Computer Information Systems Persistent Struggles for Humanism: An Antithesis.

Inaugural Lecture

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Abstract

Computerized Information Systems have successfully been used in organizations to improve the efficiency, speed and accuracy of doing repetitive tasks. However, organizations have added more expectations to their capabilities and now expect them to completely play the roles of humans. This has not been a complete failure, neither has it been a resounding success. This lecture raises some issues that require attention when designing IS if they are to completely replace humans in organizational roles. Besides incorporating the principles of romanticism in the IS design, methods should be found that allow the inscription of consciousness, freewill and interests among a plethora of other issues into the IS artefacts. This lecture is grounded more in the philosophical arguments of IS-organization relations.

Introduction

The University Inaugural lectures committee has provided would be speakers with guidelines on how to prepare, what to include and how to present an inaugural speech. This became very handy during my preparation period and I need to thank them. However, while on the same preparation process, I happen to have several contacts with one of my brothers who also cautioned me on the purpose, content and structure of this talk. In short he said:

"Do not assume that your audience don't know what you will be talking about"

In response I said:

" Yes brother, but why on earth do they want me to give a speech on things they already know anywhere?"

This gentleman is sitting in this auditorium and I would like the Inaugural Committee to allow me to present what my audience already knows.

Every organization survives by capturing, processing and sharing data and information amongst its workforce. These processes can be enabled manually or automatically. The state of the affairs is regarded as Information Systems (IS). Currently, many organizational systems are being automated that make processes lean, efficient and effective. This automation has so excited people to the extent that IS, instead of playing an enabling role to humans, are now replacing them in their roles. IS practitioners are currently battling to humanize these artefacts. An example prevalent in these sectors of IS are robotics.

The Information Systems Problem

The software development problem which has been extended to be the IS development problem, was coined a '*crisis*' at the first NATO software engineering conference held in Garmish, Germany, 1968 (Randell, n.d.). Despite many reasons being cited as causes for the "crisis" (Baker, 2006; Brooks, 1987; Mullet, 1999) the problem that IS artefacts are not humans has not always been fully understood.

This problem has persisted for generations. Without some concerted effort and some stroke of genius, this may continue into the unforeseen future. We are provoked to ask several questions:

- What is the "IS Problem?'
- What are its origins?
- Why is it a problem?
- What do we do about it?

For a start, the IS problems have been inherited from its origins as a discipline. Information Systems as a discipline was an offshoot of the Computer Science discipline that also had its roots in the computer engineering discipline. As an engineering discipline and strictly bounded by the functionalist philosophical paradigms (Burrell & Morgan, 1979) where objectivity and

order reigned supreme, IS developers conceived a 'reality space' where Russell and Wittgenstein had dwelt, grounded in the thinking of "logical atomism." Logical atomism, according to **Russell,** is the belief that all truths can be deduced from a layer of atomic facts. These atomic facts lie either in simple particles forming a pattern or in multiple simple particles lying in a relation.

With this thinking, the IS development and operational space was viewed to comprise of clearly ordered artefacts that could be arranged and re-arranged to construct different artefacts from the same atomic units as long as their original natural states were preserved. In short, bigger and complex organizational patterns could be built and defined using the simpler (atomic) ones as building blocks.

Essentially, the development of IS fundamentally negated and neglected the presence of people as components to the system. People, IS asserted, bring a certain degree of complexity in organizational IS. There has been limited success in some processes and total failure in others. What then are the issues required in humanizing IS? This lecture highlights issues that need to be addressed in the quest of humanizing IS.

Focusing on the objectivity and orderliness of organizational reality, where atomic patterns could be identified, IS developers borrowing from their origins, adopted reductionist principles that were used in the engineering discipline to fashion their products. IS could be developed sufficiently enough using systematic methods. As Foucault (1987) accepted, "systematizing methods produces reductive social and historical analyses, and that knowledge is perspectival in nature, requiring multiple viewpoints to interpret a heterogeneous reality" such as an organization.

Also, the problem of these reductionist tendencies has seen IS artefacts being guided and controlled by algorithms that are inscribed as programmes. This was intended to ensure IS functionality. Since time immemorial, from its birth as computing machines, to gradual growth in information processing systems, IS as a discipline has grown from just ensuring functionality

of systems, optimization of information seeking and storage to information meaning. These attempts looked at a fuller actualization of the humans (Cibangu, 2015). Is this attempt good enough in the 21st century? This presentation critiques the grounding principles of IS development and the origins of gaps that still need to be closed for IS to approximate human praxis. An original IS, the level one, consists of people, technology and processes. These resources comprise the social, the natural and the artificial respectively.

As captured in Mavetera (2011), there must be a link between the natural, the social world together with the artificial world of human constructions for an effective mapping of the IS artefact onto the original being of the organizational system. There must be a theory that links these three elements (Gregor, 2006). Practice has shown that all but the social element of the original system is mapped in automated IS. This gap needs to be addressed.

This calls for new ways of critical thinking and looking at the nature of organizations, which dictate the way IS products are to be fashioned in the future. How does one get a characteristically human IS product when the thinking behind its design negates the presence of humans in organizational information systems? What theoretical constructs are being considered and used in building IS products? Do these constructs consider the reality space where organizations dwell? This talk postulates that many theoretical constructs that are currently used in the development of IS artefacts are incapable of mapping them to the organization's life state. As such, a paradox exists where a romantic view of the organizational system is force-mapped onto a mechanistic view of the IS artefact. Organizational life has an infinite life states that can be assumed at any one given time. This is because of the presence of humans. We would like to propose also that the IS representation of the organization maps only one life state out of the several possible and available. In its whole, an organizational system has a fluid existence that can be characterized as romantic, unlike the one static mapping of IS products that is mechanistic.

Can humans then entrust the running of their organizations, their lives, their activities to automated IS artefacts? Is there sanity in abrogating our life responsibilities to these artefacts? They aren't human but artefacts is the story that needs to be expounded in this thesis.

"There is a reason why computers have not yet become fervent natural language speakers (It's not a matter of processing power and never will be): we simply are not programming them correctly."

El Baze 2005.

El Baze's (2005) comment points to the fact that although developers can perfectly implement whatever they design, IS products fail because it is the design itself that is grounded on improper assumptions. IS product designs do not take cognizance of the central role played by people in organizational information systems. El Baze (2005) therefore logically laments that "we simply are not programming them correctly."

IS practices have gone so far that practitioners want to "engineer" the human mind, thinking, experiences, emotions, and beliefs. They seek to clone the human mind. This engineering mechanistic world view, based fundamentally on the functionalist paradigm, regards the world as ordered, rational and unchanging. Monod (2007) strongly blames IS practitioners' unquestioning and faithful adoption and use of this rationality principle. Why should practitioners believe that the world can be reduced to discrete functional units that can be represented as rules and algorithms? How do we deal with knowledge and information possessed by people, which is mostly tacit and intuitive? IS practitioners therefore ought to adopt development paradigms that reject extreme rationalism and technological determinism. To address this, we must accept a world view that is voluntarist, messy, chaotic and subject to human interpretation. This is the relativistic stance. This also is the humanistic view required in automated IS.

Ladies and gentlemen, humanism is the belief in the value, freedom and independence of human beings. Humanism by its nature is ever-evolving, hence, the evolution that we have seen in

humanity must extend and enrich IS design processes. The battle amongst IS professionals is to impart IS products with these humanist qualities. The argument so far suggests that IS design principles are grounded in the objective-ordered pair of the functionalist paradigm. Contrary to this, the lived organizational state lies along the continuum through to the neo-humanist paradigm. This has created a reality paradox.

Issues for Consideration in IS fashioning

The paradox identified above has revealed a major difference between the nature and representation of organizations using automated IS. People, information systems and the environment in which organizations exist can be considered holistically as a social group of actors interacting through networks. As Ngwenyama and Lee (1997) contend, being social involves the alignment of an individual's actions to both the organizational context and the other actors involved in performing a social action. All social interaction is governed by a social culture and this culture has to be observed when implementing organizational IS.

As complex systems, organizations have requisite variety (Rosenkranz & Holten, 2007:57). Requisite variety views organizational systems as possessing several possible states, in terms of "patterns of behaviour" or a "number of manifestations." The intention when implementing IS has always been to capture and maintain these patterns of behaviour (manifestations). However, contrary to this, all IS when designed tend to reduce the complexity of these organizational systems, thereby reducing their requisite variety. This process is regarded as the reductionist principle. Reduction in the possible behavioural states and hence, in the requisite variety of the original system. It is the contention of this presentation that most information systems fail to provide value to their organisations because of this reduction in requisite variety. The question then remains, how can we have ISs that have as much the requisite variety as the original organizational system?

Culture in Organizations

Another aspect that contributes to the requisite variety of organizational systems is culture. Organizational culture comprises the attitudes, experiences, beliefs and values of people in an organization. It also embodies the organisation's interactional behaviour with its stakeholders. All organizations are run within certain cultural and contextual boundaries. How do we, as IS practitioners, allow IS to capture culture? Culture is a very important element in defining organizational context.

Context-building amongst organizational actors is a process of weaving together the different situational understandings of different actors, establishing threads of common understandings and of inter-subjective knowledges within a network (Goldkuhl, 2002; Dilley, 1999). Contrary to what many people think, context is not a static phenomenon and is not a given. It is not self-evident in a situation but requires a constructive machinery to mould the varying situational meanings into a common understanding. Context, therefore, is an object of study that requires some analysis to arrive at an agreed and shared understanding. Furthermore, it is within the shared meaning of some situatedness that the said context resides. Organizational context is ever changing and amorphous.

This dynamism in context poses a big challenge to IS development if one has to capture the running context of an organization. IS practitioners scramble to find methods for identifying, capturing and communicating context? In a bid to address this, Mavetera (2011) proposed an ontology-driven approach and methodology for capturing and incorporating context into IS. To support the fluidness of organizations, another lens that can be used to critique organizations is the Theory of Organized Complexity.

The Theory of Organized Complexity

According to the Theory of Organised Complexity (Checkland, 1999:78), systems in general exhibit a general hierarchy of levels in which each higher level is more complex than the level below it. Each such higher level has emergent properties that are not found at lower levels. The

emergent properties are a result of system formation, in which the whole exhibits characteristics that cannot be found in the individual sub-systems that combine to form it. Checkland (1999:78) notes that *"neither a one level epistemology nor a one level ontology is possible"* to describe the sum total of the subsystems. Hence, in a hierarchy of systems forming the whole, each level has different, distinct epistemological and ontological views. In other words, the views of the lower levels of the system can never be the same as those of the whole system. Put in another way, the behavioural characteristics of subsystems, when added together will generate a system whole that has behavioural characteristics completely different from those of its constituents. The interaction of its components creates some emergent properties that are a by-product of the interaction and these manifest themselves in the whole as new characteristics. Rightly so, an aggregation of mechanistic components cannot have the same behavioural properties as the whole. The principles of systematicity and system formation that IS practitioners have depended upon to build products fail to preserve the natural that is encompassed in the romantic world view. In this sense, systematicity looks at the extent to which a system can be regarded as an ordered, hierarchical arrangement of components while system formation in turn looks at the ordered, organised building up of the whole system from its components.

With this state of affairs, Aristotle's maxim that the whole is equal to the sum of its constitutive parts is negated. When the whole is broken up, it loses its requisite variety by negating some other possible states. At the same time, when the system is reassembled from the parts, the theory of organized complexity explains the introduction of emergent properties that never existed in the original whole. This now constitutes a paradox, where one cannot holistically get an organizational whole from the products of its deconstruction, that is, the constitutive parts. Another lens that can be used to have organizational diagnosis is human activity system (HAS).

Human Activity Systems (HAS)

Human beings have never been predictable. Their behaviour is always changing. It is very difficult, if not impossible, to consider all contingencies in an *a priori* prescription of a human action (Suchman, 1987). Rationalization of human actions *a priori* or *a posteriori* overlooks

much detail that is situated in the running context, such as the detail taken during a course of action in everyday life (Roque *et al.,* 2003).

Furthermore, Roque *et al. (*2003) urge IS developers to guard against neglecting variability and independence during the development of IS products. They discourage any reliance on procedural and functional descriptions of organizations and individual roles as complete accounts of the social dynamics. This narrative, together with the TOC, argue for a change in our IS practices. The third lens discussed here is the Theory of Organized Activity (TOA)

The Theory of Organized Activity (TOA).

Like the human activity system (HAS), Holt (1997) developed the theory of organized activity (TOA) that is also based on human (organized) activities. An organized activity is a dependent variable of the social interaction of people in a particular setting. We would like to postulate that more often than not, IS technical component attempts to automate these organized activities. Looking at an IS as an activity system, Cordeiro and Filipe (n.d.) view the technical aspect of IS as playing a supporting role to the organizational human activity.

They describe the human action, that is, the action performed by a human actor, as comprising of interests and actors. These interests, together with the actors, are responsible for the actions. While humans can have interests, technical machines cannot have interests and, therefore, cannot be assigned any organizational responsibilities. This results in the technical aspects of IS being unable to perform actions (Cordeiro & Filipe, n.d.).

In short, although technological artefacts may be components of an organized activity, their failure to inscribe and exhibit interests places them at a disadvantage if they are to be assigned any responsibilities for an action. The development of IS product, a technical artefact, should therefore include ways that allow them to be assigned responsibilities. This is the notion of humanizing the technical artefact. This notion is expounded in the rest of this presentation.

The three theories of TOC, HAS and TOA, as discussed herein explain very important characteristics of organizations which should be incorporated into information systems. These three theories can be used as a basis for a conceptual grounding of romantic information systems.

The Principle of Romanticism

Romanticism can be described using Gasche's (1986) notion of anti-systematic thought. This is related to the anti-positivist notion described in Mavetera (2011). Romanticism argues for the negation of systematicity and system-formation while, at the same time, allowing the concept of "the fragmentary …" (Gasche, 1986)

The paradox that faces IS practitioners emanates from the fact that one cannot tackle IS development project without breaking it up into manageable chunks. On the other hand, the whole cannot be reconstituted from these chunks. A development approach that reduces the gap between these two poles, one that is able to reintroduce the romanticism that existed in the original system in the developed systems, has thus to be found. By assuming the romantic world view, IS developers consider a holistic view and an acceptance of the organizational system, where culture and social context play a part in the execution of tasks. In the eyes of romanticists, "processes and change" are at the forefront of system "contemplation, understanding, interpretation and feeling" (Dahlbom and Mathiassen, 1997:501). In this view, change in organizational systems is taken as "unpredictable and beyond human control, the expression of hidden and unknowable forces" (Hirschheim *et al.,* 1995:3).

The Romantic Systems Movement

Human problem-solving resides in the interpretive and neo-humanist paradigms. IS developers should not concentrate on tractability and objectivity. Such a move effectively distances and isolates the IS artefact from the complexities of everyday social changes. To build a system, the process of requirements engineering has to be followed. It is important to leverage the requirements engineering effort on the reasons why these are needed and gathered than on the specification of what the system must do (Yu, 1997). According to Roque *et al.* (2003), there is

more to *requirements than elicitation.* Requirements are an everyday social construction, in which human and non-human actors participate. The requirements engineering process forms the basis upon which IS failures and successes can be measured.

While current IS development methodologies force organizational systems to embed their business rules, organizational culture, practice and their human aspect in the technological side of IS, it is necessary to liberate the human aspects of the organization from the bondage of technology by introducing romantic information software products.

What is a Romantic Software Product?

 These are IS software products that are at the epicentre as building blocks of romantic information systems. Romantic information systems (RIS) are not only limited to the dictates of syntactic machine representations. They are also based on the romantic world view that considers the "world as a unitary organism" in sharp contrast to the rational and atomistic view of the mechanistic world (Tarnas, 1991:366-7). Mavetera (2011) is the first to coin these systems 'romantic information systems.' Romantic information systems can be viewed as having "gloried in the unbounded multiplicity of realities" (Tarnas, 1991:368) that are realised in organizations as a result of the subjectivity and the divergence in perspectives of the people found in them. Romantic systems accept the notion that "reality is constructed by the mind, not simply perceived by it, and many such constructions are possible [...]"

Furthermore, these systems capture and reflect all the possibilities in organizational life states (intentions) than to concretize a single life state only as a fact. The idea for romanticism in information systems is supported by Hohmann (2007:18), who calls for a "pluralisation of our culture and the humanization of technology." In his vision, he sees a future that demands technologies that stimulate creativity and inspire thoughts, thereby reconciling the "contradictions between technology and art" (p.18) that characterize the modern era. A conceptual framework for romantic information systems is characterised by Mavetera (2011) as one:

> *"… that allows the development of socially-constructed systems that capture and maintain the softer elements of organizational systems such as culture, social context, and semantics and to a certain extent pragmatics. These systems must be adaptive, dynamic, evolvable and innovative."*

The whole romantic world view idea has to bring some intuition, tacit information and meaning into the IS product. This characterization may seem far-fetched, but existing literature like Weber (2003), Hohmann (2007), Yu (1995, 1997), Beynon *et al* (2008), Soffer *et al*. (2001), and Mavetera (2011), have already called for a romantic framework mentioned herein and several prototypes have been tested. The romantic IS cannot be conceived if practitioners cannot design IS artefacts that can be inscribed with the romantic characteristics as specified herein. This thesis as proposed in Mavetera (2010, 2011) introduces ontologies as artefacts to fill in this gap.

The theory of IS Ontology? A Brief Description

> *"Ontology makes knowledge visible and accessible and enables teams to share their knowledge and profit from experience."*

> ***Sheryl Torre-Brown (In-PharmaTechnologist.com, 2005)***

Ontology is a word that originated from classical philosophy as a branch of metaphysics. It is referred to as the science of being (lower-case 'b') (Ruiz & Hilera, 2006) or as the study of existence (Hacking, 2002). As a study of essence, ontology started as a way of categorizing things and establishing the nature of their existence (Corcho *et al*., 2006). It also deals with issues such as how people perceive the world and with general issues of the nature of things as opposed to specific theories about particular things. Checkland (1999) holds that it is a concept that deals with the nature of the world or with what it contains. This definition does not look at the individual fragments of existence but at the general. As Hacking (2002:2) argues, ontology constitutes the thought study of "What there is." It should be noted that this term, 'Ontology' written with a capital letter 'O' has an uncountable reading (Guarino, 1998). A typical example is the statement '*Ontology is the study of existence*' which, in this context, refers to a specific

discipline of study. The philosophical ontology is "neither reducible to, nor identical with language or its formalism" (Zúñiga, 2001:188). However, the language can be used to describe this ontology.

In IS discipline, the term ontology has assumed a countable reading (Mavetera, 2011) allowing researchers and IS practitioners to assign it a linguistic definition that can inscribe romantic characteristics in the IS artefacts. This linguistic model definition is characterized in softer terms as a:

> "…model of the world that comprises of syntax, semantics, pragmatics as well as the social context of that which is represented. Despite some unavoidable informal indeterminacy in the real world view, it should allow a shared, descriptive, both structural and behavioural modelling and representation of a real world view by a set of concepts, their relationships and constraints under the open world assumption" (Mavetera, 2011).

This characterization is very important to people who work in the softer fields of IT such as information systems. It is a characterization that allows behavioural and constructivist scientists to develop frameworks that guide the subsequent development of IT artefacts by design scientists. Examples of such ontologies are domain, method, process, intentional, social and status ontologies as explained in Mavetera (2011:144).

Context of the Discipline of Specialization

A specialization can be regarded as the process of concentration on and becoming of an expert to a particular subject area or skill set. In this regard, our field of specialization is information systems (not capitalized) versus Information Systems (capitalized) referring to artefacts. As a discipline, Information systems looks at the essence, the practice, the methodologies, the ethical and legal issues guiding the fashioning and use of IS products by people and for people in organizations. The author has devoted most of his career to improving the way IS products can

enhance the way business is done. Most of this work has focused on the methodologies, the pillars upon which products are developed.

Knowles *et al.* (2015) advocated for new information system development methodologies that are grounded in "humanistic understanding of space, place, time, language and perception." Computing, sharing and presenting human experience has always been a problem that has confronted computing professionals and the Information Systems discipline. As stated in Knowles *et al.* (2015), moving away from the mechanistic dictates of current computing platforms to the conceived semantic, pragmatic and humanistic position requires a gradual transition process. This calls upon IS practitioners to be aware of their theoretical positionality and the sociotechnical implications of their methodological choices. In fashioning IS products, it has become necessary to relook at the paradigmatic choices. How can IS products be improved to incorporate human-like behavioral characteristics?

Hohmann (2007) and Beynon et al. (2008) advocated for the development of intuitive systems that are easily understood by humans, at the same time increasing the productivity gains from their use. Beynon et al. (2008) argued further that marrying intuition and software development has been made difficult because researchers and developers use frameworks that are inherited from the computer science discipline. These frameworks concentrate on "stable contexts of experience that can be engineered to exhibit law-like characteristics" (Beynon et al., 2008:4) and they do not allow some degree of freedom in cognition (Tarnas, 1991).

Just like the "biblical archetypes such as Exodus, the Chosen people, and the promised land," which did not stop playing an important role in the cultural imagination of the Christians, (Tarnas, 1991:108) the author realized that the functionalist archetypes even with new revelations of positivist weaknesses have persisted in IS developers' minds and practices. This is one linking factor, particularly impeding the advancement of the romantic worldview in IS development. This problem has been persistent in the author's efforts to solve IS problems.

Contribution of Research to Body of Knowledge

Information Systems look at the social relations amongst tools, human actors and the social environment in which they co-exist. In 2002, the author published a paper that prescribed a framework for Land Registration Organizations (LRO) of South Africa and Zimbabwe to share their information with practitioners and the citizenry (Mavetera, 2002). This was based on the fact that e-systems were beginning to be pervasive and ubiquitous in the society and business environments. The framework aimed at reducing the costs of data sharing as well as increasing its access and availability to the citizenry. The information needed to be packaged in specific formats that would ensure all users get it in the same format. The research solved the problems of inefficiencies and government systems' bureaucracies. We envisaged a system that would replace these "blood lazy and inefficient" public servants, the humans. The system worked quite well in the laboratory but failed in the operational environment. Of the issues raised, some claimed the system lacked the flexibility of querying and customization to specific individual requirements.

In Mavetera and Kadyamitimba (2003), we attempted to improve the e-systems by introducing software agents, which would assume the role of a human principal to search, choose, collect and customize requirements. This system also hit a snag because, while humans are intuitive and have interests, these agent-mediated systems were not. As developers, we could not prescribe interests to mechanistic and artificial artefacts as software agents. Having noted that system failures are not because of the technologies that are used to design, build and implement them, the focus of our problem then changed.

Between 2000 and 2003, the research focused entirely on the design and development of systems that automated the work processes of information seeking and delivery in the electronic-business era (Mavetera, 2000; 2002; 2003a & b; Mavetera & Kadyamitimba, 2003). An attempt was made to replace the human principal in these transactions of buying and selling with software agents. The processes, however, relied heavily on the syntactic matching capabilities of technologies that had grown in computing and storage capacity. This left a big gap in the effective and

efficient operations of the Information Systems as enablers of business and complementary tools to human efforts.

It must be brought to the attention of the audience that organizational problems during this time now focused on semantic rather than syntactic issues. There was a realization that humans are more about sense-making and decision-making than finding similarities. This time the idea of semantic enabled ISs started developing and being researched. It was noted that information systems, despite their intended role to replace humans, had failed to completely eradicate human beings because humans are "more flexible, adaptable, and creative." Humans are better suited to respond to varying and unexpected situations.

The period 2004-2009 focused on the idea of e-systems that could semantically run business processes. These entailed the use of ontologies (Mavetera, 2004a & b; Shawa *et al.*, 2008 &2009; Mavetera, 2007; Mavetera & Kroeze, 2009). During the period 2010-2013, the studies started graduating from previous studies and focused on enriching IS with human traits. Again the central theme and focus point was ontologies (Kroeze et al, 2010, 2011; Mavetera & Kroeze, 2010; Mavetera, 2011a & b).

The 2014-2017 period saw the research looking at missing human elements in IS that inhibit their capabilities. Consideration of culture in e-learning systems (Chukwuere *et al.,* 2016a & b), e-government systems (Chikerema *et al.,* 2016) are some of the products of these studies. All these researches have been grounded in the discipline of IS development and software engineering. Methodologies and frameworks for fashioning IS products were the central theme. The central theme of developing requirements engineering frameworks that consider the incorporation of tacit knowledge and human traits of intuition, freewill and choice making in the IS products is now the current focus.

In this research journey, forty seven plus (47+) refereed conference publications and forty five (45+) refereed book chapters and journal publications were produced. Five (5) PhD students, including the author, have graduated and three (3) are finalizing their theses for examination.

Eight (8) more are at different stages of their PhD studies. Sixteen (16) Masters students have graduated, two (2) have submitted for examination and five (5) are also in the pipeline. More than 120 Honors students have been successfully supervised. It is important to mention that Nehemiah also participates actively in The Public Sector ICT Forum, consults and advises the NWPG Premier's office on ICT implementation in the province and engages with the South African Financial Sector on IS implementation practices. In summary, his main wish is to get ICT giving value to the public and organizations.

Research into the Future

As we have consistently posited, technologists are advocating for the replacement of "human-decision makers and policy makers" with automated systems. These should measure and collect data, and make adjustments automatically to correct discrepancies. The idea is to position the role of technology as replacing humans instead of supporting them. However, as discussed in Robinson (2015), there still exists human capabilities that cannot be replaced by or abrogated to IS artefacts.

Human capabilities that cannot be replaced by computers?

There has been a very long and arduous journey in academic and industrial research that has seen computers moving from simply automating processes to imitating the human capabilities of thinking (artificial intelligence) and decision making. Talking of intelligence, let us define it as the acquisition and application of knowledge and skills. While computers can take decisions based on information gathered, there are three things that computers have failed to do (Robinson, 2015). These are understanding, judgment and empathy. Human decision making and understanding do not rely solely on intelligence but also on experience and values. Human beings, apart from making decisions and being intelligent, are also capable of setting objectives. We can group these traits under understanding.

We can, however, fashion IS artefacts to be capable of acquiring experience. Can this, however, be compared with the ability to make judgments based on values like what humans do? Major

questions still arise in human nature. What constitutes decision-making? Is it making choices? Where do we find values that are learned through experience? Where is empathy that is derived from shared values and experiences?

The Ghost Finally is in the Machine

For the sake of argument, let us assume that our technology will advance to the extent of being able to make judgments and decisions. Will the technological artefacts be able to possess free will? This is an unavoidable capability of humans. Freewill is defined by Robinson (2015) as the "ability to set our own decisions bringing with it the responsibility to deal with their consequences." But our IS artefacts are based on classical physics and logic.

Let us bring this argument closer to home. Check information systems such as e-Natis and Hanis to name but a few. These are examples of several e-government systems that are being developed and implemented for public service delivery. How successful have they been in replacing the public servant of today? Judging through the lens of syntactic matching, semantic evaluation and pragmatic performance, can they make judgments and decisions too? Do they possess free will?

 Rightly so, these systems can use a recorded occurrence to eventually inform the next event. However, they do not have capabilities for conscious decision-making. Put simply, while computers can make choices, they cannot make judgments. Judgments are based on values and these values in turn emerge from human experiences of life. Hence computers cannot ascribe values because they cannot experience life. As can be deduced from the discussion on TOA, IS artefacts cannot have interests, they cannot be assigned responsibilities and hence cannot perform actions. Future research then has to enrich the IS artefacts with enough capabilities to address these gaps.

Summary and Conclusions

Ours is not a matter of being trapped in a paradigmatic pit and then cry for God to rescue us. IS practitioners have realised the need to move our practices to include other fields such as humanities (Kroeze et al., 2010), and to investigate how IS can espouse the human societal value system. This can not be investigated from the functionalist-positivist lens but an acceptance of the interpretive-and neo-humanist positionality of organizational systems should be cherished.

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For now:

They are not humans but artefatcs.

Or

They are artefacts not humans.

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APPENDICES

Appendix A-Brief Background of Prof. Nehemiah Mavetera

Nehemiah Mavetera, was born in a family of many children, in the peasant commercial farms of Nyazvidzi Purchase Areas, GUTU district, Masvingo province of Zimbabwe some many years ago. He went to school at the age of eight. His primary education saw him study at Domborenikiti, Gona, and Rafomoyo primary schools. His secondary education was at Dewure Secondary School (Forms 1-4) and Gokomere (Forms 5-6). Having been born in a Christian family and nurtured at Christian boarding Schools, it was no fluke that Nehemiah attempted to enlist for Priesthood in the Catholic Church. This, however, faltered for reasons better known to him. He later joined the University of Zimbabwe as an Engineering student, majoring in Surveying.

In 1994, he joined industry as a Land Surveyor-in-training working for a government parastatal called Urban Development Corporation (UDCORP). His four year tenure saw him in cadastral, mining, engineering survey disciplines as well as advising local authorities on efficient and effective land and housing delivery methods. After realizing that engineering was very mechanistic he joined academia as a Lecturer at the Harare Polytechnic College.

At the college, he taught engineering modules of Photogrammetry, IT, Land Surveying and Engineering Surveying. As a holder of a BSc Honors degree in Engineering, Nehemiah realized it was important to further studies and he enrolled for a Master's in Geoinformation Management with ITC, University of Twente, the Netherlands, in September 1999. After completion, he joined Monash University as an IT lecturer and simultaneously enrolled for his PhD with the University of Pretoria.

Nehemiah joined NWU in 2004 as a Senior Lecturer in the Department of Information Systems, grew to Associate Professor in 2013 and later Full (Fool!) Professor of Information Systems in 2017. During this time at NWU, he acted twice as a Programme Leader for Information Systems and School Director for Economic and Decision Sciences School among many other Universities duties. He has served the University in different capacities as Senate member, staff and student disciplinary committees' member, Chair of the Institutional Bargaining forum and ETUCC.

As an IT lecturer, Nehemiah honed his skills in the discipline of Information Systems. He focused on electronic-business (e-business) and wrote and published many papers in this area. During this time, he realized the weaknesses in the way e-business information systems were being fashioned. In brief, the fashioning processes neglected the presence of people (humans) in organizational systems. This is how his career started to focus on software development methodologies that are used to develop Information Systems Products.

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Lastly, my colleagues at NWU, your input into my life cannot be measured. Remember a race cannot be run by a single person - there would be no competition. Thank you for participating in my growth at this wonderful institution.