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

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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 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 corporate 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 ecosystem 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 so-
cialized 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 CO2 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
ethic 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 impel 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 implement 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 awareness 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 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 literature in hypothesis development (section II) through the corresponding detailed analysis of ten variables between
FIGURE 1. Research and hypothesis model

H6

H5

H4

H3

H2

H1

dependent and independent (see Appendix A). 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 1. 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].

Cronbach’s alpha (CA) for the construct indicators because they were higher than 0.7, which gives them validity [160].

In Table 2, 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 2, 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 2, all AVE constructs were superior to 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 differenced and identified. The AVE square root values are on the diagonal of Table 3 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 4. 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 $\beta$. 

### TABLE 1. 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%     |
| < 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%     |
**TABLE 2. Reliability and convergent validity**

| Constructs                          | Indicator | Outer loading | Composite Reliability | Cronbach’s Alpha | AVE  |
|-------------------------------------|-----------|---------------|-----------------------|------------------|------|
| Organizational context, (ORC)       | ORC1      | 0.876         | 0.717                 | 0.779            |
|                                     | ORC2      | 0.889         |                       |                  |
| Environmental context, (ENC)        | ENC1      | 0.847         | 0.760                 | 0.582            |
|                                     | ENC2      | 0.722         |                       |                  |
|                                     | ENC3      | 0.800         |                       |                  |
|                                     | ENC4      | 0.801         |                       |                  |
| Environmental Sustainability motivating forces, (ESM) | ESM1    | 0.850         |                       |                  |
|                                     | ESM2      | 0.868         |                       |                  |
|                                     | ESM3      | 0.823         |                       |                  |
| Technological context, (TEC)        | TEC1      | 0.880         | 0.826                 | 0.648            |
|                                     | TEC2      | 0.820         |                       |                  |
|                                     | TEC3      | 0.863         |                       |                  |
|                                     | TEC4      | 0.752         |                       |                  |
| Attitude towards Green IT (ATG)     | ATG1      | 0.926         | 0.879                 | 0.806            |
|                                     | ATG2      | 0.884         |                       |                  |
|                                     | ATG3      | 0.926         |                       |                  |
| Green IT Drivers, (GID)             | 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)            | MGI1      | 0.904         | 0.841                 | 0.759            |
|                                     | MGI2      | 0.860         |                       |                  |
|                                     | MGI3      | 0.872         |                       |                  |
| Awareness of consequences, (AWC)    | AWC1      | 0.890         | 0.819                 | 0.729            |
|                                     | AWC2      | 0.875         |                       |                  |
|                                     | AWC3      | 0.850         |                       |                  |
| Ascription of responsibility, (ARG) | ARG1      | 0.843         | 0.712                 | 0.645            |
|                                     | ARG2      | 0.651         |                       |                  |
|                                     | ARG3      | 0.904         |                       |                  |
| Green IT Adoption Intention (GIA)   | GIA1      | 0.913         | 0.880                 | 0.677            |
|                                     | GIA2      | 0.840         |                       |                  |
|                                     | GIA3      | 0.839         |                       |                  |
|                                     | GIA4      | 0.736         |                       |                  |
|                                     | GIA5      | 0.855         |                       |                  |
|                                     | GIA6      | 0.840         |                       |                  |

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**TABLE 3. 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|

**TABLE 4. 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|
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 5, 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.

| Table 5: $R^2$ of dependent variables. |
|---------------------------------------|
| $R^2$  | Explanatory level |
| ARG   | 0.312           | Moderate       |
| ATG   | 0.520           | Substantial    |
| ENC   | 0.271           | Moderate       |
| GIA   | 0.765           | Substantial    |

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 6 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 ($\beta$), 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 7 presents the coefficient trajectories of these variables. All $\beta$ values are greater than 0.2, indicating that the variables have an impact on the 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, 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).
**TABLE 6.** Effect Size \( f^2 \)

| Category | ARG | ATG | ENC | GIA |
|----------|-----|-----|-----|-----|
| ARG      | 0.146 |   |   | Small |
| ATG      | 0.126 |   |   | Small |
| AWC      | 0.454 | Large |   |   |
| ENC      | 0.168 | Medium | 0.372 | Large |
| ESM      | 0.454 | Large | 0.372 | Large |
| GID      | 0.689 | Large | 0.284 |   |
| MGI      | 0.104 |   |   |   |
| ORC      | 0.080 | Small | 0.197 | Medium |
| TEC      | 0.197 | Medium | 0.197 | Medium |

**TABLE 7.** Trajectory coefficient (\( \beta \))

| \( \beta \) |
|-------------|
| ARG \( \rightarrow \) GIA | 0.284 |
| ATG \( \rightarrow \) GIA | 0.221 |
| AWC \( \rightarrow \) ARG | 0.559 |
| ENC \( \rightarrow \) ATG | 0.321 |
| ESM \( \rightarrow \) ENC | 0.521 |
| GID \( \rightarrow \) GIA | 0.584 |
| MGI \( \rightarrow \) GIA | 0.245 |
| ORC \( \rightarrow \) ATG | 0.239 |
| TEC \( \rightarrow \) ATG | 0.356 |

**FIGURE 3.** Bootstrapping for the structural model
C. HYPOTHESIS TEST

PLS estimates the path model for each sample and the obtained coefficient of the model creates a bootstrap distribution 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 8 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.

Hypothesis one suggests that organizational context has a positive impact on attitude towards GIT. The model results in Table 8 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 (0.321) in Table 3, the result is 0.1874, which implies that 18.74% of the attitude towards GIT construct is explained by the organizational context latent variable.

TABLE 8. 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

Hypothesis two suggests that environmental context has a positive impact on attitude towards GIT. The model results in Table 8 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 3, 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.

FIGURE 4. Structural model results.
Hypothesis three establishes that environmental sustainability motivating forces have a positive impact on the environmental context. The model results in Table 8 highlight the positive and significant influence of ENC on EN, which supports this hypothesis. By multiplying the path coefficient (0.521) by the corresponding correlation coefficient (0.521) in Table 3, 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 8 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 3, the result is 0.2139, which implies that 21.39% of the attitude towards GIT construct 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 8 show the 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 3, 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 8 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 3, 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 8 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 3, 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 8 show a positive and significant influence of ARG on GIA, which supports this hypothesis. Multiplying path coefficient (0.284) by the corresponding correlation coefficient (0.726) in Table 3, 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 8 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 3, 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, 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 9, 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 0.00 indicate a lack of predictive relevance.

| TABLE 9. 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 | 0.015 | Medium |
| ENC | 2,248,000 | 1,897,268 | 0.156 | Large |
| ESM | 1,686,000 | 1,686,000 | 0.512 | Medium |
| GIA | 2,810,000 | 1,371,134 | 0.512 | Large |
| GID | 3,934,000 | 3,934,000 | 0.015 | Medium |
| MGI | 1,686,000 | 1,686,000 | 0.015 | Medium |
| ORC | 1,124,000 | 1,124,000 | 0.015 | Medium |
| TEC | 2,248,000 | 2,248,000 | 0.015 | Medium |

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 research...
ers, such as Macovei, used [171] TPB as a reference for researching 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 Abaresi [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 that attitude has a higher impact on the motivation to maintain pro-environmental and pro-social behavior [104], [177]. According to Ghomami et al. [97], for functionaries who 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 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 [181]; 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. [182], in theoretical model for green information technology adoption. On the other hand, the structural model results of Suárez et al. [183] reveal the importance that responsible consumption has, materialism, and future consequences consideration are based on the multidimensional model of Balotjahn et al. [184], which relates the future awareness of consumers, the
environmental consequences of their behavior [185], 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.

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 [182]. 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, academics 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 nominated 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.

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APPENDIX A. Questionnaire items development based on literature

| Variable | Organizational Context (ORC) | Source |
|----------|-----------------------------|--------|
| ORC1     | Your organization formally defines organizational structure. | [44], [65], [68]–[70], [170] |
| ORC2     | Your organization provides adequate channels for sufficient resource provision for all statements. |        |
| ORC3     | Support for the senior direction covers all organizational levels. | [81]–[85], [170] |

| Variable | Environmental context (ENC) | Source |
|----------|-----------------------------|--------|
| 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 |
|----------|-----------------------------------------------------|--------|
| ESM1     | In business social responsibility, the organization considers environmental aspects. | [32], [88], [91], [94]–[99], [174] |
| ESM2     | Your organization is aware of the environmental context and emphasizes energy efficiency and waste treatment. |        |

| Variable | Technological Context (TEC) | Source |
|----------|----------------------------|--------|
| TEC1     | Organization informatics systems support environmental initiatives. | [103], [105]–[110], [119] |
| 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 |
|----------|---------------------------|--------|
| ATG1     | Green IT practices are convenient for the organization. | [111]–[113], [182] |
| 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 |
|----------|------------------|--------|
| GID1     | Your organization requires economic resources that enable green IT development. | [44], [108], [114]–[117], [182] |
| GID2     | From an ethical point of view, the organization has sustainability strategies where green IT can be enabled. |        |
| GID3     | As Corporate Social responsibility, the organization habilitates Green IT. |        |
| GID4     | The compromise of the senior direction enables 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 |
|----------|--------------------------|--------|
| MGI1     | Government laws, industry standards, and business politics have motivated green IT implementation. | [98], [119]–[124] |
| MGI2     | Cost savings, income improvement, effectiveness improvement, efficiency, and higher competitiveness motivate green IT implementation. |        |
| MGI3     | Corporate social responsibility toward employees, investors, clients, and general public motivate the Green IT implementation. |        |

| Variable | Awareness of consequences (AWC) | Source |
|----------|-------------------------------|--------|
| AWC1     | Individual awareness of environmental protection by each employee. | [125], [126], [128], [129] |
| AWC2     | Organizational awareness of environmental protection. |        |
| AWC3     | Environmental awareness of the organizational sector. | [56], [136]–[139] |

| Variable | Ascription of responsibility (ARG) | Source |
|----------|---------------------------------|--------|
| ARG1     | Environmental knowledge of both organizations and employees. | [56], [136]–[139] |
| ARG2     | Environmental attitudes of the organization and employees. |        |
| ARG3     | Environmental behavior of the organization and employees. |        |

| Variable | GIT adoption intention (GIA) | Source |
|----------|------------------------------|--------|
| GIA1     | Actions for green IT by the organization. | [98], [142], [145]–[148] |
| 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. |        |

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