affirmation as schools can be used in the teaching of *Ubuntu* and safeguarding the African culture. Dube (2021) observes the degeneration of culture in most areas and Muzvidziwa and Muzvidziwa (2012) observe that highly performing schools are characterised by the presence of *Ubuntu* among learners ,indicating that schools instil discipline in learners through the impartation of *Ubuntu.* Zhao (2021) observes that the role of schools and education is to influence industrial development through vocational education as this has transformed North East China industrial development since 1932. Ren *et al.* (2017) articulates that education in practical education and apprenticeship match well with industrial developments, therefore, education has served its purpose as the spark for industrial development in communities.

Bjaelde *et al.* (2017) posits that the Danish Education system uses continuous assessment in higher education (HE) institutions and it has a paramount role of transforming and making the education system effective and changing communities. Muzira and Bondai (2020) observe that education should lead to the creation of new jobs, reduction of unemployment, generation of foreign currency from the export of goods and services produced through the beneficiation of raw materials and also help in the reduction of some vices such as drug abuse and criminality induced by poverty and unemployment with reference to Education 5.0. Lee *et al.* (2005) allude that the continued evolution of HE curriculum is necessary as a curriculum should provide solutions to challenges like economic problems, that are faced by society the world over. Maria, Shahbodin and Pee (2018) allude that Malaysia implemented a higher and tertiary education reform they termed Education 4.0 meant to align the HE system with global trends and the need to balance between both ethics and morality, along with knowledge and skills. This literature shows that education plays a pivotal role in communities, i.e. it has a multi-layered impact on society as it can provide learning and become a community centre for demonstration.

RESEARCH METHODOLOGY

The article is housed in the qualitative methodology with a bias towards the descriptive research design. The article was built through a desktop study involving a multi-perspective comprising literature and documentary review. To craft the discourse for this study, the researchers engaged literature review to understand how the school can be a multi-layered platform for learning, equipping learners with the knowledge to inspire socio-economic development, and as a vehicle for social change through being a community demonstration centre countering power structures within society. Snyder (2019) observed that a literature review-based study can provide a transdisciplinary approach to social phenomena, as such, this study intends to bring a transdisciplinary understanding to the study. Data was also collected using archival methods where documents were purposively selected.

KEY THEMATIC ARGUMENTS

The study reveals that the school in Zimbabwe has proved to be a multi-layered platform for learning and a community centre for demonstration as the education curriculum reform in Zimbabwe through Education 5.0 has been used in the demonstration or decolonisation of the colonial education system that aimed to create subservient job-seekers not job creators. Through Education 5.0, the Government in Zimbabwe has strived to create a platform for learning that creates graduates who can add value to the goods and services created by local industries. By doing away with Education 3.0 and creating Education 5.0, the school in Zimbabwe emerged as a multi-layered platform for learning and community centre for demonstration, as the system created an education that teacheas innovation and industrialisation, while demonstrating through the decolonisation of the education system. Concurrent with these findings is Deng (2010), who observes that, in Singapore, the curriculum reform helped create skills (also referred to as graduate attributes or 21st century skills) that are lifelong skills not specific to any class or subject that students need to learn. The introduction of technological innovations into schools and the integration of online technologies in education is a process that calls for instructional strategies. Education systems around the world are required now, more than ever

before, to adapt to the spirit of time and to embrace technological innovation (Fullan, 2006). To structure learning, students engage in an iterative process that includes identifying the problem, deconstructing problem frames, reframing the problem, analysing problem facets and integrating findings (Moust *et al.*, 2005), furthermore, fostering lifelong learning in line with the opportunities and challenges of society through re-learning to learning, embracing ICTs and e-learning, flexibility and adaptability, critical thinking, creativity and problem-solving.

The study reveals that the school system in Zimbabwe has played the role as the platform for learning and community demonstration in terms of climate change and disaster risk management. The study has reveals that the education system has mainstreamed climate education in primary and secondary education, targeting children, as the change agents that can push climate education into communities. The study reveals the system has also been used as a community demonstration platform as the curriculum has been reformed in Geography to include indigenous knowledge systems (IKS) to create a climate change response model that is informed by locally-based experiences. In support of these findings is Tanyanyiwa (2019), who observes that knowledge creation about climate change in Zimbabwe has to involve IKS as they espouse lived experiences and lessons that can be used in the future. Natural capital covers natural resources, ecosystems, and biodiversity, while cultural capital holds cultural property (tangible and intangible), cultural networks and support systems and cultural diversity (Throsby and Petetskaya, 2016). Thus, curriculum integration is required to enrich learning and to connect the information learned.

The school in Zimbabwe has become a multi-layered platform for learning and a community demonstration centre as it has been used to counter Eurocentric ideologies and provides the country with the much-needed human capital in the fight against economic sanctions imposed on the country by Western countries. Nani and Shervashidze (2017) observe that due to high unemployment bedevilling Zimbabwe, entrepreneurship has been introduced into the tertiary education curriculum with

the hope that graduates can create their own jobs than being job-seekers. The findings reveal that the school in Zimbabwe has been used by advocates of Afrocentrism to demonstrate against Western European ideologies, with Ndlovu-Gatsheni (2015) requesting a rewriting and reconstruction of the whole panorama of human history in its account of the origin of mankind, the origin of philosophy, science, medicine and agriculture. The findings indicate that Mavengano, Marevesa and Nkamta (2022) protest the use of Western knowledge systems advocating for Africanisation of the University curriculum in Zimbabwe, in an effort to debunk Eurocentric thinking characterised by binarisms, racial biases and discriminatory attitudes towards Africans.

The findings reveal that the school in Zimbabwe has become a multi-layered platform for learning and community centre for demonstration as Ndlovu-Gatsheni (2015), protests the misconstruction of the African identity by positing that Africanisation of curriculum in Zimbabwe can help the dismembered people be re-membered, relaunch themselves from being non-being into the world of being, recapture their lost land, power, history, being, language and knowledge. Murwira (2020) statess that the Education 5.0 is a heritage-based curriculum that aims to reposition indigenous knowledge into the education system to equip students with African experiences and solutions. Rusiro (2019) found out that in pursuit of the decolonisation project, the Government of Zimbabwe has integrated indigenous knowledge into the Zimbabwean Geography curriculum as modern Eurocentric weather forecasting is becoming less reliable due unpredictable weather changes. Mavengano *et al.* (2022) observes that the university curriculum Africanisation can provide answers on how Africans can regain their identity, power and history through discourses of decoloniality, Africanisation and liberation as they address the impacts of colonialism on Africans and their contemporary existential circumstances.

Murwira (2020) perceives that Zimbabwe has the best literacy rate in Africa and the world, but its industrialisation is remarkably low, implying that knowledge, skills and awareness,

crucial determinants of the degree of industrialisation, are inadequate. This inadequate industrialisation is premised on Education 3.0 that had three missions: (1) Teaching; (2) Research; and (3) Community Service. This was a colonial government curriculum that produced workers instead of producers of goods and services (Matorevhu, 2023). Mutorevhu (*ibid.*) asserts that to decolonise the education system, the post-colonial government of Zimbabwe created Education 5.0 that has five pillars: (1) Teaching; (2) Community Service; (3) Research; (4) Industrialisation; and (5) Innovation. This curriculum was against the colonial curriculum that created workers and not employment creators, hence the school becomes a multi-layered platform for learning and community demonstration as students are taught to be innovative and industrious, rather than wait for employment.

Chingozha *et al.*, (2022) claim that higher tertiary education plays a key role in innovation and economic growth through universities and colleges that develop new knowledge and technologies and applying them in economic growth. Matorevhu (2023) avers that Education 5.0 advocates for innovation in teacher education in the 21st century, including the integration of ICTs, i.e. computers, software, networks, satellite links, websites and other related systems into teaching and learning of teacher education programmes to make the school a platform for learning. Dziwa and Postma (2020) opine that Education 5.0 makes creative graduates with an eye towards industry and elevating the middle-income economy. The Ministry of Primary and Secondary Education (2018) reveals that the Ministry developed the Education Sector Strategic Plan 2016-2020 and one of the key messages of the plan is to mainstream climate change and disaster risk reduction into the formal education curricula. This makes schools multi-layered platforms of learning and community centres for demonstration.

DISCUSSION
A functional school should have a coherent curriculum. The school must be a purposeful place, with a clear and vital

mission, be a communicative place where people speak and listen carefully to each other, be a just place where everyone is treated fairly, be a disciplined place, with clearly defined rules of conduct and it must be a caring place where students, teachers and parents feel secure (Boyer, 1995) The community, without question, is the glue that holds together an effective school. The study reveals the need for decoloniality, Africanisation and liberation of the education system so as to reposition, re-member Africa in the knowledge creation system through school curriculum Africanisation, hence making the school a platform for community centre for demonstration. Concurrent with these findings are Lebakeng *et al.*, (2006), who note that the resuscitation of local knowledge and problematisation of epistemic reliance on the West could be realised in the inclusion of African indigenous epistemology. Congruent with the findings is Ngugi (2009), who posits that Africanisation of education in Africa can re-humanise and re-memberise African humanity, previously dehumanised and dismembered by the process of colonialism. Concurrent with the study is the theoretical framework the education for sustainable human development (Tribe, 2002) as the decolonisation and Africanisation of the education system can create an education for sustainable human development as the education can give identity to Africans while demonstrating against the control of the discourse (cf. Guli, and Mamuladze , 2017). This positions the school as a platform for community demonstration against the dominant colonial forms of education that have, for a long time, been imposed on African communities through the universalisation of Western knowledge systems.

CONCLUSION

For generations, wars have been fought and, after the wars, victors have used education to subjugate the vanquished. Education has also been used as a decolonial tool by the oppressed as education embodies the power to teach and equip revolutionary mentalities to the oppressed and inspire change. The study concludes that the education system has been used

in Africa as a multi-layered platform for learning and as a community demonstration centre through various decolonial initiatives that have seen the Africanisation of the education system countering the universalism of Western knowledge systems. The education system in Zimbabwe has been used as a platform for learning in the area of climate change, as well as a platform for protest as Zimbabwe education system has included IKS in climate change studies. Education is a complex system requiring multiple perspectives and levels of analysis to learn, It, thus, has the power to guide learners to not only be theoretically equipped, but also have practical skills. These skills can equip students to sustain and fend for themselves even if not formally employed, engaging them in the community and become problem-solvers, and preserve culture through IKS. Skills can make them innovative through integrating online technologies into their learning and also through re-learning to learning, embracing ICTs and e-learning, flexibility and adaptability, critical thinking, creativity and problem-solving. The school, therefore, is a thriving centre for learning, a place with curriculum coherence, a climate for creative learning and a commitment to building the community.

Future studies should look into the impact of Education 5.0 on the school system in climate change studies to understand if it has brought to the studies innovations and resilience capacities to the communities. Future studies should also look into the impacts of innovation and industrialisation, espoused in Education 5.0 on rural development to understand if it has developed and transformed the rural livelihoods as lack of entrepreneurship skills have been indicated to be the impediment of rural development. These studies should regard the schooling system as a platform for democratic transformation of societies and understand how schools can play a role in alleviating political problems bedevilling Zimbabwe. Future studies can look in how the school, as a platform of learning, can help in the achievement of sustainable development goals (SDGs).

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Educational Technology in Vocational Training Programmes in Zimbabwe

EUNICE DHOKURA[1]

Abstract

The study centred on the types of educational technology used in vocational training programmes with a primary focus on Zimbabwean vocational training centres (VTCs). The main objective of the study was to identify the types of educational technology in use in vocational training programmes. The study reveals the following educational technology currently in use at VTCs: Synchronous, Asynchronous, Linear Learning, Blended and Collaborative Learning to enhance the learning experience and produce world-class graduates with transportable skills who are ready for work in the technologically developing world. Quantitative data was gathered from students at VTCs, whilst qualitative data was obtained from lecturers and staff also at VTCs, to complement the quantitative data. The research instruments used were questionnaires, interview guides and observation guides. Both probability and non-probability were used. The target population for this study consisted of 3 500 participants drawn from five VCTs. Research concluded that two beliefs, perceived usefulness and perceived ease of use, have been identified as important user acceptance criteria.

Keywords*:* collaboration, synchronisation, asynchronisation, innovation, linear and blended learning

INTRODUCTION

The use of different educational technologies has become one of the driving forces in the delivery of instruction in present-day vocational education and training (VET). Though educational technology has become an increasingly accessible resource for educators to use in their teaching activities, most teachers are still unable to integrate it into their teaching and learning

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processes. Different types of educational technologies are used to improve teaching quality where quality is expensive to reproduce, or to substitute for the lack of teachers, or schooling opportunities that cannot be made available with conventional teaching methodologies. However, this is not achievable without enough educational technology. VTCs are pivotal to the Zimbabwean economic landscape, especially through the provision of basic services that include policy formulation, quality control, preparation of competency-based curriculum, developing skill standards of various occupations and testing the skills of the people, conducting various research studies and training needs assessment, among others.

Information processing and electrical communication using educational technology have progressed remarkably, as office computers and word processors are introduced at tertiary institutions, including VTCs. Currently, the importance of knowledge and educational technology, VET schools are responsible for the provision of qualified middle-level personnel needed mostly in industrial and service sectors. Thus, the provision of high-quality educational technology and education in present-day vocational education and VTCs is very important. Around the world, all economically advanced democracies place high value on the quality of their vocational education and training (Nkasiobi, 2011; Hall, 2022; Angotti, and Morse, 2023).

VET, also known as Career and Technical Education (CTE), prepares learners for jobs that are based on manual or practical activities, traditionally non-academic and related to a specific trade, occupation or vocation. It is sometimes referred to as technical education, as the learner directly develops expertise in a particular group of techniques or technology. VET have become a key policy issue as their importance to national economic performance has been generally recognised (Porter, 1990; Shaturaev, 2021; Carstensen and Emmenegger, 2023). In the face of rapid technological advances, economic globalisation and the intensification of competition both within developed and developing countries, it is now clear that human resources are the key to continuing prosperity in advanced economies. It is also clear to most governments, although to some perhaps

more than others, that a maximum diffusion of education and training is a necessary prerequisite for a healthy democracy and for maintaining a level of social cohesion and solidarity in fast-changing pluralistic societies (Prasad *et al*, 1998; UNESCO, 2022).

Nkasiobi (2011), supported by Hennessy (2022), says; 'Despite the emergence of a common agenda for vocational education and training using computers across many countries, it is increasingly recognised that policy in practice varies significantly as argued by national contexts." Of course, it is one thing to develop grand visions of VET society within official policy documents, but translating such visions into reality usually turns out to be rather problematic. This applies to specific goals, cultural policies and initiatives that are being pursued and implemented, the wider institutional framework within which they take place, and the roles played by key factors such as state, employers and trade unions etc.

It is against this background that the current study focuses on the types of educational technologies that are currently in use in vocational training programmes with a primary focus on Zimbabwean VTCs.

CONCEPTUAL FRAMEWORK

The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) model has been widely used to study new technological systems. It has proven to be a robust conceptual framework for predicting users' intentional use. Although UTAUT2 was intended for commercial use, many later studies have focused on educational technologies like e-learning, learning management systems, mobile learning, e-books and instructional tools. Nikou and Aavakare (2021), cited in Basilotta-Gómez-Pablos *et al*. (2022), develop a conceptual model to examine the impact of information literacy and digital literacy on university staff. To do so, they adapt the integrated model of the UTAUT by including digital and information literacy as additional predictors of intention to use digital technologies. The results indicate that information literacy has a direct and significant impact on the intention to use thesetechnologies. This article reviews previous work done on

the model and proposes a new research model by integrating the Task-technology Fit Theory with UTAUT2 to study educational technology acceptance.

THEORIES UNDERPINNING THE STUDY

TECHNOLOGY ACCEPTANCE MODEL
The Technology Acceptance Model (TAM) was proposed by Davis (Davis *et al.*, 1989). As argued by TAM, a person's belief determines his/her attitude toward usage. Davis *et al.* (*ibid.*) introduced theTAM in his attempt to address reasons for users accepting or rejecting information technology and how users' acceptance is influenced by system characteristics.

Research concludes that two beliefs (perceived usefulness and perceived ease of use) have been identified as important user acceptance criteria. They are instrumental in explaining the variance of customers' attitudes. Perceived usefulness is defined as "the degree to which an individual believes that using a particular system would enhance his or her job performance". Perceived ease of use is defined as "the degree to which an individual believes that using a particular system would be free of physical and mental effort". Perceived ease of use is hypothesised to have a significant direct effect on perceived usefulness (Nikou, 2019; Venkatesh and Davis, 2000; Gupta *et al*, 2022; Nie *et al.*, 2023). Users perceive a system as easy to use as they gain more knowledge and confidence through direct experience in using the system (Hackbart *et al.*, 2003; Albayati and Rho, 2020; Al-Mamary, 2022; Linardatos and Apostolou, 2023).

SELF-EFFICACY
A determinant of perceived task difficulty is a person's belief in his/her ability to successfully perform behaviour, or the level of task difficulty an individual believes is attainable with their perceived skill level. Bandura (1986) and Shah and Bhattarai (2023) have argued that personal beliefs about self-efficacy are crucial determinants of action. Self-efficacy is defined as one's belief in one's ability to exercise control over events. Many empirical studies have validated self-efficacy in a wide variety of settings, such as employee attendance management (Frayne

and Latham, 1987), complex decision-making (Wood and Bandura, 1989), computer skill acquisition (Mitchell *et al.*, 1994) and user acceptance of technology (Agawal *et al.*, 2009). Computer efficacy is affected by someone's practical intelligence, the ability to solve new problems, and the ability to learn from experience, by tacit knowledge. As argued by Marakas *et al.* (1998) and Satjawathee *et al.* (2023), computer self-efficacy is the perception of one's capability to use a computer in a multilevel construct, operating at two levels: the general computer level and the specific application level. The former is defined as "an individual judgment of efficacy across multiple computer domains". Application-specific self-efficacy is defined as an individual's perception of efficacy in using a specific application within the general domain (Qadasi, *et al.,* 2023); Yi and Hwang, 2003; Al-

Technology Acceptance Model Research is relevant to the current study because it concludes that personal educational technology efficacy relates directly to someone's perceptions concerning these technologies. The model is instrumental in explaining the variance of students' attitudes. Both perceived usefulness, along with students' attitudes, determine students' behavioural intentions. Matching this theory to the adoption of educational technology in VTCs confirms the basic relationships between the three variables of TAM, that perceived ease of use is positively associated with perceived usefulness and behavioural intention; and perceived usefulness is also positively associated with behavioural intention. Students' attitudes to educational technology are influenced by both the perception of the usefulness of mobile learning and the ease of use of mobile technology. Positive attitudes about the benefits of mobile learning were found to influence the adoption of mobile learning

LITERATURE REVIEW
Educational Technology (Ed-Tech) refers to the use of technology in academic settings, be it in the classroom, at home or elsewhere. Ed-Tech encompasses anything from simple educational tools like flashcards and applications to more complex technologies like online learning platforms and virtual reality simulations (Ramiel, 2021). It is used in formal and

informal education settings and by learners of all ages (Huang and Yang, 2019). Ed-tTch supports various learning goals, including enhancing student engagement and motivation, improving assessment results, facilitating online learning, increasing access to qualifying education resources, and supporting blended or online/offline learning programmess. It is the process of integrating technology into education to promote various learning environments and opportunities for students to learn using technology for their common tasks.

Identifying instructional challenges inherent in incorporating virtual laboratories in instruction helps contextualise educational needs. First, there is a shortage of professional teachers and instructors qualified to teach Educational Technology (ET) and VET curricula (Baladoh, Elgamal, and Abas, 2017; Lou, 2018). Next, many ET and VET teachers and instructors do not have formal pedagogical training to prepare them for teaching in traditional educational settings. This issue is only exacerbated by the introduction of technology and online pedagogies. One article notes, "college teaching is the rare profession that doesn't train its practitioners, forcing instructors to rely on trial and error … most are not taught to teach, and none is taught to teach online" (Grose, 2020:24). Further, as instructors are transitioning from face-to-face to virtual and online learning environments, they need additional support in making the transition and managing the integration of high-technology tools into learning environments (Jin and Nakayama, 2013; Grose,2020;). Finally, a significant instructional challenge to overcome in integrating virtual labs in ET and VET programmes is the cost (Jou and Wu, 2012; Abidi *et al.*, 2019). It is, however, noted in several writings that the integration of virtual labs in these technical fields could also reduce the amount of expensive equipment needed and reduce breakage and material costs, thereby reducing overall costs (Alvarez, Parra and Montes-Tubío,2017; Baladoh, Elgamal and Abas, 2017; Ethiragan, Kandasamy and Kumaraguru, 2020).

King (2002) observes that substantial research has been conducted in relation to the concept of "Educational Technology Professional Development" (ETPD), which focuses on teachers' professional development as "an essential component to ensure pedagogically sound technology use in the classroom" (*ibid.,*

284). The purpose of this literature review was to present a comprehensive understanding of this emerging field of research in higher education.

King *(ibid.)* noted that ETPD training programmes generated several categories of designed products. First, when positioned as designers, faculty members were given the opportunity, through ETPD programmes to create and develop their own resources within their teaching context, such as the redesign of a single lesson or course unit, in order to include social networking (Archambault *et al.*, 2010) or learner-centred principles (Derting *et al.*, 2016). Another example is the increased number of web-based learning environments, courses on Moodle, and ICT pedagogical initiatives produced by faculty members by the end of their ETPD programme (Baya'a and Daher, 2015). Physical space and pedagogy have also been redesigned, together with efforts in technology training (Friel *et al.*, 2009). Second, the design process also affected the tools used by faculty members. For instance, Chen *et al.* (2018) focused on the continuously designed and reviewed tools of a novice Mathematics teacher educator-researcher. Similarly, Hoekstra and Crocker (2015) paid attention to the design of feedback tools for their collaboratively designed e-portfolio approach. Third, some ETPD training programmes have been co-designed collaboratively with faculty members, focusing on incorporating principles of good practice in undergraduate education (Friel *et al.*, 2009) or on technology integration (Teclehaimanot and Lamb, 2005). Involving faculty members in the design of their own training, Teclehaimanot and Lamb's (*ibid*) study goal was to reach the "ripple effect" of faculty redesigning their syllabi, revealing interconnections between the designed intervention and generated production. This leads to the final category of designed products, research itself, which, in recent times, has increasingly been co-designed. Shattuck and Anderson (2013) perceive the increased interest among educational researchers over the last decade in design-based research, defined as:

> a systematic but flexible methodology aimed to improve educational practices through iterative analysis, design, development, and implementation, based on collaboration among researchers and practitioners in real-world settings, and leading to contextually-sensitive design principles and theories (Wang and Hannafin, 2005: 6-7).

Whatever is being designed, most researchers have pointed out the importance of the collaborative dimension of the design process: design has been used mostly within ETPD as a team-based activity (e.g., Dolk *et al.*, 2002; Shattuck and Anderson, 2013; Baya'a and Daher, 2015; Hoekstra and Crocker, 2015; Derting *et al.*, 2016; Becuwe *et al.*, 2017). According to Foley and Masingila (2014:800), this is because "without such collaboration, interventions are unlikely to affect changes in the real-world context". Even when projects were individually designed to better meet participants' needs and interests, researchers demonstrated how the creation of collaborative communities of learners was concomitant (Seels *et al.*, 2003), or how the design process of a teacher educator was embedded and influenced by different collectives (Psycharis and Kalogeria, 2017). Becuwe *et al.* (2017:159) argue that "collaborative design [in teacher design teams] of technology-enhanced lessons has been shown to contribute to the development of competencies necessary to integrate technology in education" This is why the engagement of faculty members in design-based activities simultaneously enabled investigation of practice and fostered the creation of communities above the traditional gap between practitioners and researchers (Triggs and John, 2004; Foley and Masingila, 2014).

Finally, Mourlam (2017) recognise that design-based research usually ended prior to the implementation of instruction, while Archambault *et al.* (2010) proposes engaging faculty in the full instructional design process, including the implementation phase. Jaipal-Jamani *et al.* (2018) extend the process of learning, designing, and implementing until the mentoring phase in which teacher educators adopt a technology leader's role in ETPD workshops

RESEARCH METHODOLOGY

Quantitative data was gathered from students whilst qualitative data was obtained from lecturers and staff at VTCs, to

complement the quantitative data. The research instruments used were questionnaires, interview guides and observation guides. Both probability and non-probability were used. Thhe target population for this study consisted of 3 500 participants drawn from five VTCs. Secondary data, on the other hand, was collected for other purposes, however, was also useful for the current study (Schiffman and Kanuk, 2000; Linneberg and Korsgaard, 2019; Antoniadis *et al.,* 2022; Lutfi *et al.,* 2023). Qualitative data obtained in the study were analysed using narrative analysis. The quantitative data collected were coded, entered and analysed descriptively using the Statistical Package for Social Sciences (SPSS) version 16.0. Descriptive statistics in the form of percentages, frequencies, mean scores and standard deviations were calculated for different variables and presented. Correlation analysis was done to determine the relationship between the variables identified in the conceptual framework. One-way Analysis of Variance (ANOVA) and independent t-test was used to analyse the relationship between educational technologies-related factors and VTCs. A multiple-linear regression analysis was conducted to determine the statistical relationship between the independent variables (educational technology) and the dependent variable (VCTs).

RESULTS

Effects are grouped into three factors (perceived ease of use, perceived usefulness and self-efficacy) since eigenvalues exceeded 1. The selected factors accounted for 65% of the total variance. The Kaiser-Meyer-Olkin (KMO) value was 0.65, indicating the appropriateness of using the technique for factor analysis. This appropriateness was further supported by the significant result from Bartlett's test of sphericity (x^2 = 3764.751; $p<0.0001$). Cronbach's *a* coefficients were: Perceived Self-efficacy: a = 0.787; Perceived ease of use: a = 0.929; Perceived Usefulness: a = 0.685. The rotated component matrix, including the factor loadings, is shown in Table 1.

Table 1: *Factor Loadings of perceived ease of use, perceived usefulness and self-efficacy (*Grozeva, G. and Dimitrov. Y, 2012)

	Loadings
Perceived ease of use	
I find a new adoption easy to use	0.821
My interaction with new technologies is clear and understandable	0.795
I find it easy with new technologies to do what I want to do	0.860
Perceived usefulness	
Using a new technology increases my productivity	0.641
I find new technology useful in my studies	0.619
Using a new technology improves my training performance	0.565
Using a new technology improves my effectiveness	0.731
Perceived Self-efficacy	
I believe I can easily use new technologies	0.919
I believe I can easily become skilful in new technologies	0.901
I believe I can easily learn about new technologies	0.993

The impact of personal characteristics upon the three factors influencing the adoption of a new technology is examined by using inferential statistics (t-tests and ANOVA tests). As argued by these tests, females are considering adopting a new technology since they perceived it as easier to use than males (t=2.756 df= 695 and p=0.006<0.05). The hypothesis "Males are more self-efficient in using a new technology than females" was not supported, since t=1.560 df= 516.783 and p=0.119>0.05.

The level of an employee's education has a positive impact on perceived self-efficacy in adopting new technologies. As the level of education rises, the perceived self-efficacy of the students adopting a new technology increases. Different variances are assumed and F(2.693)=36.291 p< 0.005 indicates differences among the means of the groups of students with different educational levels. Student-graduates from secondary school indicated a lower perception of self-efficacy (mean=-0.5324840) than graduates with bachelor's degrees (mean=-0.0258622),

who also indicated a lower perception of self-efficacy than the students with post-graduate studies (mean=0.4639108).

The level of students' education has a positive impact on the perceived ease of use of new technologies. Equal variances are assumed and $F(2.693)=4.125$ $p< 0.005$, indicates differences among the means of groups of students with different educational levels. Specifically, posthoc analysis revealed differences in the perception of students towards considering a new technology as easy to use, between graduates of secondary school and graduates with bachelor's degrees (mean: 0.0256410 > -0.2366863), and also between graduates of secondary school and students with post-graduate studies (mean: 0.0972040 > -0.2366863).

The level of students' education has a positive impact on the perceived usefulness of new technologies. Equal variances are not assumed, $F(2.693)=6.964$ $p<0.005$, indicating differences among the means of groups with different educational levels. Post-hoc analysis reveals differences in adoption between students with different educational backgrounds. There is a different perception of usefulness among students with bachelor's degrees and graduates of secondary school. Students with bachelor's degrees perceived the adoption of new technologies as less useful compared to secondary school graduates (mean: 0.2897110> -0.0931591).

Age is negatively correlated to students' perception of self-efficacy. Older students perceive themselves as less efficient in using new technologies than younger students. Equal variances are assumed and $F(2.693)=10.253$ $p< 0.001$ indicates differences among the means of groups of students belonging to different age groups. As the age of the students increases, their perception decreases their self-efficacy. Students in the age group 51-65 have a different perception (mean=-0.38104) of self-efficacy from students in the age group 41-50 (mean=-

0.2913233), compared to the age group 31-40 (mean=0.1058948). Young students (age 18-30) have the highest perception of self-efficacy among all age groups.

Age is negatively correlated to students' perception on ease of use. Older students perceive new technologies as less easy to use than younger students. Equal variances assumed and F(2.693)=6.151 p< 0.001 indicates differences among the means of groups of students belonging to different age groups, concerning their perception of ease of use of new technologies. Differences exist among the age group 18-30 compared to the group 41-50 and the 51-65 group . Younger students consider a new technology easier to use than their older colleagues.

Exploratory Factor Analysis (EFA), with the questionnaire responses of the students on mood, to identifies if mood is one of the factors affecting the adoption of information and communication technologies. The extraction method was the Principal Component Analysis (Hair *et al.*, 2006) and the Varimax method was applied to increase the explanatory ability of the model. Effects are grouped in two factors (positive affectivity, negative affectivity) since eigenvalues exceeded 1. The selected factors accounted for 48.9% of the total variance. The KMO value was 0.725, indicating the appropriateness of using the technique for factor analysis. This appropriateness was further supported by the significant result from Bartlett's test of sphericity (x^2 = 1773.675; p<0.0001).

ANOVA analysis was further applied between groups of students and their perception of self-efficacy. Equal variances not assumed, F (1.695) =0.470 p>0.05, indicating that the hypothesis was not supported. Also, ANOVA between groups and their perception of their ease of use in adopting a new technology demonstrated, assuming equal variances, F(1.695) =0.367 p>0.05, indicating that the hypothesis was not supported.

Table 2: Factor GLoadings of mood measures

Factors	Loadings
Negative affectivity	
I feel afraid	0.702
I feel nervous	0.663
I feel upset	0.615
Positive affectivity	
I feel excited	0.714
I feel interested	0.802

The hypothesis that students' psychographic situation, represented by mood, affects the acuity of their self-efficacy and their perception of a new technology's easiness and usefulness, was not supported by the results.

KEY PARTNERS AND INITIATIVES IN ED-TECH

GOVERNMENT AGENCIES
The responsibility for designing and implementing Ed-Tech initiatives is shared across different agencies in Zimbabwe. Table 3 describes the role that different agencies are currently playing in supporting Ed-Tech.

Table 3: *Agencies with Ed-Tech roles*

Ministry/Agency	Roles and Responsibilities in Ed-Tech
Curriculum Development Unit in the Education Ministry's Curriculum Development and Technical Services Department	● Designs a new instructional system and strategies for the production of multimedia learning materials ● Develops and disseminates learning resources like video programmes and computer-assisted instructional multimedia packages to schools
Centre for Educational Research, Innovation and Development	● Guides research and innovation in the deployment and use of ICTs effectively and efficiently in education

	● Facilitates the provision of up-to-date research-based data, information and practical knowledge on the use of ICTs to improve instruction
National Library and Documentation Services	● Facilitates sharing and supply of resources through access to international electronic bibliographic and information networks, databases and resources
Zimbabwe Schools Examinations Council, an autonomous examination board;	● Sets standards for levels of academic expertise including ICT
Ministry of ICT, Postal and Courier Services	● Develops, manages and maintains central government ICT infrastructure ● Facilitates the implementation of the Presidential e-Learning programmes in schools
Ministry of Information, Publicity and Broadcasting Services	● Promotes the use of ICTs

NON-GOVERNMENTAL AGENCIES

United Nations agencies, such as UNESCO, have managed Ed-Tech initiatives such as the ICT Transforming Education in Africa project from 2016 to 2019 withhe aim of increasing access through innovative solutions (e-Schools Model), facilitating the development of national ICT in education policies and master plans and strengthening teacher training and higher education systems. Additionally, organisations, such as the FBC Bank have partnered with MoPSE to provide Ed-Tech equipment that include tablets, laptops, projectors and interactive whiteboards to 20 primary and secondary schools. Established in 2000, e-learning Solutions are a private for-profit corporation that provides instructional design and interactive digital multimedia tools to schools.

ED-TECH INITIATIVES

The Government of Zimbabwe has introduced several initiatives aimed at promoting the use of technology in education over the last 10 years. These activities include: The Presidential Schools Computerisation Programme launched in 2000 from where more than 25% of schools received computers and printers: The Presidential e-Learning Programme of 2011 that aimed at

strengthening the use of ICTs for teaching and learning; The Connect a School-Connect a Community Project of 2013 that provided disadvantaged schools with modern technology; The Curriculum Framework (2015- 2022) that prepares learners for a 21st-century environment dominated by ICTs E-learning content development in schools; Teacher professional development activities carried out in partnership with various universities; Implementation of e-registration and e-marking by the Schools Examinations Council (ZIMSEC); Introduction of an Electronic Ministry Application Platform (e-MAP) used for school applications; Introduction of an electronic Institution Inspection Report used by schools to generate school reports; Introduction of an e-Recruitment platform for teacher recruitment. Some of the main challenges that inhibit the effective use of Ed-Tech in education include limited power supply; low broadband coverage in rural and remote areas; lack of equipment; limited financial resources for Ed-Tech-related programmes/ and lack of awareness and skill in effectively integrating Ed-Tech in teaching and learning content, to improve student learning outcomes.

TYPES OF EDUCATIONAL TECHNOLOGY
There are five types of educational technology: Synchronous, Asynchronous, Linear learning, Blended and Collaborative Learning (Neelakantha, 2022). Synchronous and Asynchronous are the first of the educational technology types. Learning can be self-based with the help of various resources available on the internet. Now students can learn online through distance learning programmes and Virtual Classrooms (Maddie, 2022).

SYNCHRONOUS LEARNING
Synchronous means 'existing or occurring simultaneously', which refers to discussing thoughts and information regarding certain topics with others. Some examples include online and working jointly, like face-to-face discussions, chat rooms or virtual classrooms, live teaching and feedback sessions, Skype conversations, etc. Since the students are working in groups, they widen the range of their thinking by listening to others' thoughts about the same topics. This may boost students' knowledge.

ASYNCHRONOUS

Asynchronous means 'not in real-time'. It is done mainly through blogs, emails, online textbooks, audio/video courses, hypertext documents, wikis, etc. Students can learn at their own pace. If they do not understand the lesson at once, they can read it again without falling behind in class. Through online courses, students complete their programmes while doing internships, work, or sports, or if failed, they can repeat their courses without any embarrassment of being in the same class with younger students (Neelakantha, 2022).

LINEAR LEARNING

Liner Learning is the second number in educational technology types. It is all about computer-based training (CBT), where the information about the programme is sent to students' computers, tablets or smart phones. CBT looks much like reading an online manual or book. It is frequently used in teaching static processes, like using software or completing mathematical equations. The training is similar to web-based training (sent over the Internet using a web browser). CBT is different from traditional learning as there is no classroom, textbooks or manuals. Instead, videos and animation can be included and this helps students understand the topics more precisely. Furthermore, with the help of CBT, assessments such as multiple-choice questions, drag-and-drop and others can be stored easily and recorded using online software and providing feedback/results simultaneously to users. Lastly, users get the result online in the form of a certificate. However, there are some challenges, as creating the required CBTs enyails significant resources. Sometimes, CBT may be complex to use. Also, there is no interaction between students or teachers, resulting in no exchange of thoughts and knowledge. Some examples of CBT are: training people in how to operate heavy equipment (e.g. cranes) and vehicles (e.g. aircrafts) or how to work safely in hazardous environments (e.g. oil rigs) (Edmonger, 2021).

BLENDED LEARNING

Blended Learning is a type of educational technology where students receive part of their instruction in a traditional classroom setting and part of their instruction online. This type

of learning is often used for classes that require both hands-on and online learning, such as science labs or history projects. Blended Learning can be done in person or online, and it often includes tools like video conferencing, discussion boards and wikis. Benefits include the best of both worlds, i.e. hands-on and online learning that can be used for classes that require both hands-on and online learning. However, some drawbacks include: more expensive than traditional learning, requires a reliable internet connection and teachers may need to be trained in how to use Ed-Tech tools (TV Dev Tech, 2022).

COLLABORATIVE LEARNING

Maxfield (2018) defines collaborative as 'to work with another person or group to achieve or do something". So, it is how learning is done in groups by working together. Problem-solving, learning new concepts or completing tasks are provided in groups of two or more to work together. In this way, individuals can learn through collecting data, listening to others' thoughts, rather than simply learning from the provided resources. This way, they are dependent on teachers. These different types of educational technologies are the new era for learning, where individuals need not attend classes, learning from anywhere regardless of age. Moreover, they are not only dependent on teachers to provide knowledge, but they can learn through different sources (also learning through the process of finding sources). Educational technology has come a long way in the past few years, and there are now many different types of technologies that can be used in the classroom. Each type of technology has its benefits and drawbacks, so it is important to choose the right type of technology for each class.

USING A BLOG

Paquet (2003), concurring with Jin and Lin (2022), describes the term 'blog' a log of the web or a weblog. A blog may take on many variations, but in its simplest form, it is a website with dated entries. It can be described as an online journal with one or many contributors. A blog provides a platform for individual expression. Just as important, it provides support to the individual student through reader commentary, critique and interlinking as subsequent steps. A blog may become an essential tool for the individual student in cases where there is

no strong sense of group belonging or loyalty, or there is lack of group turn-taking and communication skills (Akdim and Casaló 2023; Paquet, 2003).

BENEFITS OF USING SOCIAL MEDIA IN VOCATIONAL EDUCATION AND TRAINING
The potential benefits of using social media in education are far and wide. Research and investigation have produced both documented and undocumented evidence of benefits in education and training. These include providing a constructivist-friendly toolkit - generally acknowledged and used in online education as an effective roadmap towards successful, deep learning outcomes for students. One of the key assumptions before Web 2.0 technology was that online classrooms would serve as platforms for creating a constructivist learning environment, however, they simply served to only as transmission models of education and this was due largely to high levels of expertise required by earlier technologies (Allen and Long, 2013; Kaur and Kaur, 2023).

Another benefit is the promotion of collaborative learning that is capable of helping to create "an entire constructivist learning environment" with an online class (Seitzinger, 2006). Social media and other Web 2.0 technologies have also proven valuable in various corporate, government and institutional settings, and their adoption has been quite rapid compared to other IT technologies (Atkinson and Burghin, 2008; Shamout *et al* 2022). Implementing these tools in the vocational educational and training arena can help prepare students to use them in real-world venues.

DISCUSSION
Women are characterised as "nurturing" and influenced by social factors and environmental constraints (Gefen and Straub, 1997; Peng, Ng and Ha, 2023). They seek intimacy, support and consensus. They prefer interpersonal aspects and are good at providing service. When exploring the level of education, the findings highlighted that respondents with a bachelor's degree or above had a much higher adoption impact than those less qualified and that the higher the level of qualification, the more the impact on adoption. The education level has an impact on the three well-known factors that affect the adoption of new

technologies: perceived self-efficacy, perceived ease of use and perceived usefulness. The improved usage of new technologies comes through education. Agarwal and Prasad (1999) agreed with Shamout *et al.* (2022) in concluding that education level was mediated by perceived usefulness and perceived ease of use. Given that the world over, most of the developed countries are operating in an information-intensive age, relying heavily on information technology to acquire processes and deliver the appropriate information to students, customers and users, the level of education is important in adopting new information and communication technologies.

Students' maturity, a factor that is supposed to add wisdom to human experience, does not increase the favourable attitude toward information technology (Babcock *et al.*, 1995). Agarwal and Prasad (1999) concurred with Geet *et al* (2023) in concluding that perceived usefulness and perceived ease of use mediate the relationship between age and attitude. In 2017, the Zimbabwe's National Statistical Agency (ZIMSTAT) conducted an ICT census to document access to and use of ICT in education institutions (Zimbabwe National Statistics Agency, 2017). It also aimed to identify geographical areas with limited use of ICTs and key barriers to ICT use in education. Five out of 11 objectives in the national ICT Policy (2016) relate to ICT in education and human resources (Ministry of ICT, Postal and Courier Services, 2016). The policy articulates the aim of providing connectivity in all schools to bridge the urban-rural digital divide, and to enhance teaching and learning through the use of technology and VTCs are not exceptional.

The objectives and strategies include working with relevant institutions and government departments to develop programmes that increase ICT human resource capacity and skills; facilitating the deployment and exploitation of ICTs in the education system from primary school upwards; working with relevant ministries to include ICT training and education in schools, colleges and universities; providing equitable access to ICT-enabled education and training in all parts of the country, including disadvantaged communities; promoting e-learning and use of e-learning materials throughout Zimbabwe; making use of the Universal Service Fund (USF) to boost connectivity for

remotely located schools; facilitating the National e-Learning Programme; and encouraging, promoting and applying research and development in ICTs in society. The ICT Policy for Primary and Secondary Education (2019-2023) aligns with the Constitution, the Zimbabwe Agenda for Sustainable Socio-Economic Transformation (ZIMASSET), Education Act, National Policy for ICT, Education Sector Strategic Plan, and other key documents that relate to access to education and training. The vision for the ICT Policy for Primary and Secondary Education is: "ICTs being used effectively and efficiently throughout the education sector, enabling all learners to achieve their full potential and become productive responsible citizens" (Ministry of Primary and Secondary Education, 2019). Additionally, the policy states: "The Government of Zimbabwe, through the Ministry of Primary and Secondary Education, commits to the use of ICT as an enabler for education to create, promote and sustain the development of a knowledgeable, innovative and creative society that ultimately supports the national agenda of attaining a knowledge-based society" (*ibid.*, 2019).

CONCLUSION AND RECOMMENDATIONS

The provision of high-quality educational technology and education in vocational training centres is very important. Around the world, all economically advanced democracies place high value on the quality of their vocational education and training. It is increasingly recognised that policy in practice varies significantly as argued by national contexts. VTCs are important to the economic growth of the country, hence; require appropriate educational technology to redirect their path. This may be done through various legislative developments in Zimbabwe, which are: government agencies, non-government agencies and Ed Tech initiatives. It is recommended that future researchers look at the competency of teachers in the use of different types of educational technology in vocational training programmes. In Zimbabwe, there is need to carry out further studies on the competency of teachers in the use of different types of educational technology in vocational training programmes as a developing country compared with developed countries. Such studies would be most desirable as a way of addressing the pertinent problems currently bedevilling VTCs in Zimbabwe.

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Integrating Landuse and Transport Planning in Harare, Zimbabwe: Challenges, Gaps and Opportunities

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Abstract

Most Harare residents depend on public transportation to participate in the economy and meet their life needs. However, the existing urban transport system does not provide sufficient and reliable access to destinations. The current strides to solve the transport problems are failing in such endeavours. There is need for innovative and alternative planning methods to deal with transport poverty. The study evaluated the prospects of one such innovative planning model to achieve sustainable mobility and accessibility. It explored the prospects of integrated land-use and transport planning in Harare. The study employed qualitative research tools to gather data. Key informants were engaged through interviews. The qualitative data analysis was done using N-vivo. This study concluded that the prospect of integrated land-use and transport planning in Harare is bleak although there is high consciousness of the concept. This is due mainly to lack of political will, lack of financial resources, poor institutional integration and weak regulatory and legal frameworks.

Keywords: land-use planning, mobility, accessibility, public transport, transport poverty

INTRODUCTION

While transport systems enable economies to grow, they can slow down growth and efficient delivery of essential social services, if not well-managed,. Moeckel and Nagel (2016) posit that negative economic and environmental impacts of transport

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are linked to lack of planning. Planning solutions to current transport challenges in most urban areas include optimising the use of the private car, promoting sustainable modes of mobility (public transport, walking, cycling) and increasing the use of Intelligent Transport Systems (ITS) (Litman and Steele, 2017). Further, the use of alternative sources of energy, such as electricity in the transport system, has been introduced and is picking up pace in developed countries while in developing countries, the growth is very slow (Lubida *et al.*, 2019). Dumba (2017) observes the safety and reliability of urban transport and changes in public commuting behaviour by influencing how urban travellers perceive transport as a critical factor.

Most Harare residents depend on public transportation to participate in the economy. However, the existing urban transport system does not provide sufficient and reliable access to destinations. The current strides to solve the transport problems are failing in such endeavours, innovative and alternative planning methods to deal with transport poverty must be part of the package. Acheampong and Silva (2015) perceive that the physical distribution of land-uses determines the travelling patterns, modes and frequency of the people. Therefore, land-use plans can be effective tools to achieve sustainable mobility in cities. Further, Batty and Marshall (2017) conceptualise that transport problems cannot be dealt with in isolation, but in the broader sense of the urban form. However, the idea of using the urban built-up form as an explicit strategy to solve urban transport problems in developing countries has attracted little attention (Giuliano, *et al.*, 2012).

Although the rapidly growing literature has explicitly outlined the importance of integrated land-use and transport planning in promoting sustainable urban public transport, it is not good at explaining the prerequisites of the implementation of integrated land-use and transport planning in settings such as those in developing countries. The present study, therefore, seeks to evaluate how integrated land-use and transport planning can be a tool to promote sustainable urban transport in Harare. This study is an academic effort that captures the prospects of

the practical application of the integrated planning model in solving the transport challenges in Harare.

CONCEPTUALISING THE RELATIONSHIP BETWEEN URBAN FORM AND TRANSPORT

Mashayekh (2013) defines urban form as the physical makeup of built-up areas, including the shape, size, density and configuration of settlements. Litman and Steele (2017) define urban form as the description of a city's physical characteristics expressed by street patterns, block lengths, building heights, building setbacks, average residential density and average non-residential intensity. A common feature in the numerous definitions of urban form is the concept of physical expression of land-use plans. Thus, the urban form is a product of the physical planner through land-use planning (Lee and Bencekri, 2020). Historically, land-use planning was motivated by a concern to promote the orderly development of the landscape, preserve some open spaces and provide consistency among developments (Batty and Marshall, 2017). For example, in the UK, industrial urban forms were brought about predominantly by planning that sought to achieve housing, health, transport and economic objectives. Most such settlements have concentric densities contained by green belts and protected land, a product of careful land-use planning.

While acknowledging that urban form is the domain of planning, it is also noted that urban forms continually evolve, responding to social, environmental, economic and technological pressures. Contemporary cities are subjected to various pressures, which may not be planning, that result in unmethodical expansion of form, thereby creating new challenges and problems (Battya and Marshall, 2017). For example, it has been noted that cities in developing countries are growing organically due to informality and wanton disregard for laws, planning laws included. This could be a sign that the governance and planning of land development are struggling to cope with the unpredictable growth of the population in cities. Chirisa *et al.* (2019) reveal that the existing urban land-use plans are not responding adequately to the needs of the population in urban areas because they are in pursuit of elitist colonial development codes.

Lubida *et al.* (2019) suggest that transportation planning is the planning required in the operation, provision and management of facilities and services for the modes of transport to achieve safer, faster, more comfortable, convenient, economical and environment-friendly movement of people and goods. As the term 'planning' implies, there is the forecasting of transport demand due to future travel needs and putting in place all necessary facilities and services to cater for that demand beforehand. Transport planning is also critical in shaping cities, enabling economic activities, promoting community interaction and enhancing the quality of life. It is also essential for sustainable development and ensuring safe accessibility at various levels for all individuals.

The relationship that exists between land-use planning (urban form) and transport planning is intricate and can never be sustainably managed if the projections are done separately (Anjomani, 2021). The development of any urban form is hinged on the transport network. In the past, movement within cities was restricted to walking due to the unavailability of vehicles. Activity nodes were agglomerated to reduce the need for mobility.This resulted in compact urban forms with mixed uses. Locating urban land-uses away from each other caused inefficient and time-consuming urban mobility, hence this was avoided (Moeckel, 2017). However, innovations in transport systems influenced the spatial form of modern cities. For example, cities in Australia and America, among others, have dispersed urban forms. This is mainly because there is high motorisation that can support long-distance travel (*ibid.*). Therefore, the urban forms present are encouraging vehicle dependency and are linked with high levels of mobility. The emergence of suburbanisation in peripheral areas is a response to increased motorisation and it expresses new relationships between elements of these urban sub-systems (Battya and Marshall, 2017).

Master plans or land-use plans, through zoning, prescribe the desired patterns of traffic circulation, bulk and density levels, and necessary public improvements (Massey, 2015). Lee and Bencekri (2020) assert that every change in land-use of an area, either in terms of intensity or type of use, has a corresponding

change in the flow of people to and from that area. Every land-use either generates new trips originating from that area or attracts new trips to that area, or even both (Schwanen *et al.*, 2016). Similarly, for every change in the flow of people, vehicles and goods along certain routes adjacent to any site, there is a corresponding change in accessibility to the site and its attractiveness to the present use, or for some other potential use (Cevero, 2017). Thus, many people are attracted to locate in areas with high accessibility to different modes of transport. Further, transport infrastructure occupies urban land which also makes it a land-use.

While the knowledge that the land-use system affects transportation systems has improved and impacted positively in reforming planning paradigms in other developed countries, there is no evidence of integrated or coordinated planning in many developing countries. On top of various social, political, ecological and economic challenges, planning in Africa is heavily influenced by the colonial ideology of segregation, for example, the apartheid regime in South Africa left a separatist planning philosophy (Matamanda, 2019). The different racial groups lived separately and consequently developed unequally (Battya and Marshall, 2017). In these cities, the poor live mainly on the fringes, a contradiction to Alonso's (1964) Residential Location Theory (Matamanda, 2019). The dangers of this arrangement are manifesting in ever-rising traffic challenges and growing transport poverty.

THE CONCEPT OF INTEGRATED LAND-USE AND TRANSPORT PLANNING
The intricate relationship between transportation and land-use bore the concept of integrated land-use and transport planning in the broad sustainable development agenda. Giuliano *et al.* (2012) argue that integrated land-use and transport planning is a process that coordinates the land-use planning efforts and those of transport planning to achieve the land-use and transport objectives simultaneously. Similarly, Moyo *et al.* (2021) say integrated land-use and transport planning is the alignment of transport infrastructure and services plans with land-uses plans in ways that reduce private-vehicle travel and increase mass transit usage and mixing of compatible land-use and higher densities inaccessible locations. Therefore,

integrated land-use and transport planning defines a process where land-use policies and programmes are done in liaison with transport system investment policies and programmes. This brings about an urban form that improves accessibility, not just mobility, and efficient use of the space.

The integration of land-use planning and transport planning stemmed from a realisation that the extant urban settlement trends and the associated travel patterns are very unsustainable. Many urban settlements are characterised by low-density fringe expansion and vehicle-dependent travel. Battya and Marshall (2017) suggest that to redress this anomaly, it requires that spatial planning and transport planning share the same strategic objectives through integrated decision-making and physical implementation. The integrated planning model, therefore, consciously plans to mutually reinforce land-use and transport systems (Moyo *et al.*, 2021). The emphasis shifts from offering unlimited transport and land-use options that are mutually negating and in competition for resources.

IMPORTANT ELEMENTS IN INTEGRATING LAND-USE AND TRANSPORT PLANNING

There is a broad and growing consensus that an integrated land-use and transport planning strategy is an effective tool for the establishment of efficient and sustainable urban environments (Aljoufiea *et al.*, 2013; Acheampong and Silva, 2015; Bandauko, *et al.*, 2016). However, studies so far have shown that such integration is hard to achieve in daily planning practice, especially in developing countries, due to many institutional barriers and substantive differences. Precisely, the tools developed to support integrated land-use and planning strategy development have very low implementation rates in daily planning practice (Dumba *et al.*, 2017). In the reviewed literature, there is no comprehensive text that covers the prerequisites for the implementation of integrated land-use and transport planning. These could have helped many countries to assess their capacity, identify their weaknesses and capacitate themselves towards integrated land-use planning.

Murphy *et al.* (2021) suggest that political will is one of the important requirements for integrating land-use and transport planning. Kramarz *et al.* (2021) describe political will as having a sufficient set of decision-makers who have a common understanding of a particular problem and who are committed to supporting a commonly perceived, potentially effective policy solution. The analysis of political will is mainly about whether there are enough people in positions of power who support the desired reform (Murphy *et al.*, 2021). Thus, it is imperative to have committed leadership to see integrated land-use and transport planning implemented. Thoughtful leadership should put up incentives to have innovative ideas adopted and implemented (Moeckel, 2017). For example, Lerner, mayor of Curitiba, provided political capital that saw the successful implementation of innovative ideas. Lerner provided the required leadership and support that saw the development of Curitiba's 1968 Master Plan that transformed the city into a sustainable, thriving, efficient place to live in. Curitiba is, many times, mentioned as one of the most sustainable cities in the world and is arguably considered the greenest city in a middle-income country (Anjomani, 2021).

Institutional and regulatory frameworks also play an important role in integrating land-use and transport planning. Battya and Marshall (2017) argue that policy outcomes are the product of different streams of interacting legal frameworks, policies and governance structures. Thus, enabling laws and government policies should be there to specify the role of the state and the philosophy of management and control in public authorities charged with urban development management. Policies and legislative frameworks mould the working practices of local authorities that are understood to be the steering cultures with the potential to facilitate the implementation of integrated land-use and public transport planning approaches (Massey, 2015). For example, the success of Curitiba's transit-oriented development was anchored on zoning regulations (planning laws) that emphasised high-density mixed-use neighbourhoods along the main public transport corridors. The regulations also provided incentives to people who developed in the prescribed ways. This is very important in achieving a change of mindset towards an integrated approach.

Huzzard (2021) also suggests stakeholder engagement as another prerequisite for integrated land-use and transport planning implementation. Integrated land-use and transportation planning depends on the direct involvement of the stakeholders as partners (Murphy *et al.*, 2021). Stakeholder participation embraces the complex interactions among government entities, citizen groups, industry leaders, local departments and planners as this can generate commonly accepted solutions (Lubida *et al.*, 2019). Land use and transport planning are collaborative processes that need to incorporate the input of many other urban stakeholders. For example, within the municipality of Amsterdam, planners work together with other stakeholders in several planning projects in teams, either thematic or geographical (Lee and Bencekri, 2020). The municipality benefits from current research from the university.

Finance is another important requirement for the successful implementation of integrated land-use and transport planning. Massey (2015) points out that a city needs adequate financial resources to integrate urban systems, develop plans and implement and maintain the plans. Thus, a planning authority must be endowed with adequate financial resources to fund institutional and professional integration, acquisition of the latest technologies and contacting researchers. This would assist in crafting evidence-based policies and the implementation of plans to meet existing and future urban needs. Funding constraints inhibit the creation of institutional mechanisms for collaboration and cooperation among agencies, including relevant government departments. In this situation, integrating land-use and transport planning remains a challenge. Also noting that integrated land-use and transport planning is not an end in itself, achieving the integration without funding does not result in an improved urban transport system or sustainability.

Institutional integration is also an essential requirement to achieve integrated land-use and transport planning. In the transport context, it refers to the connection of all organisations, departments and professionals in the built environment. Huzzard (2021) notes that some of the barriers

faced in integrating land-use and transport planning include distinctive budgets among institutions, different procedures, weak or contradictory incentives for cooperation, reluctant departmental culture and the lack of efficient management mechanisms. Thus, this institutional integration achieves a common understanding of strategic urban outcomes by traffic or road engineering professionals, transport planners and land-use planning professionals, championed by a unified authority with effective operational control. Moeckel (2017), Battya and Marshall (2017) and Anjomani (2021) observe that many urban authorities have policy coordination rather than integration. There are substantive differences between the domains of land-use and transport planning in planning objects, including the tools and instruments used, operational modes and educational carriers (Anjomani, 2021). Collaboration during strategy development and goal visioning can potentially produce shared policy goals that would promote mutually reinforcing (instead of obstructing) land-use and transport measures.

RESEARCH METHODOLOGY
The study adopted a qualitative research methodology. Purposive sampling was used in the selection of the organisations and the key informants that participated. The data needs for this study included both primary and secondary data. Accordingly, the collection of the data was done using both primary and secondary data collection methods. The qualitative data was analysed through inductive analysis.

FINDINGS
The extant urban form (product of land-use planning) has had negative effects on the urban transport system performance in Harare. Literature supports the notion that transport challenges being faced in present-day urban areas can be best dealt with when the two, land-use and transport, are planned in an integrated fashion. This proves the importance of understanding what needs to be done to integrate land-use planning and transport planning to achieve sustainable development in Harare.

THE FACILITATORS OF INTEGRATED LANDUSE AND TRANSPORT PLANNING IN HARARE

Fischer, Smith and Sykes (2014) define facilitators as favourable factors or conditions available within a system that promote integration. The study identified two key enablers to integrating land-use and transport planning in Harare, these being concept comprehension and stakeholder willingness and acceptance.

CONCEPT COMPREHENSION

Effective implementation of any programme starts with concept comprehension, including the knowledge of what the concept is all about, the advantages derived therefrom and the preconditions and working modalities of the concept (Dawadi *et al.*, 2021). Similarly, it is very crucial for the people who have the responsibility of land-use and transport planning in Harare to have an understanding of the integrated land-use and transport planning concept. The study established that key stakeholders have a profound understanding of the integrated land-use and transport planning concept, the importance of the concept in dealing with both the land-use and transport issues in cities and some of the requirements for effective implementation. The definitions and explanations about the concept by key informants indicated that there is improved knowledge of the concept and its essence in the current planning practices. This knowledge does not stem from practice but elsewhere, because this concept is still foreign in Harare.

The informants indicated that it is imperative to disband the existing planning institutions and rebuild them in a way that promotes cohesion among the planners from all departments, including development planning, transport planning, housing and environmental planning. Although there is clear evidence that the concept among the various players in the spatial planning field, the uptake of integrated planning is still worrisomely low and the advocacy for this concept by the planners is not vibrant. Despite some indications in policy documents, like the Zimbabwe National Human Settlement Policy, to adopt integrated land-use and transport planning, there is no sign of reform towards integration. This indicates that while there is a profound knowledge of the concept and its

role in addressing some of the obtaining transport challenges, knowledge alone is not sufficient to drive the adoption of the same. The comprehension of the concept forms one step in the whole puzzle. It is imperative to get the other drivers right for the adoption and effective integration of land-use and transport planning.

COMMUNITY ACCEPTANCE AND WILLINGNESS TO PARTICIPATE

Human beings are wired to resist change. Huzzard (2021) argues that human beings are resistant to change, they prefer to maintain the status quo. Thus, stakeholder buy-in or positive participation is a pre-condition for any successful reform process or project. Similarly, the integrated land-use and transport planning, as a reform process, needs stakeholder buy-in and positive participation to be successful. The study evaluated the level to which urban stakeholders, including the residents, participate in urban planning issues and the willingness of the participants to be involved in planning processes. The study also gauged the perceptions on the suitability of the current planning practices.

These residents of Harare have bought into the idea that the current planning practice has to be reformed to include other critical players during plan formulation and that they are willing to participate should they be asked to participate. The major reason for residents to long for reform of the current planning norms is that they are facing multitudes of challenges, including the inadequacy of transport, housing and water and sanitation facilities. Sustainable urban forms address these ills. The stakeholders accept that the current planning practice has to be reformed to effectively deal with emerging urban challenges.

The results also indicate there is limited or poor stakeholder participation and engagement in plan-making. Although many urban stakeholders have never been included in any plan-making process, there is a high willingness to participate. The citizens are willing to give their input should the local planning authorities invite them. Many other stakeholders, such as universities, civil society organisations and the business community, are also willing to participate in urban planning

issues. The informants singled out universities as critical players in sustainable plan-making through their research infrastructure. Universities are a hub of knowledge and competencies that if harnessed well can transform the country. As a sign of willingness to partake in projects of national interest, the University of Zimbabwe is leading in the preparation of the master plan for the new city to be located in the Mt Hampden area.

THE BARRIERS TO INTEGRATED LANDUSE AND TRANSPORT PLANNING IN HARARE

Fischer, *et al.* (2014) says a barrier is a factor that generates difficulties when attempting to do something. The study found six barriers to the effective implementation of integrated land-use and transport planning. These include a lack of political will, insufficient resources, poor institutional architecture, bad politics, weak policy and legislative framework and rapid urbanisation.

LACK OF POLITICAL WILL

Political leadership, at the highest levels, is a critical agent in project success because it has the power to allocate resources. Thus, the lack of it is often the major reason for failure to formulate and implement plans, projects and/or reforms. Throughout the study, it was noted there is no political will in reforming the planning practices and adopting new paradigms, like the integrated land-use and transport planning. Thus, while there is increasing awareness of the merits of compact settlements, mixed-use and sustainable transport in the country, there has been no political leadership to put in place structures, modalities and frameworks that achieve these noble urban development concepts. There is a limited government initiative to promote integrated land-use and transport planning.

The study found that although the government, through its various agents, came up with noble policies, like the Zimbabwe National Human Settlement Policy, to achieve sustainable urban development, there is no impetus from the same to see these concepts being implemented. It is believed that the

government is not providing the necessary institutions, resources and empowerment to see noble ideas being practically implemented. This resonates with the views expressed by Matamanda (2019), that there are no well-crafted sanctions to push planners to reform the planning practices towards the envisioned urban form. To push for reform in planning, it is imperative for effective, proportionate and enforced sanctions.

INSUFFICIENT RESOURCES

Finance is a critical resource that makes other resources available for the integration of integrated land-use and transport planning. It is imperative to have sustainable funding to support institutional restructuring, staffing and training, technology acquisition and maintaining integrated planning systems (Batty and Marshall, 2017). The study sought to understand if the local authority or government has or can mobilise financial resources to finance integrated land-use and transport planning.

The key informants concurred that financing in Zimbabwe is a challenge, whether to support the efficient running of public institutions and/or service delivery. There is no readily available funding to create institutional mechanisms for collaboration among institutions in the built environment. The planning departments are underfunded to meet their operational requirements, thereby exposing them to manipulation. They are exposed to capture as the possible funders (private players) may sway plans to further their business interests. Further, Harare does not have the technologies that support innovative solutions. This hi-tech era has seen the adoption of the latest technologies, like Geographical Information Systems, in planning output delivery. However, this is not the case in Harare. Dumba (2017) highlights that city-wide transport planning needs to be done under the Traffic Operations Management System or Framework, comprising six components, namely organisational structure, workforce, procedures, standards, state-of-the-art equipment and comprehensive database. However, due to funding challenges, all the above components are said to be absent or in shambles.

POOR INSTITUTIONAL ARCHITECTURE

The study evaluated the institutional governance, focusing on the relationships existing among various institutions working to deliver a sustainable Harare, both on the land-use planning front and transport planning. The informants indicated that the current institutional organisation is fragmented and punctuated by overlaps and duplications. Mbara and Pisa (2019) also identified institutional governance as another impediment to delivering sustainable urban transport in Harare. There are many players in urban land-use and transport matters, including government ministries (the Ministry of Local Government and Public Works, the Ministry of National Housing and Social Amenities, the Ministry of Transport and Infrastructure Development, the Ministry of Energy and Power Development, the Ministry of Finance), the City of Harare, the Zimbabwe Republic Police (ZRP), the Environmental Management Agency (EMA), the Traffic Safety Council of Zimbabwe (TSCZ), the Zimbabwe National Roads Administration (ZINARA) and the Urban Development Cooperation (UDCORP), among others. The planning and operations of these institutions are disjointed and incoherent, and a systematic approach is missing (Dumba, 2017).

There is lack of coordination and good relations among these players and information is not readily shared to make informed decisions, decisions are made in silos. The poor institutional relations and coordination end up creating antagonism among key players in the transport sector. There are administrative integration barriers culminating in inconsistent policies and plans of various departments and institutions that have impacts on the built environment (Matamanda, 2019). Thus, if the issue of administrative relationships is not addressed and reflected in the application of planning instruments, tools and implementation by all spheres of government and professions involved, the issue of integrating land-use and transport planning remains a pipe dream. Mbara and Pisa (2019) suggest that an urban transport authority should be created to get rid of the obtaining institutional dysfunctional challenges. While the suggestion is plausible, the authority can succeed only if it is given support and autonomy to perform its duties without political interference.

BAD POLITICS

Politics affects the efficient running of planning institutions and the planning and implementation of various planning programmes (Mapuva, 2011). The informants concurred that planning in Harare, and Zimbabwe at large, is negatively impacted by the unsettled national and local politics. Muchadenyika and Williams (2016) also mention that the contested politics in Zimbabwe has distorted the planning system, swaying planners to assent to spatial plans that advance political interests. There are observed political squabbles between the central government and local government. These squabbles are affecting the professional and administrative integration of the land-use and transport planning institutions in the government and the council.

The Zimbabwe African National Unity – Patriotic Front (ZANU-PF) is in charge of the government while the Movement for Democratic Change-Alliance (MDC-A) is in charge of Harare City Council affairs. These are political opponents who, at every turn, try to outsmart each other (*ibid.*). While these political games should be in the political arena during elections, they are played every day and it has affected service delivery in the local authorities. The key informants identified that there is a frosty relationship that has affected the professional relationships between the workers in the council and those in government as they are serving different bosses. Further, the sprawl development in Harare is also blamed on organic settlement growth pushed by housing cooperatives which are mainly ZANU-PF supporters (Mapuva, 2011). The impact of this is increased urban sprawl and vehicle dependency as the residents in such settlements will be going somewhere to look for economic opportunities using these vehicles. Integrated land-use and transport planning require professional, institutional and administrative cohesion (Perraa *et al.*, 2017). Thus, without good political relations and cohesion, as happening currently, there is no integration to talk about. The integration in these conditions can never achieve efficient integration.

WEAK POLICY AND LEGISLATIVE FRAMEWORK

The study, through documentary review and key informant interviews, evaluated the policy and legislative framework guiding land-use and transport planning in Zimbabwe. The key informants endorsed the view that the existing policy and legislative framework governing land-use and transport planning is not specific and strong to push for integrated land-use and transport planning in Zimbabwe. Thus, a weak policy and regulatory framework is an inhibitor to the full integration of land-use planning and transport planning. The local policies concentrate much on the outcomes of an integrated spatial planning framework, for example, compact city form. Scholars like Matamanda (2019) castigate this legislation as prescriptive and rigid that fails to integrate various facets of societal needs. This Act leads to plans produced through prescribed approaches to plan-making. This defines a methodological or procedural integration barrier that is defined by Fischer *et al.* (2014) a the challenge associated with prescriptive decision-making processes, methods and techniques. He notes, for example, that if the plan preparation processes are too drawn out, just like in the Regional, Town Country Planning Act (RTCPA) (1990), they may struggle to achieve the timely resolution of problems making this process come up with outdated solutions.

RAPID URBANISATION

The rapid rise in population and the constrained real economic growth usually result in unintended consequences on the economy, social fabric and the environment (Sultana and Weber, 2014; van Geet *et al.*, 2021). In Harare, the population is growing rapidly, yet economic opportunities are shrinking. This gave rise to informality and the public authorities lost some form of control over many issues without being called heavy-handed. For example, the council is not acting on people who are engaging in informal businesses like street vending which is affecting mobility in many streets in Harare. If the council enforces the by-laws that outlaw street vending, they are accused of being insensitive and heavy-handed. Further, rapid urbanisation has caused a shortage of affordable formal housing; many people have resorted to self-help housing projects in peri-urban areas where there are administrative

loopholes (Muchadenyika and Williams, 2016). The resultant urban development trends are partly occurring outside the council or government's sanction which is problematic. The informality of many things in Harare has affected its revenues. This has also constrained the council's capacity to expand services and infrastructure. For instance, the demand for formal public transport has grown and is growing rapidly to the level where the council and government cannot efficiently meet. This dearth of conventional public transport stimulated the growth of informal public transport which is one of the major problems that the country has endured and trying to correct now.

DISCUSSION
There is a profound understanding and knowledge of integrated land-use and transport planning among the practitioners and stakeholders in the built environment in Harare. This becomes an enabler in line with Lubida *et al.* (2019) who suggest that the effective implementation of any programme starts with the comprehension of the concepts involved, including the advantages derived therefrom, and the pre-conditions and working modalities of the concept. The major stakeholders agree that any major changes in land-use patterns influence the number of trips, destinations and modes, and those changes in the transport system influence patterns of urban development and location choices of households and firms. This proves the value of integrating the two planning sections in Harare. Thus, the advocacy for integrated land-use and transport planning has positive signs of growing.

The knowledge among key personnel in urban planning of the important role of this concept in the ongoing urban renewal processes indicates that it may not be difficult to integrate land-use and transport planning in Zimbabwe. Further, the acknowledgement that the present planning paradigm does not resemble the desired paradigm and that there is need for a reform. The acceptance by the planners and other key stakeholders in spatial planning in Harare is a positive gesture to the effective implementation of integrated land-use and transport planning. However, it can also be noted that a profound understanding of the concept is not sufficient to drive

the adoption of the same but is just one of the many factors. Therefore, improving on other drivers for successful integration of land-use and transport planning is imperative.

The issue of stakeholder participation is very important for any planning reform to ever take place. Thus, the stakeholder acceptance and willingness to participate and collaborate in urban planning affairs is a positive prospect for integrated land-use and transport planning. This is mainly because stakeholder collaboration, through participation, is crucial in the successful integration of plans and implementation thereof. Although the current situation is that there is limited or tokenistic inclusion of these stakeholders in land-use or transport plan preparation, there is a high willingness by the residents and business people to contribute towards improving the transport system. Murphy (2021) says citizen participation is a very critical element for achieving integrated planning processes as it widens the scope of ideas, implementers, resources and protectors of the development. Community buy-in is important for the success of any project, as there will be shared ownership of the planning processes, implementation process, maintenance of the outcomes and resourcing of all the processes involved. There is a common mistake observed in the current planning practices, that spatial planners plan for the people, instead of planning with the people. In Harare, the people are willing to be part of the planning process, which is a very encouraging position in terms of integrated land-use and transport planning.

There are several barriers found in this enquiry: lack of political will, insufficient resources, poor institutional architecture, weak policy and regulatory frameworks, bad politics and rapid urbanisation. These barriers can be further regrouped into three broad barriers, namely lack of political will, weak policy and regulatory frameworks and insufficient resources. Lack of political will is affecting the implementation of good policies and reform agenda. Although there have been many public debates and policy recommendations for reform in planning practices, there has been no movement on the ground to effect the necessary reforms and capacitation to achieve the new requirements coming from such reforms. According to Schwanen *et al.* (2016), several actions should be visible to see

if the political will is present. These include, among others, government/council initiatives, allocation of resources and application of credible sanctions. There is nothing to show in these respects, except the bringing in of piecemeal changes and requirements in the planning system. The lack of political will also covers poor institutional architecture and bad politics. The current administration, both local and national, has the power to restructure institutions and shun politicking, but they continue to the detriment of service delivery.

The issue of financial resource inadequacy compounds the capacity to acquire other critical resources in the integrated planning system. For effective integration, sustainable funding for institutional restructuring, staffing and training, technology acquisition, maintaining integrated planning systems, funds plan-making processes and implementation of the plans is critical. The municipality is in perpetual financial challenges that have crippled service delivery. The government has not reasonably assisted, financially, the council as is required by the constitution. However, it was also noted that if there is political will, the financial resources required can be mobilised and achieve integration.

The existing policy and legislative framework governing land-use and transport planning is not specific and not strong enough to push for integrated land-use and transport planning in Zimbabwe. The laws have dealt with aspects of integrated land-use and transport planning in a piecemeal fashion with no comprehensive pieces of legislation that specifically deal with integrated land-use and transport planning. This is different from other countries that have made significant progress in integrating these two sets of urban planning. For example, in South Africa, there is the Development Facilitations Act (Act 67 of 1995) that emphasises the efficiency and promotion of integrated spatial planning; the Municipal Systems Act (Act 32 of 2000) mandates municipalities to be development-oriented through Integrated Development Plans and the National Land Transport Act (Act 22 of 2000) that states that land-use planning must be integrated with land development processes and the transport plans. These are part of the many policies and legislation that directly push for integrated land-use and

transport planning. Thus, in the current state, the policy and legislative frameworks are too weak to promote integrated land-use and transport planning.

CONCLUSION AND RECOMMENDATIONS

The prospect of integrated land-use and transport planning is bleak in Zimbabwe. Barriers outweigh the enablers of integrated land-use and transport planning, indicating there is still a long way to go to achieve integrated land-use and transport planning. There is no political will, insufficient resources, bad politics, poor institutional architecture, weak policy and legislative framework and rapid urbanisation militate against the integration of land-use and transport planning. Several policy implications, relating to the understanding of sustainability, can be drawn from this study on integrated land-use and transport planning in Zimbabwe. These include, among other things, the Government of Zimbabwe must enact policy and legislative frameworks that push for sustainable urban development, including laws that make integrated land-use and transport planning mandatory.

Through supportive policy and regulatory frameworks, the national government and councils can then implement institutional restructuring, taking into account the professional, departmental, organisational and sectorial integration as part of the development framework and promote genuine stakeholder participation with the potential to unlock partners and collaborators. Further, the national government, through law enforcement agencies, should maintain and enforce the rule of law to deal with issues of corruption, abuse of office, political influence on council business and disregard for planning laws and many other laws. To attract financiers, public authorities must strive to achieve transparency to guarantee potential funders of public projects that their resources are not going to be plundered. Public Private Partnerships (PPPs) are also another recent important financing mechanism for important sustainable development projects. The authorities should consider the PPPs in funding the spatial planning reforms and implementation of sustainable urban plans.

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Are Efforts by Urban Local Authorities in Embracing Smart Technologies for Urban Development and Governance in Africa Yielding Results? Case Studies of Cape Town, Cairo, Lagos and Harare

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Abstract

There is evidence and consensus that African urban local authorities have to capitalise on the dawn of smart technologies to match cities and towns of the developed world. The adoption of technological advances in finance and administration has improved local authorities' revenue collection. This article assesses the success of efforts by urban local authorities in embracing smart technologies in urban development and governance in selected African cities. African cities are faced with service delivery and urban development challenges owing largely to the lack of smart technologies in urban infrastructure planning and maintenance. The article examines the struggles of cities, municipalities and towns in embracing smart technologies in dealing with urban development and administration in Africa.

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The adoption of e-administration, geographical information systems and other technologies for the surveillance of urban infrastructure enhance transparency and efficiency in service delivery in urban areas. It highlights how ICTs have continued to influence urban development in the rapidly urbanising cities of Cape Town (South Africa), Cairo (Egypt), Lagos (Nigeria) and Harare (Zimbabwe).

Keywords: cities, service delivery, e-administration, infrastructure.

INTRODUCTION

African cities are facing challenges in dealing with their rapidly growing populations. Cities are growing at a faster rate than they can provide for their people. The cities face various challenges, including economic collapse, poor governance, social decay, mobility and environmental challenges. Technology is seen to make work easier (Brynjolfsson and McFee, 2014; Raja and Nagasubramani, 2018). There are various ways of improving technology in people's lives. Advancements in technology have taken centre stage in various fields, including communications, and have also been adopted in urban development (Naveed *et al.*, 2018). These developments in technology have made it easier to gather and disseminate information, thus improving communication (Tumbo *et al.*, 2018).

Technology is used to reduce human carbon footprint (Hayder, 2017). This is done through the use of solar systems (Shahsavari and Akbari, 2018). There is a link between climate resilience and economic resilience that has prompted people to focus on the environment and urban development to ensure economic growth (Evenhuis, 2020). Residential areas are being modified to meet the standards of the people by retrofitting solar systems, boreholes and green buildings on old properties and designing new housing with those modifications in place.

Urban development has adopted the use of smart technology to improve service delivery (Albreiki *et al.*, 2019). This is seen through the use of artificial intelligence (AI) and autonomous vehicles used in Singapore (Tan and Taehagh, 2021) to make it

more liveable. Washington DC street lighting is upgraded to include monitoring and control systems, Wi-Fi and sensors, with the LED lights used energy-efficient (Nirosha *et al.*, 2017; Patarroyo *et al.*, 2019). Developed nations can afford to further develop their technology whilst developing countries are lagging behind, creating a gap between the countries (Ngwa *et al.*, 2020).

Smart systems are viewed as intelligent technological systems that are self-sufficient and have advanced functionality (Smys, 2020). These can sense, analyse and manage any given situation. They can work simultaneously and communicate with each other, yielding highly reliable and predictive results. They assess a situation and provide the most optimal route to follow with technically calculated variables (Alter, 2020).

Smart technology in urban development and governance is vital as it promotes the development of smart cities, resulting in the success of the National Agenda 2030, fitting in with Sustainable Development Goal (SDG) 11 (Angelidou *et al.*, 2018). The characteristics of smart cities include interconnectedness, intelligence and autonomy (Cui *et al.*, 2018). These highlight smart systems, showing that they ought to be integrated and self-governing. However, these smart systems have challenges of their own that include integration vulnerability, and centralisation vulnerability as servers are usually located in one area and then information is disseminated elsewhere. This compromises individual privacy, increases automation and inconsistent adoption, creating gaps and lag times between different municipalities or countries (Silva *et al.*, 2018; Pathak and Pandey, 2021).

Technology is changing at an alarming speed. This has led to a change in industries, commerce and also urban development and governance. The technology industry growth has opened up a variety of avenues in the world and their interconnectedness (Bailey and Osei-Bryson, 2018). Technology has made it easier to communicate and to spread information and also store it in

various forms and anywhere. This information has proved to be essential in running businesses and urban development (Chen and Milanovic, 2019). This is particularly vital as urban development is one of the fields that require real-time and predictive data to create functional and operational products.

Most urban development has adopted the use of Geographical Information Systems (GIS) to map zone, visualise and predict urban plans and compare data. GIS was introduced in the 1960s and has been used as a vital data source (Malleson, 2019). This is particularly helpful in the bid for the New Urban Agenda 2030 of creating smart cities using geospatial data (Moomen *et al.*, 2019). Spatial planners can compare master plan designs with what is on the ground with cadastral maps, overlays and Google Earth software. The adoption of planning support systems (PSS) has provided geospatial tools in communication (Pettit *et al.*, 2018), analysis and information handling. However, there exists a mismatch between the supply and demand, the information needed and the users.

CONCEPTUAL FRAMEWORK

URBANISATION CHALLENGES

Urbanisation is a result of an increase in population in the city due to rural-urban migration and the government expanding urban areas (Dijkstra *et al.*, 2020). Rapidly urbanising cities are facing challenges due to their incapacitation. This stems from the large and growing population that places pressure on the available services and resources of the city. A growth in population means that there is need for housing institutions to cater for the citizens. This is difficult to deliver, especially in developing countries, where the state of the economy does not allow for good quality free or low-income housing. Most people end up renting and, in turn, increase pressure on the available resources and services. Overcrowding results in bursting sewer pipes and the spread of diseases (Bodo, 2019; Singh *et al.*, 2020).

A growing urban population requires employment for independence from the government and donor assistance. With jobs, people pull themselves out of poverty. If people are incapacitated and do not have enough resources to go digital, then the hopes of achieving a smart city vanish without the technological means to access information and services (Gore, 2017; Ranchod, 2020).

INFORMATION COMMUNICATION TECHNOLOGY (ICT)
This refers to technology that is centred on information access through telecommunication. The focus is on communication technology, the internet, mobile phones and wireless networks (Franca *et al.*, 2020; Porru *et al.*, 2020). ICT has become key for the sharing of information to do with service delivery and feedback in urban areas.

SMART CITY
Smart city refers to an urban settlement where citizens and the government work through the use of technology (Kirimtat *et al.*, 2020). It is the transformation of how local governments work and how they interact with the citizens. The local authorities adopt technologically aided means of communication to better disseminate information (Caragliu and Del, 2019).

The smart city has various components that enable it to be called 'smart' and these include smart citizens who use technology for communication and everything else, mobile network/ Wi-Fi access and open data that is accessible to all. This includes smart health, where transactions are done online, smart government, smart farming, a smart grid with clean energy sources, smart buildings, smart manufacturing and smart transportation (Silva *et al.*, 2018; Singh *et al.*, 2021) (Figure 1). The 'smart' is representing reduced carbon footprints and environmental exploitation and industrial emissions. It is a digital city that provides services and passes information through digital and technological means (Rathore *et al.*, 2021).

Figure 1: *Smart City Components* (Facilitator, 2021)

LITERATURE REVIEW

Economic challenges faced by cities include poverty, where the citizens live in deprivation and are prone to urban insecurities (Oluwatayo and Ojo, 2018). Access to employment is limited and urban poverty is perpetuated by an increase in competition for resources. The infrastructure in place cannot cater for the networks required for the high functioning of a city (Ibragimova *et al.*, 2021). A lack of diversification and an unbalanced geographical development also pose challenges to the city. Lack of diversification means no innovation, thus no new ways of accessing employment and generation of income. Unbalanced geographic development results in overcrowding in a certain area due to infrastructure jnavailability (Xiong *et al.*, 2021).

Mobility is another challenge faced by cities that includes transportation shortages, congestion and pollution (Gebresselassie and Sanchez, 2018). Growing cities have difficulties in accessing affordable public transportation, as characterised by long bus queues. Taking the case of Zimbabwe, this has an avenue for th *mushikashika* (Chigwenya and Dube, 2018; Chikengezha and Thebe, 2021). These are private cars that illegally transporting people between the Harare CBD and residential area. This has created a serious

situation where operators of these vehicles are in a rat race with the municipal police (Mutambanengwe and Dambudzo, 2021) as the former try to avoid arrest. Many accidents have occurred and these vehicles do not have passenger insurance, hence putting passengers are at great risk (Maringira and Gukurume, 2020). These vehicles have invaded the City of Harare in large numbers and have worsened the congestion crisis in the CBD..

The influx of these *mushikashikas* is caused by the shortage of public transport, and the societal construct that vehicle ownership translates to wealth (Londoño-Vélez and Ávila-Mahecha, 2018; Lucas and Wilson, 2019). This has seen an increase in vehicle ownership in African cities. This negatively impacts the environment of the urban areas as people are not willing to adopt cycling as a means of mobility.

Pollution is dangerous as it releases chloroflorocarbons (CFCs) and greenhouse gases that are eroding the ozone layer and causing climate change (Adedeji *et al.*, 2020). This is one of the main reasons most companies have tried to go paperless (Wilts and Berg, 2018; Nopilda and Setiawan, 2019). Most cities are facing water shortages that has seen many boreholes sunk and wells dug to supplement council water (Mapunda *et al.*, 2018). The rate of development in cities is also another environmental challenge because development is at a high rate and there are very little or no regulations to govern urban growth (Boamah *et al.*, 2018). At times, regulations are acknowledged after development completion.

Urbanisation challenges can also be classified as people challenges. The dimension is significant as people drive development, directly or indirectly. They migrate to cities and put up structures and settle in different areas, driving development. Other services come to complement the residential growth. The people dimension includes inequalities such as education inequalities (Reay, 2018), where some people are unable to access education. This may be due to geographic

differences (Öhler *et al.*, 2019) and poverty where some residents cannot afford school fees. Cultural differences also provide challenges to city development (Ayed *et al.*, 2017). For instance, some cultures do not allow women to go to work, which reduces the household's income. Gender inequalities also pose challenges. This is because some men may not allow their wives to have smartphones to pay bills and to communicate with local governments, yet, most women have the information of what they need and the services they want to pay for.

Access to employment is also another people dimension affecting urban development (Wei and Ewing, 2018). This is because people who cannot access employment do not have funds to acquire stands and may, therefore,end up illegally settling on land reserved for other uses. Urban poverty also means that citizens do not have access to technology required for the city to go 'smart'.

Other challenges are related to the quality of life of citizens. This includes access to decent housing that is seen as a luxury in most rapidly growing cities because of the government's inability to provide housing to its people (Karadimitriou *et al.*, 2021). This leads to the development of illegal illegal settlements. Access to employment also affects the quality of living and other basic rights to security and protection against violence within a settlement (King *et al.*, 2017). Leisure facilities access also affects the quality of life because everyone needs free time to refresh and rest. Access to information affects living quality through the spread and access of data (Nevado-Peña *et al.*, 2019).

Governance challenges are interwoven in the cities' structure. These challenges are centred on institutional instability where institutions do not have enough capacity to develop, monitor and guide urban development (Repette *et al.*, 2021). This capacity can either be human, financial or technological, hence limiting the capabilities of the city. Excessive centralisation

creates an abyss between the government and the governed, creating communication gaps where decision-makers are unable to pass on adequate information to the citizens (Dadashpoor and Yousefi, 2018). Institutional coordination is vital; a lack will lead to difficulties for different departments to formulate complementary solutions. Lack of participation, awareness, infrastructure deficit, technology and access to information creates poor governance (Oleribe *et al.*, 2019).

NEW URBAN AGENDA 2030

The Agenda 2030 was established to propel the development of cities to be world-class and match cities in developed countries (Valencia *et al.*, 2019). The initiative is centred on the use of technology to further develop cities. This was also a way of correcting challenges of congestion, pollution and overcrowding in the cities. Some initiatives used towards Agenda 2030 include densification of residential areas, creating mixed-use areas and using technology to advance urban development, to manage and monitor urban infrastructure with the use of geospatial data (Alves, 2020). Geospatial data takes centre stage in urban development for individuals and companies to access geographical data online and openly (Scott and Rajabifard, 2017). There is need to educate people on the use of technology devices and to formulate new innovative ideas to propel development further.

In South Africa, Cape Town localised the New Urban Agenda framework through the Integrated Urban Development Framework launched in 2018 andand the UN Sustainable Development Goals (SDGs). However, central government did not actively support this endeavour. The smart city concept has evoked the need to use of clean energy to achieve the development of cities. In this case, companies such as Eskom have developed systems to provide clean and safe energy through solar development.

Zimbabwe has also embarked on the noble idea, though it is facing some challenges. It was established that there be an encouragement in the development of alternative energy uses to help create a smart city. However, taxes and duties made it

expensive such that a battery bought US$75 is sold for almost US$350 because of these taxes, put in place to protect local businesses. This has not helped because the solar development sector is developing slower than the demand for the equipment.

RESEARCH METHODOLOGY
The data used in this study were from mainly secondary data sources such as documents, including reports and plans. Thematic analysis was employed to discern the different smart technology tools used in different parts of the world.

RESULTS
The urban population is growing at a high rate, leading to the estimation that about 70% of the world's population will be in cities by 2050 (Ritchie and Roser, 2018). This growth in the urban population compounds the urban challenges, which include pollution, congestion, poor sanitation and shortage of potable water, housing and poverty (Dos Santos *et al.*, 2017). This makes urban areas difficult to manage and service.

CAIRO
Cairo has embraced smart technology in various aspects. It has initiated and integrated a smart CCTV system design to access information from around the city and to help in crime prevention (Hassanein, 2017). These require sharing of information timely enough to allow quick response to utility outages or traffic congestion. These systems are being adopted from South Korea as it is one of the leading countries in smart technology (Elsayed, 2021).

The New Cairo Capital is a smart city proposed to change and embrace smart technology (Hassanein, 2017). The proposed area is about 700km^2 of high and medium residential areas, with about 200km^2 as natural preservation areas (Figure 2). The city embraces the old one and is connected with it through public transit links. The city is also concerned with education, quality of life and economic opportunities, especially for the younger generation whilst conscious of environmental sustainability.

Figure 2: *Master Plan of the New Capital Cairo. Source* (SOM News, 2015)

CAPE TOWN

Cape Town is one of the leading cities in smart technology. This has drawn many people to the city, therefore, creating a platform for innovation and competitiveness among the residents (Pinfold, 2018). An influx of technical people encourages the development and spread of digital 'smart' tech (Killian and Kabanda, 2017). Bills are paid online, conserving the environment and reducing the travel frequency of people between their homes and service provider accounting halls.

The city of Cape Town initiated its first ever smart city strategy in the year 2000 (Mhangara *et al.*, 2017). This was in a bid to aid in the accomplishment of city goals such as employment creation, economic growth of the city, high-quality service provision and to improve citizen engagement in urban development and governance. It centred on finding ways in which technology is used to meet the city's objectives and to encourage citizen participation. The Unicity initiative integrated seven municipalities in the Cape Town region to allow inclusivity and integration(Hart, 2021).

However, the city has faced challenges (Boyle, 2020) in adopting these initiatives and the smart city concept. This is because of the ambiguity that surrounds the digital city and smart technology. Therefore, it created a theoretical framework that is difficult to undertake practically. It lacks implementation techniques and remain hypothetical and superficial (Lim *et al.*, 2019).

LAGOS

Nigeria is one of the countries facing an infrastructure gap due to underinvestment and poor innovation strategies and performance (Orji *et al.*, 2019). In Lagos, the public service delivery and implementation strategies failed due to the methods and techniques used. The government is also failing to adequately provide services to the people and has also failed to properly manage public infrastructure (Ahmad, 2017). This is worsened by the growing urban population resulting from the rural-to-urban migration. There is an increase in governmental challenges of service delivery in education, health care, safety programmes, social welfare and an efficient business environment. The Internet of Things (IoT) is not yet widely used in the public sector as most government services are not online yet (Kunle *et al.*, 2017).

The Lagos smart city project was initiated in June 2016 (Adejuwon, 2018) as a conceptual way of improving service delivery and governance. The project was aimed at creating a link between human and social capital with ICT infrastructure to enable the flow of useable information to the residents. This was also to address the gap in public service delivery and to drive sustainable urban development to improve the quality of life of citizens (Olokesusi and Aiyegbajeje, 2017).

HARARE

The prepaid Zimbabwe Electricity Supply Authority (ZESA) system has worked to a greater extent as most residents buy electricity tokens before using the power (Dumbura and Özkoç, 2021). The use of prepaid meters has encouraged people to pay for their electricity, hence people are paying for the energy that they are using, unlike what was happening before, where one

would use the electricity and be billed later. This reduces unpaid bills and ensures that households or companies use only electricity that they paid for. It also helped in the revenue collection of unpaid bills. However, a some residents have bypassed the the system of buying tokens; therefore no revenue for that electricity is collected. Prepayment also has helped in reducing the energy consumption of citizens, since some are are now using LP gas and firewood for heating and cooking, saving the nation's electricity (Macheka and Chikoto, 2021). The use of gas has been a great substitute for electricity. There has also been the use of other energy sources such as solar power, which is a clean source of energy. The use of solar energy is used in Homelink, Westlea, Harare, and has provided lighting during intermittent power cuts. These are clean energy sources that protect the environment and reduce pressure on the resource.

The Harare City Council has faced many challenges in delivering potable water to its residents. The chemicals required for water purification are expensive (Tundu *et al.*, 2018). The city needs all the revenue it can get. However, it is difficult to obtain because of non-revenue water which is between 40% and 60% in amount lost (Nhongo *et al.*, 2018). This is attributed to burst water pipes, illegal connections and political exemptions. The need to adopt prepaid water meters is long overdue, as the idea has not taken flight since 2016 (Maramura, 2018). The prepaid water meter will help in revenue collection and reduce non-revenue water.

Urban local authorities have attempted to embrace smart technologies in their daily operations with 15 million mobile connections and a 98% connectivity rate (Mupfiga and Tafadzwa, 2017). This is through the establishment of bill payment applications, such as the one for the City of Harare. The council has developed an application that allows people to pay their bills online (Mapfumo and Mutereko, 2020). The application was also designed to enable citizens to report issues and to request or advise on garbage collection. The application needs to be downloaded first on Google Playstore, eliminating those residents who do not have smartphones.

DISCUSSION

There is widespread use of smart technology in urban development and governance. This is one of the main causes of modernisation in developing countries and the adoption of new tools and innovations. The development of ICTs has made the smart city concept a possibility as they provide the means to achieve sustainable city development.

African countries, like Zimbabwe, South Africa, Egypt and Nigeria, have adopted the use of electronic payments and mobile payment of rates and utility bills. Zimbabwe has adopted the use of Ecocash and Telecash as payment methods for rates and utilities (Mupfiga and Tafadzwa, 2017). This has reduced the need for people to commute to and from the accounting offices that are usually located in the CBD, thereby reducing the hustle of paying ratesb and also reducing the need to travel. The city can get more payments via mobile and online means and has, therefore, aided in the revenue of the city (Simatele, 2021). The sending of messages and advertisements on easier ways of paying bills has also acted as an enabler with people using those avenues stated by different service providers and the City of Harare.

The City of Harare has moved away from the sending of hard copy bills, as a way of ensuring environmental sustainability. However, the sending of electronic bills has not taken root because one needs to send an email requesting their bill and/or statement. Some people tend to pay a fixed amount that may or may not be significant enough to aid the city in service delivery because they will not have updated arrears to the city council (Mhike, 2019; Zvobgo, 2021). The city is moving towards smart technology but does not have enough resources and also the citizens do not all have access to the technology required for the smooth flow of information. Therefore, service delivery is still facing deficits in terms of supply and demand.

The city lacks monitoring mechanisms for rate payments (Maramura and Shava, 2021). This is because technological innovation and adoption in developing countries are still in their infancy as it has not fully developed to meet all the requirements.

The adoption of smart technology is a way of addressing urban challenges faced by developing countries. Most developing countries lack diversification in the economic sector with most tending to lean towards primary industries such as farming, forestry and mining (Mayuzimi, 2020). This sets a limit on the country's reach because the economy is not driven further by the chosen sector. There is also an unbalanced geographical scenario where urban areas have most of the population and the potential for development and rural areas are left with very few people and little to no development. The developed centres cannot provide enough money to develop these areas. There is also an excess weight of the informal sector. It is vital to have an informal sector that caters for the uneducated and unskilled. However, this situation has overtaken the formal sector that does not have enough money to function well with almost all sectors of commerce informal. This limits employment creation and income generation that is beneficial to the whole.

Zimbabwe needs to learn from Lagos and adopt a situation whereby a link between human and social capital is encouraged. The connection provides a pathway for infrastructure development, with social needs expressed to inform urban development. There is also need to abolish the development for the 'greater good' without consulting the people,who will eventually use the developed area.

CONCLUSION AND RECOMMENDATIONS
Technology is ingratiated in most activities. Its advancements have led to the improvement of work and its mechanisation. Technology has also been adopted in the urban planning field to plan creation, mapping and monitoring development through the use of GIS and other systems. Smart technology has had an impact on most developed countries with enough financial capacity to implement and further develop plans. However, developing countries have found it difficult time implementing smart tech ideas. This is because of a lack of financial, human and political capacity. That is why cities, like Harare and Lagos, have formulated plans that tend to be superficial and theoretical.

The New Urban Agenda 2030 has been adopted the world over and there is need to work to successfully get results. The embracing of technology in all aspects, working with the IoT to stay connected and sharing information is critical. This begins with accepting that the world is interconnected and so information[-sharing should be free and easily accessible through open data sources and urban labs.
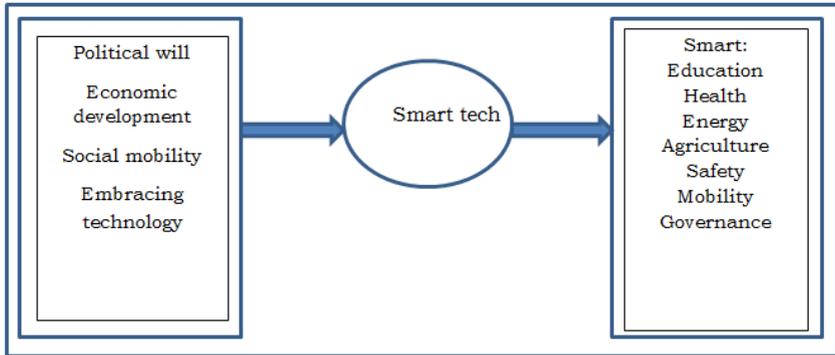
Figure 3: *Smart Tech Framework (*Adapted from Kumar *et al.*, 2020).

There is a need to foster political persuasion for the idea of smart tech to take root and be a priority (Figure 3). Equity wealth distribution and economic development are key to ensuring access and ability to purchase technological gadgets that aid in accessing the internet and performing tasks. Social mobility is also vital to succeed in the development of smart cities that use technology in almost all aspects of urban development (Mapfumo and Mutereko, 2020). There is need for a platform where people can move out of poverty and further develop their housing and move to other residential areas.

All this work leads to the attainment of smart cities that have all aspects required for further development and improvements. The results are smart agriculture, smart energy, smart manufacturing, smart health care, smart living, smart education, smart safety, smart mobility and smart governance.

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The Project Lifecycle in the Political and Economic Cycles in the Developing World: Case of Zimbabwe

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Abstract

This article is built on a study that investigated a development projects' life cycle in the context of Zimbabwe's political and economic cycles. These projects bring about visible and tangible public goods that can be used as evidence that development is taking place. The study's main goal was to figure out the reasons for the failure of some megaprojects in Zimbabwe within the context of political and economic cycles and provide recommendations on improving that nexus. This study's approach included a desktop review and topic and content analysis for in-depth analysis. As argued in the study findings, numerous projects that have been set to fit in particular political and economic periods, have failed to meet the completion deadlines because of constraints within and beyond the project's control. These include unsustainable use of resources, poor project planning, lack of stakeholder involvement, incompetent project managers, poor inadequate monitoring and evaluation and lack of funding and an unconducive political climate, resulting in the so-called white elephants.

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INTRODUCTION

Across the globe, projects are key building blocks for the development of any nation. They are instruments of policies that demonstrate the impact of the policies at a practical level (Cusworth and Franks, 2013). Once these projects are successfully executed, they result in economic and social good of the nation. In most developing countries, projects are a vehicle for attracting both domestic and foreign investment. As argued by Mathabire and Dzingirayi (2020), projects involve large sums of money that are pumped in with an expectation that they will, in return, produce greater economic gains after their activation. A project is a short-term endeavour having a clear beginning and end point, undertaken to fulfil specific aims and objectives, typically to bring about good change or additional value. For this reason, efforts should be given to successfully deliver the goals and objectives of the project within a specified timeframe and given budget. Since projects are temporary in nature, PMI (2000) notes that the success of the project should be measured in terms of completing the project within the constraints of scope, time, cost, quality, resource and risk as approved between the project managers and senior management.

However, the perceptions of success vary with individuals, the nature of the business and the type of projects and that project success can be categorised from an objective perspective when it considers factors such as cost and quality, while a subjective perspective focuses on stakeholder satisfaction (Zuofa and Ochieng, 2014). A project is regarded as a failure if it does not achieve what was expected by the specifications (Project Smart, 2012). (Zuofa *et al.*, 2014:60) note that, in addition to using traditional indicators that include cost, time and scope, value-added assessment criteria that include project usefulness, value to the organisation and learning potential should be added. Exceeding a project's initial budget is regarded as a failure. Similarly, if a project achieved everything in the detailed project

blueprints, it may still have failed as a result of omitted crucial features that important stakeholders require. It appears unfair but project success and failure are not only about facts or what was provided.

The success of national projects is a benchmark of socio-economic and psycho-political growth and stability (Mathabire *et al.*, 2020). It is further noted that mega projects in developing countries are not always immune to common financial, environmental and legal setbacks and Zimbabwe is an example of an interesting environment under which projects exist (*ibid.*). Projects are exposed to a series of political, economic, social, technological and economic underpinnings. They are also used in political and economic cycles for various reasons, thus declarations are made over these projects in terms of the purpose of their deliverables to communities and regions in the country. Project periods are also defined to suit political cycles such as electoral cycles, hence funds are set aside or disbursed for implementation at the appropriate time. This article seeks to explore why some megaprojects in Zimbabwe fail within the context of political and economic cycles and proffer recommendations for improving that nexus. Using Life Cycle Management (LCM) as a conceptual lens, the study assessed the involvement of various stakeholders and their relationships in the Project Life Cycles (PLC) to determine their influence on the process. The environment within which the project exists may pose challenges to the success of the project. It is prudent to note that project failure can happen at any stage of the PLC, depending on the circumstances of each project. Many projects have failed as a result of not meeting the requisite deadlines or compromised quality of output. However, it is inadequate to just measure the success of a project using the benchmarks of time, cost or quality alone as there are other factors such as the political, social, ecological and technological environment, among others (*ibid.*).

In national development interventions, health, social services and basic infrastructure development are a priority. Legal and policy frameworks have been put in place to ensure the delivery of these development priorities. Current public sector

governance for project execution remains implied, among other things, in the Procurement Act (Chapter 22:14) that creates the State Procurement Board (SPB), which is responsible for regulating and managing the public procurement process in all government ministries, public bodies and local governments by public procurement legislation; the Prevention of Corruption Act (Chapter 9:16) focusing on corruption prevention by establishing a code of behaviour, policing it and criminalising non-compliance; the Public Finance Management Act (Chapter 22:19), that attempts to provide accountability, transparency and effective public resource management and the Joint Venture Act, enacted to regulate and facilitate Public-Private Partnerships (PPPs). The updated Zimbabwean Public Procurement and Disposal of Public Assets (Chapter 22:23) Act of 2018 emphasises 'procurement' processes, corruption prevention and prudent management of public resources, but is silent on execution, monitoring and regulating, and project closing (Chaza, 2016). In Zimbabwe's legislation, though there are various provisions, they appear to be limited to guidelines or methods on project management and project governance for the public sector, and this study's interpretation is that the implementation of state capital projects has many challenges.

CONCEPTUAL FRAMEWORK

PLCs are influenced by various factors that can be internal or external to the project. LCM can be used to understand how various stakeholders influence the cycles. LCM is the process of managing products and services throughout their life cycle. To accomplish LCM, all stakeholders in the chain must work together. Policy instruments like product declarations and certifications, can help to support this collaboration. LCM can also be supported by analytical techniques such as Life Cycle Assessment (LCA). The major aim is to enhance LCM in a way that considers this diversity. The main priorities in this field are to improve the link between analytical tools and procedural approaches to link corporate and governmental strategies in the use of communication tools such as various types of labelling, to develop stakeholder communication and participation in given product life cycles, and to create training material and a description of LCM case studies.

The use of life cycle techniques creates numerous societal benefits. Life cycle techniques can assist to avoid issue-shifting that occurs when a problem is not addressed, but (partially) moved (from one stage of the life cycle to another, from one place in the world to another, from this generation to future ones). Secondly, they can assist in identifying points in the life cycle where improvements can be implemented at a lower cost and/or with better impact. Redesigning items to maximise their recycling efficiency is frequently less expensive than improving recycling systems. Additionally, in some circumstances, employing life cycle techniques is just necessary to produce changes. Finally, motivations exist for particular businesses to engage in life cycle techniques, such as improved market conditions, opening new markets or improving company image.

LITERATURE REVIEW

As argued by Wetland (2006), the PLC is a structured methodology whereby all potentially fundable projects are steered. It shows the steps required by project managers to successfully manage a project. A PLC describes how it begins and finishes. A well-defined cycle brings order and structure to the project. To achieve the desired results, a cycle of interrelated activities is undertaken by project implementers.

The stages of the PLC differ based on where the classifications or groups come from. Larson and Gray (2011) define the stages as defining stage, planning stage, executing stage and closing stage. Concurrently, Burke (2001) explains the stages as identification, formulation, appraisal, implementation, monitoring and evaluation. Regardless of the kind of project being planned for, every project goes through the same stages, although some stages are combined and others are separated as shown by the definitions.

The first step in the PLC is to identify an issue that a project could address. As argued in Westland (2006), during this stage, a problem or opportunity is identified, leading to the identification of a solution. At this stage, project ideas are conceived to meet the needs or requirements for development. This usually involves a 'needs assessment' that finds out what the community needs are. Only when planners know what

development recipients need, can they develop an effective project. Consultation and involvement of stakeholders should not be neglected at this stage to ensure appropriate identification and increase prospects for successful implementation and, ultimately, sustainability. From the definition stage, the next is planning. The goal of the planning and design stage is to demonstrate project management throughout the remainder of the phases. During this stage, tasks are defined, the order of operations is established and the resources required are determined concerning the various grouped activities. It ensures that a project meets its target audience and can be completed within the project's defined restrictions, which may include time and cost limits (PMI, 2004).

The third stage is the execution or implementation phase. The actions outlined in the Project Management Plan (PMP) are carried out to achieve the project's goal. This includes integrating activities and the coordination of people and other resources to accomplish the intended outcome defined in the PMP (*ibid.*). The monitoring and controlling stage involves primarily an assessment of progress in the project execution phase with the primary objective of detecting execution obstacles and taking corrective action. This stage considers activities that are still being completed, the real cost of doing the tasks, the time it took to complete the jobs, and the effort involved in these tasks.

All of this is compared to the PMP's budgeted cost, projected time, and predicted production rate. This stage also examines the Project Performance Baseline (PPB) in greater detail, assesses risks and implements corrective measures (*ibid.*). The closing stage is the phase in which the completed project is formally turned over to the client and formal acceptance is given. At this stage, tasks across the project are completed and certified, and contracts relevant to the project are concluded and closed off (*ibid.*). While project cycles appear to be very technical on paper, in reality, they involve social processes and power relations that bring out the kind of environment they operate in. Various stakeholders have different interests.

CAUSES OF PROJECT FAILURE

Globally, each country's wealth is measured by the status of its infrastructure. Scholars believe that projects are critical building blocks for every nation's progress (Rwelamila, 2007). National project success is an indicator of socio-economic and psycho-political growth and stability. Furthermore, emerging countries require more developmental national programmes to avoid stagnation or even retreat. Zimbabwe's economic progress has been stifled by decades of economic morass. Over the years, Zimbabwe has received several projects, some of these have been completed while others failed to provide the expected outcomes. While non-implementation of government projects has been discussed several times, one cannot run away from the fact that what defines and characterises how projects are conceptualised and funded, and contracts awarded and implemented, has long ceased to have public or national interest at heart but, rather, personal and self-serving interests.

As argued by Mathanda (2021), the major cause of a nation's development project failure is the failure of monitoring and evaluation systems for national projects. Challenges of pilfering of resources and stalling of work by team members can be experienced if project evaluation is not effectively done. It is easy to get stuck in the details of a project as you are working on it. Monitoring and change control of a project is very essential. Monitoring project goals, both large and small, is essential to clearly understand if the project is on track and moving along efficiently. While the project work is being performed by the project team, it is necessary to monitor progress to ensure that everything is going according to plan. The project control process involves regularly gathering data on project performance, comparing actual performance to planned performance, and taking corrective actions if actual performance is behind planned performance.

Project management is a proactive approach to controlling a project, to ensure that the project objective is achieved even when things do not go according to plan. However, by having constant reviews of a project, the project manager may identify problems early, avoid missing deadlines and waste minimal time and resources. Change of ideas may come into play, hence

project managers must be able to discern and evaluate each idea. so only the best survives the cut hence change management (Leeuwen, 2000). Priorities should be managed so each new idea is evaluated against the original goals and the availability of resources.

In addition, as the world moves forward, many changes take place in all spheres of the economy, especially the way of doing business. Mathanda (2021) is of the view that due to technology, there are new ideas that come in a single day and this is why some project managers fail to deliver. Project managers should invest in project risk management and adapt to new environments to successfully deliver desired goals as they face continuous changes in the developing world.

Another cause of project failure is poor communication. Successful project managers also ensure that all stakeholders have an appreciation of what the project is all about. Relevant stakeholders in development projects can help project managers to meet desired goals in a stipulated timeframe (*ibid.*). A lack of, or poor, communication leads to misunderstanding in the workflow, weak Return on Investment (ROI), and even loss of revenue. In short, the level of communication can spell either the success or failure of a particular project (Dammoleros, 2018). Poor communication, especially in this digital era, is a common cause of project failure. Project managers should make sure that stakeholders and beneficiaries are fully aware of the project's objectives. Some project managers get too excited when they receive donor funds and rush to initiate projects that are far from being relevant to communities. Project managers always remember that projects are done for the people, not just to please the donors (Mathanda, 2021), hence relevance. It is also important to evaluate the relevance of any project before implementation to avoid wastage of resources During project implementation, people should understand how to communicate and use technology available to them.

As argued in a study of big infrastructure departments in South Africa (Rwelamila, 2007), many public-sector Project-Oriented Organisations (POO) are doing badly in terms of project delivery, owing to the use of experienced 'accidental' project managers. It

was, however, proposed that project management be adopted as a core competency, that would need a restructure of the POO management structures and cultures and the establishment of a project manager development programme. Using Ghana as a proxy for African project management policies, a research study carried out by Amponsah (2012) discovered that only 46% of public sector interviewees involved in project implementation had some knowledge of project management techniques, while a staggering 54% did not know project management. Despite the high literacy rate in Nigeria (Eja and Ramesgowda, 2019), most projects suffer from inadequately skilled professionals to execute the project.

Administrative procedures influence project delay or failure among Ghana's Metropolitan, Municipal and District Assembly (or MMDAs). This is followed by issues with the release of cash and resources, which is a primary cause driving project delays or failure among Ghana's MMDAs (Amponsah, 2012; 2014; Ika, 2012; Amade *et al.*, 2015; Damoah, 2015; Okereke, 2017). Changes in government and political meddling are both significant factors in MMDA project delays or failure. The Ofori (2013) and Damoah *et al.* (2015) studies corroborated the effects of government change on project delay or failure. This reflects the nature of Ghana's socio-political climate, which depicts each administration's hesitation to maintain prior government undertakings. Each government strives to launch its initiatives to earn popularity, favour and acceptability among voters in subsequent election cycles (Amponsah, 2012; Ofori, 2006).

RESULTS
The purpose of this study was to highlight the main causes of project failure. It may be critical to first define project failure before discussing its causes. Project failure is defined as failure to meet deadlines, failure to fulfil objectives, failure to deliver services and failure to bring about good change. As argued in allAfrica.com (2011), a project fails when it falls short of reaching its initial goals (whether defined in terms of functionality or business edge).

Many projects have failed as a result of poor budgeting or lack of financial resources and corruption. The Zimbabwean government frequently faces budgetary difficulties while implementing projects. For example, the Matabeleland Zambezi Water Project (MZWP) is a national project whose origin can be traced back as far back as 1912, but is yet to be completed. The project was inherited by the First Republic in 1980 to become Matabeleland province's permanent water supplier. This project is at the core of national development in Zimbabwe. If successfully implemented, it is envisaged to spur socio-economic growth by creating a green belt of agricultural projects in the region. The project upon completion should also be able to service areas that include Kadoma, Kwekwe, Gweru and Plumtree (Zhou and Chilunjika, 2013). This project is considered a failure since it failed to accomplish defined objectives within the set timeframe and is now late owing to a lack of financial resources. Zhou and Chilunjika (*ibid.*) go on to assert that the project was dogged by financial constraints since inception as it is capital intensive and clearly shows that the governments, pre- and post-independence, lacked the financial capacity to expedite and complete the project. The estimated project costs continue to escalate with each review from US$600 million in 2007 to around US$1.2 billion in 2009. The first phase of a total of three phases that constitute the project is the construction of the Gwayi-Shangani Dam since 2012 with the support of China International Water and Electric, a Chinese company.

Another example of project failure is the Shavi Dam construction in Zvishavane which began in 2004. The project aimed at supplyling water to the Mabwematema Irrigation Scheme and the local communitiesof Zvishavane communal lands. The contractors were granted permission by Zimbabwe National Water Authority (ZINWA) to commence the project on 18 June 2004. Activities that include site establishment, access roads and excavation of foundations were executed in the same year. However, it is not clear why the project was suspended between October 2004 and December 2007. When the project was resumed, excavation on the river bed had silted and the left bank had been destroyed by nature and had to be rebuilt. However, the contract did not last long as it was officially

suspended on August 11 2008. ZINWA bemoaned the lack of financial resources on their failure to pay for work done (Chiri, 2011). In addition, a misunderstanding between the two parties led to contractors removing equipment from the site without informing the resident engineer.

Corruption and lack of accountability result in the failure of national projects. Several issues that affect the delivery of public sector projects in the African context are cited as, *inter alia* (Chima 2016), corruption through ineffective governance and haphazard control of a given project by the government; lack of skills, that is, absence of training and ignorance of project management knowledge; lack of resources; failure to include the local community in planning; project implementation; operations and no arrangement for maintenance and operation of the project deliverables (Chaza, 2018). The government supports projects through the Constituency Development Fund (CDF) which some legislators divert for personal use. People in the Chikomba West constituency in Mashonaland East Province, for example, were outraged over the alleged misuse of CDFs provided to their legislators for failing to use the funds for the community development of the constituency (Chiripasi, 2011). Chiripasi (*ibid.*) observes that 210 hMembers of Parliament were allocated $50,000 for the development of their constituencies. However, the then Minister of Parliamentary Affairs reported that only 66 of the 210 legislators accounted for the constituency development funds.

Corruption begins by cutting project finances, then diverting cash, and finally, lack of financing for projects, becomes an outcome. The study found that corruption led to project failure in the execution of the Harare Airport Road project that was commissioned and given national project status in 2009. Mathabire and Dzingirayi (2020) state that the project was initially granted to a local company, Augur Investments (with a 70% stake), a company involved in the business of developing properties and infrastructure and the Harare City Council (HCC), through a company called Sunshine Investments. Ironically, the then Harare Town Clerk was reported to be the Director of Sunshine Investments with allegations that the then

Minister of Local Government and Housing had a stake in the same company. This alone indicates corruption as suggested by the Auditor General's Report (2015), whose findings indicated that the project was marred by serious corruption allegations, whereby proper tender procedures were not followed by authorities. As argued in Mathabire *et al.* (2020), Augur Investments failed to deliver on the project despite having received payment for the work to be done, leading to the project being taken over by the Zimbabwe National Road Administration (ZINARA) in 2014. The Auditor General's Report notes that ZINARA was inconsistent in the project implementation which saw fresh funds that had been injected in the project being misappropriated.

Funds were misused through unnecessary procurement and contracting of equipment that was not relevant to the project. The example shows that corruption and lack of transparency lead to project failure in most developing countries like Zimbabwe. Therefore, diligent execution of a project is key its success. Sound financial management is a critical ingredient of the diligent execution of a project and its success. Timely and relevant financial information provides a basis for better decisions, thus speeding the physical progress of the project and the availability of funds, and reducing delays and bottlenecks (Lumby, 1998). Depending on the economic situation, this is why bank policy and procedures require good financial management in bank-funded projects. Essential information is needed by those who manage, implement and supervise projects, including government oversight agencies and financing institutions. The comfort needed by the borrower country, lenders and donor community that funds have been used efficiently and for the purposes intended; and a deterrent to fraud and corruption, since it provides internal controls and the ability to quickly identify unusual occurrences and deviations (Dobie, 2007).

Furthermore, inadequate project planning, control and monitoring is a major source of failure in development projects. As argued in allAfrica.com (2011), the biggest management concerns that organisations encounter include uneven methods of documenting and controlling project activities, difficulty in

project planning and too many projects or investing in an incorrect project. As argued by Adebayo *et al* (2018), project planning, control and monitoring are extremely important to execute successful projects. The social change theory, therefore, has an impact on the project's success with regards to constant review in that culture is dynamic, so the geographical delimitation may also expand or may be reduced, hence may influence the change in the course of a project determining its success or failure.

The majority of the time, there is little or no planning. The lack of skilful planning, scheduling and monitoring in the implementation of projects is a major cause of project failure. As argued in Eja and Ramegowda (2019), the planning shortcomings arise in poor development of objectives and clear-cut roadmaps (project plan) to attaining them. The delivery or success of a project's purpose requires the management of project objectives, project scope and project constraints. However, project objectives are a clear statement of what the project intends to achieve and the objectives must be specific or clearly stated, measurable, agreed upon by both parties, for instance, donors/sponsors/beneficiaries and regulating authorities, realistic or achievable and time-bound. The project plan is the most frequent document that most project managers rush to sponsors to present, without considering the two prior steps that give life to the planning, which are issue analysis and objective analysis. Many practitioners are task-oriented, and they perceive planning as a waste of time and resources, preferring instead to get on with the job. The project team simply tries to "fly it", i.e. executing the task without any preparation at all. As argued in *Herald Online* (2011), failure to produce a strategy means that there can be no true control over the project. Everything is a diversion when there are no plans. Project managers frequently overlook critical early steps that enable project success. The projects are thus embarked upon haphazardly, devoid of structured projections that altogether cause significant failures in most projects (Eja and Ramegowda, 2019).

A case in point is the Jatropha Bio-diesel Project that was launched by the then Governor of the Reserve Bank of

Zimbabwe, Gideon Gono, in 2005 at the height of an economic crisis that saw a lot of fuel service stations running dry across the country. The project was a multimillion-dollar intervention with funds raised locally and abroad. One of the many bio-diesel plants that were erected could produce 70 000 litres of biodiesel every month showing the great magnitude of the project (Mathabire and Dzingirayi, 2020). To show commitment, several stakeholders were involved in the project but Tigere *et al* (2006) noted that theylacked coordination, hence no coordinated implementation of the project. Despite the government's efforts, the project failed due to poor planning. As argued by Mathabire *et al.* (2020), from the onset, on planning for the project, the government should have ensured that the duties and responsibilities of all involved stakeholders were very clear to avoid uncertainties during the course of the project. However, because all this was ignored during the initial planning of the project , it collapsed.

 Lack of stakeholder engagement from the initial stage is another cause of project failure. Development practitioners prefer to interact with beneficiaries during the implementation stage while working alone during the preceding phases. One effective way for stakeholders to contribute to the achievement of programme or project objectives is to be directly involved in the planning, organising, monitoring and evaluation process, thus in the formulation of the project and during its life cycle. Monitoring and evaluation reports help stakeholders, partners, donors and others involved in the project to grasp a clear picture of the performance of the project and its real impact on the ground, helping them make evidence-based decisions to improve the current intervention and design better projects in the future. Beneficiaries thus lack ownership of the initiatives, which leads to project failure. When government officials wish to undertake problem analysis, they conduct so-called rural tourism in rural regions, for instance.

Rural tourism refers to the visit by urban professionals to rural regions in pursuit of rural issues. This is generally done in easily accessible regions, such as peri-urban areas. As a result, because other rural regions are more marginalised, some professionals do not access these places. These contribute to

project failures in the sense that projects are performed without the full participation of people throughout the planning stage. For example, Christian Care in Zvishavane distributed money vouchers as a means of poverty reduction, with recipients expected to spend the money on small animals but the people spent the money on items outside the scope of the project. When they gave people the vouchers, they did not involve people in their planning stage, instead, they consulted their beneficiaries only during the implementation (Zvishavane Development Report, 2012). As a result, this project was a failure in the sense that it was not sustainable since people were unaware of the initiative's goal. Those who bought the goats with the money sold the goats to buy food and paid school fees for their children. In this essence, one can argue that a lack of beneficiary participation during the planning stage cause project failure to attain the intended objectives.

Furthermore, contractor-related issues have also surfaced as causes of project failure. Many Zimbabwean contractors are accused of failing to meet performance targets, have limited knowledge about business techniques and are generally blamed when projects fail (Ngendakumana and Kakono 2020). As argued by Eja *et al.* (2019), poor contracting practices linked to poor contracts agreed upon with contractors, contractors' deliberate non-performance on awarded contracts and embezzlement of allocated budgets to contractors, have been subpar delivery of projects, late deliveries and all dreaded abandonment and failure of public projects across the country. The performance of Zimbabwean contractors has become a major concern as observed by Mhlanga (2017). The ineffective selection of contractors is another challenge. Chiri (2011)'s report on the management of dam construction and water supply projects by the ZINWA highlights that the failure to select contractors who met all the requirements, such as qualified personnel, equipment and other amenities, harmed the completion of projects.

The contractors awarded contracts were failing to execute them as expected. These included contractors for Matezva Dam, Bubi-Lupane and the Beitbridge pipeline, among others. Using the Matezva Dam construction as an example, the dam is

located in the Bikita District of Mavingo Province, and the main purpose was to provide water for irrigation in the surrounding community. It was first contracted to C&A Biffen in 1999 with the completion date being set for October 2001. The contractor failed to complete the work due to a lack of appropriate equipment and resources. The contract was refloated and awarded to Kuchi Builders on 5 February 2004. The project was given resources and was supposed to run for a period of 100 days, from February 2004 to May 2004. The contractor was advanced 50% of the project cost to enable him to meet the deadline and buy the equipment required for the speedy completion of the project. However, by 15 March 2004, no equipment had been bought. The equipment on site was continually breaking down and no mechanic was on site to do the repairs. For example, a bulldozer was down for one month from 15 March to 18 April 2004, hampering the progress of work and the contractor was not in a position to hire another one. Again, this contract was terminated by ZINWA due to poor performance by Kuchi Builders. The contracting challenges that contribute to failures have also been linked to nepotism and corruption in awarding contracts in a rather biased manner that has led to high failures. Work should be given on merit but nepotism is rife in Zimbabwe. Other contractors also apply but without full capacity to perform the tasks at hand but those who apply for tenders should be honest about their capacity. Bribery is also another issue that leads to awarding of tenders to unworthy contractors. To get tenders, contractors offer discounts to entice clients but this eventually leads to shortcuts that then compromise the quality of services.

After offering discounts, the contractors then use cheap materials to cut costs and make more profits which is not good practice. Also, in some instances, contracts are awarded to some companies who already had work in progress that they are failing to complete or performing poorly. This means that resources for those contractors are overstretched as they move between projects, hence affecting the completion of the project. For example, Chiri (2011) notes that Multiforce Contractors 21 (Pvt) was awarded the contract for the construction of the Beitbridge pipeline in 2007, yet it was failing to complete the Bubi-Lupane Dam construction that it was awarded in 2003. As

of 5 August 2005, Multiforce was working on five projects that were the Bubi-Lupane Dam, Beitbridge Pipeline, Kamunda Dam, Chiduku Weir Irrigation Scheme and Jekwa Irrigation Scheme. The little resources of the contractor were spread over many projects, thereby reducing the capacity of the contractor to perform on a particular project, and affecting the progress of the projects as equipment was moving between the projects, hence the delay in completing the projects. The examples show that there is no thorough background checks through research and verification of contractors' records, equipment and other requirements to assess their capacity to deliver. These poor contracting practices lead to failure in national projects.

However, among all the factors of project failure described above, poor planning and management is the leading cause of project failure in Zimbabwe. As a result, excellent planning can result in project success. Other causes of project failure can be identified if the key factors are presented by development practitioners. Poor planning results in projects that do not solve people's needs. Furthermore, the capacity to function under triple restrictions is a sign of inadequate planning. One may argue that poor planning and management are major human drivers of project failures in Zimbabwe. As a result, thorough planning is a must to ensure project success. Furthermore, the use of government finances must be monitored and evaluated in government.

DISCUSSION
As argued by Tichapondwa and Tichapondwa (2013:7), "There are two sorts of projects in any situation: those that are improving and those that are dying. "A project that is stalled is dying because it is sick. The health of a project is determined by how it is handled." As argued by Andersen *et al.* (1995), the features of project failure relate to cases where the project scope is not adequately defined, initiatives that fail to gain buy-in from the relevant stakeholders, and a lack of resources. Furthermore, Andersen *et al.* (*ibid.*) cite workplace politics and a lack of effective planning as factors for project failure.

Governments in different regions of the developed and developing worlds are implementing policies to improve the

performance of public project delivery by introducing project management capabilities and project governance within the public sector. The application of such regulations in Zimbabwe will result in savings of hundreds of millions of dollars in infrastructure project implementation. Without it, project failure rates will be high. Opportunistic corruption will accompany this. The announcement by the Zimbabwe's Minister of Finance and Economic Development on the need to implement a suitable Project Management framework and training is a good development. Project Management specialists in Zimbabwe are encouraged to contribute to the creation of such a framework, and the private sector is encouraged to follow suite and embrace Project Management as an important management skill, therefore restoring Zimbabwe's greatness.

Life cycle thinking incorporates current consumption and production systems, avoiding a piecemeal approach. Life cycle techniques prevent problems from migrating from one life cycle stage to the next, from one geographic region to the next, and from one environmental medium to the next. Human needs should be addressed by supplying product and service functions like food, housing and transportation via optimised consumption and production systems that are limited by the capacity of the ecosystem. LCM is an integrated concept for controlling the whole life cycle of products and services to achieve more sustainable consumption and production patterns. The LCA technique is used to evaluate the environmental implications of a product or service system at all phases of its life cycle.

The PLC methods are intended to translate the conclusions of the analytical approaches and aid in the realisation of a life cycle economy. Governmental and business efforts, for example, attempt to achieve (part of) a life cycle economy. Green Procurement policies may be implemented by both governments and organisations to encourage the purchase/consumption of environmentally friendly products or services. Policy tools assist governments and organisations in carrying out these projects. In the case of Green Procurement, governments might utilise a financial instrument (taxes) to encourage the procurement of environmentally friendly items. Procedural tools, also known as

practical life cycle methods, are recommendations for developing and implementing these initiatives.

CONCLUSION AND FUTURE DIRECTION

Zimbabwe is one of several nations that engage in mega-projects to attain economic progress. However, as seen above, mega-projects are not doomed to failure. Certain principles must be addressed to reduce the risk of failure or delay in implementing such national developmental programmes. There are several reasons projects fail to fulfil their deadlines, including lack of proper money, corruption, the political climate, misuse of resources and occasional bureaucratic impediments. These components will undoubtedly influence the stated three key project limitations, which are time, money and scope, affecting the overall quality of the project.

The government, through its positive policies, might make it a condition for any indigenous contractor to have proof of certification or have passed the vocational training programme to qualify to tender for any publicly financed projects. No financial aid in the form of government advance mobilisation should be made available to indigenous contractors whose management personnel are not competent in their respective disciplines. This is significant because using these monies will fail, as has been the case in the past. The development of indigenous contractors should be prioritised since it has a high potential for job creation, while also building the critical infrastructure that the country requires. Only by teaching these indigenous contractors project management skills, will they be able to contribute effectively to economic growth. Only when indigenous contractors comprehend project management, will future projects allocated to them be executed within budget, to specification and on schedule. As a result, all stakeholders in the building sector must take a comprehensive approach. More research is needed in Zimbabwe to define project management criteria for success and to determine the existing degree of public sector failure or success.

Policy formulation must be customised to the local context. As a way forward, project implementing institutions should ensure that they have a robust monitoring and evaluation system that

is informed by the National Monitoring and Evaluation Policy of Zimbabwe. A functional monitoring and evaluation system ensures the successful implementation of national projects and ensures effective and efficient use of resources. The monitoring and evaluation system will assist in tracking implementation and informing decision-making. It will also assist in ensuring accountability, thereby reducing corrupt practices for the success of projects.

RECOMMENDATIONS

- To minimise project failures, Zimbabwe's government and organisations must hire competent and qualified individuals to boost efficiency.
- Furthermore, project managers must employ additional project analysis tools, such as the "pestle analysis", which is a method used to identify and analyse primary drivers of change in a strategic or commercial environment (Dcosta, 2011). The application enables an evaluation of the present environment and future adjustments by looking at the political, economic, social, technological, legal and environmental aspects. The assumption is that if the project is better positioned than its rivals, it will be better equipped to adapt to changes. As a result, if the project manager uses this tool, projects are more likely to succeed since it contains crucial aspects that, if not handled properly, can lead to project failure.
- To create sustainable projects, project planning techniques such as the logical framework approach must be implemented (Project Smart, 2012). Such frameworks require the presence of skilled individuals who are conversant with them. The logical framework approach gives room for participatory planning by involving all stakeholders during the planning phase. Participatory planning enhances the sustainability of projects by incorporating all stakeholders, including the marginalised, who are usually the target beneficiaries. The logical framework can enable a common understanding among all stakeholders of what the project entails and a thorough exploration of the causes and effects of the development problem to reduce the risk of project failure.

- To prevent wasting resources, it is critical to analyse the relevance of every project before execution..

Project initiation is a vital step that necessitates extensive study in that project managers should examine previous similar initiatives, keeping in mind that culture differs from time to time and from location to place. For example, while executing comparable projects, a creative project manager cannot repeat techniques. Current fiscal and monetary policies can influence or derail project outcomes. Previous projects should instil an agile mindset in project managers who are trying to adapt to the new scenario.

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Wakadzidzei, Wakadzidzepi, Wakadzidziswa Nani? Reconceptualising 21ˢᵗ Century University Education in Zimbabwe through Modular Learning Approach

ANGELA MUNJANGA[1]

Abstract

The questions Wakadzidzei? Wakadzidzepi? Wakadzidziswa nani? are critical and essentially influence the activities and focus of many education systems. The introduction of modular learning not only facilitated education following the novel COVID-19, but also answers these critical questions on what should matter at the end of any education, what skills and demonstratable knowledge a learner acquired through education, where he/she studied or who taught him/her. This qualitative research examines existing literature on modularisation in a bid to demonstrate the implications of the approach and how it should ideally be implemented vis-à-vis current practice as established through discussions with educators from different universities in Zimbabwe. Literature reveals that the goal of modularisation is theory-practice integration through the impartation of relevant skills and knowledge. The article concludes that challenges, including time constraints, lack of skills and sufficient knowledge among educators on teaching in modular instruction, render the educator poorly equipped for this approach and, in turn, render modularisation ineffective. When effectively and correctly implemented, the question Wakadzidzei? should be the main concern for all education stakeholders as opposed to individual institutions or educators.

Keywords: Modular instruction, semesterisation, linear degree, assessment, education 5.0, theory-practice integration

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INTRODUCTION

The 21st-century hyper-industrial community demands apractical and relevant education. Products of any education system should be able to fit in seamlessly and without unnecessary hiccups within the economic spectrum, be it as employees or employers. This requirement has absolutely nothing to do with who taught the individual or where they attained their degree but, rather, centres on what they attained during the process of university education in terms of theoretical and practical knowledge. Previously, university education focused primarily on equipping students with theoretical knowledge through lecture-teaching methods over a whole period of two or three years, depending on the programme, thus creating a yawning gap between educational products and industrial demands. As a result, upon completion of a university degree, graduates often found themselves forced to go through the process of learning all over again to link the gained theory with the practical skills required in the industry. The reality of the matter is that, upon graduation from any university, the most important quality required from the product of education is a demonstration of acquired knowledge and skills through practice (what they have learnt) rather than an expose of where they learnt or who taught them.

Wide literature exists on the importance of learner-centredness in education at all levels, including university, yet the issue of institution prestige still takes centre stage when it comes to choosing schools to attend or, in some cases, even employment opportunities, at the expense of demonstratable learner capabilities. Many universities may have adopted the modularisation approach but there is still a lot to be understood in terms of its implications for both teaching and learning and particularly its role in theory-practice integration. It is thus the intention of this article to examine the recently adopted modularisation approach to university education, and its implications and to establish how it bridges the gap between theory and practice, education and industry, in an environment where the focus of learning outcomes has shifted from content to competence (Botma *et al.*, 2015). The article also seeks to demonstrate how modularisation enables the appropriation of validation onto learners' demonstratable skills and knowledge

after a university qualification, rather than on individual educators or institution prestige.

CONCEPTUAL FRAMEWORK

Effective implementation of modularisation as an approach in tertiary education is measured by demonstrated student successful knowledge and skills acquisition following combined institutional, faculty member and student effort. These efforts combine seamlessly to ensure that graduating students stand equal opportunities for employment in the industry or abilities to create employment for themselves and others. Universities provide, or ensure the provision of, competitive degree programmes in conducive teaching and learning environments which affords both educators and students access to vocational and theoretical knowledge and skillsets. Educators facilitate and stimulate learning through the development of tasks that foster individual or group learning. Students, on the other hand, make use of all available human and material resources to acquire knowledge and skills to make themselves relevant in the industry for both personal and community development. These combined efforts ensure that the learner is at the heart of the education process and the end of the course, the learner and his/her demonstratable knowledge and skills, and not the teacher or institution, is the focus of all relevant attention.

LITERATURE REVIEW

WAKADZIDZEYI?/WHAT KNOWLEDGE AND SKILLS DO YOU HAVE?

Sule *et al.* (2020:37) argue that "education without fortified institution and quality personnel for teaching become a skeletal frame". Effective education requires three key players, namely the learner, the educator and the institution. Whatever efforts may be contributed by each of these players, though they will benefit, each of them, in one way or the other, the goal is mainly to ensure the full development of only one, the learner. This explains the recent intense waves of lobbying for learner-centred approaches to education at all levels from pre-primary to tertiary and centres of life-long learning (Chigbu and Nekhwevha, 2022). Hargrave (2022.) notes that "many critics within academia, as well as the "real world" of business, [argue that] almost any type of rating misses the point. What's more

important than a school's prestige, they argue, is the effort a student puts into their time there". Hargrave (*ibid.*) further argues that "students at any school who play an active role in the process and take full advantage of the opportunities those four years can provide, have a leg up on those whose best effort ends at acceptance" . Students capitalising on such opportunities as that afforded by learner-centred approaches to education, should benefit from their efforts regardless of the rank or reputation of the institution they attended. At the end of a course or level, a learner should demonstrate knowledge and skills acquisition appropriated at that particular level. Human capital matters more than the institutional prestige of educator expertise or popularity.

WAKADZIDZEPI?/WHERE DID YOU ATTAIN YOUR DEGREE?

This question is often posed in many situations to graduates from institutions of higher learning and is often intentionally or unintentionally used discriminatingly. While the importance of learning institutions cannot be denied and their crucial role in the development of an individual cannot go unconsidered, this can and should not be the determining factor when it comes to the employability of an individual. Employers, according to Chigbu and Nekhwevha (2022), need skilled and credentialed graduates and institutions of higher learning (universities) are the providers of both the skills and credentials sought by employers. Sule *et al.* (2020:37) point out that:

> a good institution is a true reflection of the good environment which reinforces the effort of the academic staff and learners by providing effective teachings, the teaching of research and community services to enhance a kind of learning that will aid undergraduates: with employability skills.

Once the individual demonstrates employability skills, that is the most important quality the employer or community should focus on. However, the demands of the labour market, as a result of globalisation, lead to increased competition amongst universities which, in turn, leads to issues of prestige and institutional reputation taking centre stage over graduates' demonstrable skills.

In an investigation on the impact of university reputation on employment opportunities in Bolivia, Nogales, Córdova, and Urquidi (2020) concluded that there is a large university

reputation premium where applicants from well-valued universities are more likely to receive positive responses from employers as compared to unpopular university applicants. For instance, a law graduate from the University of Zimbabwe (UZ) would more likely receive a positive response to an application than one from Zimbabwe Ezekiel Guti University (ZEGU). A Harvard graduate would be more likely to be readily acknowledged as knowledgeable compared to a graduate from a university in a developing country. Such decisions, either by employers or communities, in most cases, are made without due consideration of the applicants' demonstration of skills and knowledge, but taken at face value due to the influence of institutional reputation.

WAKADZIDZISWA NANI?/WHO TAUGHT YOU?

In other cases, association with prominent faculty members can influence one's fate in terms of access to opportunities. A blog post by Staffaroni (2017) states that, "If you're planning on pursuing positions in your field after graduation, then studying at a school with a good reputation in your specific field (and with a professor who is highly regarded) is essential". In some cases, as highlighted above, some people get ahead in life, not because of what they know or the skills they have demonstrated, but simply because the employer is confident in an educator's skills and knowledge. Some people tend to assume that if an individual passes through the mentorship of an expert within a particular field, that means that the incumbent automatically possesses similar skills and knowledge. This is not necessarily the case because teaching may occur and yet learning never transpires. Thus, to acknowledge an individual as knowledgeable simply because of some association or having passed through the hands of a knowledgeable another, is wrong. Gage (1963:5, cited in Rajagopalan, 2019), observes that observes that, **"**teaching is a form of interpersonal influence aimed at changing the behaviour potential of another person". Judging from the numerous debates and calls to shift from teacher-centred learning approaches, to those that are learner-centred; the arguments arise from the backdrop that teaching does not automatically mean learning. One can be taught and yet emerge on the other end having learnt nothing.

DEFINING MODULARISATION

Modularisation, as a concept, is not necessarily a new phenomenon (Cornford, 1997), even though it has become mainstream in Zimbabwean university education only recently with the advent of the COVID-19 pandemic. Literature on modularisation in institutions of higher learning dates back to the 1970s such as Goldschmid and Goldschmid (1972), who review the principles, implementation, management, formats, problems and research in modular instruction. Modularisation is rater a popular practice in various industries such as construction. For the manufacturing industry, modularisation is an invaluable strategy for the achievement of mass customisation which is opposed to the more common practice of mass production. Mass customisation is whereby products and services are tailored for specific customer needs, while mass production is product-centred (Ezzat *et al.*, 2019). The argument thus posited by proponents of modularisation is that higher-level learning institutions, as service providers, should be focused on the mass customisation of services offered as opposed to the traditional mass production of graduates at the end of their programmes or four-year programmes.

Various schools of thought define modularisation as the approach to teaching which involves dividing the curriculum into small discrete modules or units that are independent, nonsequential, and typically short in duration (Dejene, 2019). Cornford (1997:238) argues that:

> "modularisation of courses involves the packaging of course content, either theory or practical, into shorter, logically self-contained units which together cover the content which would be covered by a conventional, longer course".

Concurring, Goldschmid and Goldschmid (2015) submit that modules cover less content. What defines small, however, is left to the discretion of each institution or each module designer, thereby leading to inconsistencies.

The emphasis of modularisation is that the industry should concentrate on learner-acquired knowledge and skills (*wakadzidzei),* rather than where you studied (*wakadzidzepi*?) or who taught you? (*wakadzidziswa nani?).* As Ekene and Oluoch-Suleh (2015) point out, any education should bring

about change within the individual which promotes greater productivity and work efficiency, which then ensures self-sustainability. This can be possible only where "education for sustainable development is seen as a process of equipping learners with the right understanding and knowledge, skills and abilities required to work and survive in a way that safeguards the environment and the socioeconomic well-being, both in the present and future generation" (*ibid.:*92). The relevance of modularisation, as Dejene (2019) puts across, is that it is an outcome-based approach to education, whereby the teacher gives the same information as would or intended to be given during lecturing, but does it through a written series of information/tasks which students then work on and produce results as evidence of acquired knowledge. Materials or tasks given to learners are designed and packaged in such a manner that a student or students working either individually or in groups may use them without the direct assistance of the educator (Wimmer, 1991; Lebrun, 2001; Betlen, 2021), thereby promoting active learning (Chigbu, and Nekhwevha, 2022).

Scholars further posit that in this approach to knowledge and skills acquisition (modularisation), students are presented with a variety of possible situations designed not only to equip them to cope in class or other academic environments but also to prepare them to deal with the realities of the unpredictable future after college (Lebrun 2001; Valencia, 2020). This unpredictable future does not take into cognisance the graduate's tutorship nor the institution they hail from, but would demand a demonstration of acquired knowledge and skillsets. Economic, organisational and graduate needs must be unified to engineer impeccable inclusive development. Thus, opportunities afforded by institutions must be uniformly developed to advance lifelong learning by combining university and vocational curricula and post-compulsory learning and training systems into a unified system (Raffe, 2003; Chigbu and Nekhwevha, 2022). Where this unification exists, the result is enabling the focus to be placed on the graduate as the relevant object and not the prestige of a degree-awarding institution or individual educators. Achievement of this result is the goal of a modularisation approach to university education.

The strength of modularisation in Loveland's (1999) view, lies in that, process takes precedence over content. Dejene (2019) adds that modularity enables the design of the curriculum to meet students' needs, thus moving the curriculum from the supply side (what universities want to deliver) to the demand side (what students and their employers identify as what they want). The goal of the university is to reduce skills shortage through the production of skilled manpower, relevant to the needs of the labour market, hence universities tailor their programmes towards equipping students with skills, especially the ones that aid in securing jobs for themselves or enable them to employ others (Sule *et al.*, 2020). Modular instruction meets the needs of students more adequately than traditional instruction both in terms of the quality of learning and the content. As the role of the educator changes from lecturer to facilitator, autonomy is thus given to the learner to take charge of their learning, while the teacher provides guidance. Furthermore, the relationship between content and its impartation or acquisition by students is complementary, with more significance being given to the how and the what of knowledge acquisition. This is what then bridges the yawning gap between individual universities (*wakadzidzepi*?) or individual educators *(wakadzidziswa nani?)* thus for the incumbent exiting from the education system rather than the institution they studied with to be the centre of the whole system.

MODULARISATION IMPLEMENTATION AND DIFFERENCES
As argued by Martin (n.d),

> the target of modularisation is to create a flexible system that enables the creation of different requested configurations, while also reducing the number of unique building blocks (module variants) needed to do so.

For instance, taking a degree programme like Social Work as the product can then be subdivided in such a manner that it has several entry and exit points. Instead of waiting for four years for one to use the product, that is when a person finally graduates with an Honours in Social Work, they can take a few courses for instance. which would be strategically grouped to meet specific objectives such as the attainment of a certificate. One can even start working using that particular certificate funds and time permitting. Some who take up degree

programmes are working already and may require only certain knowledge offered within the particular degree programme.

The idea being emphasised through modularisation is that instead of having to take up to four years to complete the studies, products within the education system can then take it in bits and pieces at their convenience. After studying for some time, graduating with a certain qualification and taking a gap, the individual can then choose to re-join the programme and, instead of beginning from level one, which would already have been covered, they pick up from where they left off, develop the certificate further into a diploma or another qualification and then exit only to return at a later stage to attain the full degree. This way, the whole degree is then a product of multiple breakable units which can be attained at the convenience of the learner. Thus, at the end of the day, instead of coming up with a separate qualification called Diploma in Social Work, for instance, modularisation allows learners to take up several courses and then exit from the system with that same diploma qualification.

The hierarchical modular system, for instance, as has been exemplified above, is one way that universities can adopt to tailor-make degree programmes for the needs of the customer and industry.

> Shorter, self-contained units lend themselves to advantages in terms of scheduling, choice of modules to satisfy the training needs of individuals and individual employers, and review of courses to ensure technological currency" (Cornford, 1997:239).

As Martin (online) rightly defines, "a modular system is a collection of building blocks that can be configured in different ways, adapting to different customer needs". This enables institutions to use the same available resources for several qualifications, while also making education cost-effective for learners. When a new independent qualification is introduced, it means an increase in the number of employees or an increase in the workload for the existing human resources if the institution is incapacitated to hire more manpower. Whereas, with the implementation of modularisation, the very same people taking up modules for a degree programme maintain their workload and yet achieve more.

As French (2015) suggests, university education in the past comprised linear degree programmes made up of subjects which at some point, were taught over a year and the examinations for the course would be taken once at the end of the academic year. With the introduction of semesterisation, the one-year course was then broken down into two separate but related courses. For example, where Bible Knowledge was a one-part course, it was broken into two for Old Testament in one semester and New Testament in another. Modularised degrees, on the other hand, tend to be made up of stand-alone, independent units that can be undertaken in a different order and accumulated at different speeds. While semesterisation dealt with modules, there was some level of interdependency between modules. In some cases, some modules were prerequisites, whereby for one to proceed to another level, they would have completed another module in the previous semester. Modularisation, however, is associated with the notion of delivering knowledge in "bite-sized" pieces and, therefore, lends itself to time-shortened and intensive modes of delivery (Kamakshi, 2011; French, 2015; Dejene, 2019) and these units are delivered independently of each other.

In the modular approach, all capabilities required to perform in a given field, which are closely related, are then designed into sets of tasks which then are and grouped. For instance, capabilities required for the management of institutional finances, which may include generation of finances, allocation, accounting and monitoring, can be grouped and form a module called financial management (Goldschmidt and Goldschmidt, 1973; Sejpal, 2013). Learners then have to gain both theoretical and practical understanding of these capabilities through research, innovative strategies and practice which makes the core of Education 5.0. Many arguments on educational approaches emphasise child-centred learning and nothing observed that it is more than modularisation of and in education. Modular design gives greater student autonomy in constructing the programmes and a greater range of entry gates and exit points (Ali *et al.*, 2010) and enables the learner to have control over and be responsible for his/her learning. It does demand greater maturity on the part of the learner the moment

they enter the university system and this too is a requirement for the industry.

METHODOLOGY
This qualitative research adopted the constructivist worldview of education, where the educator is the facilitator of learning. An extensive review of existing literature on modularisation and its implementation at the university level globally was conducted.

FINDINGS

CURRENT PRACTICE
Modularisation involves the reduction of teaching and learning time for each module. This, however, should tally with the module content. The change from year courses to semesterisation meant the reduction of course content. Similarly, the implementation of modularisation implies a reduction of content to match the reduced time assigned for each unit. This explains the different formats/approaches adopted by different universities in Zimbabwe as outlined here. The introduction of this new approach has met with mixed feelings among faculty, students and other stakeholders. This attitude towards change is, however, not new. When semesterisation was introduced at the UZ in the 1990s, the then Minister of Education, Dr Ignatius Chombo and the UZ Vice-Chancellor, Professor Graham Hill, expressed what the media considered "unqualified faith in semesterisation as the key to 'revitalising' the University of Zimbabwe". While this new approach has been adopted by many universities in the country, the implementation differs from one institution to another, which leaves a lot to be desired as far as understanding of this approach is concerned. Modularisation in Zimbabwe seems to mean compartmentalisation of the semester to allow lecturers opportunities to meet other demands of Education 5.0. The following is a brief outline of the implementation of modularisation at some of the local universities.

THE ZIMBABWE EZEKIEL GUTI UNIVERSITY PRACTICE
Programmes at ZEGU have five modules per semester and within each semester there are two examination seatings. Thus,

the semester is broken down into five two-week blocks, whereby each module is allocated two weeks of teaching and learning, lecturer/facilitator ensuring yhat learners acquire knowledge and skills for the particular course/module. The first fortnight is set aside for university-wide courses, if any, within that semester, the second fortnight constitutes faculty-wide courses and learners take up examinatio for those two modules studied. After a one-week semester break, the university opens with a fortnight allocated to department-wide courses. Either during this first week or the last fortnight block, two modules will share the teaching and learning period. The last examination seating is held after the last fortnight block. Ideally, it is within this fortnight that the educator has to impart all the skills required and facilitates that learners acquire these skills through diverse strategies employed or tasks given to learners. The examination at the end of the block is also meant to assess learners' acquisition of skills and measure their competence at the end of each learning area. The idea behind ZEGU's choice of implementation of modularisation is to allow educators more time to engage in all the Education 5.0 missions, which are teaching, research, industrialisation, innovation and community engagement.

CHINHOYI UNIVERSITY OF TECHNOLOGY– UNIVERSITY OF ZIMBABWE PRACTICE

The two institutions (CUT and the UZ) use similar approaches to modularisation implementation. Each programme has four modules per semester and each module is allocated three weeks of teaching and learning time, a one-week study and examination preparation and examinations after that. What this means is that within each semester, there are four examination sittings.

THE MIDLANDS STATE UNIVERSITY PRACTICE

The Midlands State University (MSU), just like ZEGU, adopted dual compartmentalisation approach whereby there are two quarters per semester. Each programme has six modules and students will complete half of the modules in the first quarter, take examinations for the completed modules, then complete the remaining modules in the last quarter. With MSU, lecturers, unlike at ZEGU, can have classes throughout the semester, that

is, have classes in both segments of the semester, whereas ZEGU encourages educators' engagement with learners in one of the two segments to allow them to work on other missions.

ASSESSMENT IMPLICATIONS IN MODULAR LEARNING

With the constructivist approach, the educator becomes a facilitator of learning. For this reason, the responsibility of the educator-facilitator is to create learning opportunities for students to process new information and link it to existing mental frameworks through individual or social activity (Botma, 2015). The educator ceases the traditional role of being the ultimate source of all knowledge but only guides as the student seeks knowledge on their own. This means, through the use of module guides and other prepared course materials and frequent objective feedback at multiple levels, the teacher continuously gives students direction towards knowledge and skills acquisition, maximising potential and identifying opportunities.

Assessment methods in the modular programme should be under the learning outcomes of the module and should foster a deep approach to learning. Educators ought to be critical to avoid either under- or over-assessing students, based on the unit of study. Sadiq and Zamir (2014:105) concur that:

> even very good-designed modules, with very well-defined learning outcomes, can fail if the edification strategies employed are infelicitous to inspirit and support the learners towards meeting the desired learning outcomes.

In cases where the class sizes are too big, there is need to devise assessment strategies that ensure that all learners get sufficient objective and constructive feedback, otherwise the whole purpose of both assessment and the system would be defeated. Assessment is key to the effective attainment of educational goals, especially in this modular programme.

The major affordance of modularisation is that it frees the facilitator from both lecture preparation and many routine administrative tasks, thereby creating time to focus on the deficiencies of individual students without involving the whole group with each problem. Where properly implemented,

modularisation enables educators to concentrate on the process of learning which is often an exciting and scholarly activity.

Goldschmid and Goldschmid (1973) recommend that when designing a module, there are different steps to follow to attain educational goals. The steps include identifying the subject matter to be taught, establishing rationale, defining objective and evaluation items, designing units and selecting study materials. Any facilitator/educator has the mandate to prepare for teaching just as learners prepare for learning. One has to establish what they want to cover that is in line with the curriculum. If modularisation is to be truthfully adopted, the module content should be related to other units that learners are to cover within each given period. This means one has to provide a statement of rationale that aligns the module with the rest of the broad spectrum of things. In the absence of meaningful rationale, teaching would be haphazard.

After the identification of the subject matter and rationale, the definition of a set of objectives and evaluation items then follows. A decision should be made on the hierarchy of the objectives and sequence of instruction. Modularisation instruction regulates that students should self-teach and the provision of adequate tools is mandatory for learners to self/peer teach. This allows the educator free space to prepare and carry out other responsibilities such as community engagement, industrialisation, research and innovation. The development of pre-tests and post-tests enables learners to evaluate their learning. During the pre-test, learners can establish their existing knowledge and during post-test activities, they demonstrate the acquisition of new knowledge.

CRITERIA FOR MODULARISATION IN UNIVERSITY EDUCATION
For modularisation to be effective, some steps ought to be followed.

BOTMA ET AL., FOUR STEPS TO THEORY - PRACTICE INTEGRATION
Botma *et al.* (2015) identified that to achieve sound integration between theory and practice in education, following the steps from activation of existing knowledge to engagement with new information, demonstration of competence, and application in

real-world practice is critical. This may be quite the most basic approach to productive learning in the context of modularisation. The first step borrows from the idea that learners are not necessarily empty vessels but they possess some knowledge. The educator must establish first what learners already know about the topic by way of activating their existing knowledge through the use of diverse strategies. From then, learners can engage with new information which probably is what the course demands of the learners. Through a variety of tasks, learners demonstrate competence. For example, the use of dramatisation, writing up memos and conducting simulations, are all ways that English for Professional Purposes students can use to demonstrate competence following engagement with new information acquired in the module. When they finally draft application letters for attachment, create marketable resumes and attend interviews to apply for internships or any other jobs, that becomes the last step of application of knowledge and skills in real-world situations.

DISCUSSION

Modularisation, if properly and correctly implemented, is unarguably the best way to go to meet the practical mandate of faculty, the needs of students and. in turn; the industry. Ideally, modules are independent single-topic units that may be used intact in different courses. thereby eliminating redundancy within and between departments thus decreasing staff preparation time (Goldschmid and Goldschmid, 1973). However, understanding the principles of implementation is still a major challenge for both faculty and students. There is the issue of limited time, students have to carry out tasks in a manner that is meaningful and efficient. Taking, for instance, institutions where each module is allocated a fortnight block, the educator has to introduce the module and then assign tasks that require students to engage with the community, demonstrate innovation, industrialise and learn. The practicality of this being completed within a fortnight is rather far-fetched. As such, effective implementation of modularisation becomes impossible or unreal.

As it is, while many universities have adopted this *modus operandi*, there is limited understanding as to what it entails.

Each institution reserves the right to implement this system in its unique way. However, the irregularities in implementation in different universities in Zimbabwe are suggestive of the fact that there is limited understanding as to what modularisation entails. As argued by French (2015: 1), in institutions of higher learning. where "credit-based modular curriculum structures" were put in place, the idea was, and still is, "an attempt to cater [for] the needs of more diverse student groups and to allow students greater flexibility and choice in managing their studies". Where this does not happen, suffice to observe that modularisation either has been wrongly implemented or has not been implemented at all. Learners are still restricted within the confines of the rigid system with no multiple exits and entry points. The system is still focused on what faculty wants and not what students need in terms of what knowledge and skills they acquire at which point. For example, a student pursuing an honours degree in Social Work has to meet the demands of that programme as prescribed by the educator/facilitator, the skills they acquire are in line with mandates set by the facilitator.

The goal of modularisation points to classrooms that are "centres of intellectual inquiry", where students form ideas, take risks, make mistakes, critically think, fix mistakes and learn how to solve problems from those mistakes (Ali *et al.*, 2010). Within each module/unit, students should be able to engage in and demonstrate these critical skills which then make them relate to industrial experience. In an English for Professional Purposes class, for instance, whose goal is to prepare learners and equip them with practical skills for work-related learning, tasks should include learners researching intercultural challenges encountered in the workspace. This requires them to visit organisations in their different fields and this also requires time. Students can then role play some of their findings by way of creating and solving problems during feedback. Teaching-learning, particularly at university, is no longer a one-sided teacher-to-students interaction but is rather multidirectional. Students, in the process of learning in modularisation, interact with teachers, peers, parents, and, importantly, professionals outside of the school building to seek and understand their learning (Martin, 1997; Ali *et al.*, 2010). This enables theory-

practice integration, thereby closing the gap between school and industry. However, if this is at all the heart of modularisation, one would then wonder how current practice at local universities is achieving this, given the constricted teaching and learning time adopted in what is now called modularisation.

The idea of making the curriculum 'typically short' is also another major concern if one is to consider a system that allows for products of higher learning institutions to demonstrate similar skills acquisition in the industry. There are differences among different institutions in terms of the duration of modules. Whilst semester length is generally the same for higher education institutions, the amount of time allocated for each module within that semester is different. For some institutions, there is more time awarded for each module, while for some very little time is given. ZEGU gives each module two whole weeks to allow the facilitator to introduce content, assign tasks, allow learners to engage with the content through research, etc. and then give feedback and receive the same from the educator. At the end of the two weeks, learners then go for another module or sit for their final examination. The allocated time is, however, too short because the content being covered by learners during the two weeks is similar to what they covered in the module during semesterisation which allowed them a total of over 12 weeks of learning each module.

Adding on, modularisation, as many scholars seem to agree, is associated with the notion of delivering knowledge in "bite-sized" pieces and, therefore, lends itself to time-shortened and intensive modes of delivery (Dejene, 2019). When considering the idea of bite-sized knowledge, one inevitably wonders how one can measure it. considering the differences among learners in terms of their capacities, abilities and disabilities. Zimbabwe's education policy calls for mandatory inclusive education where all learners, irrespective of abilities and disabilities, should be afforded equal opportunities. One would realise that this would be quite a challenge that would need attention so that all students across the faculty have similar content and space within which to cover that content.

The core of modular instruction, according to Botma *et al.* (2015), is to promote transfer of learning and for the educator to achieve this, consideration should be given to several factors and this is the most daunting task as many educators do not know where to start. Task preparation, for instance, is one such daunting task educators have to deal with. Coming from a system where essays for assignments and presentations would simply be drawn from existing test banks, the idea of preparing tasks would be mountainous, especially in the absence of prior training for the educator. Furthermore, due to limited time, tasks prepared by the facilitator are not necessarily tailor-made to meet each student's needs. These tasks are often prepared before the teacher meets and knows the students who, in often cases, are way too many in each class for the facilitator to even get an opportunity to know them individually to even make such a move to help. Some programmes in certain faculties attract large crowds such that preparing and supervising given tasks in the given fortnight/module is next to impossible. Assignments/tasks end up being issued in the form of group work. This strategy, widely known for its unique challenges, does not allow for individual feedback as it is hard to determine individual effort.

The use of modules, which, according to literature, is demonstrated through the use of module guides, is not unique to modularisation, as these were used before COVID-19. Modules have been in use in Zimbabwe universities during semesterisation. Universities, such as the Zimbabwe Open University (ZOU), make use of module guides, commonly referred to as modules, for each learning area and are university-published way before the module is undertaken. These modules are not necessarily textbooks, though they come in a textbook format providing learners with brief details on the content to be covered in each module, activities for students to carry out during self-study as well as sources for further reading. As a centre for open-distance learning, it seems ZOU is the only university providing this as self-study is mandatory at this institution. In all the other universities, while using "modules" as the name for the different units leading up to a degree programme, this aspect associated with module learning has not been present. However, while there may not be sources

for self-learning provided to learners in the other universities as is at ZOU, the institutions currently implementing modularisation remain making efforts towards this approach. For instance, the nature of activities that students are tasked with, such as group tasks and individual assignments which require learners to go and make research and then report back usually in the form of class presentations, are all geared towards fostering self-learning.

At ZEGU, for example, the English for Professional Purposes students were, at one point, tasked to visit the Human Resources office to find out what constitutes an interview panel, typical questions that may be asked in a job interview, the materials which should be brought to the interview and how an interviewee should dress. Following their research in which the learners had to engage with the community to gather information, they had to then report back to the class in the form of an interview simulation. This ensured that students were fully engaged in self-learning and at the same time gaining knowledge and skills that would benefit them to cope with in the real world. This module is strategically offered to Level 2:2 students who would going on industrial attachment in the following semester (Sejpal, 2013).

Adding on to the idea of self-learning, another major characteristic of modularisation is the issue of self-paced studies. Current university learning in institutions offering modularisation is not at all self-paced (Son *et al.*, 2022). The system remains institution-focused in this regard. Students still wait for four whole years before they can graduate and make use of their studies. There are no multiple entry points and the degree that one is pursuing is the only possible outcome from the studies and nothing else. The moment one enters the system during the first year of studies, the only available exit enabling one to use their study efforts is at the end of the year. One cannot consider work-related learning as exiting from the system even though it may include applying acquired theory to practice in an industrial environment.

Other universities like the UZ and CUT, use an approach whereby a whole month is dedicated to each module. A student

doing a Social Work Honours degree at ZEGU is required to demonstrate similarly competitive acquisition of knowledge and skills with a learner from UZ, when one student had two weeks of exposure to the content covered in one Social Work module. while the other had an extra one week. The UZ and CUT approach allows more time for students to self-teach or peer-teach. There is little more room for feedback from both learners and facilitator, hence modularisation is likely to produce better results compared to the ZEGU approach.

CONCLUSION AND RECOMMENDATIONS

The study sought to examine the recently adopted modularisation approach to teaching and learning in Zimbabwe universities. Even though this move was necessitated by the 2019 COVID-19 pandemic, it has also emerged as a long overdue way to reconceptualise university education as it enables theory-practice integration. Unlike the previously used methods in education which were largely theoretical, making use of such teaching methods as lecturing, modularisation is a task-based approach where learners acquire knowledge and skills through interaction with content by way of completing various given tasks. If correctly implemented, following sufficient training of educators so that they are well acquainted with the approach, modularisation can be greatly beneficial. The major challenge associated with this approach is time versus content coverage within each module. Universities applying this approach ought to carefully ensure the content to be covered within the given time would allow for effective self-learning and leave room for sufficient feedback by both the facilitator and learner.

To improve the effectiveness of modular learning at the university level, the following recommendations are made:

▪ Intense in-service training for educators on modularisation is key at institutional and national levels to ensure some similarity in the quality of education across faculties at different institutions. If at all, we should arrive at a level where the educator and institution do not play a role in the industry in influencing the employability of an individual at the expense of acquired knowledge or competence.

▪ Modularisation implications for learners should form part of the content during the orientation of first-year university

students to acclimatise them to the uniqueness of university education and its demands, while returning students should receive workshops on modularisation demands and implications.

- Quality assurance offices within universities need to ensure that the quality of learning is in line with the demands of modularisation, especially where time versus content is concerned.
- The Zimbabwe Council for Higher Education (ZIMCHE) regulates and ensures uniformity across higher education institutions in terms of time allocation for modules to ensure that all learners are afforded the opportunity to interact with content, especially for programmes, and modules provided by the MBKs.

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The Gweru City Growth Pattern as An Innovative Governance Issue in Zimbabwe

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Abstract

Urban platforms play a significant role in the development of city resources, addressing social and economic services and the impact on growth and pace of urban systems. Hence, this article sought to explore the historical, dynamic and fluid interactions of these processes to understand motives, drivers, impact and outcomes all designed to drive long-term city development, modernisation and social service provision. The study used mixed-methods approach, employing both qualitative and quantitative methods. The article utilised the Complex Systems Theory to identify regularities at the global scale and enable global comparisons of urban platforms. It examined urban platform governance by outlining various types of public governance and depicting the role of platforms in this context and assessed the relevance of platforms as an emerging form of local public governance by merging theoretical analyses and empirical views from Gweru City. The study revealed that urban platforms concepts and practices can help explain modern growth patterns and pace of cities. The article also provides theoretical arguments and practical frameworks for developing policies for urban innovative development. The work will assist local policy-makers, planners and managers in understanding platform logic in the creation of public value by involving various stakeholders.

Keywords: urban growth, urban innovation and development, urban platform, platform governance

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INTRODUCTION

In essence, platforms can be viewed as new forms of urban governance system. Platformisation is a major trend in urban development, with effects spreading across a wide range of urban sectors every day (Heeks and Shekhar, 2020). As argued by Wray and Cheruiyot (2015), there is growing interest among academics and government agencies in developing tools for monitoring and directing urban spatial transformation within the city-region. Many cities are struggling to cope with the current magnitude and rate of change and are looking for better management solutions. The creation of environmentally sustainable urban systems involves a complex and interdependent set of social and physical factors that can be comprehended through the application of increasing sophistication models (OECD, 2011).

Urban growth and development have been contentious, with urban poor vying for access to city space against the elite and establishment. As is known, cities are contentious sites of interaction and contestation among social, physical, political and economic entities, making planning and intervening in such systems difficult and thus impeding needed development. Hence, also given that their behaviours are frequently the result (sum total of the parts) of the interaction of their components, urban systems are invariably complex adaptive systems. On one part, mass urbanisation processes are driving rapid expansion of urban systems. On the other, this process is creating contestations and conflict between classes and related interests.

Invariably, the shift to networks, digital technologies and the gig economy, has created issues such as citizen inequality, given the influence of artificial intelligence and automation on jobs now and in the future. Governments could solve the problems by introducing safety nets for people potentially "left behind." This resonates with the current Zimbabwe government's policy of not leaving anyone or region behind. Hence, cities can accomplish this (integrated protection) by implementing policies in four asset categories: infrastructure, people, technology and data (Bollier, 2016).

Explaining the novel concepts and practices, Caprotti *et al.*, (2022), argue that platform urbanism was an evolution of smart cities revolution, underpinned by novel, digitally-enabled socio-technical assemblages that enable new forms of social, economic and political intermediation. Equally, Michel and Schröder-Bergen (2022) focus on praxis of service platforms and the way they use geodata finding that platforms are central actors in a new urban techno-capitalism that are inherently spatial. To explore these emerging ideas, this study's focus is on Gweru City growth, innovativeness and integration.

Cuppinia, Frapportib, Pironec (2022) investigated the socio-historical background for platform economic development to propose a methodological approach linking urbanisation and platformisation in the framework of a more general transformation of capitalist processes. Repette *et al.* (2021) cover both the chances and difficulties for platform urbanism to achieve revolutionary and disruptive effects on the government and society and the prospects and difficulties for smarter urban development governance using collective information. Because it focuses on Gweru City development pattern as an innovative governance problem in Zimbabwe, the current study is inventive and different.

Most recent literature indicate that urban growth has been primarily driven by urbanisation in the global south (Negendra, 2018). Cities like Paris or Amsterdam, for example, are leading the charge in regulating dark businesses, inspecting, regulating or outright prohibiting their expansion. Datta (2023) looks into the emergence of a digitalising state in the developing world with an emphasis on new governance practices brought about by the information age. As argued by the article, these processes lead to a politics of digitalisation as urbanisation in that digitalisation serves as both a by-product and a creator of local urbanisation. The poorest and most fragile states, particularly those in sub-Saharan Africa and South Asia, face some of the most severe challenges of rapid expansion, including danger, environmental pollution and poverty. To address these issues, creative problem-solving is necessary (Brown, 2015).

If Gweru City is to embrace the concept of "city as platform", infrastructure and policies that allow citizens, businesses and technocratic participation, including the electorate, must be encouraged. Cities can become "governance experiments" with open areas for individuals to contribute and assume accountability, where ordinary citizens and civic organisations can explore various and better approaches that help address social needs and stimulating public life. As argued by Adler (2015), individuals ought to be given space and allowed to engage in a constructive manner on their own, without being overly supervised. Platforms can be viewed as hybrids that incorporate aspects of both networks and markets and, to some extent, hierarchies. In the same vein, platforms have some irreducible characteristics that allow them to be perceived as a fourth mode of governance. Today, city governments build and maintain urban platforms to bring together various actors and enable value-added collaboration in service delivery, governance and planning.

Hence, Gweru City should engage citizens in service delivery and citizen engagement in ways that the government does not track and micro-manage, because there are many ways in which citizens want to engage which the government does not allow. Allowing people to experiment and contribute may be one of the most effective ways to generate new ideas and develop innovative projects (Adler, 2015; Bollier, 2016). This underscores the need for research on innovative governance and partnership issues in Gweru City.

STRUCTURE OF THE ARTICLE
The Gweru City growth pattern, as an innovative governance approach in Zimbabwe, is examined in this article. The context of the study will be discussed first. The conceptual framework of the study is highlighted, to be followed by relevant literature review, methodology, findings and discussion, recommendation and conclusion.

BACKGROUND OF THE STUDY
Municipal governments face difficulties because so many traditional systems of city governance, service delivery and management have a very different logic and culture from those

spawned by network platforms, hence the need to re-imagine the city as a platform. Traditional modes of representative politics and bureaucratic administration have existed for decades, if not centuries, and are generally intended to exert strict hierarchical control. Since 1980, the Zimbabwean government has cultivated a well-developed worldview and professional culture that values strict rules and regulations. Local authorities should harmonise perspectives and practices with the emerging network culture to promote past-driven innovation. Therefore, Gweru City should be innovative and embrace new technologies to drive growth and development.

The other challenge faced by city governments is to find new ways to navigate the transition to "platform governance", that refers to network-based modes of interacting with citizens and co-producing services (Boiller, 2016). Political, economic, technological and cultural barriers are impeding Gweru's urban growth and innovation. To address these issues, entrenched institutional structures must be examined and revamped. Yet another issue affecting Gweru City's growth is that there are frequently knots within the city structure that must be untangled to leverage collaboration. To make matters worse, many cities have limited resources, resulting in serious inequalities for thestate's citizens as more prosperous cities become more networked and "smarter", while poorer cities fall behind (Herrera, 2015; Boiller, 2016).

Furthermore, governments resist change because they do not believe they can fail, leading them to act in a conservative, cautious manner. Governments may find it difficult to innovate when their roles are so critical and so many different constituencies rely on them. Facilitating change within government is one of the most difficult challenges (Verhulst, 2015). Gweru City lacks innovation due to government's slow-footed, less strategic decisions. However, local governments are very different types of organisations serving very different functions. Despite the fact that most governments recognise the need for adaptation, they are affected by politics. But, it is more difficult for them because three political parties (the Zimbabwe African National Union-Patriotic Front (ZANU-PF), the Movement for Democratic Change-Tsvangirai (MDC-T) and the

Citizens' Coalition for Change (CCC)) run local governments and must negotiate agreements among themselves. Apparently, they disagree on many issues leading to poor service delivery.

As argued by Repette *et al.* (2021), the consequential disruptions force governments and societies to seek ways for their cities to become more humane, ethical, inclusive, intelligent and sustainable. Cities should embrace and implement the concept of City-as-a-Platform with the hope of providing innovative approaches for addressing the disruptions.

THEORETICAL FRAMEWORK

THE COMPLEX SYSTEMS THEORY

It is now well acknowledged that the urban system is extraordinarily complicated. Urban planners and other decision-makers involved in urban administration and construction have widely adopted von Bertalanffy's 1968 Systems Thinking. Systems Thinking is concerned with complexity, accuracy and an all-encompassing strategy. To understand "synergy", "interdependence", "interconnections", and change in one aspect that affects the evolution of an organisation's behaviour, this systems approach seeks to explain these concepts. As argued by von Bertalanffy (1968), real systems are responsive to, and engage with, their environments to emerge with qualitatively new qualities, leading to ongoing evolution.

This article examines urban growth as a system, specifically a complex system, revealing the universal and distinct characteristics that it shares with and differentiates from other complex systems (Cheng, Masser and Ottens, 2003). Physical expansion or change in space (transition from non-built-up to urban), and functional changes, or changes in major activities, are components of urban development. As a result, urban growth should be understood in terms of space and activity. As an open system, urban growth creates a new dynamic system that imports a variety of regulation/decision-making, investment from higher organisations, external investors, residents and managers (*ibid.*). The spatial dimension, new development density (population density or land conversion)

decreases non-linearly with distance from the city centre and sub-centres all have an impact on urban growth.

For the purposes of this article, urban systems are defined as systems that are a part of a larger urban or metropolitan environment. A system is defined as a complex whole, a collection of things that work together as a mechanism or an interconnected network. Thus, urban systems are defined as a collection of components, subsystems and agent systems that interact to form a complex whole in urban environments. The complex whole includes city residents, service providers, planners and other interested parties. The design, operation and continuous improvement of such systems are difficult due to the nature of urban systems being complex adaptive systems (Batty, 2013).

Complex adaptive systems are multi-component systems that interact non-linearly, self-organise and constantly respond to their environments (Portugali, 2006). Because complex adaptive systems are ever-changing, they are difficult to operate, manage or predict. Cities and urban systems are more interconnected today than ever before and are also vulnerable to both technological and social disruptions. Urban systems interact in a variety of ways and frequently deal with a rapidly changing environment. Cities are the sites of numerous social, physical, economic and political interactions. Urban areas are forming systems and structures that frequently deal with functions and processes in the same space and time, causing them to interact in complex ways (Preiser, 2018). The interconnection of various systems necessitates the development of new methods for comprehending the effects (Moustaid, 2019).

The difficulty is that urban systems are complex adaptive systems because they are the site of interaction between many social and physical components (Barthelemy *et al.*, 2013). The interactions of such agents frequently result in difficult-to-understand dynamics. The realisation that cities are dynamic networks of people and information, rather than a physical environment, is shifting the focus of city planning from a 'place' to a space of interactions of networks and systems of various morphologies (Portugali, 2006; Raghothama *et al.*, 2017).

The perception of cities and their subsystems as complex systems with non-linear relationships, self-organisation, emergence and ever-changing dynamics, has given rise to a new science of cities (Portugali, 2012; Batty, 2013). Cities are dynamic and ever-changing due to their evolving nature. The interconnection of the constituent subsystems of urban systems frequently poses policy challenges. The consequences of changes in one subsystem frequently spread beyond its boundaries. This makes planning and designing city subsystems and aspect systems difficult. Stakeholders often plan from the perspective of a subsystem and try to achieve their goals in an environment where other stakeholders have different goals, values and experiences (Vogler *et al.*, 2017:7-17).

The non-uniformity of stakeholders' incentives, values and objectives makes city planning even more difficult. Furthermore, top-down planning approaches have frequently failed because cities and their constituent systems are self-organising, reacting to new information, rather than being planned from the top-down (Portugali, 2012; Barthelemy *et al.,* 2013; Batty, 2013). Cities are no longer isolated, as populations and city systems can respond to national or international trends (such as climate, economic growth, political situations, migration and technological effects) (Glaeser, 2013). The complex system theory is relevant to this study because it helps explain the city and urban dynamics, growth and innovativeness.

LITERATURE REVIEW
Urban platform research is still in its infancy (Caprotti, *et al.*, 2022). The phrase "Cities as Systems within Systems of Cities" was first used by Berry in 1960, as referenced in Boiler (2016). Platformisation, in the opinion of Repette *et al.*, (2021), is an essential element of sound governance. Zoning, spatial planning and the provision of public services like housing, educational, recreational and medical facilities, are all under the purview of local governments. Barns' (2020) account of platform urbanism is a comprehensive examination of how data circulates in various forms as it is created, aggregated, processed and redistributed.

An "Urban Platform" is the actualised application of a logical architecture or design that connects (integrates) data flows within and across city systems and uses cutting-edge technologies (IoT/sensors, cloud, mobile, analytics, social media, etc.). These technologies provide the building blocks for cities to quickly transition from dispersed operations to predictive effective operations and novel ways of engaging and serving city stakeholders (EIP-SCC, 2016).

Cities are challenging places to live. They are forces for societal and economic advancement (Metropolis International Institute, 2009). This has both good and terrible effects. On one hand, cities expand as people move there in quest of greater quality of life options, such as the ability to make more money, learn new things, have access to medical care and other services and build relationships. They can act as focal points for future economic expansion and global rivalry and be the keepers of present and emerging cultures. They are also acknowledged by the international community as focal locations for tackling the biggest issues in environmental sustainability and economic and social growth (Metropolis International Institute, 2009; Villesendevenir, 2010;).

The term "city data" refers to information held by any organisation, whether it is a government agency, a utility company, a business, or a not-for-profit organisation, that affects the local populace and the operation of the city in some manner. It may be static, almost-real-time, or real time in the future, and practical or descriptive. Additionally, as individual citizens produce more data in the future, this data can also be regarded as city data (with proper consideration for privacy and a strong trust framework) (EIP-SCC, 2016).

As argued by Boiller (2016), the shift in mindset toward "the city as platform" is having far-reaching consequences in almost every aspect of local administration, governance, urban planning, trade and business, public transit, public safety and health cultural and social life and democratic citizenship. Citizen participation, through networks, is required to reduce bureaucracy. Cities should develop policies to ease the transition to new types of open-platform administration and

governance. In other words, cities can use digital and network technologies to solve urban problems, co-create different initiatives and raise public awareness more directly in the city's work and play by tapping the expert knowledge of its many stakeholders and residents. Cities use the open data, crowdsourcing and urban prototyping to improve both government services and the enjoyment of city life.

Furthermore, city officials are typically more directly accountable to politicians and city councils than to individual citizens. This is a major issue because political decisions override everything. However, in a networked environment, this mentality can not only result in poor service, but it can also undermine the city's "brand" — its image, goodwill and culture — and fuel citizen frustration, anger and cynicism. The best way for governments to address this issue is to focus on users and make interactions more convenient and seamless (Pahlka, 2015; Boiller, 2016). For example, the process of obtaining city permits could be streamlined by making it available online or through digital platforms. People with special interests in traffic or city parks may receive text notifications on their smartphones on a regular basis. In practice, the mayor and councillors are feared by the city staff and citizens. This affects service delivery.

The Gweru City Council current systems' shortcomings are well illustrated by city government websites that hardly communicate anything. Cities are failing to redesign and rebuild their information and administrative systems. Some documents are simply scanned and posted as PDFs on the Web; they are not searchable or cross linkable (Pahlka, 2015). Users searching for a specific piece of information will be frustrated, if not completely stymied, due to the poor navigation. Palacios and Kaufmann (2022) concentrate on two issues relating to delivery platforms and urban government. The first difficulty is from the use of algorithmic management and the optimisation of their workforce that allows for a fast-paced work environment and increases occupational risk for their employees. The second difficulty is brought on by the platforms' geographical presence in cities.

Platforms, rapid growth and pervasiveness in daily life undoubtedly provide issues for urban government. As a result, thinking about a digitally enabled urban future where sustainable development retains the social feature. Urban platform research is important because it shows that while most local administrations are not very smart, cities are. In Zimbabwe, most municipal governments lack accessible, responsive websites or data centres say via social media links. Instead of using computers, citizens communicate with government through smartphones. A city's "brand image" and perceived personality are significantly impacted by citizens' technological interactions with city government, as smarter politicians and city managers are aware of.

To address urban governance problems, there is need for re-imagining urban governance and administration which entails a variety of new municipal institutions, new attitudes about the proper role of government and political leadership that seek to facilitate and empower rather than dictate and control (Boiler, 2016). Gweru City should see things differently, and a new culture should emerge. Residents of Gweru should be given the opportunity to form the government that they need and deserve (Pahlka, 2015; Boiller, 2016).

Poorly organised city departments can be remedied, for example, through collaboration among city departments. Transparency in city government would presumably aid in addressing some of the issues that cities face. However, as several participants pointed out, transparency does not always result in the kind of changes that are hoped for. The threat of transparency can be debilitating if the disclosures are politically damaging in the first place (e.g., a failed information technology experiment, data revelations about unequal services in different neighbourhoods). Cities should not embrace open data systems and open network platforms that are prone to exposing administrative failures or embarrassing political decisions. If there is a lack of transparency, the performance of information systems and city agencies is politically irrelevant. Failures in infrastructure and poor agency coordination provide their own political justifications for action. As a result, Zimbabwean city

governments should be evaluated based on their performance in network-based administration and governance.

Urban platform studies also discuss the operating mechanisms of innovation systems, with Markatou and Alexandrou (2015) noting that a small-scale innovation system must consider not only economic factors, but also the full range of societal challenges. Yang *et al.* (2019) investigated the relationship between industrial development, urban expansion and the development of urban innovation from the standpoint of industry-city integration.

Nonetheless, there is still a lack of research in understanding the operational model of the urban platform, that has different goals that can also be in conflict, such as city internal operation. This builds on Leszczynski's (2020) observation that platform urbanism is incomplete and prone to malfunctions because of organisational issues, yet it is these malfunctions or 'glitches' that allow resistance and innovation to materialise. Such a mess made by urban planners would be a welcome counterbalance to the oligarchical land centralised power structures that critics have observed. Embracing the incoherence and messyplatform urbanism, while powerful and potentially inequitable, may be a helpful step in creating new and more vibrant urban spaces and services versus publishing public data (Boiler, 2016).

There is a gap in literature as local authorities are mandated to be transparent and embrace digitalisation to improve service delivery. Platform governance is the in-thing in the 21st century. Cities should use information technology to develop the tools and environments. Governments and citizens can work together to develop public spaces, new educational programmes, modes of transit, public safety measures and other services (Boiller and Brown, 2016). O'Reilly (2016) argues that we tend to think of government as doing things, but it should also be thought of as a platform that allows things to happen.

METHODOLOGY
In this article, the mixed methods research approach and case study method were used. The study gathered information by sending Likert Scale questionnaires to 30 council officials (quantitative) and conducting interviews with five department heads (qualitative). The convenience sample size of 35 participants was used in this study, allowing the researcher to establish and maintain a good rapport with all the interviewees and achieve saturation. The population of this study includes all urban local authorities in Zimbabwe. The Gweru City Council in Zimbabwe's Midlands Province was the study's target population.

In this study, qualitative data was collected using purposeful sampling, specifically interviews, and the sampled participants were relevant to the research questions. Managers were specifically chosen for their extensive knowledge of the organisation's urban growth problems, plans and future projects. Separate quantitative and qualitative analyses were carried out. The researchers combined quantitative and qualitative data and results to analyse both data sets (Creswell and Clark, 2011).

The researchers made certain that participants could decline or participate in the study and withdraw from it temporarily or permanently, without explanation. Free and informed consent was required for this study. As a result, the researchers' main ethical concerns were reducing the risk of unforeseen harm, confidentiality by protecting interviewee information and confidential information, honesty by not fabricating, falsifying or misrepresenting data and effectively informing interviewees about the purpose of the study and participants freely participating or withdrewing from the research at any time, reducing the risk of exploitation (Melham, Moraia, Mitchell *et al.*, 2014).

The study is based on interviews with council heads of department and officials. Gweru City Council has experienced rapid urbanisation from 1980.T here are two local authorities in Gweru, namely Gweru City Council and Vungu Rural District

Council. Rural-urban migration has resulted in the population increasing to 350 000.

RESULTS
This article produced several key findings and discussed Gweru's urban platforms.

EXISTENCE OF URBAN PLATFORMS IN GWERU
As revealed by the findings of the qualitative study, current knowledge on urban platforms is generally low in Zimbabwe local governments. As argued by data collected, 39.7% of respondents generally agreed, 20.7% strongly agreed, while 31% disagreed and 8.6% strongly disagreed. Evaluation of the interviews showed that staff were unsure of what is useful and what is not on urban platforms, attesting to the general ignorance about the frameworks.

TYPES OF URBAN PLATFORMS
The City officials interviewed agreed that *there are generally no platforms for the participation of the informal sector in the development of the City of Gweru.* Vendors are selling at undesignated places and this results in them harassed by municipal police. This scenario means that the people in the informal sector are not participating in the development of the city because of lack of platforms.

URBAN GROWTH
The majority of the respondents (79.4%), agree and strongly agree that the City has expanded, as opposed to 20.7% who disagree. One head of department said, "The City is expanding at an alarming rate for example, Mkoba has 21 villages and there are new suburbs that resulted in population increase." In low density suburbs, there are new suburbs like Hertfordhsire Park, Tatenda Park, Umsungwe Park, Southview Park and Daleyford just to mention a few. This indicates that the city is expanding into peripheral areas.

During the interview process, Gweru City officials also emphasised the importance of urban population structure and cultural quality. A reasonable population structure, in other words, can effectively control unemployment, reduce urban

social instability and promote urban social development. Local governments should embrace urban platforms to improve and address issues related to urban growth

URBAN INNOVATION AND DEVELOPMENT

Drawing on research findings thirty (30) respondents disagree that there are innovative activities taking place in the city, 23 agree and five strongly agree. This is because of lack of knowledge on urban platform issues. Research findings clearly established that knowledge on urban platforms is limited.

PLATFORM GOVERNANCE

From the interviews, city officials revealed that the city should be autonomous and that stakeholders should be involved in governance issues. Platforms introduce new components to the field of public governance. Platform governance implementation by local authorities is affected by a lack of finance. The findings showed that 50% of the respondents strongly agree that platform governance is the way to go, whereas 39.7% agree that platform governance does affect city growth, and only 10.3% indicated that they disagree with this. This indicates that platform governance should be regarded as a form of governance by local authorities. The study also revealed that some local authorities are implementing platform governance at a very slow pace.

URBAN DEVELOPMENT AND LEADERSHIP

From the interviews with city officials, it was gathered that the city lacks dynamic leadership, hence poor service delivery. Another factor affecting urban platforms is ineffective leadership as argued by respondents. A lack of dynamic leadership, as argued by the council officials interviewed, has an impact on urban platforms. A good leader ensures that urban platforms are well-organised and data is secure. "Lack of dynamic leadership manifests itself in inexperienced leaders and leadership failure," argued some interviewees.

URBAN PLATFORMS AND CITIZEN PARTICIPATION

According to the study, only 30 out of 35 respondents concur that a lack of community involvement has an impact on urban platforms. This is since public participation in decision-making

has improved service delivery. Communities are conscious of this. To provide better services, municipal governments should involve the community. When addressing problems with service delivery, rapid city growth and mass urbanisation, this is of utmost significance.

The study found that local governments launched awareness campaigns by hosting consultation meetings with residents to involve them in urban platforms. Residents have the chance to contribute to discussions about urban platforms and participate in decision-making processes at consultative meetings. Since residents have no trust in government, they are unwilling to pay for the services that councils provide. The situation led to poor service delivery.

The interviewees revealed that there is a lack of engagement of citizens in development issues. Platform urbanism offers a unique opportunity for urban planners by creating a new socio-technical canvas for urban development. This study revealed that in Gweru City citizen, e-participation was found to be positively associated with the clearance rate of urban service requests, though the magnitude of the effect varies between different types of city services — there was more involvement in complex problems compared to simple routine services.

DISCUSSION

TYPES OF URBAN PLATFORMS
City fathers and managers should come up with policies that incorporate informal traders since they play a critical role in the development of the city. As argued by Boiler (2016), there is need for the inclusion of urban informality in the development of the city to take advantage of the development potential of informal activities. Participation of various groups in city development will create a shared vision of the city, and it will help to bridge the democratic gap between the city and civic society and bring cities closer to the realities of urban life (Watson, 2007). This inclusive governance will foster a civic culture and a transition to an inclusive city (Menegat, 2002). This ushers in a shared vision of the city, that may result in cost-sharing between the city and its citizens. In some cities,

physical planning approach does not result in an inclusive city because it is always disconnected from the realities on the ground (Chigwenya and Simbanegavi, 2020). There are various types of urban platforms. The various digital platforms such as Google, Facebook and Amazon, and urban platforms such as Uber, have thus been manifested in other countries like the USA (Barns, 2020). Some of these digital platforms are being utilised by Gweru City.

URBAN GROWTH

In Zimbabwe, the City of Gweru is among cities that have been, and are still, experiencing lateral urban growth due to the existence of undeveloped land in the urban fringes (Matsa *et al.*, 2021).The population of Gweru City is growing year by year, and has an estimated population of around 350 000 (National Statistics, 2022). As a result, it is critical that Gweru City residents be made more comfortable and improve their well-being. In this regard, several pillars are required, including energy, mobility and ICT, among others. ICT contributes to the digitalisation process, that is one of the city's urban transformation strategies. The three-tier inter-operability concept helps local authorities to avoid loss. Furthermore, it encourages the development of entrepreneurship programmes to develop new services with the goal of making cities more liveable (Hernández *et al.,* 2019). An urban platform is a crucial facet in promoting transparency and openness of urban data.

Many cities are unable to manage the current scale and rate of change and are searching for better management solutions (OECD, 2011). As argued by the Head of the Engineering Department, the city is expanding at an alarming rate, necessitating the creation of a GIS database that includes Google maps and cadastral maps. Urbanisation is the physical growth and change in the extension or intensity of urban areas because of local and global change, including the movement of people from rural to urban areas. Gweru City is surrounded by rural areas, hence the increase in urban population. With the expansion and integration of various technological and communication networks, the nature of urban governance has become increasingly complex. As a result, leadership, community engagement and new perspectives on decision-

making systems have become critical to managing urban growth (Commission 2 Report, 2011).

As a result, new urban efficiencies, products,and services for city dwellers are possible. Users can then access an open access digital services delivery platform via a smartphone or laptop, all the way up to digitally enhanced infrastructures like responsive public spaces, intelligent transportation systems, or smart energy infrastructure. The city becomes a permanent platform for interaction, offering each user a unique mix of services. Furthermore, by empowering users to create their own solutions and services, a more inclusive and bottom-up model of social and economic development will be created, while local dynamics will be accelerated.

URBAN INNOVATION AND DEVELOPMENT

Urban innovation systems can also be viewed as complex systems composed of many interconnected sub-systems and artifacts, meaning that the boundaries of an urban innovation system must be clearly defined before studying the factors that influence such a system. Hou *et al.* (2009) expand urban innovation to six elements by including knowledge innovation ability and environmental innovation ability. Chen and Xu (2009) examine the innovation experiences of innovative cities in a variety of countries, concluding that urban innovation systems comprise three basic elements: innovation subject, innovation resources and innovation environment.

The social factors that influence urban innovation and development are included in the social system. Population, policy and social structure all constrain the social system. When analysing the relationship between social organisations and human activities, culture, scientific level and traditional habits must all be considered. These elements are inextricably linked to the innovation and development of cities and urban centres.

The Internet of Things (IoT) is a concept for connecting various sensors to the Internet. Using big data analytics with applications in smart cities. it has the potential, at least theoretically, to improve urban services, while reducing

resource consumption (Boiler, 2016). There is also literature that takes a more critical or realistic approach, claiming that building large-scale smart city IoT platforms remains empirically challenging, and challenges of how to solve residents' privacy rights . As argued by Barns (2020), platforms play a growing strategic role in the daily lives of cities by facilitating subject matchmaking, whether for mobility, accommodation, shopping, or even dating, thereby expanding data ecosystems of users, producers and consumers.

Cities' administrative levels are analogous to geographical locations and thus represent different resources. Indeed, most cities with a higher administrative level have better transportation, better infrastructure and more physical openness. These benefits have encouraged a variety of other factors. At the same time, the central government tends to allocate more resources to the capital, municipalities directly managed by the central government, and cities specifically designated in the regional or national governmental plan when promoting the development of local governments. Accumulation encourages urban innovation and development (Cartier, 2011; Wei, 2015).

Provinces and autonomous regions favour province capitals and capital cities in this context because they are preferred locations for capital investments and other economic and social support mechanisms (Peng *et al.*, 2016; Cainelli *et al.*, 2021). Culture plays an important strategic role in a city's development, with the cultural environment both supporting and leading innovation and development (Lazzeroni *et al.*, 2013). Furthermore, cities with a high concentration of cultural assets and cultural industries are more likely to stimulate the vitality of innovative entities and generate new ideas, resulting in greater innovation capacity. In Zimbabwe, Gweru's innovation and development have benefited from its rich, central location and cultural diversity, creating a supportive and enabling innovation environment (Gu *et al.*, 2016).

To achieve the desired effects, the platform model emphasises the collection and co-development of actors' outputs, information transparency, user orientation and the role of the

platform's own facilitation and integration tasks (Anttiroiko, 2016; Bollier, 2016). The city's task is not to do everything itself, such as providing in-house services or favouring regime politics, but rather to create conducive conditions for the activities of government, markets, businesses and the third (civil society) sector (Thornton, 2016). The city government must continue to facilitate and orchestrate collective action, and provide tools and ensure public value (Millard, 2018).

Haveri and Anttiroiko (2021) argue that one plausible way to think about platform governance is as a hybrid in the sense that: its rules and the platform creator's internal governance are based on hierarchy; its open-access orientation and the gathering of large masses of users together through matchmaking functions bring it closer to the market mechanism; and, the connections between the platform creator, producers and the wider ecosystem, resemble network logic. In terms of fundamental forms of governance, platforms appear to be market-like networks or network-like markets. Nonetheless, the integrating socio-technical locus is a platform with a distinct function. It manifests itself as a facilitated collaborative space capable of dealing with audience building, matchmaking and other forms of distributed social action and connecting with larger business, service and innovation ecosystems (Ansell and Gash, 2018).

Platform governance conditions ensure the extension of rule-based digital interaction systems across diverse sites, selves, sensors and situations. These rule-based conditions are "ambient" in the sense that they are not visible to users, who are encouraged to create their own value, content and services in exchange for underlying data (Barns, 2020).

Localised arrangements related to urban development, local public services, innovation, and/or citizen participation are referred to as urban platforms. Urban platforms use modern technologies to integrate actors within and across city systems and improve interaction between them. They are frequently initiated, governed or supported by public sector organisations, most notably city governments (Hodson *et al.*, 2021).

Educational institutions in Gweru City have a significant impact on the city's ability to innovate (Huang *et al.*, 2014; Luca and Margherita, 2016) and a city with a high density of educated residents is more conducive to regional economic growth (Glaeser, 1998; Armeanu *et al.*, 2017). Hence, the education structure of the population has a significant impact on urban innovation and development, thereby stimulating the spirit of innovation, that is unquestionably conducive to the generation of new ideas and the development of new technologies. Urban innovation and development are critical drivers of innovation system performance at both the regional and national levels (Ari-Veikko, 2016; Lauer and Liefner, 2019; Deng and Chen, 2020).

Urban development and innovation are complex and dynamic processes that necessitate long-term planning, rather than short-term interventions. This process is dependent on governmental entities providing and coordinating supporting mechanisms and appropriate regulations and controls. Cities with high quality social governance often have a higher quality of innovation and development (Liu *et al.*, 2017).

PLATFORM GOVERNANCE

Platform governance, defined by Gorwa (2019) as a concept that refers to the layers of governance relationships structuring interactions between important parties in today's platform society, captures the expanding body of work addressing the political effects of digital platforms (governance by platforms) as well as the difficult challenges that platform company governance presents. Platforms take part in individual, user-level administration (Gillespie 2015). Platform governance is a strategy that calls for knowledge of technical systems (platforms) and appreciation of the platform businesses' inevitably global operating environment. However, it also acknowledges the other side of the equation: that these private "governors" (Klonick, 2017) are themselves subject to governance on all fronts, and that their conduct of governance is directly informed by local, national and supranational mechanisms. As noted by digital media scholars, platforms are fundamentally political actors that make significant political decisions while engineering what has become the global

infrastructure of free expression. Platform governance describes the technical, design, and policy choices that affect a large worldwide network of internet users.

URBAN DEVELOPMENT AND LEADERSHIP
Because of the findings, dynamic leadership is essential in capturing digitally enabled urbanism. Good leadership assists organisations in achieving their goals, thereby achieving a higher quality of innovation and development.

Urban Platforms and citizen participation
There is need for platform urbanism that engages more concretely with citizens' situated needs and participation. Platform governance describes the technical, design and policy choices that affect a large worldwide network of internet users. Each urbanite can be viewed as a human sensor, capable of reporting on their city experience via content-sharing platforms such as Flickr, Twitter, Facebook or Wikipedia. This provides a unique perspective on how citizens navigate their surroundings, shedding light on points of attraction or spontaneous migration. The crowd transforms into a distributed network of sensors that enables understanding of the city's dynamic patterns and citizens' experiences (Appl. Sci., 2022). Digitally controlled circuitry and virtual operating systems are transforming urban space into an open living lab.

Importantly, urban platforms can function independently of the city government. Velsberg, Westergren and Jonsson (2020) focus on the concept of "smartness" in the context of service provision, reflecting the public sector's desire to become more agile and resilient when implementing novel technologies such as the IoT, that is also central to urban platforms. Cities have wrong organisational structures. At the urban level, there is need for the development and spread of digital platforms (Cuppinia, Frapportib, Pironec, 2022:2666-3783). Cities should be unlike those of the past. Cities must be creative. Platform urbanism may look to the future high-tech city, but it is already embedded in, and dependent on, the ubiquitous digital systems that pervade the landscape (Wiig and Masucci, 2020). Future cities should be distinguished by a patchwork evolution of interconnected devices and disorganised service accessibility,

exacerbated by the emergence of exclusive platform capitalism spaces amid continuing under-investment in neighbourhood-based civic infrastructure, systems and environments (*ibid.*).

The widespread availability of Internet access, mobile devices and big data is altering the fundamental nature of city life, at least for businesses and the majority of individuals. It is less clear that municipal governments are getting accustomed effectively to the changing landscape, let aloone demonstrating innovation capability in deploying new tech services and infrastructure to foster economic development, citizen participation and the improvement of bureaucratic processes. Verhulst (2015) explains that cities can now employ four asset classes, or tools: people, data, infrastructure and technologies, that can interact in more fluid, mutually supportive ways than before. The interconnectivity of these factors, amongst many others, is triggering many people to consider cities as platforms rather than just places. Data is far more abundant and shareable, especially now that new infrastructures such as broadband, cloud computing, and Wi-Fi, are commonplace. Because of these developments, many new types of communications, "gig economy" markets and social habits have emerged. The concept of cities as platforms represents a significant shift in how cities may operate (Boiler, 2016).

Gweru City should be creative. Hirshberg (2015) contends that a network connected city is more than just a network of communications and sensors. It is an aspiration of city governments "engaging in acts of co-creation with citizens"' It represents a vision of city councils "engaging in acts of co-creation" with citizens. It is about acts of democracy, city care and ownership, and even acts of collaboration between urban centres: how do you network and get smart together? How do we as a network learn and grow? Adler defines a smart city as one that is self-aware, and at first, this meant making local administration more equipped and intelligent from a top-down control standpoint (Adler, 2015, cited Boiler , 2016).

CONCLUSION AND RECOMMENDATIONS
Because of mass urbanisation processes fuelling the rapid expansion of urban systems, urban platforms play a crucial role

in the development of cities. Urban systems are inevitably complex adaptive systems. Competition and conflict between classes and related interests are being exacerbated by urban development. To comprehend the motivations, drivers, impact and outcomes all intended to propel long-term city development, modernisation and social service provision, this article examined the historical, dynamic and fluid interactions of these processes.

The Complex Systems Theory allowed for comparisons of metropolitan platforms across the world and the identification of patterns at the global level. Platforms can be thought of as hybrids that combine elements of markets, networks and, to a certain degree, hierarchies. Platforms, on the other hand, have a few unavoidable qualities that make it possible to think of them as a fourth method of governance. To bring together different actors and allow value-added collaboration in service delivery, governance and planning, city governments create and maintain urban platforms.

Urban platform management should be included in the mission and vision of all local government initiatives. Urban platform management training workshops should be held, with satellite imagery, GIS hardware and software, and the digitisation of analogue and urban platforms included. City managers should introduce a regular (at least annual) and cross-functional review of the forward plans for exploiting city data, ensure value is evidenced from urban platforms and manage city stakeholders (society, science, SMEs) to maximise innovation at local value. Cities should provide a city data asset that can be exploited by others and, indeed, capabilities to accompany the asset operational considerations.

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