Model for the Intent to Adopt Green IT in the Context of Organizations

DIEGO CORDERO[1], **CARLOS JUIZ**[2], **(Senior Member, IEEE), ANDREA MORY**[2],
VANESSA BERMEO[3], **AND DANIEL ANDRADE**[3]

[1]Green IT Research Group, Administration Academic Unit, Universidad Católica de Cuenca, Cuenca 010107, Ecuador
[2]ACSIC Research Group, Universitat de les Illes Balears, Palma, 07122 Illes Balears, Spain
[3]Administration Academic Unit, Universidad Católica de Cuenca, Cuenca 010107, Ecuador

Corresponding author: Diego Cordero (dcordero@ucacue.edu.ec)

ABSTRACT In organizations, part of sustainability is manifested through green information technology (GIT) for the use of information technologies (IT) resources in a profitable and sustainable manner. The purpose of this study was to understand the social, individual, and contextual factors that drive actors belonging to the sector of organizations in the Latin American and Caribbean (LAC) context on the intention to adopt GIT to generate strategies that promote its application. A model resulting from the analysis and integration of adoption models was proposed, including the theory of planned behavior (TPB), norm activation theory (NAT), GIT adoption model (GITAM), and environmental sustainability variables. To determine the predictive factors, the research team collected data from organizations belonging to Mexico, Panama, Honduras, Colombia, Ecuador, Peru, Bolivia, and Chile, where information was collected from personnel at strategic, tactical, and operational levels. Data were collected from 562 informants from different productive and service sectors and analyzed using a structural equation model with the partial least squares technique. This research provided important insights into the most significant factors that determine intent towards GIT adoption. The model analyzed contextual variables of the organization or external drivers, such as the motivating forces of environmental sustainability and environmental, organizational, and technological contexts; and behavioral variables of internal organizational actors, such as awareness of the consequences, attribution of responsibility, motivation, attitude, assignment of responsibility, and internal IT enablers.

INDEX TERMS Green IT, organization, adoption model, structural equation model.

I. INTRODUCTION

The greenhouse gas emissions produced by the use of information technologies worldwide would have increased from 1.6% in 2007 to 3.5% in 2020, reaching 14% by 2040 if necessary corrections are not taken [1]–[3]. As dependence on devices and IT services grows exponentially, the electric energy needed to produce and feed these devices has also reached a point where it has become an important contributor to carbon dioxide creation [4], [5], one of the main greenhouse gases, as well as the creation of other contaminants of global warming [6].

Recently, an increasing number of organizations worldwide, have experimented with initiatives to reduce their impact on the environment and improve their green protection

The associate editor coordinating the review of this manuscript and approving it for publication was Francisco J. Garcia-Penalvo.

seals [7]. As information technologies have entered most, if not all, organizational processes [8], it is necessary to approach the problem with the intention of reducing contamination produced by the technology [9].

On the other hand, strategic levels continue to put pressure on the parts of interest to improve efficiency in IT operations and activate environmental protection to mitigate contamination that the use of IT produces. Making IT ecological inside organizations has become one of an important consideration for improving environmental sustainability [10], [11].

Organizational adoption of GIT has increased. Nevertheless, several organizations face difficulties in identifying and adopting a relevant ecological strategy, even if this practice can create a situation in which all interested parties agree [12]. Adoption studies at the organizational level are based on theoretical frameworks; however, subjacent theories have been poorly studied [13].

In the literature review, several technology and GIT adoption models in organizations were studied and analyzed in the context of developed and developing countries [14]–[16]. Meanwhile, GIT potential is attractive; it results in some organizations, especially those from developing countries, and its adoption is still a path in the search for applications [17]. This is necessary because it is anticipated that electronic waste generated by developing countries will double that developed countries by 2030 [18].

Green technology adoption in LAC has been downgraded owing of economic, developmental, and cultural problems [19]. Organizations, especially small- and medium-sized companies that represent 99.5% of companies in LAC regions, fight for a place in international markets, and green management can do so [20], [21]. Thus, green innovation in organizations represents a critical factor for facing climate change challenges, at the same time that stimulates a more sustainable economic development [22]. There is empirical literature on green innovation in organizations, most of which is based on qualitative analysis [23].

Studies on IT adoption to help organizations accomplish overall sustainability objectives in LAC are limited; consequently, GIT practices are still incipient. Even if proper efforts and initiatives have been implemented in isolation, it is advisable that there is a reference framework for this organizational context that will allow the related variables and indicators to lead to a more efficient GIT adoption process [24].

According to Tushi *et al.* [25], there is a gap in knowledge concerning GIT theoretical models because only a few studies have proposed theories related to GIT. This affirmation is supported by El Daly [26] and Bose and Luo [27] in the sense that there is a lack of theoretical frameworks in the literature on GIT; even if green motivations are important for the organization. However, it is difficult to obtain benefits from GIT unless it has already been adopted, and it is necessary to pay more attention to its adoption in organizations [15].

The main objective of this study is to propose a GIT adoption model for organizations called GITL and to examine the context of LAC countries. This study addresses the following research questions: What are the factors that influence an organization's adoption of GIT? What is the appropriate model to reflect the influence of these factors on GIT adoption? What are the most important implications of proposed model?

To answer these questions, a revision of the literature related to GIT was conducted, in which models and adoption variables were analyzed. In order to generate GITL, it is planned to integrate constructs of TPB, NAT, GITAM, and environmental sustainability variables; because, when trying to explain the GIT adoption, it is necessary to make an effort by covering all the domains of the adoption.

A. THEORY OF PLANNED BEHAVIOR (TPB)

Is one of the most widely accepted psychological theories of pro-environmental behavior [28]. The reason why part of the TPB components have been selected is its successful application in several behavior evaluations in favor of environment [29]. Ajzen [30] stated that, in TPB, the importance of behavioral components is the prediction and explanation of behavior. Several authors believe that the use of TBP as a referential framework can describe intention and future behavior in environmental behavior studies [31].

According to Akman and Mishra [32], TPB describes the behavioral intentions of information technologies as a responsible environmental mechanism. However, Yuriev *et al.* [33] and Loo *et al.* [34], TPB has limitations at the moment of predicting human behavior, so it is advised to incorporate more variables into the model, as in the case of Yarimoglu and Gunay [35], who incorporated into the theory two constructs: respectful activities towards the environment and general image, which shows the flexibility of the TPB to adapt to other contexts.

B. NORM APPLICATION THEORY (NAT)

Schwartz originally developed the NAT in the context of altruist behavior [36], and personal norms were part of the model's core. The model states that personal norms are specified by two factors: the feeling of responsibility for acting with a particular behavior, and the awareness that acting or not acting in a particular way has certain consequences.

NAT has more applications in predicting pro-environmental individual behavior [37], assuming that people's pro-social and pro-environmental behaviors are boosted through their norms instead of personal or cost-benefit evaluations. Personal norms are a group of moral standards regarding what should or should not be done [38]. At the same time, they guide a wide range of organizational and personal behaviors and consequences [39].

In addition, environmental personal norms are the main ecological behavioral predictor compared to other predictors [40]. A personal norm does not affect a person's behavior unless it is activated. If the consequences of future actions are recognized, the person accepts responsibility for the consequences and behavior [36].

From TPB and NAT, it is considered an integral moral theory that is widely accepted among psychologists of moral theory for the intention of an organizational decision-maker to adopt GIT in the organization. GITL considers the constructs: attitude towards GIT, responsibility attribution, consequence awareness, as well as the conductors for the GIT adoption.

C. GITAM MODEL FOR GIT ADOPTION

From the literature review about adoption of: innovation, ecological technologies, electronic commerce IT, the framework for Technology-Organization-Environment (TOE) rises [41]; and, also, the model for perceived e-preparation (PERM) [42], [43], that are integrals for unifying the primary and secondary characteristics of the four key domains in adoption: institutional, organizational, management, and technology.

However, PERM is useful for capturing four dimensions of dynamic and perceptive disposition. The GIT adoption model, referred to as GITAM, has TOE and PERM as its theoretical background [44], where there are dimensions called GIT enablers (drivers) that could also influence the GIT adoption process. To contemplate GIT enablers (drivers), it is necessary to appeal to the motivation theory [45].

From GITAM, the GITL proposal considers first the primary contextual and static variables for GIT; these variables are referred to as the GIT context, which is divided into three constructs: organizational context, environmental context, and technological context; several studies have examined organizational IT adoption from a wide range of perspectives, including technological [46], organizational, and environmental perspectives [47]. The second GITL considers the variables GIT enablers (drivers).

D. GREEN IT ORGANIZATIONAL MOTIVATIONS AND MOTIVATIONAL FORCES

The adoption of green technologies, although similar to the adoption of other technologies, has some differences [48]. Traditionally, environmental compliance has been perceived as an additional cost for businesses, and managers are afraid that such initiatives could negatively affect a company's competitiveness [49].

For Mahmoud [50], green initiatives delay reaching the balance point, probably because they are motivated by softer benefits, such as employees' morals and good corporative citizenship [51]. It is probable that all mandatory requirements and legislative actions play a very important role in technology adoption and can force some companies to accept a technology, even if they do not have a strong intention to do so [52]. However, the literature distinguishes three main motivations for organizations to adopt GIT: regulation, competitiveness, and ecological responsibility [7]. Motivation to adopt GIT is another variable considered in GITL.

It is well established in the literature on management for organizational sustainability that numerous motivational forces influence an organization's environmental strategy, including ecological, political, economic, sociocultural, and organizational forces. All have the capacity to motivate or restrict environmental strategies [53]–[55]. Five motivational forces related to environmental sustainability strategies have been identified in the literature: ecological, technological, market regulatory, socio-cultural, and organizational. These forces describe the external and internal factors that influence organizational actions [56], [57].

For GITL it is considered the motivational forces of the environmental sustainability variable; but, referred to the organization external factors, there are: the market regulatory forces represented by norms, regulations and external laws, as the market pressures [58], [59]; the socio-cultural forces, that reflect the values, believes, and tendencies of a society, and the need of social legitimacy of the organizations [60]–[62]; the public pressure can play an important role in the organization movement towards more sustainable commercial practices, including the ones related to GIT [63].

The proposed GITL uses eight interrelated dimensions: organizational context, environmental context, environmental sustainability motivating forces, technological context, attitude towards GIT, GIT drivers, motivation for GIT, the ascription of responsibility, awareness of consequences to predict GIT adoption intention.

Information collection was implemented in organizations belonging to Mexico, Panama, Honduras, Colombia, Ecuador, Peru, Bolivia, and Chile. Data were collected from 562 organizational actors from different productive sectors and services, processed, and analyzed through a structural equation model using the partial least squares (PLS) technique.

The remainder of this paper is organized as follows: Section 2 explains the hypothesis development, Section 3 distinguishes the applied research method, and Section 4 presents the data analysis and results, followed by a discussion in Section 5. Sections 6 and 7 present the contributions of this research, its implications, and the conclusions.

II. HYPOTHESIS DEVELOPMENT

A. ORGANIZATIONAL CONTEXT (ORC)

The first variable predicts organizational behavior to maintain an attitude towards GIT in GITL. This is the organizational context, which refers to the descriptive characteristics of an organization as the sector, size, human talent, and other aspects, such as data storage providers, financial tools providers, and telecommunications providers, which are considered for technology adoption according to the GITAM model [44].

With GIT adoption, organizations try to improve resources and review aspects such as cost-benefit and energetic efficiency [64]. The first attempts to invest in technology allowed the improvement of information processes and flows to help in decision making [65]. The second aspect shows how companies try to be responsible with society by using eco-friendly energy sources [66].

Along with the Covid-19 pandemic situations, organizational structures have changed their schemes to digital environments, using more business intelligence systems (BIS) [67] that propose group technological tools related to good practices and politics for process management and decision making.

There are reference frameworks as the technology-organization-environment (TOE) that propose different influence factors (enablers or drivers) for organization to adopt GIT. Some studies have focused on this model in terms of size, preparation, and employees' attitudes towards technology [68], [69]. Other studies have proposed that, when using TOE, it is necessary to consider factors such as human resource quality, senior-direction support, and organization size [70].

The perception model of e-preparation (PERM) proposes that the perception of organizational electronic and environmental preparation is fundamental for companies willing to adopt innovative technologies. The PERM model includes two key sub-constructs: POER (preparation for the organization external reception,) and PEER (preparation for the organization external electric reception). Both of them include the following four dimensions: (1) Consciousness, that refers to the organization perception, and the perceived benefits and the risks while adopting technologies; (2) The resources (human, financial, and technological) that refer to the capacity that the organization has for future necessities or dynamic changes; (3) Compromise, that refers to the group members promise, particularly the senior executives that lead long term strategies of an organization; and, (4) Governance, that refers to strategies and tactics that lead decision taking, resources assignment, and develop of general goals [71].

In the field of technological infrastructure, more organizations use resources in the cloud to improve their services and management of IT resources [72], [73]. This paradigm change in organizational structure is produced because the Internet is more accessible [74], and storage capacity has increased for companies to share information with their internal and external clients [75].

In this sense, in the present study, the organizational context as well as the factors influencing the adoption of GIT in LAC organizations and enablers are exposed in the previously described theories and models, formal organizational structures, provision of sufficient resources, and senior-direction support.

Therefore, we propose the following hypothesis: H1. Organizational context has a positive impact on attitude towards GIT.

B. ENVIRONMENTAL CONTEXT (ENC)

Some studies have revealed the relationship between individuals' personal norms and the will to participate in activities or pro-environmental behaviors based on the norm activation model [76], [36] or the environmental value–belief–norm theory, which tries to explain an individual's pro-environmental behavior [77]. Studies have demonstrated that personal norms can affect behaviors related to environmental protection [78], [79].

In that sense, the second variable is supposed to predict the organization's behavior related to maintaining a GIT adoption intention in GITL, which is the environmental context, the same that refers to socially responsible practices, to keep an eco-friendly work environment that the organization should have as nature protection interested entities [80].

The TOE model emphasizes that environmental factors are based on competitive pressure, commercial partner pressure, government support, and environmental dynamics [81], [82]. However, other studies propose that environmental factors to consider in some cases are industry characteristics and regulatory support [83], [84]. In other cases, it depends on an IT governance within the organization that promotes the use of GIT to obtain a friendly eco-system with the environment [85].

In the environmental context, organizations involve corporate social responsibility processes in their business models [86], and some studies indicate that companies search for more cost-effectiveness, sustainability, and prestige [87]. In some cases, the improvement of the supply chain has been studied [76], and additional research has analyzed human resource motivation factors to be involved with their activities [88]. All studies include aspects of environmental care that organizations have as part of their environment, and the global warming effect changes the focus that companies have on improving their energy resources to reuse and recycle supplies, which can improve cost-effectiveness [89].

In organizations, one of the areas that link environmental improvement is known as Investigation, Development, and Innovation I+D+I to understand how institutional dynamics are related to the factors that influence the adoption of GIT [90]. To analyze the influence of environmental context on GIT adoption, we consider the following four variables based on the aforementioned theories and models: industry dynamics, institutional dynamics, market demand, and regulatory support.

Thus, we propose the following hypothesis: H2. The environmental context has a positive impact on GIT.

C. ENVIRONMENTAL SUSTAINABILITY MOTIVATING FORCES (ESM)

The third variable that supposedly influences the environmental context in GITL is environmental sustainability motivating forces, as explained by the theory of planned behavior (TPB) [32], which refers to the social [91], ecological [92], [93], and end-company prestige implications [94] that organizations adopt to improve their image and favor planet care while optimizing resources and productivity.

As part of the first motivational force, emphasis will be placed on internal business social responsibility (BSR) [88] and external [86], which should be fully identified and socialized in the organization as part of the value-generating political [76], and to motivate compromise and social consciousness as an answer after adopting GIT [95].

From an ecological aspect (second motivational force), energy efficiency is considered [66], a GIT strength proposed by organizations in both hardware [96] and software [97], a group of good practices, and activities as strategies to reduce environmental impact [98].

To improve competitiveness, organizations search for financial mechanisms that improve market participation and cost-effectiveness [99]. In this context, the concept of sustainable development and its impact are provided with GIT adoption [100] and an economic and financial field (third motivational force) opportunity [101] to improve the technological governance of business models [102]. These three motivational forces are outlined and involve studies on environmental sustainability as measures to consider GIT

adoption in organizations: company social responsibility, energy, and economic efficiency.

Thus, the following hypothesis is proposed: H3. Environmental sustainability motivational forces have a positive impact on environmental context.

D. TECHNOLOGICAL CONTEXT (TEC)

The fourth variable that predicts the organization's behavior for maintaining and attitude towards GIT in GITL, that is, the technological context, refers to identifying the challenges for green technologies and the management of information technologies, and highlights possible strategies and solutions for the future.

From an attitudinal paradigm, IT adoption models in organizations maintain a relationship with innovation [103], and some theories, such as the theory of reasoned action (TRA), explain people's positive attitudes toward the environmental benefits that lead to the appropriation of green information technology [104]. Other studies are based on theories such as TPB and normal activation theory to indicate the factors that influence the GIT adaptation decision of IT managers and personnel, which are related to cost-benefit, energetic efficiency, competitiveness advantages, consequence consciousness, and company social responsibility [64].

In this context, environmental initiatives have been developed to determine the interactions between technology, organization, and ecological factors that influence GIT adoption. Empirical studies, such as those by Bose and Luo [27], represent the organization's potential for performing GIT practices. Through nine hypothesized politics and other initiatives, as proposed by Uddin et al. [105], who focuses on using virtualization. Based on a GIT reference framework to improve the energy efficiency of data centers using monitoring systems to measure use patterns and environmental impact. Other analyses help achieve eco-friendly objectives through the use of the technology organization environment (TOE) model in organizations [83], and they are related to the use of cloud storage platforms that help improve business resources [72].

For a better relationship among technology, individuals, and informatics resources within an organization, has been found to be necessary. In order to socialize the role of IT equipment in institutionalizing the environmental dimension of business sustainability [106]. Virtual machines can be successfully applied to reduce CO_2 emissions from public agencies [107]. In relation to environmental politics that have taken strength in companies as the one called zero paper, as a good sustainable IT adoption practice, its objective is to significantly replace printing for processes that involve the use of informatics resources [108].

Process improvements that focus on energy use, elimination of electronic waste, and recycling can provide important cost savings and promote sustainability [109]. If the technology community promotes GIT processes and implements recommended better practices to avoid the collateral effects of obsolete technology, it is possible to make a considerable contribution to sustainability efforts [110].

Thus, the following hypothesis is proposed: H4. The technological context has a positive impact on attitudes towards GIT.

E. ATTITUDE TOWARDS GIT (ATG)

This is the sixth variable considered in the GITL model; in this context, Ojo, Raman, and Vijayakumar [111] examine how environmental knowledge and consciousness of IT professionals shape their beliefs about GIT, and research the effect of these beliefs in their attitude towards GIT practices.

By contrast, Tran et al. [112], try to better understand the determinants of technology adoption intention in developing countries and indicate that it is necessary to determine the factors that influence decision-making and GIT adoption intention. In this way, Asadi et al. [64] explored the individual factors in their research using TPB and NAT theories and indicated that IT managers and chiefs maintain initiatives for GIT adoption in relation to environmental conservation.

Some studies provide evidence of the effect of attitudes towards technology use and the related factors to it (GIT is included among them) by the interested parts in the intention to adopt them [113].

Thus, the following hypothesis is proposed: H5. Attitude towards GIT has a positive impact on GIT adoption intention.

F. GIT DRIVERS (GID)

There are several benefits that information technologies provide using their enhancement for internal and external clients in an organization. However, it is distressing how contamination increases. This has led companies to define sustainable green technology use practices and review the ethical aspects that contribute to the environment and ecology [108].

The senior direction in companies should emphasize technological change, while maintaining social responsibility. Several studies have proposed the integration of technological resources and information systems for sustainable organizations [114].

Research supports methodologies to prioritize sustainable information technology initiatives, whose focus is to conclude that organizations (directive levels) should maintain a budget for implementing green information technology. This is because they have the resources and power to invest in innovation and to generate changes that can have a positive impact on the environment [115].

In this context, Li et al. [116] researched how external and internal pressures interact to improve seniors' direction performance, which, at the same time, foments green culture in the company and the adoption of GIT practices.

In order to help the implementation of GIT purposes, there are regulatory frameworks such as ISO/IEC 33000 [117] and administration reference, and governance frameworks for GIT [102], whose indicators help to standardize processes, and the good practices of information technologies and sustainable and eco-friendly communication practices that have

the intention of evaluating according to international measurements that allow recognition of the maturation levels, and the organization state towards GIT.

Thus, the following hypothesis is proposed: H6. GIT drivers have a positive impact on GIT adoption intention.

G. MOTIVATION FOR GIT (MGI)

GIT adoption motivation is identified from at least three perspectives: first, the legal perspective that comes from the government through new industry standards and business-level politics from the regulatory framework; second, the savings that imply cost reductions and income increases, for example, electric energy consumption; and lastly, a social environmental responsibility perspective, reflected through corporate social responsibility [98], [7], [118].

Butler [10] explains how some factors of the external regulatory and cultural-cognitive norms of the institutional environment lead manufacturers and information technology users to become motivated by environmental decision-making, and with the base of organizational theory that will impulse to adopt strategies and make decisions that will create consciousness about GIT [119].

However, competitors, shareholders, and clients apply cultural-cognitive/mimetic influences, while standard organizations in the industry and non-governmental organizations also pressure norms on companies [120]. However, norm influences are more subtle when determining organizational answers regarding the environment [121].

Liang et al. [122] attributed IT success to complementary resource inversions in the organization, meaning that people are committed, and they incorporate the IT implementation process in the strategies and activities thanks to the senior-direction participation that supports its use. At least two-thirds of Toyota, General Electric, Timberland, and Starbucks executives believe in environmental eco-sustainable initiative adoption, where GIT is included, and there is an income source for the organization [123].

Campbell [120] maintains that there is a relationship between economic conditions and company behavior, measured by public and private regulations or by the presence of government or external organizations. These monitor and regulate company behavior towards social responsibility.

Some authors have determined that institutional forces motivate organizational adoption of GIT practices [7]. The social responsibility that environmental activists demand, in addition to the sustainable institutional changes that corporate managers face owing to the regulatory framework, is more effective in motivating the implementation of ecological practices in organizations [124].

As previously stated, the hypothesis includes the following: H7. Motivation for adopting GIT has a positive impact on GIT adoption intention.

H. AWARENESS OF CONSEQUENCES, (AWC)

Awareness of the adverse consequences leads to the acceptance of responsibility among individuals with high aware-

ness of the consequences [125]. Apparently, they are more conscious of possible acts and tend to adopt the perspective of the affected person when making decisions [126].

Nelsen et al. [127] were motivated by international expert groups on climate change that analyzed, from a psychological point of view, pro-environmental behavior, determining that social practices are present; personal, organizational, and global awareness, and this last one has more influence [128], [129]. To reach awareness of the consequences, a previous step is necessary, which is given by knowledge. Currently, it is possible to observe the consequences of environmental degradation and learn about sustainable development, which compromises the role of humans within the ecosystem, considering the long-term impact of their actions.

There are differences among individuals when considering future consequences, in which people have different results owing to their current behaviors [130]. According to Hervey et al. [131], people with more awareness of the consequences could adopt more sustainable practices, in which GIT adoption leads to a more sustainable environment. Additionally, Hansla et al. [132] provides empirical help that correlates the corresponding beliefs of awareness consciousness and worries about the environment given by different personal, social, and altruistic motivations.

The relationship between attitudes and environmental behaviors is described in a study conducted in France and China by Denis-Rémis et al. [133], who consider that, for encouraging people to act in an environmental way, emotional attraction has a stronger impact than logical reasoning about the harmful effects of environmental contamination. On the other hand, attitude towards ecological informatics has been identified as the dominant factor explaining the beliefs or intentions of IT users in applying ecological practices [134].

As previously stated, the hypothesis includes as follows: H8. Awareness of consequences has a positive impact on responsibility attribution.

I. ASCRIPTION OF RESPONSIBILITY (ARG)

Awareness of consequences refers to the personal norms that should be activated through responsibility ascription, which implies that the individual must admit responsibility for his or her behavior [135]. The study reviews demonstrated a significant effect of responsibility ascription on personal norms [136]. Personal norms reflect morality and feelings of obligation in pro-social behavior. Several studies have documented a significant effect of personal norms on behavioral intentions [137].

According to Value-Believe-Norm theory, when values impact respectful behavior towards the environment, it is possible to identify value orientations: self-transcendence and self-improvement. The first are people with higher self-transcendence; they more perceptive about environmental problems, and they are more willing to assume responsibilities and be more respectful of the environment and adscript responsibilities [138].

Stern [139] details the value-believe-norm theory, in which it is determined that adequate individual behavior towards environmental awareness depends on the values that influence attitudes towards the environment, and responsibility ascription also influences pro-environmental behavior.

Another factor that influences pro-environmental behavior is responsibility, which, according to Steg and De Groot [140], reflects the feeling of responsibility regarding the negative consequences of no-acting in favor of the environment. According to Schwartz [36], responsibility ascription influences not only the pro-social and pro-environment persona but is also a moral obligation activator at the moment of behaving.

Thus, the following hypothesis is proposed: H9. Ascription of responsibility has a positive impact on GIT adoption intention.

J. GIT ADOPTION INTENTION (GIA)

The tenth variable, which depends on the GITL model, is GIT adoption intention. The study of this variable proceeds from studies related to the adoption of sustainable practices that have the objective of facilitating adoption and implementation decision-making of ecological practices in organizations, with the inclusion of green processes, green variables, and basic reasoning techniques [141].

There is a wide consensus on the application of green technology as a means of converting current environmentally harmful developments into sustainable ones that lead to social and economic progress [142]. However, adopting a new adequate ecological technology that is adequate and included in the organization's functioning is a complex task because there are barriers [143], [144]; the knowledge in the adoption of green technologies is a previous requirement for the organization.

The selection of companies to adopt green technologies is boosted by many factors including commercial orientation, interest, and operations. Adoption development depends on the systematic interactions among operational attributes, capacity, and technical characteristics [145]. Thus, a company's technology adoption is a complex decision-making process [146]. Decision makers always ask if green technology can be successfully implemented in the operative system, which is why it is necessary to have a clear idea of possible difficulties [147].

There is a clear distinction between GIT intention and adoption. In relation to the studies that demonstrate that, even if some managers are worried about the environment and intend to do something about it, they still have to take concrete decisions [48], [148], which shows a gap between awareness and action. However, according to associative nets theories, there is usually an awareness process for action [149].

Some studies consider that GIT adoption depends on the organization's decision maker, and the responsibility falls in the organization, with limits on the behavior of people towards adoption [150]. GIT adoption differs from

TABLE 1. Questionnaire items development based on literature.

Variable: Organizational Context (ORC)	
Source: [44], [65], [68]–[70], [170]	
ORC1	Your organization formally defines organizational structure.
ORC2	Your organization provides adequate channels for sufficient resource provision for all statements.
ORC3	Support for the senior direction covers all organizational levels.
Variable: Environmental context (ENC)	
Source: [81]–[85], [170]	
ENC1	Your organization belongs to the industrial sector, which focuses on the environmental aspects.
ENC2	Organizational dynamics, structural interactions, processes, and human talent.
ENC3	Market demand suggests consideration of the environmental aspects of the organization.
ENC4	The external regulatory framework that regulates organizational operations considers environmental aspects.
Variable: Environmental sustainability motivational forces (ESM)	
Source: [32], [88], [91], [94]–[99], [174]	
ESM1	In business social responsibility, the organization considers environmental aspects.
ESM2	Your organization is aware of the environmental context and emphasizes energy efficiency and waste treatment.
ESM3	Your organization contemplates economic aspects to invest in environmental responsibility.
Variable: Technological Context (TEC)	
Source: [103], [105]–[110], [119]	
TEC1	Organization informatics systems support environmental initiatives.
TEC2	Information technologies support environmental initiatives.
TEC3	Informatics resources are adequately dimensioned and their operations are subject to environmental politics.
TEC4	Resources related to information technologies are subject to recycling.
Variable: Attitude Towards GIT (ATG)	
Source: [111]–[113], [182]	
ATG1	Green IT practices are convenient for the organization.
ATG2	Green IT practices are necessary for the organization.
ATG3	Green IT practices generate waves of change and are worth the organization.
Variable: GIT drivers (GID)	
Source: [44], [108], [114]–[117], [182]	
GID1	Your organization requires economic resources that enable green IT development.
GID2	From an ethical point of view, the organization has sustainability strategies where green IT can be enabled.
GID3	As Corporative Social responsibility, the organization habilitates Green IT.
GID4	The compromise of the senior direction enables the green IT implementation.
GID5	Competitiveness and market factors enable green IT implementation.
GID6	Regulatory and stakeholders' interests enable green IT implementation.
GID7	Due to its comparison with other organizations in the same sector, green IT implementation is enabled.
Variable: Motivation for GIT (MGI)	
Source: [98], [119]–[124]	
MGI1	Government laws, industry standards, and business politics have motivated green IT implementation.
MGI2	Cost savings, income improvement, effectiveness improvement, efficiency, and higher competitiveness motivate green IT implementation.
MGI3	Corporative social responsibility toward employees, investors, clients, and general public motivate the Green IT implementation
Variable: Awareness of consequences (AWC)	
Source: [125], [126], [128], [129]	
AWC1	Individual awareness of environmental protection by each employee.
AWC2	Organizational awareness of environmental protection.
AWC3	Environmental awareness of the organizational sector.
Variable: Ascription of responsibility (ARG)	
Source: [36], [136]–[139]	
ARG1	Environmental knowledge of both organizations and employees.
ARG2	Environmental attitudes of the organization and employees.
ARG3	Environmental behavior of the organization and employees.
Variable: GIT adoption intention (GIA)	
Source: [98], [142], [145]–[148]	
GIA1	Actions for green IT by the organization.
GIA2	Decisions of executive-level to green IT implementation.
GIA3	Support and induction of green IT technology providers.
GIA4	Infrastructure, procedures, and processes that enable green IT.
GIA5	Inversion and budgets assigned to green IT by the organization

TABLE 2. Profile of the testers.

Category	Frequency	Percentage
Country		
Mexico	100	17.79%
Ecuador	102	18.15%
Peru	96	17.08%
Chile	41	7.30%
Colombia	99	17.62%
Honduras	19	3.38%
Panama	71	12.63%
Bolivia	34	6.05%
Sector		
Manufacture	223	39.68%
Education	59	10.50%
Commerce	173	30.78%
Services	41	7.30%
Others	66	11.74%
Number Employees		
< 10	19	3.38%
11-50	94	16.73%
51-100	83	14.77%
101-300	110	19.57%
> 300	256	45.55%
Gender		
Male	323	57.47%
Female	239	42.53%
Age		
< 25	43	7.65%
25-35	77	13.70%
35-45	175	31.14%
45-55	186	33.10%
> 55	81	14.41%
Years of work at the Institution		
< 5	36	6.41%
5-10	241	42.88%
11-15	43	7.65%
16-20	134	23.84%
> 20	108	19.22%
Position Level		
Strategic	168	29.89%
Tactic	210	37.37%
Operative	184	32.74%
Education Level		
Secondary	52	9.25%
Grade	247	43.95%
Postgrad	263	46.80%

other IT adoptions because of the importance of ethical and eco-sustainability considerations in the decision-making process [119]. This could also be different from the adoption of other green technologies. However, they also need to overcome the competence and psychological barriers that come from organizational ecology and organizational psychology theories [151].

Among the competencies, the barriers of individuals and process and acquisition there are considered; on the other hand, in psychological barriers, there are group individuals and social barriers. According to Zheng [98], the role of institutional strategy in GIT adoption depends on three variables: technology, organization, and environment.

Figure 1 shows the proposed model based on nine hypothesis.

III. RESEARCH METHODOLOGY

A. INSTRUMENT DESIGN

An online questionnaire was used to validate the research model. The questionnaire items were adopted from the lit-

TABLE 3. Reliability and convergent validity.

Constructs	Indicator	Outer loading	Composite Reliability CR	Cronbach's Alpha CA	AVE
Organizational context, (ORC)			0.876	0.717	0.779
	ORC1	0.889			
	ORC2	0.877			
Environmental context, (ENC)			0.847	0.760	0.582
	ENC1	0.722			
	ENC2	0.724			
	ENC3	0.800			
	ENC4	0.801			
Environmental Sustainability motivating forces, (ESM)			0.884	0.808	0.718
	ESM1	0.850			
	ESM2	0.868			
	ESM3	0.823			
Technological context, (TEC)			0.880	0.826	0.648
	TEC1	0.820			
	TEC2	0.863			
	TEC3	0.752			
	TEC4	0.782			
Attitude to-wards Green IT (ATG)			0.926	0.879	0.806
	ATG1	0.884			
	ATG2	0.881			
	ATG3	0.926			
Green IT Drivers, (GID)			0.922	0.898	0.637
	GID1	**0.426**			
	GID2	0.777			
	GID3	0.868			
	GID4	0.844			
	GID5	0.865			
	GID6	0.835			
	GID7	0.874			
Motivation for GIT (MGI)			0.904	0.841	0.759
	MGI1	0.860			
	MGI2	0.872			
	MGI3	0.882			
Awareness of consequences, (AWC)			0.890	0.819	0.729
	AWC1	0.836			
	AWC2	0.875			
	AWC3	0.850			
Ascription of responsibility, (ARG)			0.843	0.712	0.645
	ARG1	0.834			
	ARG2	**0.651**			
	ARG3	0.904			
Green IT Adoption Intention (GIA)			0.913	0.880	0.677
	GIA1	0.840			
	GIA2	0.839			
	GIA3	0.736			
	GIA4	0.855			
	GIA5	0.840			

erature in hypothesis development (section II) through the corresponding detailed analysis of ten variables between
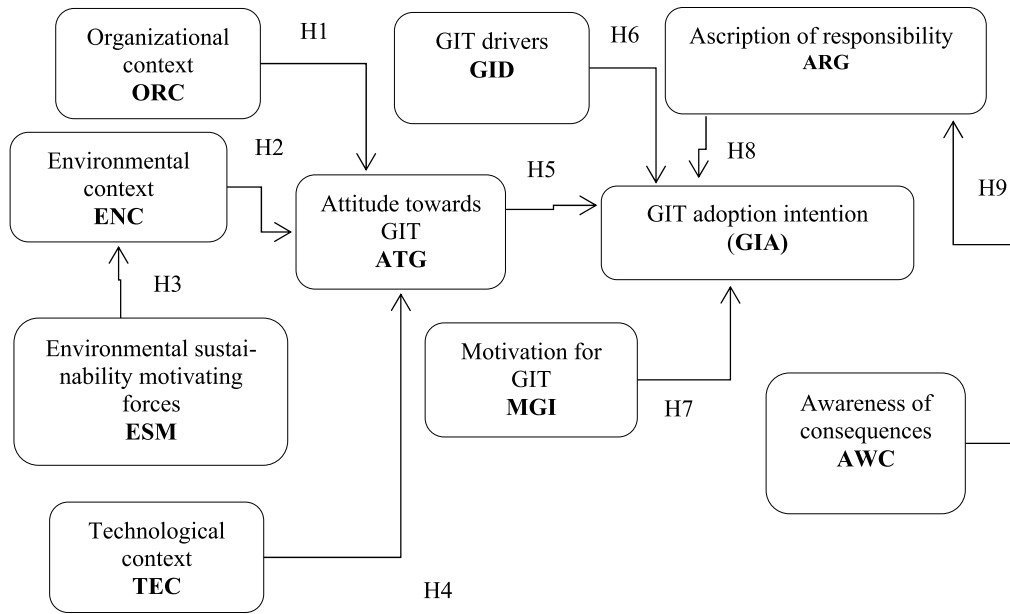
FIGURE 1. Research and hypothesis model.

dependent and independent (see Table 1). Therefore, the operationalization of the variables was carried out in the context of this study.

The questionnaire also contained demographic data, such as type of organization, sector, and number of employees, genre, age, schooling level, and years of work in the organization. The instrument was evaluated using a Likert scale that coincides with the maturity model for GIT, which comes from the maturity model for CMMI software development. A pilot test was conducted with 20 surveys between organizational staff and the Republic of Ecuador.

B. POPULATION AND SAMPLE
Regarding the number of necessary surveys, the calculus was made based on the minimum recommendations of the sample for partial least squares (PLS) models. This technique considers that sample sizes are small [152], and the researcher needs to observe the model diagram and determine which of the following studies is necessary: (a) the number of indicators in the formative construct, meaning that the latent variable with a higher number of manifested variables, and (b) the number of exogenous variables directed to a particular endogenous construct in the structural model, with a higher number of them.

When a heuristic regression of 10 cases per predictor is used, the requirement of the sample size is the result of multiplying the higher digit present in one of the studies (a) or (b) by 10 [153], [154]. Using the second applicable rule for the initial model, the study required 40 surveyed people as the minimum sample size to analyze the model based on SEM.

Hair et al. [155] believed that this was an approximate guide. That is why, in addition, it is considered the potency analysis that measures the probability of rejecting the null

hypothesis when it is false. Considering that in social areas, values lower than 80% are not admitted [156], it is necessary that, in a total of 40 cases, to reach 80% potency, it is required at the end: $40 + 32 = 72$ cases. Nonetheless, the total recollected sample for the main study (N = 562) was sufficiently large to prove the parameters of this model.

The selected type of organization belongs to the manufacturer, education, commerce, services, and other sectors, and the informant staff is the strategic, tactical, and operative range in which there could or could not be included as decision makers because it is required to auscultate the information of a representative range of employees about the study variables related to the GIT adoption intention in the organization. Data were collected between July and November 2021, and the questionnaire was designed in line with Google Docs and sent via e-mail to 3000 candidates. After five months, 562 surveys were completed after excluding 100 incomplete surveys.

Demographic data of the participants are presented in Table 2. This validates the participation of informants from eight LAC countries, the industry sector, number of employees, gender, age, years of work, position level, and level of employment and education.

IV. DATA ANALYSIS AND RESULTS
To measure the structural equation model, PLS-SEM technique was applied, which is considered adequate when there are limitations in the sample size [157] and where the orientation to the prediction is of a large value [158]; the instrumental part of measurement was executed with the Smart PLS 3.3.3 software tool. The PLS models formally constitute two linear equation groups: the measure model (outer model) and the structural model (inner model). The measure model

specifies that there is a relationship between latent variables and their observed or manifested variables, whereas the structural model specifies the relationship between non-observed or latent variables [152].

A. MEASURE MODEL

The first step of the evaluation was the measure model, and to guarantee that each construct was adequately measured. It was also validated if the theory was supported by the observed variables [159]. This section discusses Cronbach's alpha, composite reliability, average variance extracted (AVE), and discriminant validity. The results of these analyses are presented immediately. Figure 2 illustrates the measurement model, in which all constructs are reflective. The measurements reached satisfactory levels for Cronbach's alpha (CA) for the construct indicators because they were higher than 0.7, which gives them validity [160].

In Table 3, there are included the external loads of each indicator that overcome the 0.7 threshold; the range was from 0.722 to 0.889, which implies a satisfactory reliability of indicators. With the exception of GID1 and ARG2, the values reached for these indicators were based on the sample of participants who answered; these same indicators may be higher with a different sample. Despite this, with the current sample, although not satisfactory, ARG2 with 0.651 is considered valid, and GID1 with 0.426 is considered a medium or regular range [160].

CA and composite reliability (CR) were analyzed to evaluate the reliability of all reflective constructs. For Nunnally [161], a value greater than 0.7 is considered sufficient; meanwhile, values that are less than 0.6 indicate a lack of reliability. As indicated in Table 3, all CR and CA values for each construct exceeded the recommended value; thus, they reached a satisfactory level or reliability of internal consistency. To evaluate convergent validity, the average variance extracted (AVE) was used, which is acceptable if the value is higher than 0.5 [162]. According to Table 3, all AVE constructs were superior than 0.5, ranging from 0.582 to 0.806.

For discriminant validity analysis, the criteria of Fornell and Larcker [162] were considered, which determined that the construct measure differed from the other constructs. If the value of the square root of the average variance extracted is higher than the inter-construct correlations, the model satisfies the discriminant validity criteria. Consequently, the latent variables were differed and identified. The AVE square root values are on the diagonal of Table 4 and are higher than the values in the respective column.

To reinforce the discriminant validity analysis, the cross-loadings were checked, as shown in Table 5. In this table, each indicator that has a correlation with its own latent variable rather than with others is validated; that is, how it is contrasted that all the implied constructs have a discriminating validity condition in a way that it is not necessary to reconsider model adequacy. However, there were exceptions to the GID1 and ARG2 indicators, were previously explained.

The parameters that validate the measure model are accomplished; after that, it is considered that the indicator reflective measure is reliable, implying that the instrument is statistically valid and reliable, and the theory is supported.

B. STRUCTURAL MODEL

This evaluation was performed using the PLS algorithm with resampling or bootstrapping techniques. For this, the indices were taken as the basis: R^2, f^2, and standardized path coefficients β.

The coefficient R^2 determines the predictive power of the model for the dependable latent variables. For the PLS models, Chin [152] values around 0.670 are considered substantial, values of approximately 0.333 are considered moderate, and values of 0.190 and lower are considered weak. In Table 6, the values of R^2 exhibit values that are higher than 0.1, which proves that at least 10% of the construct variability relies on the model, which reassures the predictive characteristics of the model. From the values there is determined that 76.5% of the informants have the intention of adopting GIT, at least 52% maintain a positive attitude towards GIT, a 31.2% attribute responsibility GIT, and a 27.1 % consider that the environmental context influences in the attitude that they have towards GIT.

To identify the impact of a dependable construct of a latent variable, the size of the effect f^2 was used [163]. Values of $0.02 < f^2 \leq 0.15$ for a small effect size, $0.15 < f^2 \leq 0.35$ for a medium effect size, and $f^2 > 0.35$ for a big effect sized are permissible, and can be seen as an indicator, for which the latent variable predictor has weak, medium, or strong effect at a structural level.

Table 7 highlights the size f^2 effect results in the research, which reflect that, among the factors that influence the GIT adoption intention (GIA), the GIT enablers (GID) had a significant effect, while others such as responsibility attribution (ARG), attitude towards GIT (ATG), motivation for adopting GIT (MGI) had a small effect. Considering the environmental context (ENC) as a dependable construct. It was revealed that the environmental sustainability motivational (ESM) had a great effect. Considering the variable of the attitude towards GIT (ATG) as the dependent variable, the results demonstrated that the environmental context (ENC) had a medium effect on the technological context variable (TEC) compared with the organizational context (ORC), which only had a small size effect. Considering responsibility attribution (ARG) as a dependable construct, the awareness of consequences (AWC) was greatly affected by the informants.

For the trajectory coefficient (β), the objective is to measure the trajectory relation relevancy, which represents the standardized regression weights identified in the structural model diagram through the arrows that relate the constructs in the inner model. The coefficient path, which reached a value of 0.2 are considered as significant, and the ideal paths were higher than 0.3 [164]. Table 8 presents the coefficient trajectories of these variables. All β values are greater than 0.2, indicating that the variables have an impact on the model.
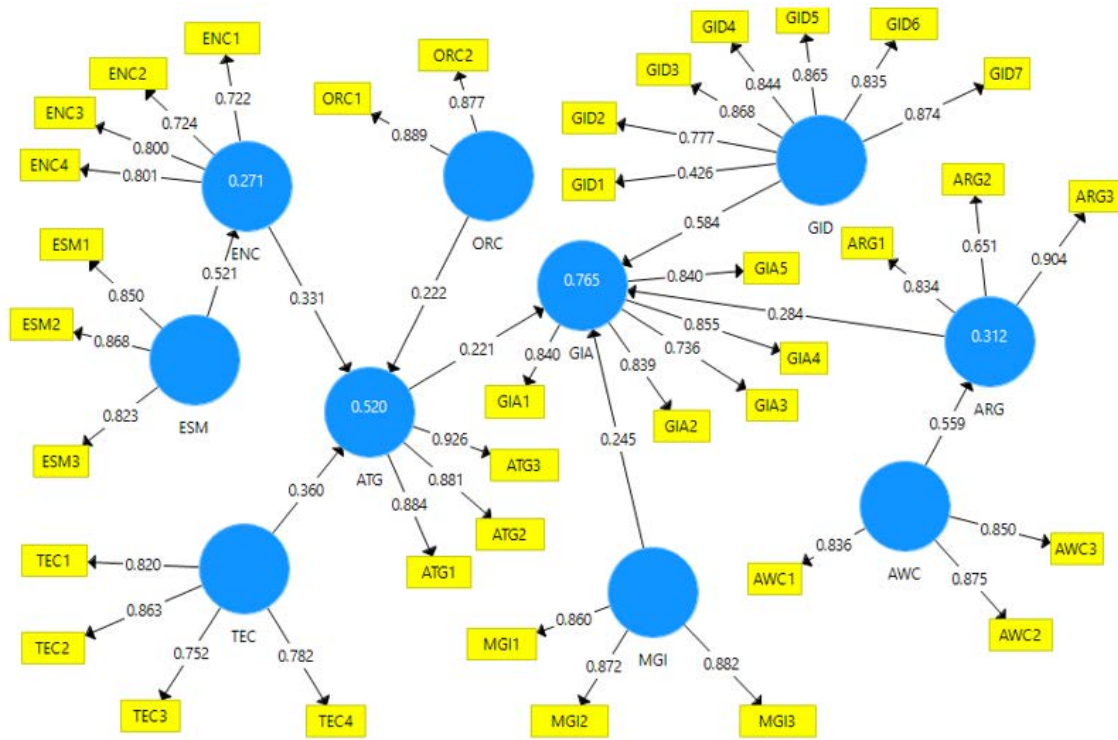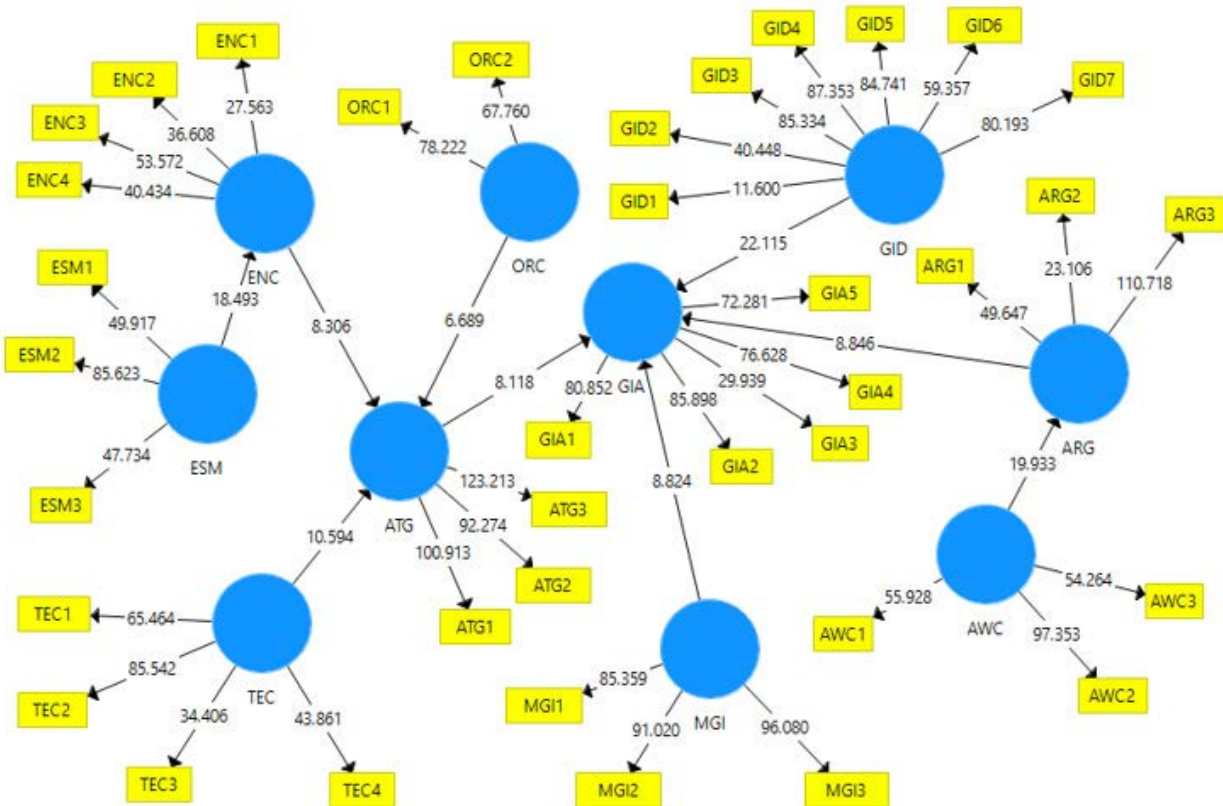
FIGURE 2. Measure model.

FIGURE 3. Bootstrapping for the structural model.

The non-parametric bootstrapping procedure can be used in PLS modeling to provide confidence intervals for all estimated parameters and build bases for inferential statistics [165], [166]. Generally, this technique provides form,
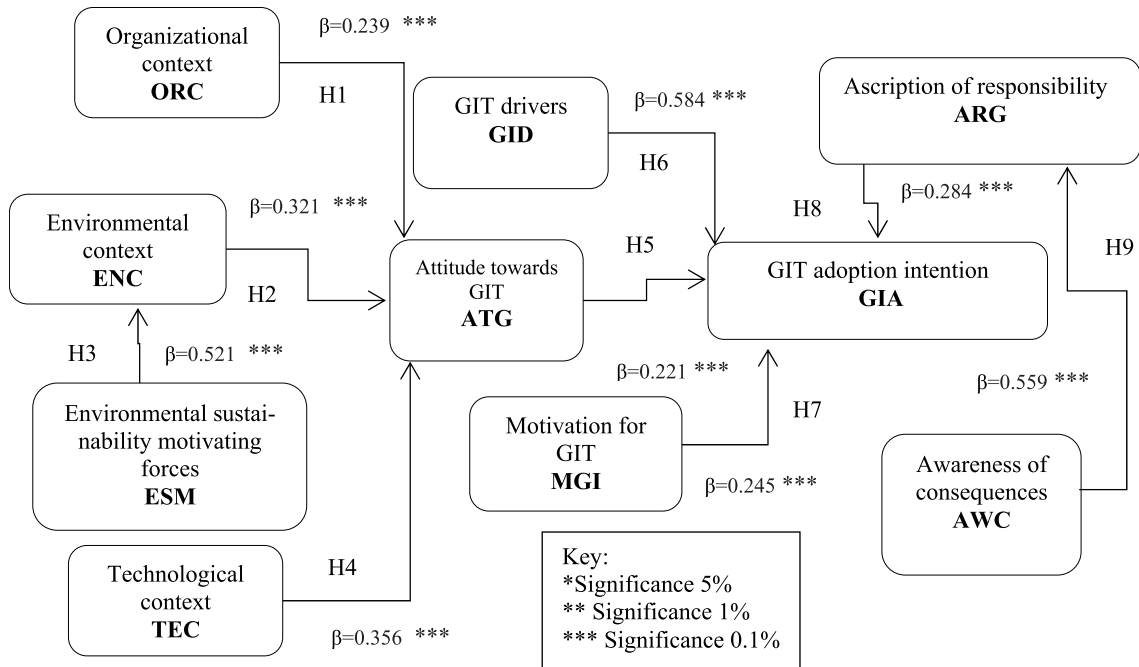
FIGURE 4. Structural model results.

TABLE 4. Fornell-larcker's criterion test.

	ARG	ATG	AWC	ENC	ESM	GIA	GID	MGI	ORC	TEC
ARG	0.803									
ATG	0.523	0.898								
AWC	0.559	0.723	0.854							
ENC	0.563	0.584	0.481	0.763						
ESM	0.563	0.206	0.216	0.521	0.847					
GIA	0.726	0.386	0.459	0.364	0.596	0.823				
GID	0.658	0.542	0.603	0.395	0.508	0.810	0.798			
MGI	0.706	0.581	0.538	0.471	0.402	0.697	0.651	0.871		
ORC	0.256	0.497	0.389	0.394	0.349	0.295	0.334	0.243	0.883	
TEC	0.639	0.601	0.540	0.460	0.537	0.683	0.789	0.580	0.403	0.805

extension, and bias estimations for the sample distribution of a specific statistic. Bootstrapping is a resampling procedure that treats a researcher-observed sample as representing a population. N sets were created to obtain *n* estimates for each parameter of the PLS model. Thus, the procedure creates a large number of bootstrap samples (e.g., 500), each of which is generated in a random manner and has the same number of cases as the original sample [167]. Figure 3 shows the bootstrapping values (affected by 500 subsamples to demonstrate the statistical significance of each path coefficient).

C. HYPOTHESIS TEST
PLS estimates the path model for each sample and the obtained coefficient of the model creates a bootstrap distri-

bution that can be considered an approximation of the sample distribution. Bootstrapping analysis allowed us to conduct a hypothesis test. The resultant PLS for all bootstrap samples provides the average value and standard error for each path coefficient model. This information allows us to analyze the t-Values, which is executed to determine the significance of the path model relations [152].

The indicators whose t-Values is higher than 1.96 are significant [165], [166]. Table 9 shows the relationships among the model constructs; within it, there are standardized beta (β), standard error, t-Values, p-Values, relation significance, and hypothesis acceptance or rejection. Figure 4 shows the structural model representation obtained using the β values and significance levels.

TABLE 5. Cross-loadings.

	ARG	ATG	AWC	ENC	ESM	GIA	GID	MGI	ORC	TEC
ARG1	0.834	0.232	0.268	0.353	0.547	0.679	0.544	0.597	0.084	0.487
ARG2	0.651	0.659	0.676	0.499	0.197	0.359	0.431	0.531	0.241	0.507
ARG3	0.904	0.373	0.405	0.497	0.590	0.690	0.598	0.568	0.280	0.539
ATG1	0.406	0.884	0.601	0.453	0.177	0.328	0.538	0.517	0.455	0.590
ATG2	0.472	0.881	0.589	0.557	0.203	0.343	0.425	0.512	0.402	0.496
ATG3	0.527	0.926	0.752	0.560	0.175	0.368	0.497	0.537	0.480	0.535
AWC1	0.435	0.495	0.836	0.410	0.173	0.364	0.443	0.366	0.384	0.358
AWC2	0.581	0.712	0.875	0.429	0.219	0.483	0.618	0.635	0.308	0.584
AWC3	0.366	0.620	0.850	0.386	0.146	0.284	0.441	0.294	0.312	0.395
ENC1	0.484	0.310	0.323	0.722	0.463	0.325	0.296	0.326	0.240	0.326
ENC2	0.417	0.440	0.412	0.724	0.346	0.316	0.342	0.344	0.369	0.392
ENC3	0.376	0.495	0.334	0.800	0.407	0.194	0.240	0.328	0.332	0.295
ENC4	0.453	0.518	0.401	0.801	0.380	0.292	0.334	0.435	0.263	0.394
ESM1	0.436	0.125	0.121	0.447	0.850	0.500	0.390	0.311	0.321	0.398
ESM2	0.511	0.271	0.293	0.514	0.868	0.509	0.456	0.366	0.344	0.486
ESM3	0.487	0.092	0.098	0.327	0.823	0.513	0.452	0.346	0.189	0.489
GIA1	0.591	0.270	0.395	0.246	0.539	0.840	0.724	0.520	0.250	0.622
GIA2	0.624	0.229	0.289	0.311	0.554	0.839	0.673	0.620	0.239	0.554
GIA3	0.622	0.501	0.504	0.402	0.415	0.736	0.579	0.547	0.221	0.560
GIA4	0.582	0.253	0.287	0.226	0.461	0.855	0.624	0.606	0.236	0.488
GIA5	0.576	0.373	0.438	0.333	0.471	0.840	0.725	0.576	0.267	0.588
GID1	0.387	0.770	0.639	0.502	0.100	0.309	0.426	0.531	0.458	0.446
GID2	0.460	0.305	0.368	0.207	0.422	0.570	0.777	0.318	0.189	0.663
GID3	0.516	0.428	0.457	0.297	0.484	0.732	0.868	0.575	0.376	0.669
GID4	0.578	0.308	0.364	0.326	0.561	0.756	0.844	0.549	0.196	0.666
GID5	0.598	0.452	0.457	0.239	0.382	0.698	0.865	0.549	0.180	0.683
GID6	0.489	0.473	0.569	0.390	0.384	0.646	0.835	0.549	0.340	0.607
GID7	0.633	0.535	0.669	0.381	0.378	0.697	0.874	0.606	0.263	0.666
MGI1	0.632	0.472	0.441	0.433	0.402	0.585	0.564	0.860	0.185	0.527
MGI2	0.582	0.571	0.521	0.351	0.237	0.583	0.543	0.872	0.160	0.474
MGI3	0.630	0.480	0.446	0.443	0.405	0.649	0.591	0.882	0.283	0.514
ORC1	0.226	0.449	0.358	0.380	0.220	0.155	0.216	0.190	0.889	0.295
ORC2	0.226	0.428	0.328	0.313	0.401	0.371	0.377	0.241	0.877	0.421
TEC1	0.559	0.490	0.491	0.407	0.469	0.591	0.673	0.469	0.298	0.820
TEC2	0.515	0.646	0.550	0.464	0.345	0.472	0.650	0.495	0.399	0.863
TEC3	0.500	0.290	0.381	0.280	0.481	0.591	0.588	0.389	0.222	0.752
TEC4	0.502	0.382	0.238	0.257	0.522	0.634	0.641	0.505	0.335	0.782

Hypothesis one suggests that organizational context has a positive impact on attitude towards GIT. The model results in Table 9 highlight the positive and significant influence of the ORC over ATG, which supports this hypothesis. Multiplying the path coefficient (0.239) by the corresponding correlation coefficient (0.497) in Table 4, the result is 0.1187, which implies that 11.87 % of the attitude towards GIT construct is explained by the organizational context latent variable.

Hypothesis two suggests that environmental context has a positive impact on attitude towards GIT. The model results in Table 9 highlight the positive and significant influence of ENC on ATG, supporting this hypothesis. Multiplying the path coefficient (0.321) by the corresponding correlation coefficient (0.584) in Table 4, the result is 0.1874, which implies that 18.74 % of the attitude towards GIT construct is explained by the predictive environmental context latent variable.

Hypothesis three stablishes that environmental sustainability motivating forces have a positive impact on the environmental context. The model results in Table 9 highlight the positive and significant influence of ESM on ENC, which supports this hypothesis. By multiplying the path coefficient (0.521) by the corresponding correlation coefficient (0.521) in Table 4, the result is 0.2714, implying that 27.14 % of the environmental context construct is explained by environmental sustainability motivating forces.

Hypothesis four states that technological context has a positive impact on attitudes towards GIT. The model results in Table 9 highlight the positive and significant influence of TEC on ATG, supporting this hypothesis. Multiplying the path coefficient (0.356) by the corresponding correlation coefficient (0.601) in Table 4, the result is 0.2139, which implies that 21.39 % of the attitude towards GIT constructed is explained by the technological context.

Hypothesis five states that attitude towards GIT has a positive impact on GIT adoption intention. The model results in Table 9 show a positive and significant influence of ATG on GIA, thus supporting this hypothesis. Multiplying the path coefficient (0.221) by the corresponding correlation coefficient (0.386) in Table 4, the result is 0.085, which implies that 8.5 % of the GIT adoption intention construct is explained by the attitude towards GIT.

Hypothesis six states that GIT drivers have a positive impact on GIT adoption intention. The model results in Table 9 show the positive and significant influence of GID on GIA, thus supporting this hypothesis. Multiplying the path coefficient (0.584) by the corresponding correlation coefficient (0.810) in Table 4, the result is 0.473, which implies that 47.3 % of the GIT adoption intention construct is explained by the GIT drivers.

Hypothesis seven states that motivation for GIT has a positive impact on GIT adoption intention. The model results in Table 9 show the positive and significant influence of MGI on GIA, thus supporting this hypothesis. Multiplying the path coefficient (0.245) by the corresponding correlation coefficient (0.697) in Table 4, the result is 0.1707, which implies that 17.07 % of the GIT adoption intention construct is explained by the motivation for GIT.

Hypothesis eight states that the ascription of responsibility has a positive impact on GIT adoption intention. The model results in Table 9 show a positive and significant influence of ARG on GIA, which supports this hypothesis. Multiplying path coefficient (0.284) by the corresponding correlation

TABLE 6. R^2 of dependent variables.

	R^2	Explanatory level
ARG	0.312	Moderate
ATG	0.520	Substantial
ENC	0.271	Moderate
GIA	0.765	Substantial

coefficient (0.726) in Table 4, the result is 0.2061, which implies that 20.61 % of the GIT adoption intention construct is explained by the ascription of responsibility.

Hypothesis nine states that awareness of consequences has a positive impact on the ascription of responsibility. The model results in Table 9 show a positive and significant influence of AWC on ARG, supporting this hypothesis. Multiplying the path coefficient (0.559) by the corresponding correlation coefficient (0.559) in Table 4, the result is 0.3124, which implies that 31.24 % of the ascription of responsibility construct is explained by the awareness of consequences.

In summary, all the model hypotheses were supported. The impact and importance of the constructs within the model were from higher to lower as follows: GIT drivers, awareness of consequences, environmental sustainability motivating forces, technological context, and attitude towards GIT, ascription of responsibility, motivation for GIT, environmental context, and organizational context.

D. PREDICTIVE RELEVANCE EVALUATION

From the research input, it is expected that the model will have predictive capacity for endogenous constructs. The predictive relevance diagnosis Q^2 of Stone-Geisser [168] is the same as that of Tenenhaus *et al.* [169] and can be measured with blindfolding procedures. In fact, the research was performed using the blindfolding algorithm of Smart PLS 3.3.3, whose results are shown in Table 10, only for endogenous latent variables. Having Q^2 higher than zero for and a particular objective endogenous construct specifies the predictive relevance of the model path for this latent variable. Values of $0.02 < Q^2 \leq 0.15$, $0.15 < Q^2 \leq 0.35$ and $Q^2 > 0.35$, reveal a small, medium, or large predictive relevance. Values of less than 0.000 indicate a lack of predictive relevance.

Attitude towards GIT and GIT adoption intention have a great predictive capacity, while ascription of responsibility and environmental context have a medium value.

V. DISCUSSION

H1 is supported. Previous literature has also confirmed this finding [170], in the sense that the organizational context refers to the descriptive measures as the lack of resources, the structural characteristics, and the leader characteristics are key elements and provide a positive environment for taking an attitude towards GIT. In addition, some researchers, such as Macovei, used [171] TPB as a reference for researching

TABLE 7. Effect size f².

	ARG	Category	ATG	Category	ENC	Category	GIA	Category
ARG							0.146	Small
ATG							0.126	Small
AWC	0.454	Large						
ENC			0.168	Medium				
ESM					0.372	Large		
GID							0.689	Large
MGI							0.104	
ORC			0.080	Small				
TEC			0.197	Medium				

consumer behavior and demonstrated that they exhibit pro-environmental behavior. Chow and Chen [134] found that attitude has a direct effect on the intention to practice GIT.

H2 is supported. This finding was also confirmed in previous studies, such as those performed by Molla and Abareshi [172], who demonstrated that the environmental context refers to the institutional and market environments in the organizations operate; when they are present and mature, they create favorable conditions for the extension and deepening of the attitudes and implementation of GIT. Additionally, Alaraifi et al. [173] demonstrated that stakeholders such as providers, clients, industrial associations, and regulation and control agencies influence the organization to promote the attitude and assimilation of GIT technologies and policies [7]. Additionally, Gholami et al. [97] confirmed that the environmental context also directly affects the behavior and assimilation towards GIT; it also influences the senior levels of the organization in order to improve its performance.

H3 is supported. This agrees with studies by Jenkin, Webster, and McShane [174], who state that motivational forces influence an organization's environmental strategy. Thus, ecological, organizational, political, economic, and socio-cultural forces have the capacity to motivate and restrict environmental strategies, which are components of the environmental context. However, these forces describe the external and internal factors that influence organizational actions, as the external environment is an environmental context [175].

H4 is accepted. This agrees with the studies by Lopez Bonilla and Lopez Bonilla [103] who, from the attitudinal paradigm and theoretical basis of reasoned action, explain that people have a positive attitude towards environmental benefits through the technological appropriation of green information [104]. On the other hand, Bose and Luo [27] validated the influence of technological context, as well as the potential and attitude of employees toward undertaking GIT practices through the implementation of diverse techniques.

H5 is supported. This result was validated by Asadi et al. [176] in their research on the factors influencing decision intention to adopt GIT in the Malaysian manufacturing industry, where GIT attitude has a significant and positive effect on the intention to adopt GIT. Previously, it was confirmed that attitude is an influential factor in intention prediction, and [30] research on informatics systems has proven

TABLE 8. Trajectory coefficient (β).

	β
ARG -> GIA	0.284
ATG -> GIA	0.221
AWC -> ARG	0.559
ENC -> ATG	0.321
ESM -> ENC	0.521
GID -> GIA	0.584
MGI -> GIA	0.245
ORC -> ATG	0.239
TEC -> ATG	0.356

that attitude has a higher impact on the motivation to maintain pro-environmental and pro-social behavior [104], [177]. According to Gholami et al. [97], for functionaries that make decisions in organizations, attitude is a key factor because it measures knowledge and interest in GIT adoption. Previous research has shown that decision-making responsible for organizations that adopt a positive attitude is essential for the successful adoption of GIT [100]. Bansal [178] validated that functionaries with a pro-ecological attitude tend to green-up their organizations. Thus, GIT adoption is a key factor for environmental sustainability, and decision-makers positive or negative perceptions can affect its acceptance.

H6 is supported. This finding agrees with the results of the model for the adoption of GIT (GITAM), which demonstrates that GIT drivers positively influence GIT adoption intention [44]. On the other hand, in order to validate the H6 result, it was taken as a reference the study by Thomson & Van Belle [179] about Antecedents of GIT Adoption in South African Higher Education Institutions, they show that GIT drivers affect the adoption of GIT in a significant way, performing an important role in this context.

H7 is supported and sustained. This result is validated with the theoretical model proposed by Zheng [98] in a study on the ''adoption of GIT and information systems: an evidence from corporate social responsibility'' in which motivation of GIT adoption influences GIT adoption decisions. H7 is also related to the results of Butler [10], who validated that information technology manufacturers and users are

TABLE 9. Summary of results for the structural model.

Hypothesis	β	Standard Error	t-Values	p-Values	Significant Level	Results
H1: ORC -> ATG	0.239	0.033	7.154	0.000	***	Accepted
H2: ENC -> ATG	0.321	0.041	7.892	0.000	***	Accepted
H3: ESM -> ENC	0.521	0.028	18.833	0.000	***	Accepted
H4: TEC -> ATG	0.356	0.036	9.812	0.000	***	Accepted
H5: ATG -> GIA	0.221	0.026	8.623	0.000	***	Accepted
H6: GID -> GIA	0.584	0.028	20.632	0.000	***	Accepted
H7: MGI -> GIA	0.245	0.029	8.322	0.000	***	Accepted
H8: ARG -> GIA	0.284	0.034	8.371	0.000	***	Accepted
H9: AWC -> ARG	0.559	0.027	20.466	0.000	***	Accepted

*** $p<0.001$; ** $p< 0.01$; * $p< 0.05$

motivated to adopt strategies that make people aware of GIT. Chen et al. [7] confirmed the presence of several internal and external organizational factors that are effective in motivating organizations to adopt ecological practices.

H8 is supported. The same agrees with the results of Asadi et al. [176], in which the ascription of responsibility positively influences adoption intention, and Stern et al. [125], in the sense that the result is aware of unfavorable results, and the consequences will result in acceptance of responsibility. This means that and the individual must admit the responsibility of his/her behavior. According to Ziaei-Bideh et al. [136], responsibility attribution has a significant effect on personal norms, which simultaneously influence the behavioral intention to participate in a prosocial way [137].

According to the value-believe–norm theory, people may be more perceptive about environmental problems, and they are willing to take responsibility for the environment [138]. Willuweit [180] demonstrated that responsibility attribution is a significant predictor of pro-environmental behavior [177]; in the pro-environmental context, is a GIT adoption intention.

H9, is supported in the research. This agrees with the hypothesis stated by Asadi et al. [181], in theoretical model for green information technology adoption. On the other hand, the structural model results of Suárez et al. [182] reveal the importance that responsible consumption has, materialism, and future consequences consideration are based on the multidimensional model of Baldetjahn et al. [183], which relates the future awareness of consumers, the environmental consequences of their behavior [184], and responsibility attribution.

VI. RESEARCH CONTRIBUTIONS AND IMPLICATIONS
A. THEORETICAL CONTRIBUTION
This study demonstrated that the proposed GITL model is consistent with the data. The corresponding variables have an impact on organizational performers' intentions to use GIT. There are theoretical consequences of the results by identifying the factors that influence the organizational functionaries' intention to use GIT, the fundamental role that competitive advantage plays in the integrator role of the theory of planned behavior (TPB), the norm activation theory (NAT), and the GIT adoption model (GITAM), and the variables extracted from the literature.

TABLE 10. Stone-geisser Q^2 predictive relevance.

Construct	SSO	SSE	Q^2 (=1-SSE/SSO)	Category
ARG	1,686,000	1,376,439	0.184	Medium
ATG	1,686,000	985,737	0.415	Large
AWC	1,686,000	1,686,000		
ENC	2,248,000	1,897,268	0.156	Medium
ESM	1,686,000	1,686,000		
GIA	2,810,000	1,371,134	0.512	Large
GID	3,934,000	3,934,000		
MGI	1,686,000	1,686,000		
ORC	1,124,000	1,124,000		
TEC	2,248,000	2,248,000		

The study results are consistent with those executed in the past related to pro-environmental behavior, where it has been affirmed that explanatory capacity and predictability can be improved using multiple theories to determine behavior. For example, some studies have integrated NAT with TPB to illustrate the pro-environmental behaviors of individuals [181]. Since the theoretical development in this context is in a mature phase, proposing a model for the intention to adopt Green IT is the significant contribution of this research, especially in the context of developing countries such as the case of LAC.

B. PRACTICAL CONTRIBUTION
This study contributes to the literature on organizational, professional, environmental, political creators, government entities, activists, and other actors. It proposes a model that can be used by different types of organizations to determine the key factors in predicting GIT adoption, especially for organizations planning to adopt GIT. The research model will be a useful guide for helping in decision-making processes.

It is important to contribute from academia to socialization and work framework diffusion, better practices, or models that are the result of the current research process. The research extension in an applied environment is a valid alternative; so, the GTIL is feasible of applying it to the practice. GIT is a research field with basic results in the regional environment; therefore, it is recommended to develop lines and research projects that study this theme. According to previously indicated topics, academies should support development.

Starting from the obtained results in the countries where the studied organizations exist, we propose a practical value that can be used by the directive level, the medium managers, and all the performers who use information technologies as a guide for establishing the necessary steps to help responsible people take action to develop and support the ecological-awareness movement and environmental sustainability. Therefore, it is necessary to make recommendations to counteract current weaknesses.

C. RESEARCH LIMITATIONS

This study had certain limitations. First, it dealt with problems when collecting data related to GIT adoption practices that were not widespread in the sample countries. Second, the study results are limited because the research methodology selected did not allow triangulation with qualitative pairs due to the difficulty in managing the focal groups of different countries. This limitation is due to the project budget, availability, and time of the informants.

The existence of research lines on GIT in research centers and academic sectors in LAC is almost null. This did not allow us to inforce the criteria, acquire experience, or receive feedback.

D. FUTURE PROJECTS

There are opportunities for additional studies to be conducted. Future studies on GIT adoption should consider other potential factors of technology adoption that were not included in this study. For example, it will be possible to involve additional internal variables of the GITIL model in the organization, such as organizational culture, conceived as a general behavior scheme, shared beliefs and values of the organization participants, and management of innovation and knowledge.

We did not consider the GIT dimension among organizations in the scope of the present study. This will be a research topic for future instances while discussing interinstitutional GIT. The GITIL model can be applied in organizational environments of different natures, and to validate the indicated topic, it is necessary to develop new research processes.

The study can be focused on analyzing the model based on responsible decision-making behavior, because the people in charge of making decisions will face fewer limitations in comparison with other organization members. Within the context of the corporate government, one of the focus or theories is the agency, in which one or more denominated principal appoint another called agent to execute a specific work or service that benefits them. This relationship is also present in information technology services through outsourcing that the theory of principal and agent is feasible for conducting empirical research in organizations about GIT. In this way, it will allow us to study the behavior for developing applicable models for other organizations in different contexts.

VII. CONCLUSION

The study validated that the main objective had been fulfilled, proposed a model for the intention to adopt the GIT in the context of LAC organizations called GITL, and answered the research questions. In GITL, the parameters that validate the measurement model are satisfied, and the reflective values of the indicators are reliable. This implies that the instrument used is statistically valid and reliable and that the indicators contribute significantly to the latent variables; that is, each indicator is correlated with its own latent variable before the others. Structurally, the nine hypotheses are statistically supported.

The model is highly predictive because GITL has predictive relevance for exogenous constructs over endogenous ones. In other words, GIT adoption intention can be predicted from attitude towards GIT, GIT drivers, motivation for GIT, and ascription of responsibility. In turn, ascription of responsibility from awareness of consequences. On the other hand, attitude towards GIT from organizational context, environmental context and technological context. Finally, environmental context from environmental sustainability motivating forces.

In this study, external or contextual drivers were treated separately from the internal motivational and behavioral variables of organizational actors. The interrelation between them has not been explored, and future studies should examine such relationships, especially the impact of external drivers on internal motivation. Adopting the GIT is the decision made by individuals, as identified in previous studies.

The GITL model resulting from the research responds to the need to support the fundamental role that information technologies play today in all organizational areas, especially as support for GIT. The GITL model, which is essential for information technologies, is a strategic value aggregator and an environmental protector. Finally, to create useful knowledge for organizations, the model proposed in this study must be tested at other latitudes and regions.

REFERENCES

[1] L. Belkhir and A. Elmeligi, "Assessing ICT global emissions footprint: Trends to 2040 & recommendations," *J. Cleaner Prod.*, vol. 177, pp. 448–463, Mar. 2018.

[2] S. Ali, M. Danish, F. M. Khuwaja, M. S. Sajjad, and H. Zahid, "The intention to adopt green IT products in pakistan: Driven by the modified theory of consumption values," *Environments*, vol. 6, no. 5, p. 53, May 2019.

[3] *Global Energy & CO_2 Status Report 2017*, OECD/IEA, Int. Energy Agency, Paris, France, 2018.

[4] R. Arshad, S. Zahoor, M. A. Shah, A. Wahid, and H. Yu, "Green IoT: An investigation on energy saving practices for 2020 and beyond," *IEEE Access*, vol. 5, pp. 15667–15681, 2017.

[5] J. Drozd, A. Drozd, and S. Antoshchuk, "Green IT engineering in the view of resource-based approach," in *Green IT Engineering: Concepts, Models, Complex Systems Architectures*. Springer, 2017, pp. 43–65.

[6] S. K. Uzaman, A. U. R. Khan, J. Shuja, T. Maqsood, F. Rehman, and S. Mustafa, "A systems overview of commercial data centers: Initial energy and cost analysis," *Int. J. Inf. Technol. Web Eng.*, vol. 14, no. 1, pp. 42–65, 2019.

[7] A. J. Chen, R. T. Watson, M. Broudeau, and E. Karahanna, "An institutional perspective on the adoption of Green IS & IT," *Australas. J. Inf. Syst.*, vol. 17, no. 1, pp. 1–27, 2011.

[8] A. Matthew and J. S. Dhillon, "A framework for transferring knowledge between expatriates and local employees in IT-based organisations," in *Proc. 8th Int. Conf. Inf. Technol. Multimedia (ICIMU)*, Aug. 2020, pp. 114–119.

[9] M. Z. Islam, S. M. Jasimuddin, and I. Hasan, "The role of technology and socialization in linking organizational context and knowledge conversion: The case of Malaysian service organizations," *Int. J. Inf. Manage.*, vol. 37, no. 5, pp. 497–503, Oct. 2017.

[10] T. Butler, "Compliance with institutional imperatives on environmental sustainability: Building theory on the role of green IS," *J. Strategic Inf. Syst.*, vol. 20, no. 1, pp. 6–26, Mar. 2011.

[11] F. Sanita, Z. M. Udin, and N. Hasnan, "Green it/s adoption within gscm in Indonesian construction industry: An elucidation and practice," *J. Inf. Syst. Technol. Manag.*, vol. 2, pp. 105–116, Dec. 2017.

[12] S. Ainin, M. M. Naqshbandi, and S. Dezdar, "Impact of adoption of green IT practices on organizational performance," *Qual. Quantity*, vol. 50, no. 5, pp. 1929–1948, Sep. 2016.

[13] A. A. Muslim, T. H. Sim, and M. Hee, "Organizational green information technology (IT) adoption theoretical frameworks: A systematic literature review," *J. Theor. Appl. Inf. Technol.*, vol. 97, no. 3, pp. 787–802, 2019.

[14] P. Coffey, M. Tate, and J. Toland, "Small business in a small country: Attitudes to 'green' IT," *Inf. Syst. Frontiers*, vol. 15, no. 5, pp. 761–778, Nov. 2013.

[15] L. Yu and W. T. Wang, "Examination of green IT adoption in organizations: Based on the expectation disconfirmation theory," in *Proc. Pacific Asia Conf. Inf. Syst.*, 2016, pp. 1–7.

[16] M. Singh and G. P. Sahu, "Developing a model for green IS adoption in Indian banking and IT industries," in *Proc. Int. Workshop Conf. Transf. Diffusion IT*, 2020, pp. 451–462.

[17] T. Thabit, S. A. Aissa, and Y. Jasim, "The impact of green ICT adoption in organizations of developing countries," *Al-Riyada Bus. Econ. J.*, vol. 7, 2021.

[18] S. Sthiannopkao and M. H. Wong, "Handling e-waste in developed and developing countries: Initiatives, practices, and consequences," *Sci. Total Environ.*, vols. 463–464, pp. 1147–1153, Oct. 2013.

[19] D. Sánchez and K. Aguilar, "El mercado verde en Latinoamérica y la responsabilidad social empresarial," *Minerva*, vol. 1, no. 3, pp. 40–44, Dec. 2020.

[20] S. Hervas, "Green management as a competitive advantage on SMES in Latin American countries," *Joanna Szydło, Danuta Szpilko*, vol. 36, 2019.

[21] E. Goldstein and M. Kulfas, "Alcances y limitaciones de las políticas de apoyo a las pymes en América Latina: Debates para un nuevo marco conceptual y de implementación," in *Apoyando a las Pymes: Políticas de Fomento en América Latina y el*. Santiago, CL, USA: Caribe, CEPAL, 2011, pp. 429–490.

[22] H. Sun, B. K. Edziah, C. Sun, and A. K. Kporsu, "Institutional quality, green innovation and energy efficiency," *Energy Policy*, vol. 135, Dec. 2019, Art. no. 111002.

[23] M. C. Cuerva, Á. Triguero-Cano, and D. Córcoles, "Drivers of green and non-green innovation: Empirical evidence in low-tech SMEs," *J. Cleaner Prod.*, vol. 68, pp. 104–113, Apr. 2014.

[24] A. A. Hernandez, "Understanding motivation factors in green IT adoption: An empirical evidence from philippine SMEs," *Int. J. Asian Bus. Inf. Manage.*, vol. 9, no. 4, pp. 21–35, Oct. 2018.

[25] B. Tushi, D. Sedera, and J. Recker, "Green IT segment analysis: An academic literature review," in *Proc. Amer. Conf. Inf. Syst.*, 2014, pp. 1–15.

[26] N. El Daly, "Towards an understanding of the sources of sustainable competitive advantage: A literature review and conceptual framework," in *Sustainable Development and Social Responsibility*, vol. 1. 2020, pp. 299–316.

[27] R. Bose and X. Luo, "Integrative framework for assessing firms' potential to undertake green IT initiatives via virtualization—A theoretical perspective," *J. Strategic Inf. Syst.*, vol. 20, no. 1, pp. 38–54, Mar. 2011.

[28] Y. H. Shin, J. Im, S. E. Jung, and K. Severt, "The theory of planned behavior and the norm activation model approach to consumer behavior regarding organic menus," *Int. J. Hospitality Manage.*, vol. 69, pp. 21–29, Jan. 2018.

[29] S. Cai, X. Long, L. Li, H. Liang, Q. Wang, and X. Ding, "Determinants of intention and behavior of low carbon commuting through bicycle-sharing in China," *J. Cleaner Prod.*, vol. 212, pp. 602–609, Mar. 2019.

[30] I. Ajzen, "The theory of planned behavior," *Org. Behav. Hum. Decision Process.*, vol. 50, no. 2, pp. 179–211, 1991.

[31] S. Bamberg and P. Schmidt, "Incentives, morality, or habit? Predicting students' car use for university routes with the models of Ajzen, Schwartz, and Triandis," *Environ. Behav.*, vol. 35, no. 2, pp. 264–285, Mar. 2003.

[32] I. Akman and A. Mishra, "Green information technology practices among IT professionals: Theory of planned behavior perspective," *Probl. Ekorozwoju*, vol. 9, no. 2, pp. 47–54, 2014.

[33] A. Yuriev, M. Dahmen, P. Paillé, O. Boiral, and L. Guillaumie, "Pro-environmental behaviors through the lens of the theory of planned behavior: A scoping review," *Resour., Conservation Recycling*, vol. 155, Apr. 2020, Art. no. 104660.

[34] W. H. Loo, P. H. Yeow, and U. C. Eze, "Responsible consumption behaviour: A framework for acquisition, use and disposal of computers," in *Proc. PACIS*, 2013, p. 278.

[35] E. Yarimoglu and T. Gunay, "The extended theory of planned behavior in Turkish customers' intentions to visit green hotels," *Bus. Strategy Environ.*, vol. 29, no. 3, pp. 1097–1108, Mar. 2020.

[36] S. H. Schwartz, "Normative influences on altruism," *Adv. Exp. Soc. Psychol.*, vol. 10, no. 1, pp. 221–279, 1977.

[37] C. F. Lei and E. W. Ngai, "Green information technologies adoption: A managerial perspective," in *Proc. PACIS*, 2013, p. 274.

[38] H. Ateş, "Merging theory of planned behavior and value identity personal norm model to explain pro-environmental behaviors," *Sustain. Prod. Consumption*, vol. 24, pp. 169–180, Oct. 2020.

[39] I. G. M. Y. Bakti, T. Rakhmawati, S. Sumaedi, T. Widianti, M. Yarmen, and N. J. Astrini, "Public transport users' WOM: An integration model of the theory of planned behavior, customer satisfaction theory, and personal norm theory," *Transp. Res. Proc.*, vol. 48, pp. 3365–3379, Jan. 2020.

[40] A. P. Minton and R. L. Rose, "The effects of environmental concern on environmentally friendly consumer behavior: An exploratory study," *J. Bus. Res.*, vol. 40, no. 1, pp. 37–48, Sep. 1997.

[41] H. O. Awa, O. Ukoha, and S. R. Igwe, "Revisiting technology-organization-environment (T-O-E) theory for enriched applicability," *Bottom Line*, vol. 30, no. 1, pp. 2–22, May 2017.

[42] A. Molla and P. S. Licker, "ECommerce adoption in developing countries: A model and instrument," *Inf. Manage.*, vol. 42, no. 6, pp. 877–899, Sep. 2005.

[43] A. Molla and P. S. Licker, "Perceived E-readiness factors in E-commerce adoption: An empirical investigation in a developing country," *Int. J. Electron. Commerce*, vol. 10, no. 1, pp. 83–110, Oct. 2005.

[44] A. Molla, "GITAM: A model for the adoption of green IT," in *Proc. ACIS*, 2008, p. 64.

[45] P. J. DiMaggio and W. Powell, "The iron cage revisited: Institutional isomorphism and collective rationality in organizational behaviour," *Amer. Sociol. Rev.*, vol. 48, pp. 147–160, Apr. 1983.

[46] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS Quart.*, pp. 319–340, Sep. 1989.

[47] K. Zhu, K. L. Kraemer, and S. Xu, "The process of innovation assimilation by firms in different countries: A technology diffusion perspective on E-business," *Manage. Sci.*, vol. 52, no. 10, pp. 1557–1576, Oct. 2006.

[48] E. G. Olson, "Creating an enterprise-level 'green' strategy," *J. Bus. Strategy*, vol. 29, no. 2, pp. 22–30, 2008.

[49] A. Sadovnikova and A. Pujari, "The effect of green partnerships on firm value," *J. Acad. Marketing Sci.*, vol. 45, no. 2, pp. 251–267, Mar. 2017.

[50] T. O. Mahmoud, "Impact of green marketing mix on purchase intention," *Int. J. Adv. Appl. Sci.*, vol. 5, no. 2, pp. 127–135, Feb. 2018.

[51] B. B. Saeed, B. Afsar, S. Hafeez, I. Khan, M. Tahir, and M. A. Afridi, "Promoting employee's proenvironmental behavior through green human resource management practices," *Corporate Social Responsibility Environ. Manage.*, vol. 26, no. 2, pp. 424–438, Mar. 2019.

[52] P. del Río González, "Analysing the factors influencing clean technology adoption: A study of the Spanish pulp and paper industry," *Bus. Strategy Environ.*, vol. 14, no. 1, pp. 20–37, Jan. 2005.

[53] K. Jyoti, "Green HRM-people management commitment to environmental sustainability," in *Proc. 10th Int. Conf. Digit. Strategies Organizational Success*, 2019, p. 2502.

[54] J. Geng, R. Long, H. Chen, and W. Li, "Exploring the motivation-behavior gap in urban residents' green travel behavior: A theoretical and empirical study," *Resour., Conservation Recycling*, vol. 125, pp. 282–292, Oct. 2017.

[55] A. Tur-Porcar, N. Roig-Tierno, and A. Llorca Mestre, "Factors affecting entrepreneurship and business sustainability," *Sustainability*, vol. 10, no. 2, p. 452, Feb. 2018.

[56] H. Junsheng, M. M. Masud, R. Akhtar, and M. Rana, "The mediating role of employees' green motivation between exploratory factors and green behaviour in the Malaysian food industry," *Sustainability*, vol. 12, no. 2, p. 509, 2020.

[57] X. Yang, Y. Li, and L. Kang, "Reconciling 'doing good' and 'doing well' in organizations' green IT initiatives: A multi-case analysis," *Int. J. Inf. Manage.*, vol. 51, Apr. 2020, Art. no. 102052.

[58] A. J. W. Chen, M. Boudreau, and R. T. Watson, "Information systems and ecological sustainability," *J. Syst. Inf. Technol.*, vol. 10, no. 3, pp. 186–201, Nov. 2008.

[59] A. Sarkar, L. Qian, A. K. Peau, and S. Shahriar, "Modeling drivers for successful adoption of green business: An interpretive structural modeling approach," *Environ. Sci. Pollut. Res.*, vol. 28, no. 1, pp. 1077–1096, Jan. 2021.

[60] M. Masri, R. M. Yunus, and S. Sh. Ahmad, "Cultural values in green rating framework," *J. Asian Behavioural Stud.*, vol. 3, no. 10, pp. 48–58, Aug. 2018.

[61] M. Kornilaki and X. Font, "Normative influences: How socio-cultural and industrial norms influence the adoption of sustainability practices. A grounded theory of cretan, small tourism firms," *J. Environ. Manage.*, vol. 230, pp. 183–189, Jan. 2019.

[62] W. Poortinga, L. Whitmarsh, L. Steg, G. Böhm, and S. Fisher, "Climate change perceptions and their individual-level determinants: A cross-European analysis," *Global Environ. Change*, vol. 55, pp. 25–35, Mar. 2019.

[63] K. Ahsan and S. Rahman, "Green public procurement implementation challenges in Australian public healthcare sector," *J. Cleaner Prod.*, vol. 152, pp. 181–197, May 2017.

[64] S. Asadi, M. Nilashi, M. Safaei, R. Abdullah, F. Saeed, E. Yadegaridehkordi, and S. Samad, "Investigating factors influencing decision-makers' intention to adopt green IT in Malaysian manufacturing industry," *Resour., Conservation Recycling*, vol. 148, pp. 36–54, Sep. 2019.

[65] C. Yoon, "Extending the TAM for green IT: A normative perspective," *Comput. Hum. Behav.*, vol. 83, pp. 129–139, Jun. 2018.

[66] P. Klavík, A. C. I. Malossi, C. Bekas, and A. Curioni, "Changing computing paradigms towards power efficiency," *Phil. Trans. Roy. Soc. A, Math., Phys. Eng. Sci.*, vol. 372, no. 2018, pp. 1–13, 2014.

[67] S. Ahmad, S. Miskon, T. A. Alkanhal, and I. Tlili, "Modeling of business intelligence systems using the potential determinants and theories with the lens of individual, technological, organizational, and environmental contexts—A systematic literature review," *Appl. Sci.*, vol. 10, no. 9, p. 3208, May 2020.

[68] S. Chatterjee, N. P. Rana, Y. K. Dwivedi, and A. M. Baabdullah, "Understanding AI adoption in manufacturing and production firms using an integrated TAM-TOE model," *Technol. Forecasting Social Change*, vol. 170, Sep. 2021, Art. no. 120880.

[69] G. Hoang, A. Molla, and P. L. Poon, "Factors influencing the adoption of environmental enterprise systems," in *Proc. 23rd Pacific Asia Conf. Inf. Syst., Secure ICT Platform 4th Ind. Revolution (PACIS)*, 2019, pp. 6–15.

[70] C.-Y. Lin, S. S. Alam, Y.-H. Ho, M. E. Al-Shaikh, and P. Sultan, "Adoption of green supply chain management among SMEs in Malaysia," *Sustainability*, vol. 12, no. 16, p. 6454, Aug. 2020.

[71] H.-G. Chen and J. Chang, "A study on green IT adoption," *Comput. Sci. Inf. Technol.*, vol. 2, no. 8, pp. 315–323, Nov. 2014.

[72] M. Stieninger, D. Nedbal, W. Wetzlinger, G. Wagner, and M. A. Erskine, "Factors influencing the organizational adoption of cloud computing: A survey among cloud workers," *Int. J. Inf. Syst. Project Manage.*, vol. 6, no. 1, pp. 5–23, Jan. 2022.

[73] M. T. Amron, R. Ibrahim, N. A. Abu Bakar, and S. Chuprat, "Determining factors influencing the acceptance of cloud computing implementation," *Proc. Comput. Sci.*, vol. 161, pp. 1055–1063, Jan. 2019.

[74] K. Glowinski, C. Gossmann, and D. Strümpf, "Analysis of a cloud-based mobile device management solution on Android phones: Technological and organizational aspects," *Social Netw. Appl. Sci.*, vol. 2, no. 1, pp. 1–18, Jan. 2020.

[75] J. A. Jeba, S. Roy, M. O. Rashid, S. T. Atik, and M. Whaiduzzaman, "Towards green cloud computing an algorithmic approach for energy minimization in cloud data centers," *Int. J. Cloud Appl. Comput.*, vol. 9, no. 1, pp. 59–81, Jan. 2019.

[76] W. J. Lee and S. U. Choi, "Internal and external corporate social responsibility activities and firm value: Evidence from the shared growth in the supply chain," *Borsa Istanbul Rev.*, vol. 21, pp. S57–S69, Mar. 2021.

[77] L. Steg and C. Vlek, "Encouraging pro-environmental behaviour: An integrative review and research agenda," *J. Environ. Psychol.*, vol. 29, no. 3, pp. 309–317, Sep. 2009.

[78] J. R. Hopper and J. M. Nielsen, "Recycling as altruistic behavior: Normative and behavioral strategies to expand participation in a community recycling program," *Environ. Behav.*, vol. 23, no. 2, pp. 195–220, Mar. 1991.

[79] S. Bamberg, M. Hunecke, and A. Blöbaum, "Social context, personal norms and the use of public transportation: Two field studies," *J. Environ. Psychol.*, vol. 27, no. 3, pp. 190–203, Sep. 2007.

[80] D. Basile, F. D. Giandomenico, and S. Gnesi, *Green IT Engineering: Concepts, Models, Complex Systems Architectures*, vol. 74. Springer, 2017.

[81] H. Gangwar, H. Date, and R. Ramaswamy, "Understanding determinants of cloud computing adoption using an integrated TAM-TOE model," *J. Enterprise Inf. Manage.*, vol. 28, pp. 107–130, Feb. 2015.

[82] I. Sila, "Do organisational and environmental factors moderate the effects of internet-based interorganisational systems on firm performance?" *Eur. J. Inf. Syst.*, vol. 19, no. 5, pp. 581–600, Oct. 2010.

[83] J. L. Chong and K. Olesen, "A technology-organization-environment perspective on eco-effectiveness: A meta-analysis," *Australas. J. Inf. Syst.*, vol. 21, pp. 1–26, Mar. 2017.

[84] H. Mann, G. Grant, and I. J. S. Mann, "Green IT: An implementation framework," in *Proc. 15th Americas Conf. Inf. Syst. (AMCIS)*, vol. 2, 2009, pp. 787–797.

[85] S. Hardin-Ramanan, V. Chang, and T. Issa, "A green information technology governance model for large mauritian companies," *J. Cleaner Prod.*, vol. 198, pp. 488–497, Oct. 2018.

[86] E. Stawicka, "Sustainable development in the digital age of entrepreneurship," *Sustainability*, vol. 13, no. 8, p. 4429, Apr. 2021.

[87] C. U. Gminder and T. Bieker, "Managing corporate social responsibility by using the 'sustainability-balanced scorecard'," in *Proc. 10th Int. Conf. Greening Ind. Netw.*, 2002, pp. 1–16.

[88] A. L. Salazar, J. F. O. Hidalgo, and M. R. Manríquez, "The corporate social responsibility from the perception of human capital. A case study," *Revista de Contabilidad-Spanish Accounting Rev.*, vol. 20, no. 1, pp. 36–46, 2017.

[89] B. Bermejo, C. Guerrero, I. Lera, and C. Juiz, "Cloud resource management to improve energy efficiency based on local nodes optimizations," *Proc. Comput. Sci.*, vol. 83, pp. 878–885, Jan. 2016.

[90] S. Faucheux and I. Nicolaï, "IT for green and green IT: A proposed typology of eco-innovation," *Ecol. Econ.*, vol. 70, no. 11, pp. 2020–2027, Sep. 2011.

[91] B. Anthony, M. A. Majid, and A. Romli, "Green information technology adoption towards a sustainability policy agenda for government-based institutions: An administrative perspective," *J. Sci. Technol. Policy Manage.*, vol. 10, no. 2, pp. 274–300, Jun. 2019.

[92] A. Alssaiari, R. A. J. Gining, and N. Thomas, "Modelling energy efficient server management policies in PEPA," in *Proc. 8th ACM/SPEC Int. Conf. Perform. Eng. Companion*, Apr. 2017, pp. 43–48.

[93] A. Molla, V. A. Cooper, and S. Pittayachawan, "IT and eco-sustainability: Developing and validating a green IT readiness model," in *Proc. 30th Int. Conf. Inf. Syst. (ICIS)*, 2009, p. 141.

[94] I. Hameed, Z. Hyder, M. Imran, and K. Shafiq, "Greenwash and green purchase behavior: An environmentally sustainable perspective," *Environ., Develop. Sustainability*, vol. 23, no. 9, pp. 13113–13134, Sep. 2021.

[95] D. C. Chou and A. Y. Chou, "Awareness of green IT and its value model," *Comput. Standards Interfaces*, vol. 34, no. 5, pp. 447–451, Sep. 2012.

[96] M. López-vellejo, E. Huedo Cuesta, and J. G. Sopeña, *Green it Tecnologias Para la Eficiencia Energetica, Fundación Madri+d Para el Conocimiento Velázquez*. Madrid, Spain: Colección de Informes de Vigilancia Tecnológica de Madrid, 2008.

[97] R. Gholami, A. B. Sulaiman, T. Ramayah, and A. Molla, "Senior managers' perception on green information systems (IS) adoption and environmental performance: Results from a field survey," *Inf. Manage.*, vol. 50, no. 7, pp. 431–438, Nov. 2013.

[98] D. Zheng, "The adoption of green information technology and information systems: An evidence from corporate social responsibility," in *Proc. PACIS*, 2014, p. 237.

[99] A. Shahla, E. Yadegaridehkordi, M. Nilashi, and S. Samad, "Green information technology adoption: A systematic literature review," *J. Soft Comput. Decis. Support Syst.*, vol. 6, no. 3, pp. 8–17, 2019.

[100] Q. Deng and S. Ji, "Organizational green IT adoption: Concept and evidence," *Sustainability*, vol. 7, no. 12, pp. 16737–16755, Dec. 2015.

[101] Y. S. Kim and M. Ko, "Identifying green IT leaders with financial and environmental performance indicators," in *Proc. 16th Americas Conf. Inf. Syst. (AMCIS)*, vol. 4, 2010, pp. 2484–2492.

[102] D. Patón-Romero, J. Baldassarre, M. T. Piattini, M. de Guzmán, and I. García Rodríguez, "A governance and management framework for Green IT," *Sustainability*, vol. 9, no. 10, pp. 1–18, 2017.

[103] L. M. López-Bonilla and J. M. López-Bonilla, "Los modelos de adopción de tecnologías de la información desde el paradigma actitudinal," *Cadernos EBAPE.BR*, vol. 9, no. 1, pp. 176–196, Mar. 2011.

[104] D. Mishra, I. Akman, and A. Mishra, "Theory of reasoned action application for green information technology acceptance," *Comput. Hum. Behav.*, vol. 36, pp. 29–40, Jul. 2014.

[105] M. Uddin, M. Talha, A. A. Rahman, A. Jameel, and J. Memon, "Green information technology (IT) framework for energy efficient data centers using virtualization," *Int. J. Phys. Sci.*, vol. 7, no. 13, pp. 2052–2065, Mar. 2012.

[106] D. B. Dolci, G. L. Lunardi, A. C. Salles, and A. P. F. Alves, "Implementation of green IT in organizations: A structurational view," *Revista de Administração de Empresas*, vol. 55, no. 5, pp. 486–497, Oct. 2015.

[107] P. Arnfalk, U. Pilerot, P. Schillander, and P. Grönvall, "Green IT in practice: Virtual meetings in Swedish public agencies," *J. Cleaner Prod.*, vol. 123, pp. 101–112, Jun. 2016.

[108] F. Mazella, "Ventaja competitiva en la adopción de practicas de tecnología de la información sustentables (green IT)," Tech. Rep., 2017.

[109] J.-R. Morales-Contreras, S.-O. Caballero-Morales, P. Cano-Olivos, and D. Sánchez-Partida, "Propuesta de red de distribución para reciclaje de desechos eléctricos y electrónicos," *Res. Comput. Sci.*, vol. 148, no. 8, pp. 487–498, Dec. 2019.

[110] O. A. Vega, "Efectos colaterales de la obsolescencia tecnológica," *Revista Ingeniería Universidad Pedagógica y Tecnológica*, vol. 21, no. 32, pp. 55–62, 2012.

[111] A. Ojo, M. Raman, and R. Vijayakumar, "Cognitive determinants of IT professional belief and attitude towards green IT," in *Proc. World Conf. Inf. Syst. Technol.*, 2018, pp. 1006–1015.

[112] Q. Tran, S. Nazir, T.-H. Nguyen, N.-K. Ho, T.-H. Dinh, V.-P. Nguyen, M.-H. Nguyen, Q.-K. Phan, and T.-S. Kieu, "Empirical examination of factors influencing the adoption of green building technologies: The perspective of construction developers in developing economies," *Sustainability*, vol. 12, no. 19, p. 8067, Sep. 2020.

[113] S. Kim, "Factors influencing customers' use of electronic commerce in stock trading: An empirical study in Korea," in *Proc. Pacific Asia Conf. Inf. Syst.*, 2001, p. 3.

[114] M. F. Peretti, "TI y SI en tiempos de sustentabilidad: Cómo integrar los recursos tecnológicos y los sistemas de información a la necesidad de organizaciones sustentables," in *Proc. 12th Jornadas DUTI Docentes Universitarios de Sistemas y Tecnologías*, Buenos Aires, Argentina, 2017, pp. 1–9.

[115] M. Thomas, D. Costa, and T. Oliveira, "Assessing the role of IT-enabled process virtualization on green IT adoption," *Inf. Syst. Frontiers*, vol. 18, no. 4, pp. 693–710, Aug. 2016.

[116] Y. Li, F. Ye, J. Dai, X. Zhao, and C. Sheu, "The adoption of green practices by Chinese firms: Assessing the determinants and effects of top management championship," *Int. J. Oper. Prod. Manage.*, vol. 39, no. 4, pp. 550–572, May 2019.

[117] J. D. Paton-Romero, M. T. Baldassarre, M. Rodreguez, J. G. Perez-Canencio, M. L. Ojeda-Solarte, A. Rey-Piedrahita, and M. Piattini, "Application of ISO/IEC 33000 to green IT: A case study," *IEEE Access*, vol. 7, pp. 116380–116389, 2019.

[118] H. Simula and T. Lehtimäki, "Managing greenness in technology marketing," *J. Syst. Inf. Technol.*, vol. 11, no. 4, pp. 331–346, Nov. 2009.

[119] A. Molla, "Organizational motivations for green IT: Exploring green IT matrix and motivation models," in *Proc. PACIS*, 2009, p. 13.

[120] J. Campbell, "Why would corporations behave in socially responsible ways?" *Institutional Theory Corporate Social Responsibility*, vol. 32, no. 3, pp. 946–967, 2007.

[121] L.-D. Radu, "Determinants of green ICT adoption in organizations: A theoretical perspective," *Sustainability*, vol. 8, no. 8, p. 731, Jul. 2016.

[122] H. Liang, N. Saraf, Q. Hu, and Y. Xue, "Assimilation of enterprise systems: The effect of institutional pressures and the mediating role of top management," *MIS Quart.*, pp. 87–89, Mar. 2007.

[123] G. Unruh, "The sweet spot of sustainability strategy," *Sloan Manage. Rev.*, vol. 55, no. 1, p. 16, 2013.

[124] E. J. Carberry, P. Bharati, D. L. Levy, and A. Chaudhury, "Social movements as catalysts for corporate social innovation: Environmental activism and the adoption of green information systems," *Bus. Soc.*, vol. 58, no. 5, pp. 1083–1127, May 2019.

[125] P. C. Stern, T. Dietz, and L. Kalof, "Value orientations, gender, and environmental concern," *Environ. Behav.*, vol. 25, no. 5, pp. 322–348, Sep. 1993.

[126] S. H. Schwartz, "Awareness of consequences and the influence of moral norms on interpersonal behavior," *Sociometry*, pp. 355–369, Dec. 1968.

[127] K. S. Nelsen, S. Clayton, P. C. Stern, T. Dietz, S. Capstick, and L. Whitmarsh, "How psychology can help limit climate change," *Amer. Psychol.*, vol. 76, no. 1, pp. 130–144, 2021.

[128] A. Druckman and T. Jackson, "Household energy consumption in the U.K.: A highly," *Energy Policy*, vol. 36, no. 8, pp. 3177–3192, 2008.

[129] E. Shove and G. Walker, "Governing transitions in the sustainability of everyday life," *Res. Policy*, vol. 39, no. 4, pp. 471–476, May 2010.

[130] A. Strathman, F. Gleicher, D. S. Boninger, and C. S. Edwards, "The consideration of future consequences: Weighing immediate and distant outcomes of behavior," *J. Personality Social Psychol.*, vol. 66, no. 4, pp. 742–752, 1994.

[131] D. Hevey, M. Pertl, K. Thomas, L. Maher, A. Craig, and S. N. Chuinneagain, "Consideration of future consequences scale: Confirmatory factor analysis," *Personality Individual Differences*, vol. 48, no. 5, pp. 654–657, Apr. 2010.

[132] A. Hansla, A. Gamble, A. Juliusson, and T. Gärling, "The relationships between awareness of consequences, environmental concern, and value orientations," *J. Environ. Psychol.*, vol. 28, no. 1, pp. 1–9, Mar. 2008.

[133] C. Denis-Rémis, O. Codou, and J. Lebraty, "Relation of green IT and affective attitude within the technology acceptance model: The cases of France and China," *Manage. Avenir*, vol. 9, pp. 317–385, Sep. 2011.

[134] W. S. Chow and Y. Chen, "Intended belief and actual behavior in green computing in Hong Kong," *J. Comput. Inf. Syst.*, vol. 50, no. 2, pp. 136–141, 2009.

[135] C. A. Klöckner, "A comprehensive model of the psychology of environmental behaviour—A meta-analysis," *Global Environ. Change*, vol. 23, no. 5, pp. 1028–1038, Oct. 2013.

[136] A. Ziaei-Bideh and M. Namakshenas-Jahromi, "Profiling green consumers with data mining," *Consum. Behav. Marketing*, pp. 97–112, Apr. 2019.

[137] S. H. Schwartz and J. A. Howard, "A normative decision-making model of altruism," *Altruism helping Behav.*, pp. 189–211, Jan. 1981.

[138] G. Liobikiené and R. Juknys, "The role of values, environmental risk perception, awareness of consequences, and willingness to assume responsibility for environmentally-friendly behaviour: The Lithuanian case," *J. Cleaner Prod.*, vol. 112, pp. 3413–3422, Jan. 2016.

[139] P. C. Stern, "Toward a coherent theory of environmentally," *J. Social Issues*, vol. 56, no. 3, pp. 407–424, 2000.

[140] L. Steg and J. Groot, "Explaining prosocial intentions: Testing causal relationships in the norm activation model," *Brit. J. Social Psychol.*, vol. 49, no. 4, pp. 725–743, Nov. 2010.

[141] B. Jnr, M. Majid, and A. Romli, "A proposed model for green practice adoption and implementation in information technology based organizations," *Problemy Ekorozwoju Problems Sustain. Develop.*, vol. 13, no. 1, pp. 95–112, 2018.

[142] P. Vergragt, L. Akenji, and P. Dewick, "Sustainable production, consumption, and livelihoods: Global and regional research perspectives," *J. Cleaner Prod.*, vol. 63, pp. 1–12, Jan. 2014.

[143] V. Hagspiel, K. J. M. Huisman, and C. Nunes, "Optimal technology adoption when the arrival rate of new technologies changes," *Eur. J. Oper. Res.*, vol. 243, no. 3, pp. 897–911, Jun. 2015.

[144] B. Wang, X. Wang, D. Guo, B. Zhang, and Z. Wang, "Analysis of factors influencing residents' habitual energy-saving behaviour based on NAM and TPB models: Egoism or altruism?" *Energy Policy*, vol. 116, pp. 68–77, May 2018.

[145] R. R. Hermann, M. Mosgaard, and S. Kerndrup, "The function of intermediaries in collaborative innovation processes: Retrofitting a Danish small island ferry with green technology," *Int. J. Innov. Sustain. Develop.*, vol. 10, no. 4, pp. 361–383, 2016.

[146] M. Song, S. Wang, and H. Zhang, "Could environmental regulation and R&D tax incentives affect green product innovation?" *J. Cleaner Prod.*, vol. 258, Jun. 2020, Art. no. 120849.

[147] M. Song, S. Wang, and K. Wu, "Environment-biased technological progress and industrial land-use efficiency in China's new normal," *Ann. Oper. Res.*, vol. 268, nos. 1–2, pp. 425–440, Sep. 2018.

[148] S. Dezdar, "Green information technology adoption: Influencing factors and extension of theory of planned behavior," *Social Responsibility J.*, vol. 13, no. 2, pp. 292–306, Jun. 2017.

[149] D. Rayne, C. Leckie, and H. McDonald, "Productive partnerships? Driving consumer awareness to action in CSR partnerships," *J. Bus. Res.*, vol. 118, pp. 49–57, Sep. 2020.

[150] S. Asadi, E. Yadegaridehkordi, M. Nilashi, and S. Samad, "Green information technology adoption: A systematic literature review," *J. Soft Comput. Decis. Support Syst.*, vol. 6, no. 3, pp. 8–17, 2019.

[151] D. Xia, M. Zhang, Q. Yu, and Y. Tu, "Developing a framework to identify barriers of green technology adoption for enterprises," *Resour., Conservation Recycling*, vol. 143, pp. 99–110, Apr. 2019.

[152] W. W. Chin, "The partial least squares approach to structural equation modeling," *Modern Methods Bus. Res.*, vol. 295, pp. 295–336, Jan. 1998.

[153] D. Barclay, C. Higgins, and R. Thompson, "The partial least squares (PLS) approach to causal modelling: Personal computer adoption and use as an illustration," *Technol. Stud.*, vol. 2, no. 2, pp. 285–309, 1995.

[154] W. W. Chin, B. L. Marcolin, and P. R. Newsted, "A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study," *Inf. Syst. Res.*, vol. 14, no. 2, pp. 189–217, Jun. 2003.

[155] A. Leguina, "A primer on partial least squares structural equation modeling (PLS-SEM)," *Int. J. Res. Method Educ.*, vol. 38, no. 2, pp. 220–221, Apr. 2015.

[156] M. G. Berna, "La cooperación interorganizacional como elementos de aprendizaje en las organizaciones que gestionan su conocimiento: El sector de la construcción en España," Centro Politécnico Superior. Universidad de Zaragoza, Zaragoza, Spain, Tech. Rep., 2011.

[157] C. A. Gastelú, D. M. Cordero-Guzmán, J. L. Ortiz, and A. M. Alvarado, "Influencia de factores sobre la manifestación de la ciudadanía digital," *Revista Prisma Social*, vol. 26, pp. 27–49, Jul. 2019.

[158] T. K. Dijkstra, "Latent variables and indices: Herman wold's basic design and partial least squares," in *Handbook of Partial Least Squares. Concepts, Methods and Applications*. Berlin, Germany: Springer, 2010, pp. 1–798.

[159] C. B. Jarvis, S. B. MacKenzie, and P. M. Podsakoff, "A critical review of construct indicators and measurement model misspecification in marketing and consumer research," *J. Consum. Res.*, vol. 30, no. 2, pp. 199–218, Sep. 2003.

[160] E. Carmines and R. Zeller, "Reliability and Validity Assessment," *Quant. Aplicactions The Social Sci.*, vol. 97, no. 17, pp. 9–71, 1979.

[161] J. C. Nunnally, *Phychometric Theory*, New York, NY, USA: McGraw-Hill, 1978.

[162] C. Fornell and D. F. Larcker, "Evaluating structural equation models with unobservable variables and measurement error," *J. Marketing Res.*, vol. 18, no. 1, pp. 39–50, Feb. 1981.

[163] J. D. Cohen, K. Dunbar, and J. L. McClelland, "On the Control of Automatic Processes: A Parallel Distributed Processing Account of the Stroop Effect," *Psychol. Rev.*, vol. 97, no. 3, pp. 332–361, 1990.

[164] R. F. Falk and N. B. Miller, *A Primer for Soft Modeling*. Akron, OH, USA, 1992.

[165] A. C. Davison and D. V. Hinkley, *Bootstrap Methods and Their Application*, 2nd ed. New York, NY, USA: Cambridge Univ. Press, 2003.

[166] B. Efron and R. J. Tibshirani, *An Introduction to the Bootstrap*. New York, NY, USA: Chapman Hall, 1993.

[167] J. Henseler and C. Ringle, "The use of Partial Least squares path modeling in international marketing," *Adv. Int. Marketing*, vol. 20, pp. 277–319, Aug. 2009.

[168] S. Geisser, "A predictive approach to the random effect model," *Biometrika*, vol. 61, no. 1, pp. 101–107, 1974.

[169] M. Tenehaus, V. E. Vinzi, Y.-M. Chatelin, and C. Lauro, "PLS path modeling," *Comput. Statist. Data Anal.*, vol. 48, no. 1, pp. 159–205, 2005.

[170] V. Cooper and A. Molla, "Green IT assimilation: Comparing the influence of contextual and absorptive capacity based models," in *Proc. ACIS*, 2013, p. 128.

[171] O. I. Macovei, "Determinants of consumers' pro-environmental behavior-toward an integrated model," *J. Danubian Stud. Res.*, vol. 5, no. 2, pp. 1–15, 2015.

[172] A. Molla and A. Abareshi, "Organizational green motivations for information technology: Empirical study," *J. Comput. Inf. Syst.*, vol. 52, no. 3, pp. 92–102, 2012.

[173] A. Alaraifi, A. Molla, and H. Deng, "An empirical analysis of antecedents to the assimilation of sensor information systems in data centers," *Int. J. Inf. Technol. Syst. Approach*, vol. 6, no. 1, pp. 57–77, Jan. 2013.

[174] T. A. Jenkin, J. Webster, and L. McShane, "An agenda for 'green' information technology and systems research," *Inf. Org.*, vol. 21, no. 1, pp. 17–40, Jan. 2011.

[175] S. Elliot and D. Binney, "Environmentally sustainable ICT: Developing corporate capabilities and an industry-relevant IS research agenda," in *Proc. Pacific Asia Conf. Inf. Syst. (PACIS)*, Suzhou, China, 2008, p. 209.

[176] S. Asadi, A. R. C. Hussin, and H. M. Dahlan, "Organizational research in the field of green IT: A systematic literature review from 2007 to 2016," *Telematics Informat.*, vol. 34, no. 7, pp. 1191–1249, Nov. 2017.

[177] M. Dalvi-Esfahani, T. Ramayah, and M. Nilashi, "Modelling upper echelons' behavioural drivers of green IT/IS adoption using an integrated interpretive structural modelling—Analytic network process approach," *Telematics Informat.*, vol. 34, no. 2, pp. 583–603, May 2017.

[178] P. Bansal, "Evolving sustainably: A longitudinal study of corporate sustainable development," *Strategic Manage. J.*, vol. 26, no. 3, pp. 197–218, 2005.

[179] S. Thomson and J. P. Van Belle, "Antecedents of green IT adoption in South African higher education institutions," *Electron. J. Inf. Syst. Eval.*, vol. 18, no. 2, pp. 173–187, 2015.

[180] L. Willuweit, "Promoting pro-environmental behavior: An investigation of the cross-cultural environmental behavior patterns," Case Abu Dhabi, Tech. Rep., 2009.

[181] S. Asadi, A. R. Hussin, H. M. Dahlan, and E. Yadegaridehkordi, "Theoretical model for green information technology adoption," *ARPN J. Eng. Appl. Sci.*, vol. 10, no. 23, pp. 17720–17729, 2015.

[182] E. Suárez, B. Hernández, D. Gil-Giménez, and V. Corral-Verdugo, "Determinants of frugal behavior: The influences of consciousness for sustainable consumption, materialism, and the consideration of future consequences," *Frontiers Psychol.*, vol. 11, pp. 1–12, Nov. 2020.

[183] I. Balderjahn, A. Buerke, M. Kirchgeorg, M. Peyer, B. Seegebarth, and K.-P. Wiedmann, "Consciousness for sustainable consumption: Scale development and new insights in the economic dimension of consumers' sustainability," *AMS Rev.*, vol. 3, no. 4, pp. 181–192, Dec. 2013.

[184] A. Unger, H. Lyu, and P. G. Zimbardo, "How compulsive buying is influenced by time perspective—Cross-cultural evidence from Germany, Ukraine, and China," *Int. J. Mental Health Addiction*, vol. 16, no. 3, pp. 525–544, Jun. 2018.

DIEGO CORDERO was born in Azogues, Ecuador, in 1966. He received the degree in computer and informatics systems engineering from the Escuela Politécnica Nacional, Quito, Ecuador, in 1993, the master's degree in management information systems from the Escuela Politécnica del Ejército, Guayaquil, Ecuador, in 2008, and the Ph.D. degree in sciences administration from the Universidad Nacional Autónoma de México (UNAM), México, in 2017.

He was a Postdoctoral Researcher in "Latin America and its Insertion in the Global Order," Ecuador, in 2018. He has held various positions, such as the System Manager, the Strategic Manager, the Dean, the Director of Research, the Academic Director, and the Director of Innovation Processes. He is currently a Research Professor with the Universidad Católica de Cuenca (UCACUE). He leads research projects. He is the author of two books, ten chapters of book, and more than 40 articles. He has participated as a Speaker in more than 15 international conferences. His research interests include technology governance and inclusion, green IT, data analytics, and educational innovation.

Dr. Cordero is a member of the Green IT Research Group. He is also an Accredited Researcher of the Secretary of Higher Education, Science, Technology, and Innovation of the Republic of Ecuador, and an Ecuador Node Coordinator of TIC Latin America. He is an Associate Editor of the Academic journals in UDA.

CARLOS JUIZ (Senior Member, IEEE) was born in Santiago de Compostela, Spain, in 1966. He received the Ph.D. degree in computer science from the University of the Balearic Islands (UIB), Spain, in 2001.

Before joining the Department of Computer Science, UIB, in 1999, he had several positions related to the computer systems industry. He was a Visiting Researcher with the Department for Computer Science and Business Informatics, University of Vienna, in 2003, and a Visiting Associate Professor in biomedical informatics research with Stanford University, in 2011. He is the coauthor of two books and more than 200 articles. He has participated in more than 450 international conferences, workshops, and congresses as a reviewer, the session chair, the president of the program committee, but mostly as a Program Committee Member or a Scientific Committee Member. His research interests include performance engineering, green IT, and IT governance.

Prof. Juiz is a Senior Member of the ACM. He is currently one of an Executive Vice-President of the TURISTEC Cluster and also a Board Member of the Balears.T Cluster. He is the Coordinator of the workgroup of Governance of IT UNE (AENOR), the Spanish Body in ISO, and the Co-Editor or the ISO/IEC 38503 Standard.

ANDREA MORY was born in Cuenca, Ecuador, in 1979. She received the Graduate degree in systems engineering from the Universidad del Azuay, Cuenca, in 2002, and the master's degree in telematics from the Universidad Estatal de Cuenca, Cuenca, in 2004. She is currently pursuing the Ph.D. degree in information and communication technologies with the University of the Balearic Islands, Palma de Mayorca, Spain. She has worked in different companies in the systems areas of some local companies as the Head of Systems. Since 2013, she has been the Career Director, the Sub-Dean, and a full-time Professor with the Catholic University of Cuenca. In the research area, she is a member of the Green IT Research Group and an Associate Researcher of the Diversity and Science Group, Catholic University of Cuenca. She is also a member of the ICT Latin America Research Group of the Ecuador Node.

VANESSA BERMEO was born in Cuenca, Ecuador, in 1979. She received the B.S. degree in economics from the Catholic University of Cuenca, in 2002, the M.S. degree in economics from the University of Cuenca, in 2007, and the Ph.D. degree in administration sciences from the National Autonomous University of Mexico, in 2017.

From 2013 to 2015, she was the Director of Research and the Vice Principal of Dean, from 2015 to 2021. She is currently the Vice Chancellor of the University. Since 2009, she has been a Research Professor with the Academic Unit of Administration, Catholic University of Cuenca. She has presented and published research papers at various national and international conferences and academic events on the subject of competitiveness in small and medium firms, economic vulnerability and social responsibility.

Dr. Bermeo received the "Luis Cordero" University Award for being the Best Graduate of the Academic Unit of Economics, in March 2009. Promotion (2001–2002) with the Catholic University of Cuenca, received the "Arturo Díaz Alonso" Research Award for presenting the best paper on the topic of Administration of micro, small and medium-sized enterprises at the XXI International Congress of Accounting, Administration and Information Technology organized by the National Autonomous University of Mexico, in October 2016.

DANIEL ANDRADE was born in Azogues, Cañar, Ecuador, in 1981. He received the B.S. degree in systems engineering from the Catholic University of Cuenca, in 2004, the M.S. degree in security information from the Escuela Politécnica del Litoral (ESPOL), Guayaquil, Ecuador, and the M.S. degree in technology of information from TEC, Monterrey, México, in 2016. He is currently pursuing the Ph.D. degree in business management with Pablo Olavide University, Sevilla, Spain.

From 2001 to 2008, he was an IT Manager of ATS Security. From 2019 to 2021, he was the Administration Career Director. Since 2008, he has been a Professor with the Administration Faculty, Catholic University of Cuenca. Since 2021, he has been a Subdean of Administration Faculty. He is the author of four articles. His research interests include green IT, technology information and communication business models, business competitiveness, and e-money.

Prof. Andrade is a member of CIISCA—Colegio de Ingenieros en Informática, Sistemas y Computación del Azuay.

• • •