ASSESSING ORGANISATIONS' READINESS TO ADOPT GREEN INFORMATION TECHNOLOGY: THE CASE OF A SOUTH AFRICAN INFORMATION TECHNOLOGY SERVICES VENDOR

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ABSTRACT

Green information technology (IT) adoption is an important topic in the fields of information systems, business sustainability, and corporate social responsibility. This case study applies the green IT adoption model (GITAM) to perform a systematic and qualitative readiness assessment at a major South African IT services vendor. Thematic data analysis was used to analyse the data collected from managers and specialist IT staff. The assessment revealed that the main organisational adoption readiness barriers were the lack of a formal green IT policy, an unclearly defined green IT governance framework, and a lack of green performance management. The main drivers of adoption were economic imperatives and regulatory and ethical requirements. Interestingly, a contextual variable – an exogenous shock caused by COVID-19 and the robustness of the organisation's crisis response during the pandemic – rapidly increased the rate of green IT adoption at the firm.

OPSOMMING

Aanneming van groen inligtingstegnologie (IT) is 'n belangrike onderwerp op die gebied van inligtingstelsels, besigheidsvolhoubaarheid en korporatiewe sosiale verantwoordelikheid. Hierdie gevallestudie pas die groen IT-aannemingsmodel (GITAM) toe om 'n sistematiese en kwalitatiewe gereedheidsbeoordeling by 'n groot Suid-Afrikaanse IT-diensverskafferorganisasie uit te voer. Tematiese data-analise is gebruik om die data wat van bestuurders en spesialis IT-personeel ingesamel is, te ontleed. Die assessering het aan die lig gebring dat die vernaamste hindernisse vir organisatoriese aanvaardingsgereedheid die gebrek aan 'n formele groen IT-beleid, 'n onduidelik gedefinieerde groen IT-bestuursraamwerk en 'n gebrek aan groen prestasiebestuur was. Die belangrikste dryfvere van aanneming was ekonomiese imperatiewe en regulatoriese en etiese vereistes. Interessant genoeg het 'n kontekstuele veranderlike - 'n eksogene skok veroorsaak deur COVID-19 en die robuustheid van die organisasie se krisisreaksie tydens die pandemie - die tempo van groen IT-aanneming by die firma vinnig laat toeneem.

1.   INTRODUCTION

Despite the urgent need for South Africa to make the transition into being a more sustainable nation, it ranked poorly, coming in at 19th position among the G20 nations in its ability to apply ICT to curb CO_2 emissions [1]. Goal 13 of the Sustainable Development Goals 2030 (SDGs) calls on nations to take urgent action to combat climate change and its repercussions. However, the Industrial Development Corporation (IDC) (2023) ranks South Africa at 13th position as one of the leading CO_2 emitters in the world [2]. The same report estimates that by adopting technology, South Africa could reduce its baseline CO_2 emissions of 342 million tonnes by 101.4 million tonnes [2]. Despite this major opportunity to contribute to global sustainability efforts, and despite enormous pressure from several stakeholder groups to address corporate social responsibility (CSR) and business sustainability concerns, South African organisations continue to lag

behind in their adoption of ICT to reduce carbon emissions. IT leaders and experts should be playing a greater role in addressing sustainable IT goals.

A growing number of responsible IS research studies have argued that IT should contribute to sustainable practices, and have recommended new approaches for organisations to contribute to combating climate change [3,4]. The green IT literature has made significant contributions to improving our understanding of the drivers, barriers, and critical success factors for green IT adoption in organisations [4,5,6]. However, little is known about how exogenous shock events such as disasters and wars, and even negative media publicity, might disrupt the underlying resistance structures that inhibit the ability, willingness, or urgency in adopting green IT [7]. This study endeavours to understand the influence of a crisis context in the adoption of green IT at an IT services vendor. The COVID-19 pandemic provided an ideal opportunity to investigate the influence of a crisis in green IT adoption. We applied the green IT adoption model (GITAM) by slightly refining it to accommodate a crisis context and as a theoretical framework for the case investigation. The rest of the article is structured as follows: Next, we provide a review of previous studies on green IT and the thematic areas that are aligned with the GITAM model. Then we describe our research site, a large local ICT company. In addition, we present our single case study methodology and the qualitative data collection and analysis procedures we adopted in this study. Following this, we present our results and discuss our contributions, implications, and future research opportunities.

2. LITERATURE REVIEW

2.1. The green IT adoption model (GITAM)

The G-readiness model is an integrated model that explains the adoption of green IT and the drivers of its adoption [8,9]. The G-readiness model provides a reference framework for assessing organisational green ICT capabilities and limitations to gain insights into how best to organise IT technical and human infrastructure for environmental sustainability [10,11]. The G-readiness model is a suitable framework because of its simplicity and its sufficiently well-structured base on empirical and theoretical foundations. The model is frequently used in practice-based studies on green IS in organisations [12], and has been empirically verified and validated.

The G-readiness model has a fievel count constructs: green IT context, green IT readiness, green IT drivers, green IT barriers, and green IT intention and adoption (See Figure 1 below).
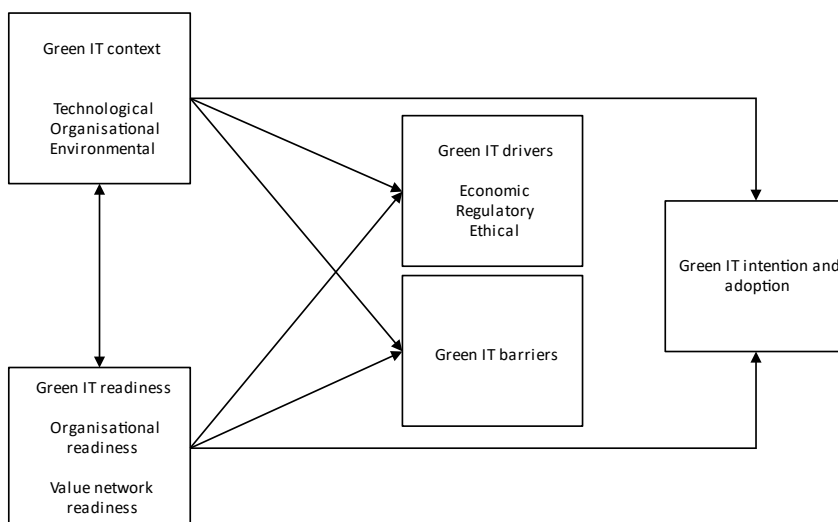

Figure 1: The GITAM model (Molla, 2008)

Green IT readiness is defined by Molla and Abarashi (2011) as an organisation's capability to embed sustainability in the beliefs and attitudes in the development, deployment, and disposal of IT technical assets, in their IT processes, practices, and policies, and in their governance systems to ensure compliance with internal and external sustainability expectations [13].

G-readiness emphasises the important role of green IT drivers, which include regulatory pressures, public image, and competitive advantage. Regulatory pressures and incentives play an important role in green IT adoption. Numerous pieces of research indicate that incentives and rewards from governments help to accelerate green practice acceptance. [14]. In Denmark, for example, businesses are required by law to include a 'green budget' in their yearly reports [15]. Companies are forced to comply with requirements despite purchasing energy-efficient technologies to justify their corporate social responsibility [16]. In South Africa, legislation and regulations exist that govern green ICT initiatives in organisations. However, they are found to be so inadequate and poorly enforced as to have no significant effect [17]. Regulatory restrictions and legislative action heavily influence green technology uptake. Organisations are becoming more concerned about their public image, which sustainability practices can improve. Developing a good corporate social responsibility image is found to be related to profitability [15]. Some businesses want their efforts towards social responsibility to be recognised [16]. Last, green IT adoption is associated with innovation, which in turn leads to competitive advantage.

Hernandez argues that eco-investments and green ICT initiatives can transform the performance of organisations to give them a competitive advantage over competitors [17]. Research also shows that competitive pressures are the main drivers for some organisations to adopt green technologies in order to gain a competitive advantage. Organisational readiness indicates the factors that support the organisation's adoption of green IT [15,16,17]. These are top management support, a sustainability culture, and compliance and certification [18,19].

First, top management commitment is one of the main drivers for implementing green supply chain management and boosting environmental performance [19]. Kiesnere and Baumgartner add that top executives have a significant impact on organisational culture and company-wide decision-making processes through their dedication and leadership, which they demonstrate by providing staff with resources and offering incentives to support sustainability projects [20].

Second, a culture of sustainability should be an embedded aspect of the organisation. In decisions and initiatives influenced by environmental training, the company's culture shows a propensity to embrace environmental change. An integrated culture for sustainability and ethical practices can emphasise the efforts to accomplish company sustainability objectives [17]. Most daily behaviours are social practices that are ingrained in larger cultural systems and conventions. Compliance with environmental laws, rules, and standards, as well as other requirements such as those for operating on a specific site, is known as environmental compliance [21]. Compliance demonstrates trust in and acceptance of the laws, and politicians believe that environmental compliance is essential to a company's survival [22].

The International Standards Organization (ISO) 14001 certification programme, which represents state-of-the-art environmental management practice globally and boosts a company's competitive advantage across all industries, is one way in which the South African Bureau of Standards actively supports environmental conservation. Environmental compliance at the business level is demonstrated by internal environmental policies, environmental excellence awards, the adoption of environmental certifications such as the ISO 14001, and the lack of environmental fines and penalties [20].

2.2. Green IT barriers

Green ICT provides numerous potential advantages. However, Hankel, Heimeriks and Lago (2019) indicate that organisations must address certain barriers to ensure that those potential benefits are realised [23]. A lack of awareness among ICT professionals about the contribution of green ICT to environmental sustainability derails the pace at which green ICT is adopted. In addition there is a lack of knowledge about organisational and environmental policies, which creates a barrier to using green ICT's productivity-enhancing benefits [21].

In developing countries such as South Africa, a huge proportion of the population lack knowledge about and skills in ICT. Another barrier to the implementation of green technology is a lack of different talents, such as innovative technical skills [24]. Research indicates that workers with insufficient environmental management abilities are hesitant to implement green practices because they lack the necessary knowledge [23]. Legislative measures are perceived as laborious and complicated government processes that create uncertainty and impede the advancement of green technologies [25].

Financial difficulties, particularly in developing nations, are seen as one of the major obstacles to sustainable innovation [25]. Financial barriers to organisations vary by sector and nation, but they have a significant influence on smaller unregistered businesses, particularly in developing nations [26]. As a result, even though budget constraints may vary, there are major financial shortages everywhere.

2.3. The role of a crisis in green IT adoption

The COVID-19 pandemic transformed the adoption of ICTs in many organisations globally and in South Africa. The ensuing measures necessitated the move to remote work in some sectors of the economy and job roles where it was feasible to do so [27]. The IT sector is one of those in which remote work is feasible [28,29,30]. As a result, the company known as Technology Professional Services (TPS), headquartered in Johannesburg also transitioned to remote work.

3. RESEARCH SITE AND METHODOLOGY

3.1. Research design and approach

This qualitative study employed an interpretive case study, focusing on TPS. According to Walsham (2006), the use of an interpretive case study helps to develop a deeper understanding of complex phenomena such as green IT implementations [31].

3.2. Target population and sampling

The target population for this study comprised knowledgeable employees of TPS. The organisation is one of the largest players in South Africa's professional technology services sector, and operates under the consulting, technology, and outsourcing model in at least 120 locations across different markets in sub-Saharan Africa and in Europe and the Middle East. Using purposive sampling, 26 participants were selected for the study. Table 1 below presents a brief description of the work roles of participants, their years of experience at TPS, and their work specialisations.

Table 1: The work roles and areas of specialisation of participants

Participant level and role	Number of participants selected
Directors	3
Senior managers	4
Middle managers	8
Technical specialists	11
Total	26

3.3. Data collection and analysis

3.3.1. Data collection

To comply with the research institution's ethical process, approval was required and granted by the candidate organisation. Both primary and secondary sources were used to gather the data for this study. The main source of data used in this study was semi-structured interviews, which were conducted between June 2021 and November 2022. The participants' perspectives on the function of digital technologies in the mining environment, as well as the social and technical challenges related to sustainable digital mining, were discussed with the help of an approved interview guide (not provided here owing to space restrictions). Individual interviews were conducted over MS Teams because of the global COVID-19 pandemic, and lasted between thirty minutes and one hour and thirty minutes. With each participant's consent and with the approval of DigiMine, every talk was audio recorded. Following the recording of the interviews, the transcripts were created using specialised transcription software, and its accuracy was manually verified. We used triangulation to broaden and deepen our understanding of our participants' shared and varied sustainability perspectives [32].

3.3.2. *Data analysis*

The data in this study were analysed using thematic analysis, a collection of research methodologies used to investigate a phenomenon by categorising and carefully analysing it. Thematic analysis was ideal for analysing and making sense of the communal or shared meanings and experiences of the knowledge workers who were recruited for interviews. In addition, thematic analysis allowed for the identification of the characteristics or variables that influenced any views expressed by the participants about green IT. Figure 1 below shows the thematic analysis process followed in this study.
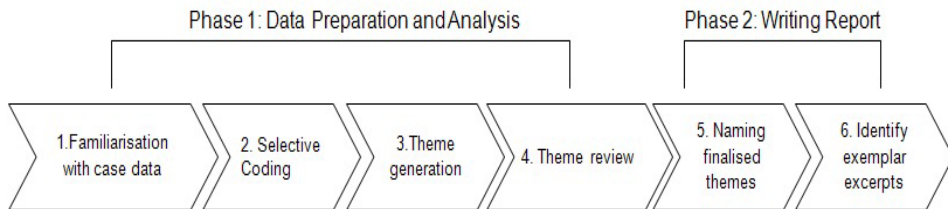
Figure 2: Thematic analysis process

Our investigation started with the creation of a coding template to pinpoint and evaluate the most significant parallels and variations among our participants' points of view [33]. The coding template included sensitising coding categories, subcategories, and definitions based on the six different sociotechnical viewpoints identified by Reiter (2017) [34]. The rules for creating thematic categories from Braun and Clarke (2019) were followed [35]. The data sets were read by both authors several times, and they each independently created an initial set of thematic categories using an open coding methodology. After that, the authors worked together to identify, classify, and assign to the chosen coding categories the common themes for the numerous codes that appeared during this iterative process. The next section presents the findings of the study. The themes are linked to the GITAM model, which was used as theoretical lens.

4. CASE ANALYSIS

Figure 3 below shows the final themes derived from the thematic analysis process used in this research.
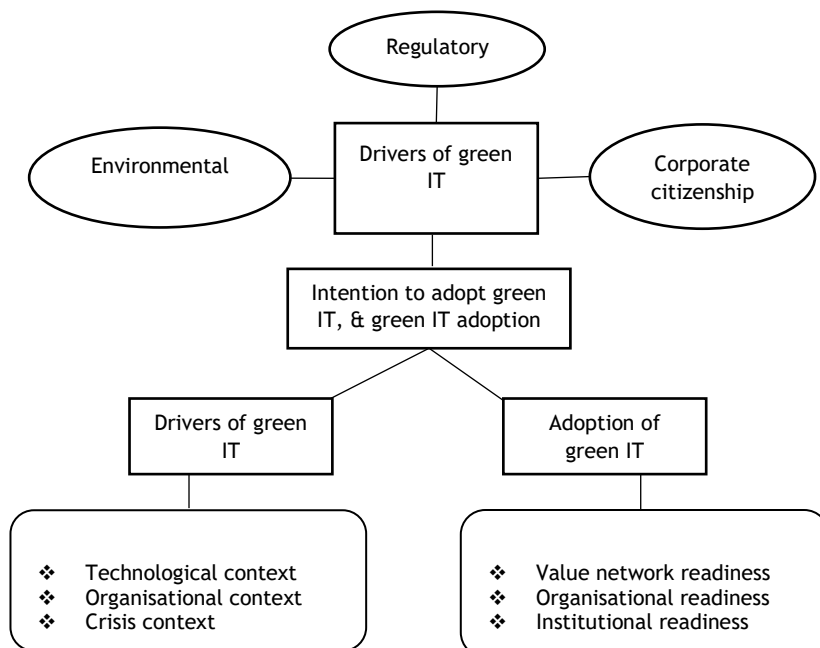
Figure 3: Visual thematic map of green IT adoption

4.1. Green IT context

The context that facilitates the adoption of green IT includes COVID-19, technology, and environmental concerns.

4.1.1. Crisis context: COVID-19

The findings suggest that the COVID-19 pandemic initiated an emergency response that proved to be a catalyst for green IT implementation at TPS. As the world implemented measures to mitigate the spread of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus responsible for the COVID-19 disease, organisations such as TPS were forced to implement precautionary measures, such as enforcing social distancing and remote work practices. As a result, TPS also transitioned to remote work at the beginning of the pandemic, with one of the senior executives admitting that "the pandemic has impacted the way we operate" (Participant 1). The following statement that was made by one of the senior managers (Participant 18) exemplifies the impact that COVID-19 had on the organisation's operations.

> …we had to make sure everyone on our team had the proper setup to continue working in terms of laptops, monitors, good internet infrastructure, home office furniture and so on. So there had to be a budget for that… the lockdown forced us to lower operational costs. And I think this was the time when some of the green IT practices started to give real tangible benefits that you can see because we could do more even with limited budgets. (Participant 18)

> We have implemented already 70/30 or 80/20 where 80% of your time will be spent at home working in a distributed team, and 20% might be required for get-togethers when it's safe to do so. So, the focus is to downscale our office footprint, and with that goes anything that you use, electricity, laptops, and phones. (Participant 6)

Realising the benefit of cost reduction, it is no surprise that the participants indicated that the organisation was considering remote work as part of its strategic plans. Consistent with the findings from other studies [34], telecommuting and a virtualised workforce are considered a major way to reduce the carbon footprint of business organisations through reduced electricity consumption and a reduced use of real estate, building utilities, and building management facilities, along with reduced carbon emissions from daily commuting [36]. A distributed team can therefore reduce carbon footprints while reducing operational costs. The focus on business and environmental sustainability during a period of recovery from the COVID-19 pandemic draws attention to the concept of green recovery. Research shows that recovery considerations after the pandemic are an impetus to achieve the United Nations' Sustainable Development Goals [37].

4.1.2. Organisational context: Corporate citizenship

The adoption of green ICT was seen as an act that would enhance the company's corporate standing, thus allowing it to gain a competitive advantage. In other words, the participants indicated that the company regarded compliance with green ICT as a marketing strategy that would improve the company's reputation and win more customers who aligned themselves with green energy practices. Commenting on the benefit of adopting green ICT from a corporate perspective, Participant 10 commented:

> Even for the entire organisation, taking an environmentally friendly stance is favourable for attracting customers and creating a good corporate image. Even in selecting who to partner with we chose companies which recognise the impact their products have on the environment and design them to limit the harm to the environment. (Participant 12)

> It's important for us to adopt green ICT practices because it gives us a good reputation. To be known as an eco-friendly or environmentally conscious technology company is good for our reputation with the government, our clients, and the public. (Participant 25)

In a competitive world such as today's business environment, reputation is seen as crucial. As the participants indicated, there are short-term and long-term gains for the company in adopting and gaining public recognition for green ICT use. Therefore, these gains can also be related to the drive to make a profit and to maintain the financial sustainability of the firm [15].

4.1.3.   Technological context: Virtualisation and cloud technology

Virtualisation and cloud technologies are key in digitising operations, with the underlying principle of reducing the IT supply chain's environmental footprint. This includes the extent to which the services offered by the IT infrastructure support concerns about a team's business long-term sustainability. The participants reported that cloud technology is *"much cheaper, more efficient, easier to maintain and even more eco-friendly than legacy systems"* (Participant 26). Cloud technology provides a more *"viable way to operate because not only does it reduce"* the *"costs of having physical servers, but it also helps manage computing and energy resources efficiently"* (Participant 1).

As mentioned earlier, IT operations and services policies that encapsulate business sustainability appear to influence technology development output positively. Several technological innovation initiatives are observed, such as *"a cloud-based digital document delivery and signing system"* (Participant 20) and *"an automated cloud-based platform"* for managing and monitoring governance, risk management, and compliance (GRC) frameworks that also double as an *"IT procurement marketplace"* (Participant 22). The policy appears to link practice and technology as the technologies developed to enhance or supplement green IT practices, such as using digital documents instead of printing paper, and enforcing environmentally preferable IT purchasing and procurement.

4.1.4.   Environmental context: Environmental sustainability

The study found seemingly competing priorities between business sustainability and environmental sustainability. The study found evidence that environmental sustainability was a priority in the organisation. For example, the concept of green IT is generally understood to be related to the concept of *"sustainability in IT operations"* (Participant 22). This conceptualisation shows that green IT is seen as a means first to minimise the negative impact of IT on the environment, and second to increase the positive impact of IT on the environment. Ultimately, green IT is viewed as an enabler of green initiatives in other sectors of the economy, as illustrated by the following responses:

> *When it comes to lowering the environmental impact of IT, you … consider how products are manufactured … used, as well as how they are disposed of after usage. You aim to minimise environmental impact by recycling and reusing obsolete equipment, conserving energy, and considering sustainable procurement. (Participant 18)*

> *I think that if we prioritise green IT, we can use our state-of-the-art information systems to track environmental parameters and preserve data that future generations can … use. (Participant 14)*

These remarks suggest a positive business attitude towards environmental concerns and embracing green IT. However, it appears that environmental sustainability may not be the main driver in implementing green IT. Rather, reducing operational costs appears to be the chief driving force for green IT implementation. Research indicates that green IT should be viewed as a possible solution to achieve sustainable outcomes rather than a source of environmental issues [23]. Business attitude dispels the notion of a conflict between economics and ecology, showing that green IT should be used to yield positive economic, social, and environmental impacts [37].

4.2. Green IT drivers

Green IT adoption is influenced by green IT drivers. The findings indicate that green IT drivers are subdivided into regulatory, economic, and ethical.

4.2.1.   Green IT regulation

It appears that there is no clearly defined green IT policy that specifies the roles, responsibilities, and procedures for green IT implementation, which suggests that the organisation employs a reactive approach to green IT. For instance, Participant 4 made the following comment:

> *People just talk about the bigger picture of green IT, but if we look, for example, in our organisation, there is no framework on how to implement it. (Participant 4)*

I cannot say that we have a specific strategy per se, but we have adopted a few practices to ensure that our work has a reduced impact on the environment. (Participant 5)

I would say sustainability is an important component of our organisation that guides our sustainability practices. But it's not part of our vision and mission statement. You see, it's not formalised in that sense. (Participant 14)

The findings show that the organisation largely employs a reactive approach to green IT. The absence of a clearly defined green IT implementation policy presents a challenge to effective implementation. The use of desktop power management solutions to reduce energy usage has been reported in the literature as an easy and effective way to save money and reduce emissions [38,39]. This study confirms these assertions by Ziemba, with participants acknowledging that the enforcement of power management solutions is largely driven by reducing cost and avoiding energy waste [40].

4.2.2. *Green IT economic drivers*

The participants indicated that there were economic benefits that were derived from the adoption of green IT. The findings showed that green IT practices are mainly aligned with cost reduction. The following statement by one of the senior managers (Participant 17) reveals how cost reduction is an important driver for green IT:

Green ICT lessens unnecessary expenses by adopting hardware or software solutions that save energy or reduce energy loss. You can see that it shows a good consumer image because of how important going green and preventing climate change has become for consumers. (Participant 17)

I have mentioned how green ICT saves money, so we get into a situation where we say we need to cut our spending and be more profitable. (Participant 17)

The above quotation from Participant 17 shows how critical green IT is for business sustainability outcomes. These outcomes help the organisation save money and improve its value proposition without losing business for the failure to comply with regulations or meet client expectations.

4.3. Green IT readiness

The data revealed that green IT readiness was shown by the main themes: value network, organisational, and institutional readiness.

4.3.1. *Value network readiness: ICT end-of-life policy guides recycling and reuse*

The IT end-of-life policy seems to influence the disposal of IT equipment. The recycling practices appear to be guided by government regulations, industry and customer expectations, and the company's cost-saving and corporate image strategies. The following remark made by Participant 17 relates the recycling practices to complying with government regulations:

We recycle our e-waste, and we do this to comply with the regulations on e-waste disposal. We have a recycling centre for recycling things like paper, outdated computers, and broken-down IT equipment. (Participant 17)

Things like e-waste management and recycling are motivated by regulatory pressure. We are required by law to dispose of our waste in a way that doesn't pollute the environment. We can't just take our old equipment and burn it or something like that. (Participant 12)

We do most of this for the cost-saving benefits and to keep up with government regulations in all the countries that we are stationed in. (Participant 21)

It appears that recycling practices are largely embedded in the organisation, driven by regulatory compliance, corporate image, cost-saving, and a concern to reduce environmental pollution. The company

policies and end-of-life guidelines for IT equipment guide the disposal of electronic waste in line with government regulations.

4.3.2. Institutional readiness: Governmental environmental regulations

The green ICT revolution has been driven largely by government regulations and policies. Most of the participants indicated that they had adopted green ICT because of existing government regulations regarding sustainable practices. Therefore, government coercion is presented as a necessary tool to enforce green ICT compliance. Commenting on the government's coercive measures, Participant 2 said:

Honestly, it's external pressure from regulations and industry standards. We have to comply with government regulations, so we recycle our electronic waste. (Participant 2)

We do this to comply with government regulations on the recycling and disposal of IT equipment and accessories that are related to ICT. (Participant 12)

In addition to compliance, participants felt that the company sought to benefit. Not only are efforts to reduce carbon emissions through green ICT cost-effective, but compliance with government regulations helps the company to build its corporate image and reputation. Research indicates that efforts to address carbon emissions result in green ICT-compliant organisations winning goodwill, which in turn attracts customers in the short and long terms [40,41].

4.3.3. Organisational readiness: Policy on technology use and development

National policies on green IT influenced the organisational policies that were adopted by TPS. To that end, cloud technologies and virtualisation are the two key technologies that support green ICT practices at TPS. The participants largely attributed these technologies to the company's strategy to embrace digitisation. A senior executive of the company (Participant 20) explained how digitisation is pivotal to the future success of the organisation:

Now, you use centralised virtual machines to perform computing tasks. And with a centralised system, you can effectively manage power usage and resource utilisation because everything is centralised. So, you optimise the deployment and usage of those resources. And it is a really smart way to minimise costs while at the same time minimising the harm to the environment. (Participant 20)

Throughout our business systems, we are embracing digitisation and automation acceleration. This will ensure that our core service functions are automated and that we can leverage our resources, utilising the most up-to-date cloud technologies. A single target operational model underpins this process, ensuring consistency across the organisation and putting sustainability considerations on the radar. (Participant 5)

The data indicate that virtualisation and cloud technologies are key in digitising operations, with the underlying principle of reducing the IT supply chain's environmental footprint. This includes the extent to which the services offered by the IT infrastructure support concerns about a business's long-term sustainability.

4.4. Intention to adopt green IT, and green IT adoption

The intention to adopt green IT was motivated by key factors such as cost reduction, corporate citizenship, and environmental policies. The intention to adopt green ICT was identified in the positive attitude expressed by the participants in relation to green IT. For instance, a majority of the participants described their positive adoption intentions and actual adoption behaviour as follows:

Going green is part of our priority goal, and we are highly aware of the strong social consciousness to prevent climate change, and the technology we use and offer to customers offer[s] innovative solutions to create an environment that is more secure, healthier, and efficient. (Participant 15)

Green ICT lessens unnecessary expenses by adopting hardware or software solutions that save energy or reduce energy loss. You can see that it shows a good consumer image because of how important going green and preventing climate change has become for consumers. (Participant 17)

Working from home helps us in our efforts to reduce our office footprint. With a smaller office footprint, we can save on keeping the office running things like heating, air conditioning, and so on. (Participant 22)

We recycle our e-waste, and we do this to comply with the regulations on e-waste disposal. We have a recycling centre for recycling things like paper, outdated computers, and broken-down IT equipment. (Participant 18)

The excerpts presented above strongly suggest that employees at the ICT company were aware of the benefits of green IT, and had strong intentions to adopt green IT. Previous studies on carbon dioxide emissions indicate that actual green IT adoption practices such as telecommuting, recycling, and responsible e-waste disposal are being used by the firm to promote sustainability [41,43].

5.   DISCUSSION

This study aimed to assess green IT adoption readiness in a South African IT service vendor. First, aligned with the GITAM model, the study established that the COVID-19 pandemic and technological and environmental concerns were the context that facilitated the adoption of green IT [33, 34]. The COVID-19 pandemic fast-tracked the adoption of green IT [35]. Second, the technological context involved the increased use of virtualisation and cloud technologies to address environmental concerns. In addition, the services provided by IT infrastructure were found to promote the team business sustainability in the long run [16]. The environmental context reflects the adoption of green IT as a means to minimise the negative impact of IT on the environment.

Green IT adoption is also facilitated by effective policies that outline the roles, responsibilities, and procedures for green IT implementation. The presence of clearly defined green IT policies can help organisations to drive green IT behaviour. For example, organisations could adopt power management solutions in the short term, which in the long term would help to reduce running costs [38]. There are obvious economic benefits, such as cost reduction, that encourage companies to adopt green IT. Green IT adoption is also motivated by the organisation's desire to gain a competitive advantage through engaging green IT initiatives that promote its image [15].

To demonstrate an organisation's readiness to adopt green IT, practices such as recycling are largely embedded in the organisation, driven by regulatory compliance, corporate image, cost-saving, and a concern for reducing environmental pollution [38,39]. In addition, government regulations and policies enforce compliance with green IT through coercive measures [40]. These national green IT regulations and policies cascade down to the organisational level, and are implemented by departments within the organisation [41]. Our case insights into the influence of the COVID-19 crisis on green IT, and recent research on crisis management, suggest that, to ensure that firms drive green IT initiatives more effectively, leaders should reframe green IT and reposition it in their business sustainability and corporate social responsibility programmes with greater urgency [44]. Finally, green IT is unlikely to be successful without effective leadership and a cultural transformation.

6.   CONCLUSIONS

The green IT adoption model (GITAM) is useful for assessing and better understanding how context, readiness factors, and drivers influence and shape green IT adoption in organisations. Interestingly, the context of the COVID-19 pandemic crisis was a major catalyst for green IT adoption in the case organisation, leading to a rapid uptake of green technologies and organisational change initiatives. The COVID-19 pandemic provided a unique context in which crisis situations and the resulting exogenous shocks could influence green IT adoption. Future research could explore guidelines for green IT adoption in crises, given that the study found that there were no policies or guidelines to address green IT practices during the COVID-19 crisis. In addition, the absence of a clear policy on green IT in South Africa limits the pace at which companies adopt green IT, as each organisation may rely on its organisational expertise and availability of resources. While green IT adoption results in reduced operational costs, the lack of incentives that promote green IT adoption may result in a gap in green IT adoption between well-resourced

organisations and less-resourced organisations. Future case study research could focus on the reframing strategies of business and IT leaders who were able successfully to drive organisational transformation to green IT adoption without relying on exogenous shocks [44].

Our study was exploratory and limited to the experiences of a group of managers and IT specialists at a South African IT services vendor. The unique contextual characteristics of the organisation and the experiences of the participants shaped our insights about green IT readiness and adoption. Despite this, we believe that the central finding – that the context, readiness factors, and drivers shape and influence green IT adoption – could inform future studies. Future research would also need systematically to investigate and assess the realisation of the actual benefits of green IT in hard cash value to the organisation.

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