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Understanding the Low Adoption of AI in South African Medium Sized Organisations

Franz Schoeman[1] and Lisa F Seymour[1]
[1] CITANDA, University of Cape Town, Cape Town, South Africa
schfra002@myuct.ac.za, lisa.seymour@uct.ac.za

Abstract

Anecdotal evidence suggested that South African Small to Medium Enterprises (SME) who have access to Artificial Intelligence (AI) tools as part of their enterprise resource planning software are not adopting these tools. This was seen as a problem because the SME sector forms the foundation for economic growth and the adoption of AI in this sector could enhance its ability to compete on a global stage. Hence the purpose of this research is to understand this lack of adoption. This qualitative study follows an interpretive philosophy and an inductive approach. Seven medium sized companies were selected across a variety of industry sectors and executives from each company were interviewed. The findings reveal that even though the participants generally have a clear understanding of the benefits of AI adoption and can articulate use cases, there are inhibiting factors preventing adoption. Primary among these inhibiting factors is the fear of losing control of critical business processes to a machine-based algorithm and the perceived lack of IT maturity to adopt and manage these AI tools. The value of these findings is that they provide an understanding of the barriers to AI adoption as well us highlighting the South African characteristic of reliance on informal networks to guide adoption decisions.

1 Introduction

Artificial intelligence (AI) systems are computerized systems that engage in human like thought processes (Kok et al., 2009). Through AI, organisations are predicted to be 40% more efficient in 2035 than they are now (Oclarino, 2021) and appears to be yet another pre-requisite for being competitive on the global stage (Makridakis, 2017). Globally, in 2019, 37% of companies surveyed by Gartner had either implemented AI in their businesses or were going to do so shortly (Costello, 2019). Gartner noted that by 2021 every vendor in their market guides and magic quadrants had demonstrated AI built into their packaged ERP applications (Torii et al., 2021). AI and ERP are complementary and are both said to be integral to embracing the Fourth Industrial Revolution (4IR) (Haddara & Elragal, 2015).

Yet it is predicted that 80% of AI benefits will accrue to Europe, North America and China, leaving the rest of the globe with minimal benefits (Oclarino, 2021). In a Deloitte survey (Adão et al., 2019) South African (SA) executives were found to be 35% less likely to use 4IR products than their international counterparts. There also appears to be a lack of AI usage by SA small to medium enterprises (SMEs). SYSPRO, an SA ERP provider, has over 600 SME customers in SA. AI tools have been available in the SYSPRO ERP product since 2018 (SYSPRO, n.d.). Yet anecdotal evidence from ERP consultants in 2020 indicated that none of these SME customers had adopted these AI tools. SMEs make up 90% of all business globally and account for up to 65% of global employment (von Weltzien Hoivik & Melé, 2009). A globally competitive SME sector is a pre-requisite for growing big business and addressing many of SA's socio economic issues, hence its failure to address the growth challenges in SA is concerning (Leboea, 2017). Given the challenging economic environment in SA and ever-increasing global competition, it is concerning that so few SA SMEs have embraced AI. It is therefore of interest that SA SMEs with the needed information technology (IT) have a low AI adoption rate. Hence the question posed is why SA SMEs with ERP systems are reluctant to embrace AI?

This paper will now summarise the relevant literature and theoretical frameworks on organisational AI adoption. The research approach taken will then be described and justified. The thematic analysis findings and the resultant model will be discussed, followed by a conclusion and a description of limitations and further research needed.

2 Literature Review

AI was pioneered by Alan Turing who articulated two paths of AI development. Firstly, the "learning machine" path notes that for machines to become intelligent they need as much data as possible to test a variety of scenarios to learn to solve complex problems. This approach is contrasted with the "intelligent machine" path where a machine has fully developed intelligence through its initial programming. AI systems were initially "intelligent machines" with computing power making "learning machines" possible in the early 21st century. AI is now part of everyday human experience, from search and AdSense algorithms to self-driving cars (Haenlein & Kaplan, 2019).

Successful AI implementations rely on computing power, algorithms that are well defined and rich data sets (Wamba-Taguimdje et al., 2020). Rich data is what ERP systems excel at. ERPs can record every transaction in every business process and store that information indefinitely and have been identified as the backbone of 4IR (Haddara & Elragal, 2015). Humans who normally interpret that data to make decisions, can be replaced by AI Cognitive Agents (Hernes, 2014). Cognitive Agents are well documented in various ERP decision making points, such as in manufacturing planning (Hernes & Bytniewski, 2017), invoice matching and supply chain routing (Torii et al., 2021). Managers can also benefit from AI/ERP implementations reducing the amount of time previously spent on mundane administrative tasks or product management report packs (Kolbjørnsrud et al., 2016). AI/ERP based quality systems also leverage the ability of AI algorithm's pattern recognition to enforce quality standards (Columbus, 2019), for example replacing humans performing beer tasting (Gonzalez Viejo et al., 2019). SYSPRO uses AI modelling tools for anomaly detection (e.g., checking purchase prices against historical norms as part of fraud monitoring), regression prediction (e.g., predicting probability of late customer payments or supplier deliveries) and classification (e.g., classifying products by profitability).

While there are no global or African statistics on the ERP market saturation, statistics are available for Europe. The Eurostat data element "Integration of internal processes" shows that across the European Union in 2021 81% of large, 62% of mid-size (50-249 employees) and 33% of small (10-49 employees) enterprises had ERP software packages (Eurostat, 2022). Hence the larger the

organisation, the greater the change that they would have an ERP and hence access to AI functionality. Therefore, we refined our question to why SA mid-size organisations with ERP systems are reluctant to embrace AI?

2.1 Adoption of Technology

Several theories explain IT adoption in organisations. The technological, organisational, environmental (TOE) framework by Depietro et al. (1990) is a broad inclusive framework to use as a lens for evaluating technology adoption (Gangwar et al., 2015). TOE has three contexts. The technology context describes the availability and the characteristics of the technology that influences the adoption decision (Depietro et al., 1990). The organisational context describes the organisation, its inherent characteristics, and the internal decision-making processes. The environmental context is the arena that the organisation operates within. A criticism of the framework is that the major constructs are not clearly defined (Wang et al., 2010). According to the framework of organisational innovation adoption by Frambach and Schillewaert (2002) the adoption decision goes through the awareness, consideration and intention to adopt phases before the adoption decision is made. It extends the TOE framework by considering supplier marketing efforts and social networks as significant characteristics influencing perceived innovation characteristics. The IT adoption in SME framework (Nguyen, 2009) adds the management category emphasising the strong role of management or decision makers on adoption decisions in SMEs. While none of the theoretical frameworks individually appeared relevant, together they refer to five broad categories impacting adoption. These categories with further potentially relevant factors found in the literature are now described.

2.2 Perceived AI and ERP Technology Characteristics

The cost of relevant IT is a major adoption concern for SMEs (Shaikh et al., 2021). As businesses understand AI they also become aware of the value of the data that their ERP systems have generated over time (Wamba-Taguimdje et al., 2020). Hence the characteristics of ERP data will impact AI adoption. Also, ERP suppliers need to make available relevant AI tools.

2.3 Environmental Influences

Depietro et al. (1990) refer to industry characteristics, market structure, IT infrastructure and government regulations influencing adoption. Frambach and Schillewaert (2002) added competitive pressures and network externalities. Government support is seen as important for SME technology adoption (Shaikh et al., 2021). A further consideration of the SA context is high inequality and unemployment, as it is one of the most unequal societies in the world, and officially unemployment is 23% (World Bank, 2021).

2.4 Organisational Characteristics of SMEs

Depietro et al. (1990) refer to organisational size, slack, communication processes and structures influencing technology adoption. Frambach and Schillewaert (2002) add organisational innovativeness and strategic posture. Information intensity has also been found to be significant (Thong & Yap, 1995). Understanding the value of ERP data also enables AI adoption (Wamba-Taguimdje et al., 2020). Yet, the main challenge to AI adoption is said to be lack of enterprise maturity which includes internal skills and data quality (Goasduff, 2019). For SMEs, culture and absorptive capacity have been found to be significant for IT adoption (Nguyen, 2009). SMEs often lack resources, skills and capital to adopt IT (Igbaria et al., 1997) and are particularly susceptible to the cultural context as many are owner managed enterprises where the owner carries the environmental culture into the organisation (Graham, 2010).

In SA, There is little clarity about the size and growth of the SME sector, although in 2018 over 17 000 mid-size firms were estimated to be in the formal sector (Stefan Schirmer & Visser, 2021). The government has introduced acts, such as the B-BBEE ICT sector code, to accelerate inclusive economic participation by previously disadvantaged individuals (Thabela-Chimboza & Chigona, 2019). To indicate commitment to economic transformation organisations should comply with elements of the code, the dominant elements being ownership and management control. Yet the sector has shown minimal compliance. SA inequality leads to a high power distance between owners/managers and employees, leading to hierarchical management structures (Graham, 2010). Decision making in these environments is left to the owner/manager of the business and reflects a controlled, top down style of management. Hofstede (2001) states that organisations with high power distance are more rigid and less likely to innovate or adopt innovative IT.

2.5 Social Networks and Supplier Marketing

SME owners and managers are influenced by interaction with other business owners, industry bodies, suppliers, customers and competitors. Mpofu and Watkins-Mathys (2011) highlight the role that formal and informal social networks play in the SA context. With IT adoption, there is a power imbalance between the IT supplier and the SME buyer as the SME buyer does not have the resources to gather the knowledge required to make an informed decision and relies heavily on the IT supplier/vendor to provide information regarding the technology (Rantapuska & Ihanainen, 2008). This places the technology supplier in an elevated position of power as they are also the primary knowledge holder in the relationship.

2.6 Role of Decision Makers

The SME owner manager is seen as the main protagonist in the adoption process and mainly uses personal experience and information gathered informally to make decisions (Ekanem & Smallbone, 2007). The rate of innovation in an SME is determined by the CEO's appetite for risk and that the CEO's attitude toward technology is a pre-determinant for adoption (Thong & Yap, 1995). Management often lack the knowledge and skills to understand relevant IT (Nguyen, 2009) and implement it in their business (Levy et al., 2001). Managers' lack of strategic planning can hamper IT adoption (Nguyen, 2009) as well as their mistrust of external IT consultants (Igbaria et al., 1997). Two of the main challenges to AI adoption are defining AI strategy and use cases and understanding AI benefits (Goasduff, 2019; Southern & Tilley, 2000; Wladawsky-Berger, 2019).

2.7 Literature Summary

The AI literature has been critiqued for being too technology focused and needing more business and organisational focus (Haddara & Elragal, 2015), and there is a shortage of literature regarding ERP and AI in the SME sector and the SA context. The literature presented highlighted factors influencing technology adoption and some factors potentially relevant to AI, SMEs, and the SA context. Yet, there is no evidence that many factors influencing technology adoption are relevant for AI and the SME and SA context confirming the need for this study.

3 Method

This study aimed to provide a model for understanding the current reality of AI adoption in SA midsize organisations. The aim was to go beyond describing the SMEs considerations on AI adoption and to provide insights that are new, interesting and lead to an understanding that was not previously

present (Gregor, 2006). The interpretive philosophy applied was found appropriate because the AI adoption considerations are subjective and shaped by the human experience within a social context which require interpretation (Bhattacherjee, 2012). The SA SME definition in in the National Small Enterprise Act includes having 10 to 250 employees, with mid-size organisations having 51-250 employees (Republic of South Africa, 2019). Seven SA mid-size enterprises (C1-C7), with implemented ERP systems and access to AI tools as part of their ERP application, were selected. The selection of the companies attempted to achieve a broad coverage across multiple industries. One growth industry (food and beverage) and one declining industry (metal fabrication) was included. The companies had all been using an ERP for over 10 years, with C3 using one for over 15 years and C2 for over 30 years. C1 and C2 were in food and beverage, C3 in electronics, C4 in furniture and retail, C5 in cosmetics, C6 in pharmaceuticals, C7 in metal fabrication.

Semi-Structured, in-depth interviews (Rabionet, 2011) are the dominant data source. Executive level managers who would have had influence over the decision to adopt AI tools in the business were selected. Prior research in SA SMEs found a second interview within the company of not much value and this was attributed to a culture of high power distance between owner managers and their employees (Seymour & Jansen van Vuuren, 2014). For that reason, one participant per company (P1-P7) was deemed sufficient to provide insight into the company and management attitudes and approach to AI adoption. Approval from the University's ethics board was obtained before commencing with interviews. An interview protocol was used to standardize the scene setting and contextualization of the interview and to ensure consistency across multiple cases. Permission was obtained from interviewees to record the interviews; they could withdraw from the process at any time. Only one document, an ERP requirements document, was secured. All data gathered was stored anonymously without reference to the individual or company. Interviews were uploaded to Otter.ai for transcription. Transcripts and the one document were uploaded into NVivo software. The Braun and Clarke (2006) thematic analysis method was followed inductively to identify factors. Each factor was then classified as either a driver or an inhibitor of the adoption decision and listed according to the broad literature classifications.

The method used did have limitations. The intent was to follow a multi-case study strategy. In interpretive case studies, interviews should be supplemented by other forms of field data (Walsham, 2006). The availability of secondary data was a limitation as respondents were reluctant to supply documentation which might contain sensitive company information. Only one document was obtained, and only one individual per company was interviewed. Hence the views expressed could not be corroborated with views from other individuals within the company or other secondary data. Hence this qualitative study did not get to the richness needed for case studies. While the original intention was for face-to-face interviews, that was not feasible due to COVID-19 policies. Hence the online mode of interviewing was a limitation as body language cues could not always be determined.

4 Findings and Discussion

According to the framework of organisational innovation adoption, the adoption decision goes through the stages of awareness, consideration and intention to adopt before the adoption decision is made (Frambach & Schillewaert, 2002). Hence the state of awareness and adoption is first described. Due to page limitations quotes are limited and only significant factors are presented.

4.1 Understanding, Awareness and Adoption of AI

Participants showed high understanding of AI, and offered four types of insightful responses, quoted below. Firstly, those who relate to AI as a tool that can augment human performance by gathering and analysing data over time to recommend the best course of action. Secondly, AI was

seen as enabling faster analysis of data volumes beyond the capability of human beings. Thirdly, as a replacement for humans doing repetitive tasks, and finally, some reflected on the predictive potential of AI. The responses reflected a good grasp of the theoretical understanding of the technology and as such cannot be seen as inhibiting their ability to adopt AI. The literature expects an understanding of the technology prior to adoption (Depietro et al., 1990) and these decision makers displayed understanding yet there was no adoption.

"You have a machine essentially, artificially, trying to help you out." [P1] "..it's about much quicker analysis" [P5] "to automate functions that normally get performed by people." [P3] "to either predict an outcome or predict a process or predict a path to be taken." [P4].

While understanding was high, awareness of vendor solutions was low. The cases were selected that had access to AI tools as part of their ERP. Fundamentals are perceived to be a pre-condition to adopting AI tools, such as a well implemented ERP system that encapsulates the primary business processes. Only one company was aware that the ERP system they were using had AI tools and capability available. This indicates a failing of ERP vendors to market their AI tools but also indicates a lack of interest in AI tools. When looking at the current application of AI only one company (C1) had implemented AI. The implementation was of an application that analysed sales data to predict possible stock out situations. One other company had considered an application of AI as a tool to enhance the customer in store experience. None of the other companies were contemplating implementing AI applications. This evidence supports the literature regarding the low uptake of advanced IT by SA executives (Adão et al., 2019). The feedback from participants also highlights a disconnect between understanding of AI and the ability to deploy it into the business. Opportunities for future adoption were seen as inevitable. Most participants were able to identify some possible future benefit of AI but with vague timelines and ideas on how to implement AI tools. Some were less optimistic around the time frames referring to 20 years' time.

Through analysing the data, various factors appeared to be influencing AI adoption. These factors are now described, backed by quotes, and contrasted with the relevant literature factors. The nature of the technology itself appeared to have the strongest influence.

4.2 Perceived AI and ERP Technology Characteristics

A range of perceived benefits of AI were clearly articulated by the participants, from staff reduction to competitive improvement. C1 had already implemented some form of AI and was clear in their next application of AI (for fraud detection), and its possible benefits. P4 was able to clearly articulate the benefit of AI when relating to behavioural analysis and prediction.

Yet overshadowing the benefits, perceived AI risks drew an emphatic response from participants in that six of the seven participants identified that without human oversight any AI intervention in a business process would be hugely risky. Some risks were not substantiated with any facts or data. These risks expressed by the participants indicate a deep-seated fear and lack of trust of AI which negatively affects the adoption of these systems. A risk expressed was the need for humans to understand the technology. AI is seen as a "black box" which cannot readily be deciphered by human beings and hence can't be adopted.

"Being guided by something blindly when you don't understand what it's telling you is incredibly dangerous... At the end of the day, there has to be a human being adopting software technology, since the human being doesn't understand it. The adoption is going to be zero." [P1] "I think there's always risk, you know, I mean, I think you always need the human factor that gut feel, I think it's always needed." [P5] "as efficient as it might be, I still believe that they should be, you know, a factor of human intervention… and I do know, a lot of people have trust issues on … these kinds of things, because it's so big." [P7]

Most companies interviewed deemed their base technical infrastructure sufficient and not a barrier to adoption, yet only one company interviewed had insufficient technical infrastructure to consider an

AI deployment. All the companies interviewed had been using an ERP system for at least 10 years, but they had many business processes running outside of the ERP system and as such, the ERP system was not the only repository for business data, hence their ERP maturity was low. Respondents referred to the maturity of BI and Big data tools used as further prerequisites to AI adoption. P1 expressed clear opinions on readiness for AI as generally being problematic as many SMEs have not even understood and adopted BI tools not to mention managing big data in their businesses. Hence in this context inadequate ERP and BI maturity was a clear barrier to AI adoption.

"In order for you to actually take advantage of AI, and to even go in that direction, you first need to understand big data… I just don't think we mature enough for it yet… So, I'm curious because they're so far behind with BI. You know, if we're still on the cusp of what it means to enhance and take charge of big data. We can't possibly start applying artificial intelligence to data that we don't even understand." [P1]

Participants were generally cognisant of the fact that good base data is a pre-requisite for any AI tools to be deployed. SMEs find it challenging to provide clean data as it requires focused effort and resources to ensure robust data. This is an inherent risk as deploying AI tools on top of flawed data will result in equally flawed outcomes.

"For these AI systems to work, well, you need good data. For machine learning, you know, your machine has got to learn on solid data, if your machine is learning on garbage, it's going to start spitting garbage up. And that, that becomes a challenge in the end." [P3] "all of these guys struggle with the same thing, base data. And it's not something they maintain at the SME level because it's too much work for too few people." [P4]

In summary of the technology factors influencing adoption, the data presents many inhibitors to adoption but few enablers. The benefits of AI were seen to be an enabler, but the primary barrier is fear of AI and of losing control to a machine-based process. This aligns with the literature which identifies fear of the unknown and one of the main challenges to AI adoption (Goasduff, 2019). Inadequate ERP and BI maturity and a lack of clean data also presented as substantial barriers. This aligns with literature that notes that a successful AI implementations relies on technical infrastructure, algorithms and rich data (Wamba-Taguimdje et al., 2020). This is also not unique to SA SMEs, a prior study on AI challenges in SA financial services, noted data quality as a barrier to the use of AI (Ndoro et al., 2020).

4.3 Organisational Characteristics of SMEs

Lack of resources was perceived as a barrier to adoption especially for SMEs. SMEs struggle because there is a point at which these tools are just too expensive and complex to deploy in a small business. When considering internal resource constraints only C1 had the resources readily available to implement AI tools, as they had a data scientist employed on a full-time basis. The balance of the companies experienced a resource availability constraint. This was further exacerbated by the worldwide COVID-19 pandemic and related economic downturn as many companies had to retrench staff. Financial resources were not always seen as a barrier to adoption. A valid business case with a positive return on investment, however, was a pre-requisite.

"I think we're just too small. And if you look at the cost, and the investment needed to ensure data integrity and the systems that you need to put in place to for data integrity, I don't think business, smaller businesses, have those kind of resources… There's a break point where it becomes relevant to your organisation has to reach a certain size and sophistication before it becomes even something worth considering. But for ordinary small businesses, and medium businesses, I don't know that there would really be a push for AI at that level." [P3] "But getting value out of that AI tool is still questionable... unless AI is being pitched and supported properly and all of that sort of stuff, then you're going to end up with the same problems that your ERP has." [P4]

Intensity of information usage was common with the three companies that were suppliers to large retailers and are classified as fast-moving consumer goods suppliers. Analysis of sales data is pivotal to these companies, and they rely on sales data analysis as a key driver into the business. One of these companies, the only current AI adopter, has applied a form of AI to this sales data to predict possible stock out situations. Hence intensity of information was seen to increase the potential of adoption.

"It helps us predict stock outs and helps us produce, predict go stock so that we can realize a potential loss sale before it even happens. So that's a great example of where artificial intelligence is adding value." [P1]

Companies need to understand the intrinsic value of their ERP data to adopt AI. All barring P3, were aware of the value of this historical ERP data. Hence this factor was expressed as an enabler.

"In order for you to actually take advantage of AI… you need to understand the importance of the combined effect of having all of that historical data, because if you don't, you're just never going to get to the next step." [P1]

In summary, the organisational factors inhibiting adoption re-enforce literature which lists one of the primary inhibitor to AI adoption as being the SMEs ability to effectively secure and manage skilled staff to enable adoption (Goasduff, 2019). Information intensity was expressed as an enabler to adoption in agreement with literature (Thong & Yap, 1995), as was understanding the value of ERP data (Wamba-Taguimdje et al., 2020).

4.4 Role of SME Decision Maker

When considering the style of decision making, Thong and Yap (1995) give credence to the leadership style of the individuals making decision in the company and their attitude towards innovation. The evidence from the interview offered little support for this view and only in one case was the attitude of the CEO and owner of the business noted as having had an influence in the decision-making process. The research revealed that in most companies the decision making took a consultative approach and the decision maker was perceived as innovative and driving the strategy. Only one company was seen as lacking an IT innovation driver. The literature indicates that SME decision makers may not trust external resources and may be resistant to using external resources (Igbaria et al., 1997). Most companies embraced the consultant model and only one company indicated that their company actively tried to minimize the use of external consultants.

4.5 Strong Informal Networks and Limited Vendor Marketing

The literature indicates that SA is heavily reliant on informal networks to make decisions regarding technology adoption (Mpofu & Watkins-Mathys, 2011). This research supports the literature in that many companies had built strong relationships with business partners, supporting the relational nature of business in the SA context. P4 offered some opinions on the possible negative effects of these informal relationships in which service delivery can often slip. These relationships are often taken to a social level, such as hunting trips, which may border on the unethical. Hence the companies rely on informal networks and actively foster informal relationships with their suppliers and customers even to the point of accepting poor service to protect the relationship. Regarding adoption decisions, most participants had informal networks which they leveraged for input regarding technology decisions.

"Ja, we do stay with the same guys, and, you know, we, we like to partner with various businesses, even if it's not technology basis, it's insurance or auditors, or whatever, I mean, we are perhaps old school, we believe there's a lot of value in building a relationship with a business partner." [P5] "Whatever I do is not really going to change that the relationship in South Africa is very important. If you have the relationship, a lot of things can slip. Whereas in the US, it's all about,

you know, delivering service… in South Africa, we still very much protected with relationships and the sort of things again, that competitive edge isn't is not the same." [P4]

These informal networks provided input to the participants which is in stark contrast to formal networks and industry bodies which provided very little input. The respondents did not refer to marketing of AI and a lack of vendor AI marketing was seen as an inhibitor.

"As far as I know, no, we don't, you know, belong to any, no, I don't think any of those are relevant. I'm not aware that we belong to any of these tech bodies." [P2] "But it wasn't an overt sort of, like sales and marketing, emails, you know, that sort of awareness, it was more by osmosis in a way". [P3]

The social networks and supplier marketing was found to inhibit AI adoption. We argue that the strong networks built by the companies studied possibly reduce the impact of competition and hence could be seen as an inhibitor to adoption as well as the lack of AI marketing by vendors.

4.6 Environmental Influences

All participants perceived their own business environment as being highly competitive, yet only one mentioned this as a driver for IT projects to make them more competitive. Hence a competitive environment could still be classified as a weak enabler of adoption.

"They should have an AI to be more competitive, another competitor competitive edge, but the timing is not now… One of the main reasons for changing the outlook on ERP and going for something that's more palatable than AS400 is they have to be competitive, to become more competitive, they have to get some sort of competitive edge." [P2]

The effects of historical inequality were seen very clearly in most companies with management and decision-making structures still largely untransformed and with only one company showing any real transformation. The literature asserts that organisations that maintain a largely untransformed managerial structure result in a high power distance between management and employees. This high power distance can result in more rigid structures that are less likely to foster innovation (Graham, 2010; Hofstede, 2001). P3 disputed the assertion that a more transformed managerial structure would lead to different decisions being made. The limited nature of this study does not provide sufficient data to understand the assertion that companies that are more transformed are more likely to be innovative. This would be an opportunity for further research.

"But if you look at our management team, it's very pale, male dominant... but I don't think a lot of our decisions, I think, if you had anybody in there, they'd be making the same sort of decisions." [P3]

The socioeconomic impact of AI adoption was also not something readily considered by most participants. In fact, the socioeconomic impact of possible job losses due to robotic automation was seen as inevitable and even beneficial to the company as they would not have to deal with the complexities of unionized labour in SA.

"What typically was the line of maybe, you know, eight or nine people is all now done by a robot. Yeah. And there are massive knock-on effects of that, there's labour unrest, you know, there's unions, there's complaints but the reality is at the end of the day is worldwide, everyone is going to move towards that because robots you know, they don't go on strike, they don't complain, they don't take tea breaks. They don't you know, burn down factories." [P1]

"Labour in South Africa, specifically in South Africa, brings all sorts of other complications, that guys are also tired of. So that's definitely changing. They are starting to understand that. No, no, labour is not that cheap anymore." [P4]

In summary, when analysing the environmental influences on adoption, the factors raised are less transparent in their either positive or negative influence. A competitive work environment was seen as the only possible enabler.

4.7 Conceptual Model

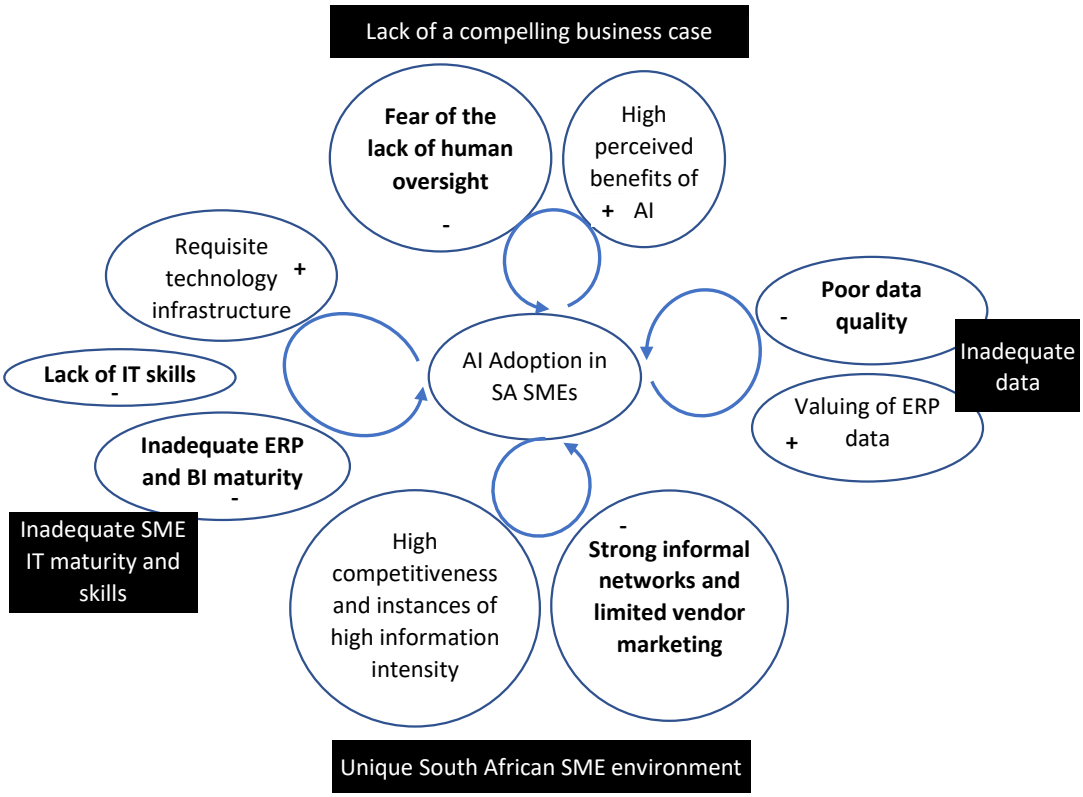

Figure 1. Conceptual model of low AI adoption in SA medium sized organisations

The final inductively derived model shown in Figure 1 explains the lack of AI adoption with SA mid-sized organisations. Four inductively derived themes were found to best explain the lack of adoption and are shown here with the relevant adoption enablers and barriers. Barriers are in bold font. The dominant theme was the lack of a compelling business case. High perceived benefits of AI appear to be overshadowed by a fear of the lack of human oversight with AI. The second theme was summarised as inadequate SME IT maturity and skills. While SMEs have the requisite IT infrastructure, the lack of IT skills means that organisations have inadequate ERP and BI maturity and hence would not be able to appropriately benefit from AI. This theme is related to the inadequate data theme. While the organisations value their ERP data, the awareness that their data quality is poor inhibits AI adoption. Finally, the SA SME environment has a moderate dampening on adoption. While high competitiveness and instances of high information intensity drives AI adoption, the strong informal networks and limited vendor marketing dampens the drive.

5 Conclusion

The objective of this study was to understand the low adoption of AI tools by medium sized organisations in SA. We chose to study organisation that had installed ERP systems with the available AI tools. We reviewed the relevant theoretical frameworks and factors mentioned in the literature that

could potentially explain adoption of AI and argued for the need for more research on the topic. We chose a qualitative approach and studied seven medium sized organisations within the SME sector. Adoption of AI within the study sample was found to be low although AI understanding was high.

A resultant inductively derived model highlighted that the dominant inhibitor was fear-based perceptions relating to losing control of AI enabled processes. These perceptions are subjective in nature and may change over time especially considering the strong SA reliance on informal networks to guide adoption. Other inhibitors endemic to the SME environment relate to a lack of ERP and BI maturity, poor data quality and a lack of internal IT skills required to manage an AI implementation. Executives interviewed were mostly unaware of existing vendor AI solutions which signals the low importance of these tools in their list of innovation priorities and the limited marketing by vendors. The expected influence of high inequality and unemployment was not reflected in the analysis. The practical value of the study is that it provides guidance as to the factors that need to be overcome to achieve adoption in the SA SME context. From a theoretical perspective it identifies which technology adoption factors are relevant to the AI, SME, and SA context.

A limitation of the research is the number of companies that participated and that theoretical saturation was not approached (Saunders et al., 2018). A further limitation is the diversity of the companies studied. It will be good to identify SMEs with different characteristics and different sizes, to confirm if all themes hold for different types of organisations and to identify further themes and approach theoretical saturation. An interesting finding in the SA context is the important role of informal networks in the AI adoption decision. A limitation of this study was not exploring this theme further to understand this phenomenon more fully. A further research opportunity exists to understand these networks and how they impact IT decisions.

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