

Article

Implementing Sustainable Digital Transformation Based on the Working with People Model: Lessons from Experience in Large Companies

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Abstract

Technology is causing unprecedented disruption that requires organisations to implement digital transformation processes. These processes are aimed at integrating technologies, redesigning their business models and, at the same time, adapting the skills of their employees and incorporating sustainability into their processes. This research aims to conceptualise a methodology for implementing Sustainable Digital Transformation (SDT) processes based on the “Working with People” (WWP) model. The model integrates three key dimensions and aligns with project management and organisational change approaches. For the purpose of this article, empirical experiences of technology adoption implemented in five large Spanish companies with an international presence are analysed. The companies were selected because they were undergoing a strategic digital transformation process aimed at implementing a digital and sustainable culture. The results show that the WWP model, aligned with IPMA project management and ADKAR organisational change approaches, is a useful tool for articulating the implementation of a Sustainable Digital Transformation, highlighting the importance of people. The model is replicable for other companies, facilitating sustainable success in digital transformation from a practical perspective of holistic and sustainable digital transformation based on the WWP model. This study addresses a key research gap in the field of digital transformation: the lack of integrative methodologies that combine technological innovation, human development, and sustainability. The proposed Working with People-based Sustainable Digital Transformation (WWP-SDT) model provides companies with a practical framework to align digital adoption with cultural change and long-term sustainable impact.

Keywords: sustainable digital transformation (SDT); sustainability; competencies; technology; project management; organisational change



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1. Introduction

Technology is causing unprecedented disruption in the business and social spheres and is driving the pace of innovation and transformation on a global scale. In this environment, Digital Transformation (DT) has become a strategic priority for organisations globally [1,2]. Technology is redefining not only business models, but also the way organisations respond to economic, social and environmental challenges. According to an OECD study [3],

digitisation is continuously transforming the production and functioning of economies, acting as a lever for innovation, efficiency and global access.

However, in many cases, these DT processes run the risk of focusing exclusively on technological aspects [4,5]. When this happens, the necessary social and sustainable impact is not guaranteed. Numerous studies warn that effective digital transformation requires incorporating not only criteria of the best technology, efficiency and competitiveness, but also sustainability, adaptation of people's skills, and organisational transformation [4,6,7]. In this context, the concept of Sustainable Digital Transformation (SDT) becomes more necessary, understood as one that comprehensively incorporates the principles of sustainability—economic, environmental, social, technical, and cultural—at all levels of the organisational transformation process [8–10].

From this perspective, there is growing academic consensus on the need to develop more integrative methodological approaches that structurally connect sustainability with digital transformation, integrating the role of people, cultural change, sustainability and the political-organisational context [2,11,12]. Hanelt et al. [13] in their systematic review, propose that most current frameworks do not adequately consider the social and organisational dimensions of DT. Along the same lines, other authors [14–16] and [4] agree that DT cannot be understood as a purely technological process, but rather as a complex organisational process that also requires transforming culture, processes and human capabilities as critical factors for the success of the transformation. Other authors, such as De Villiers and R. Dimes [17], highlight the need to integrate sustainability and technology into business models.

In this scenario, the “Working With People” (WWP) model is presented as a methodological proposal particularly suited to guiding SDT processes. Developed by Cazorla et al. [18] and validated in multiple organisational contexts [19,20], the WWP model integrates three key dimensions, technical–business, ethical–social and political–contextual, placing people at the centre of organisational change.

The main objective of this study is to develop an innovative methodological approach for the implementation of Sustainable Digital Transformation (SDT) processes based on the “Working with People” (WWP) method.

Based on this framework, the following research hypothesis is proposed: The integration of the three dimensions of the Working with People (WWP) model, aligned with the IPMA and ADKAR approaches, constitutes an effective methodological approach to guiding Sustainable Digital Transformation (SDT) processes in large organisations, improving technology adoption, cultural alignment and the sustainable impact of change.

The structure of this document is as follows. Section 2 analyses the theoretical foundations of SDT, project management and change management from approaches widely used in business practice: the International Project Management Association (IPMA) project management standard and the ADKAR change management model developed by Prosci.

The methodology and implementation phases of the WWP-SDT model are addressed in Section 3. This section outlines the phases for a structured integration of the WWP model as a methodological framework that allows SDT to be conceived as a planned, participatory and measurable process, in which people and sustainability occupy a central position from the outset.

Section 4 presents the results from the three dimensions of the WWP-SDT model in five large Spanish companies in the technology sector with international reach. Section 5 discusses the results and draws empirical evidence on the applicability and effectiveness of the model in large organisations. Section 6 sets out the conclusions and limitations to be analysed.

The outcomes of this study provide companies with a methodological pathway to manage digital transformation in a sustainable and people-oriented way. By applying the WWP–SDT model, organizations can better align technology adoption with cultural transformation, leading to higher engagement, improved efficiency, and measurable progress in corporate sustainability practices.

2. Theoretical Background

2.1. Sustainable Digital Transformation: From Technological Potential to Organisational Change Focused on People and Sustainability

The disruptive impact of technology is profoundly transforming the functioning of global economies [3]. This phenomenon has led to structural changes in organisations: redesign of value chains, automation of operations, redefinition of customer relationships and more efficient access to international markets [1,6,19]. McDonald and Rowsell-Jones [21] group these effects into four key areas: (1) acceleration of the pace of innovation, (2) increased efficiency, productivity and security, (3) global access to markets and customers, and (4) improved customer experience.

In recent years, the expansion of artificial intelligence (AI) has amplified and accelerated these impacts, particularly in terms of operational efficiency and data-driven decision-making [21,22]. DT processes have accelerated and amplified in every way, from their impact on business to the challenges and needs of previous DT processes, causing significant challenges related to skills, governance, ethics, privacy, security, and equity [6,23].

Despite the transformative potential of these technologies, their implementation alone does not guarantee organisational success or sustainable transformation. Gils and Weigand [7] warn that many digital transformation initiatives focus exclusively on the technological dimension, without addressing essential human and organisational factors. Along these lines, Vial [16] argues that a technocentric vision is insufficient to generate sustainable competitive advantages. The true value of digital transformation emerges when it is aligned with organisational change, skills development and cultural adaptation [2,23,24].

Digital maturity cannot be assessed solely by the degree of technological implementation, but by the ability to integrate change into the organisational culture and team skills. Hanelt et al., Schwab and Kane et al. [4,25,26] insist that digitalisation requires a profound cultural transformation based on agility, adaptability and active participation. Among the main obstacles to sustainable digital transformation processes are the shortage of digital skills, resistance to change and weak participatory governance mechanisms [12]. If these factors are not adequately addressed, they can compromise not only the technical effectiveness of digital projects, but also their legitimacy and long-term sustainability.

Added to this scenario is the growing need to integrate sustainability as a central axis in transformation processes. There is a growing consensus in academic, business and political circles on the urgency of moving towards production models that are both innovative and sustainable [4,7,10]. Organisations cannot limit themselves to improving their efficiency through technological solutions, but must simultaneously incorporate the economic, ecological, social, technical and individual dimensions of sustainability [27].

This convergence has given rise to the concept of Sustainable Digital Transformation (SDT), which involves the effective integration of sustainability principles into all phases of digital transformation, from strategic planning to results assessment [9]. The European regulatory framework has also played a key role in this process. Directive 2014/95/EU on the disclosure of non-financial information requires large companies to report on their environmental, social and governance (ESG) impact, encouraging the integration of sustainability into decision-making. Likewise, the Sustainable Development Goals SDGs reinforce

this orientation, promoting a business transformation aligned with global goals such as decent work, equality and the fight against climate change [13].

In short, technology is a necessary but not sufficient condition for a truly sustainable digital transformation. It is essential to adopt an integrative approach that places people and sustainability at the centre of change. This perspective requires methodological frameworks that simultaneously address the technical dimension, human development and organisational sustainability. The Working With People (WWP) model responds to this challenge by explicitly incorporating these three dimensions as the cornerstones of transformation processes.

2.2. Project Management and Change Management: A Necessary Integration for Sustainable Digital Transformation

Sustainable Digital Transformation (SDT) cannot be conceived solely as a technological process. As stated in the previous section, its success also depends on the ability of organisations to manage the cultural, organisational and human change that such transformation requires. There is an increasing need for convergence between project management frameworks and change management approaches, especially in complex and dynamic environments such as those characterised by digital transformation.

2.2.1. Project Management as a Framework for Sustainability

The literature has repeatedly pointed out that effective project management is essential to achieving strategic sustainability and digital transformation objectives [28,29]. Models such as that of the International Project Management Association (IPMA) offer a structured framework for planning, executing and evaluating projects in complex contexts, with a special emphasis on the development of individual competencies and the perspective of sustainability [30,31]. The basis of the IPMA model is its ICB4 (Individual Competence Baseline) standard, which classifies the necessary competencies into three key dimensions: perspective, linked to strategic vision, stakeholder interests, culture and organisational values; people, focused on interpersonal skills, leadership, teamwork and emotional management; and practice, oriented towards technical knowledge, methodologies, tools and project control.

This holistic approach allows technical and human objectives to be aligned, and has proven particularly suitable for addressing multidimensional challenges such as sustainability and digitalization [32]. In addition, IPMA has begun to incorporate agile (lean-agile project management) models that are iterative and focused on rapid feedback, which are particularly well suited to the cycles of accelerated technological change that characterise SDT projects [33].

2.2.2. Change Management as the Cornerstone of Organisational Transformation

In parallel with technical management, multiple authors have noted that one of the main factors in the failure of digital transformation projects is internal resistance to change, a lack of transformative leadership and poor team participation [28,34]. Given this, it is essential to complement project management approaches with structured models of organisational change management, such as that proposed by Prosci.

The Prosci model is based on the Change Triangle, which articulates three fundamental pillars: visible and committed leadership and sponsorship; integration between project management and organisational change; and the application of a clear methodology for individual change [35,36].

Its best-known model, ADKAR, proposes five sequential phases that each person must go through to achieve effective change: Awareness, Desire, Knowledge, Ability, and Rein-

forcement [34]. This perspective focuses on the fact that all organisational transformation is ultimately the sum of individual changes.

Several studies have highlighted that, when integrated from the outset, change management and project management mutually enhance their results, especially in contexts of high uncertainty or rapid technological evolution [37,38].

2.2.3. Synergies for SDT: Complementary Competencies

Although both models, IPMA and Prosci, originate from different domains, they share a common premise: the need to put people at the centre of change. While IPMA provides a competency framework for managing complex projects, Prosci provides organisations with a practical methodology to facilitate the adoption of change by individuals [39]. This synergy is particularly valuable for addressing digital transformations with a sustainable approach.

The IPMA model allows sustainability to be incorporated as a cross-cutting criterion in all phases of the project [32], while Prosci helps to reinforce cultural ownership of change, overcoming internal resistance and generating a more lasting organisational transformation [34,40].

In addition, recent studies by the IPMA Council of Delegates (2024) [41] have focused on the integration of artificial intelligence into project management and the need for frameworks that combine innovation, sustainability and governance. In this sense, the IPMA–Prosci combination provides an operational and cultural bridge between the technical challenges of digitalisation and the human dynamics of change.

In summary, this study addresses a critical gap in the literature by proposing a methodological framework that unites project management (IPMA) and change management (ADKAR) approaches under the WWP model. This integration contributes to the theoretical and practical development of Sustainable Digital Transformation by emphasizing the role of people and culture as key drivers of long-term success.

3. Methodology

3.1. Methodological Framework

In this research, a design science approach [42] has been adopted from the methodological framework based on the WWP metamodel [18], the result of 30 years of experience in the field of organisations to improve sustainability. WWP is presented as a conceptual proposal for addressing strategic changes from project-based governance and has been used for the implementation of projects that prioritise people, both in the European context [43–45] and in emerging countries [29]. Changes are made through the interaction of key agents from the three dimensions of the WWP model, through social learning processes [29–31,44,45].

The WWP is understood as a “process of change”, working on a project basis, which seeks to connect knowledge and action through a common project that, in addition to the technical value of technological goods and services, primarily incorporates the value of the people who get involved, participate and develop through the actions carried out in the context of the project. WWP prioritises project-based governance, developing competencies in the multiple stakeholders [44,46,47] aligned with the three dimensions of the IPMA model.

In WWP experiences [48,49], people are seen as key instruments for implementing projects and intervention strategies, promoting sustainability through dialogue and negotiation between multiple actors and focusing on individual behaviour and mutual learning.

By fostering active collaboration between actors—from businesses, governments, and higher education institutions—the WWP model is considered to have great potential for the

success of sustainable digital transformation projects. WWP requires intervention planners to have a particular social awareness and solid ethical standards, in addition to certain technical and contextual skills [45,50].

This methodological framework goes beyond the technical–economic vision and integrates three components—political–contextual, ethical–social, and technical–business—that interact through social learning processes [45,50].

The political–contextual dimension encompasses the capacity of different actors to build relationships with international, regional and local political organisations and public administrations in the contexts in which they operate. This dimension considers the sustainability of development [27,29]. This dimension integrates the IPMA perspective competency area and the environmental dimension, providing the essential framework for the political support, resources, and collaborative environment necessary for the successful implementation and long-term sustainability of digital transformation projects [7].

The ethical–social dimension includes the behaviours, attitudes and values of the people involved in the actions at a personal and collective level. It constitutes the system of social relations based on the moral attitudes and behaviours of people that enable effective teamwork and cooperation between actors through commitment, trust and personal freedom. It is related to the area of People competencies in the IPMA model and to the Prosci model's approach to change management in organisations through people change. This ethical–social dimension is considered fundamental to sustainable digital transformation, as it requires consideration of the impact of technology on people and society, with the aim of ensuring that the changes generated are beneficial and equitable. Without a solid ethical and social perspective, digital transformation risks exacerbating existing inequalities and creating new social challenges, undermining its potential for long-term sustainability [12].

The technical–business dimension assumes that the different actors involved are the main source of innovation and that their technical skills enable them to create products and services for society in accordance with quality standards. The focus is on promoting innovation to improve business performance [20] understood as a social learning process [45]. It integrates many of the practical skills of the IPMA model, directly related to the technical execution of projects for change and transformation. The technical and business dimensions are considered equally crucial to the success and sustainability of digital transformation initiatives, as highlighted in various studies [4,12]. These dimensions are interrelated and essential for generating value, fostering innovation and ensuring the long-term viability of digital transformation projects.

Figure 1 represents the DTP process at the center of the WWP metamodel, with the overlap between the three dimensions, as its implementation involves relationships and learning within organisations, with decision-making processes involving multiple stakeholders (political sphere, public administration, business and society) [50].

Each actor—through their own behaviors, attitudes, and values—interacts and contributes to the SD and learning process, contributing and receiving knowledge from technical, organisational, and political practices and changes [50].

The WWP model is structured around three interrelated dimensions: the technical–entrepreneurial, focused on innovation and efficiency; the ethical–social, emphasizing participation, shared values, and trust; and the political–contextual, which promotes governance, institutional coordination, and collective responsibility. These dimensions have been further validated and applied in recent studies on sustainable territorial and organizational development [45].

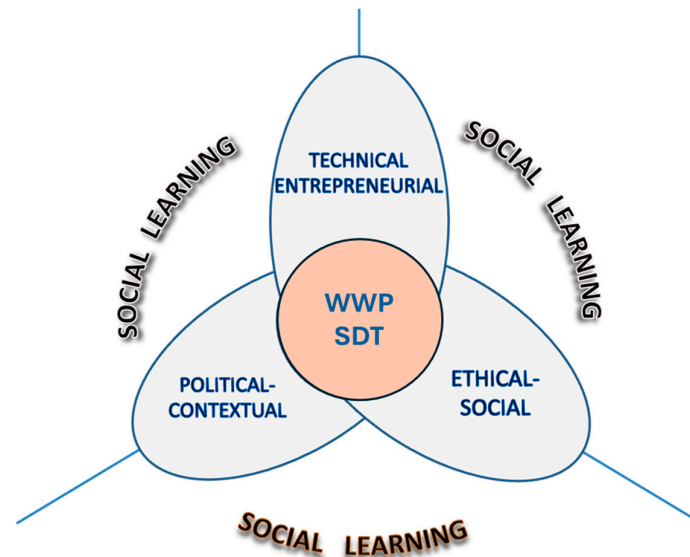


Figure 1. The SDT process within the three dimensions of the WWP model. Source: Adapted by the authors from [51].

3.2. Data Collection and Analysis for the Case Study

This article presents a two-year longitudinal empirical study conducted with five large Spanish companies in the technology sector, all of which are actively engaged in digital transformation (DT) processes. The selected organisations have more than 250 employees and an annual turnover of more than €50 million, in line with the criteria of the European Commission (BOE.es-DOUE-L-2003-80730). These criteria ensured that all participating organizations shared a comparable level of structural complexity, digital maturity, and resources to implement large-scale transformation processes. In addition to their headquarters in Spain, these companies also operate in other European countries, which gives the findings a potential projection beyond the national context.

The five selected companies were simultaneously engaged in comparable cultural transformation processes driven by their corporate Digital Transformation Offices, ensuring strategic alignment and top-management commitment to sustainable change. According to [51] Yin's (2018) methodological approach of theoretical replication, five cases are sufficient to provide analytical robustness and comparability across organizations operating in equivalent transformation contexts. In addition, the extended duration of the study made it possible to observe the evolution of the organizations through key stages of the process—from the implementation of new technologies to the development of skills and the consolidation of a digital culture adapted to new working environments. This longitudinal monitoring was particularly relevant for assessing the progressive integration of the WWP model and its alignment with the change management (Prosci/ADKAR) and project management (IPMA) frameworks.

3.2.1. Sample and Participants

A total of 25 executives and functional managers participated in the study in semi-structured interviews: 60% of them belonged to the Technology and Security departments, and 40% to the areas of Human Resources (people development) and Internal Communication.

In addition, more than 50 focus groups were organised, with an average of seven participants per session. Two types of focus groups were differentiated:

Initial design groups, held at the beginning of the process with Technology, Human Resources and Communication managers. A methodology based on Design Thinking [51] was used to adapt the SDT strategy to the specific needs of each company.

Follow-up groups, held monthly with so-called digital leaders, a figure created in each company to accompany the implementation of SDT. A total of five digital leaders (one per company) participated, all of them with middle management profiles in the Technology area. Their role was to evaluate the organisational impact of the process, follow up on the actions implemented and propose adjustments from an operational perspective focused on the direct experience of employees.

The qualitative component consisted of 25 semi-structured interviews and five focus groups conducted at the beginning of the process. The interviews aimed to diagnose the initial situation, identify organizational and cultural barriers, and align visions among the key areas involved in Sustainable Digital Transformation (SDT), including Technology, Human Resources, and Corporate Sustainability. The focus groups provided a space for participatory reflection, enabling the joint identification of priorities, expectations, and success indicators.

3.2.2. Quantitative Data

In addition, objective data on technology adoption was collected directly from the companies' dashboards compiled by their Technology and Information (IT) departments. This indicator was defined as the adoption rate of the technologies implemented, measured regularly by the IT departments of each organisation. The availability of this data enabled a comparative analysis of the model's impact in terms of effective use and technological sustainability, as well as establishing correlations between the actions taken and their adoption by the teams.

The main quantitative metric used in this study was the "usage rate", defined as the proportion of active users relative to the total number of potential users within each company and technology. A user was considered active if at least one meaningful interaction (login, file exchange, meeting participation, or workflow action) was recorded per day. Data were obtained from the IT departments, which systematically collected usage rate information according to this definition. The data were displayed through independent digital dashboards developed for each company. Usage rates were measured every two months during the implementation of the WWP-SDT model to ensure comparability across companies and technologies.

A longitudinal trend analysis was performed to estimate the slope of adoption rates before and after implementation of the WWP-SDT model. This analysis allowed us to confirm that post-phase increases exceeded baseline trends across all technologies. An adoption target of 50% or higher was defined [52]. This threshold was based on previous studies that identified this level as a benchmark of maturity for digital adoption and behavioral change in organizations [26].

The participating companies initiated their digital transformation processes in a staggered manner, with a maximum interval of two months between them. Data collection was aligned with the implementation phases of the WWP-SDT model to ensure comparability. In addition to the initial and final usage rate measurements, bi-monthly assessments were carried out during the ethical-social phase to monitor the evolution of adoption and organizational change. This staggered implementation and regular measurement allowed for temporal comparison across companies and strengthened the robustness of the longitudinal analysis.

3.2.3. Analysis Techniques

The analysis of qualitative data followed the systematic framework proposed by Norman K. Denzin [52], which involves three iterative stages: data reduction, data display, and conclusion verification. This process enabled the identification of patterns and relationships among the three analytical dimensions of the WWP–SDT model (technical–entrepreneurial, ethical–social, and political–contextual) and with the principles of change management (ADKAR) and IPMA competencies. To ensure reliability and transparency, two researchers independently coded all interview transcripts, achieving an inter-coder reliability of $\kappa = 0.80$. Discrepancies were resolved through consensus, following the trustworthiness criteria established by Nowell et al. [53], which emphasize credibility, dependability, and confirmability.

Triangulation was systematically applied following Denzin’s multi-layered approach [53]: (1) data triangulation, using multiple sources (executives, HR, and IT managers); (2) methodological triangulation, combining interviews, focus groups, and quantitative dashboard indicators; (3) investigator triangulation, through cross-review between coders; and (4) theoretical triangulation, by interpreting results through the complementary frameworks of WWP, IPMA, and Prosci ADKAR. These strategies minimized bias and strengthened the validity of the findings.

3.3. Implementation Phases of the WWP-SDT Model

The proposed methodology, WWP-SDT, structures the Sustainable Digital Transformation (SDT) process into four interrelated phases, which seek a progressive balance between the three dimensions of the “Working with People” (WWP) model: political–contextual, ethical–social, and technical–business. This approach enables technological adoption guided by active participation, capacity building and organisational sustainability.

- Phase 1

Designing a Comprehensive Sustainable Digitalisation Strategy (Political–Contextual Dimension) The initial phase focuses on formulating a holistic strategy that articulates digital transformation objectives with clear sustainability goals in their economic, environmental and social dimensions. This strategy must consider the impact of emerging technologies on internal processes, the generation of new business models and operational efficiency, incorporating long-term sustainability criteria [7]. This is a key stage in aligning the management vision with the principles of SDT and must be adapted to the specific sector and context of each organisation.

In parallel with the strategy, a robust framework for digital security, data privacy, and ethical governance is established. This aspect is crucial given that DT generates and depends on large volumes of data, and its ethical use is critical to the sustainability and legitimacy of the process. Mechanisms for the responsible treatment of artificial intelligence, data analysis, and automation are included, anticipating possible adverse social impacts and ensuring responsible digital innovation.

- Phase 2

Building Alliances for Sustainable Digital Collaboration (Ethical–Social Dimension) This phase promotes the creation of internal and external networks that foster sustainable innovation. Internally, connections between technical, human resources and communication departments are strengthened, generating synergies that are fundamental for the effective adoption of SDT. Externally, collaboration with other actors in the digital ecosystem is encouraged, including customers, suppliers, public administrations and academic institutions, creating collaborative environments geared towards sustainable development [54,55].

- Phase 3

Development of Digital Skills and a Culture of Sustainability (Ethical–Social Dimension) Next, the development of digital skills within the organisation, both technical and attitudinal, is promoted through training and support processes. This phase promotes an organisational culture based on continuous learning, innovation and awareness of the social and environmental impact of technologies. The aim is to create a flexible and collaborative working environment in which sustainability is an inherent part of technological decisions.

- Phase 4

Redesign of Processes and Business Models with a Sustainable Approach (Technical–Business Dimension) Once a mature organisational environment has been established in cultural, ethical and political terms, the reconfiguration of processes and business models is addressed. This phase involves leveraging digital technologies to optimise the use of resources, promote circular models, reduce waste and improve the sustainability of the supply chain. The focus shifts from mere technological adoption to the creation of responsible, environmentally and socially sustainable digital value [56,57].

The following chart (Figure 2) shows the phases involved in sustainable digital transformation from the three dimensions of the WWP-SDT model with mechanisms for dialogue, negotiation and capacity building in organisations.

Phases of WWP-TDS implementation	Political-Contextual Dimension	Ethical-Social Dimension	Technical-Business Dimension
F1: Designing a comprehensive strategy for TDS	X		
F2: Collaboration, creation of alliances that involve various stakeholders		X	
F3: Digital Capacity Building to Foster a Digital Culture with a Focus on Sustainability		X	
F4: Transforming processes and business models towards sustainability through digital technologies			X

Figure 2. Integrated phases of the WWP-SDT model. Own elaboration.

4. Results

This section presents the findings obtained in the study. It is approached through a longitudinal study of the companies analysed, providing an evolutionary view of their practices and performance over time.

This structure allows for a comprehensive understanding of how companies have adapted their strategies and methodologies in response to the challenges of the business environment, as well as an assessment of the effectiveness of the different approaches used in project management and the implementation of organisational changes.

At this point, a comprehensive analysis based on empirical data collected over two years in the five large companies in the technology sector is presented, exploring the effectiveness of an integrated digital transformation model. Next, the results of the WWP-SDT model implementation process are shown, integrating the three dimensions applied to the case environment.

4.1. Political–Contextual Dimension: Strategic Design and Initial Governance in DTS Processes

As outlined in the theoretical framework, the WWP-SDT model is structured around three dimensions: political–contextual, ethical–social and technical–business. The first

stage of the process focuses on designing a comprehensive strategy for DTS (Phase 1), including governance throughout the process. This involves creating a holistic plan that integrates the objectives of digital transformation and organisational change with clear sustainability goals. The strategy must define how digital technologies will be leveraged for long-term sustainability. This strategy guides the entire transformation process. In this phase, companies formalise the agreements and support, both internal and external, necessary for the implementation of the SDT strategy. In other words, an environment conducive to the success of DST is created. This dimension includes aspects related to leadership, ethical governance of technology, organisational sustainability and alignment with strategic frameworks for change management and project management (Prosci and IPMA, respectively).

- Comprehensive SDT strategy and executive leadership

During this first phase (Phase 1 of the model), all the companies in the study defined a strategic plan for sustainable digitalisation, led directly by senior management and the technology department. Although the wording and deployment of the plan varied slightly between companies, the common goal was the same for all of them: “To create a digital and collaborative work culture, through technology, that enables a digital, agile, secure and sustainable workplace”.

This approach involved not only transforming technological processes, but also aligning these changes with specific economic, environmental and social sustainability goals, as proposed by [7,10]. The strategy was to serve as a cross-cutting roadmap for the entire organisation and be adapted to the specific nature of its sector, operations and existing culture. This phase also saw the definition of specific measures to ensure data security, privacy and ethical governance of the digital technologies implemented.

- Interdepartmental coordination as a strategic lever

One of the most relevant lessons learned in this phase was—from the project governance perspective—the critical need to align the areas of Technology (IT), Human Resources (HR) and Internal Communication as co-responsible actors in the transformation process. Although the strategy had been driven by the General Management and the IT department, the experience of the case revealed that effective coordination between these three departments was essential to ensure consistency between technological objectives, internal capacity building and organisational communication of change.

This interdepartmental alignment not only made it possible to identify early barriers (such as low technology adoption rates), but also facilitated the creation of a shared framework for action, with each area contributing its expertise: IT led the technological implementation and the design of secure and functional digital environments; HR managed the development of digital capabilities and cultural adaptation to the new model; Internal Communication ensured clear and motivating channels and messages for change.

This cross-cutting governance model reinforces the postulates of authors such as [2,26], who emphasise that sustainable DT cannot be managed as a purely technical project, but rather as a complex organisational process that requires shared leadership structures and a collaborative culture.

In this sense, the political–contextual dimension is not limited to the formulation of strategy or the ethical governance of technology, but also includes the design of a functional organisational architecture capable of integrating different departmental visions under a common purpose. This was a key turning point in the redesign of the operational phase and the success of the WWP-SDT model change project, which is analysed in the following sections.

- Technology adoption and initial metrics

To evaluate the progress of the process, the companies defined the rate of use of the new technologies implemented as a key indicator, measured directly from the IT departments’ scorecards. It was established that a usage rate of over 50% would be the minimum threshold for considering that a significant impact was being achieved on the processes and culture of the digital workplace. The variables for the sustainable impact of the project, linked to these adoption rates, were also established.

Table 1 and Figure 3 summarize the adoption rates of the four technologies analyzed across the five participating companies during the study period. The data show that, in none of the cases, had the digital tools reached the 50% adoption threshold identified as critical for organizational change.

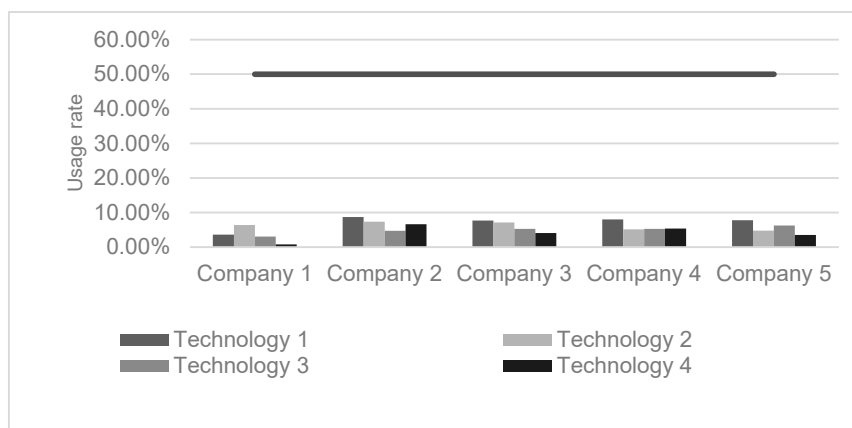


Figure 3. Comparison of starting rates vs. project targets. Starting measures phase 1. Source: Own elaboration.

An initial measurement was taken in this first phase as a baseline. The results showed very low adoption rates, ranging from 0.78% to 9% depending on the technology and the company. The following table summarises the data recorded:

Table 1. Baseline usage rates of technologies–Baseline measurements phase 1.

	Company 1	Company 2	Company 3	Company 4	Company 5
Technology 1:	3.58%	8.71%	7.71%	8.00%	7.79%
Technology 2:	6.38%	7.34%	7.12%	5.11%	4.78%
Technology 3	3.05%	4.72%	5.32%	5.26%	6.27%
Technology 4	0.78%	6.59%	4.10%	5.39%	3.53%

Source: Own elaboration.

For confidentiality reasons, the specific software solutions are anonymized as “Technology 1–4”. However, to ensure interpretability, each technology is described according to its functional category: (1) collaborative communication platform, (2) cloud-based document management system, (3) video conferencing and remote teamwork tool, and (4) process monitoring and automation system. These categories are comparable across companies and represent key enablers of Sustainable Digital Transformation

The following section analyses how the activation of the ethical–social dimension made it possible to overcome these differences between the planned objective and the baseline data detected in the first phase.

4.2. Ethical–Social Dimension: Training, Digital Culture and Collaboration Networks

The second and third phases of the WWP-SDT model activate the ethical–social dimension, which is a fundamental pillar for the success of sustainable digital transformation (SDT). This dimension encompasses both the development of individual digital skills and

the creation of an organisational culture aligned with the values of sustainability, collaboration and innovation. Its relevance is based on the integration of the competencies of the People area of the IPMA (International Project Management Association) model [58] and the elements of Awareness, Desire and Knowledge of the Prosci-ADKAR change management model [35,59].

- Activation of digital capabilities and organisational culture

At this stage, a comprehensive intervention plan was designed, articulating communication, awareness-raising and training actions aligned with the strategic objectives defined in previous phases. The focus shifted from technical deployment to human development, reinforcing the link between digital transformation and corporate culture [26]. Three fronts were addressed in a coordinated manner:

Strategic internal communication: awareness campaigns at the organisational level, highlighting best practices, and recognising change leaders as mechanisms to generate engagement and social legitimacy for the process.

Personalised training by profile: specific training itineraries for different organisational groups, led by figures known as “digital leaders”, with a focus on technological skills applied to agile and sustainable environments. This cascading structure helped to reinforce social learning and ownership of change [27].

Definition of new digital behaviours: key expected behaviours were clearly identified and communicated, along with their associated benefits and impact indicators (operational efficiency, waste reduction, organisational well-being).

This operational approach aligns with the initial phases of the ADKAR model [35]: (1) Awareness of why the change is happening, (2) Desire to participate in and support the change, and (3) Knowledge of how to change. The literature supports this approach by demonstrating that DT processes are more successful when they are supported by structured, people-focused change management strategies [12].

- Creation of collaboration networks and distributed leadership

At the same time, both internal and external collaboration networks were consolidated. Internally, synergies between the Technology, Human Resources and Internal Communication areas, which had already been activated in the political–contextual dimension, were strengthened. These networks facilitated shared governance and greater strategic cohesion in implementation. Externally, alliances were promoted with key players in the digital ecosystem—such as technology providers, public institutions, and third sector entities—in order to enrich the process with shared learning and extend the impact to the value chain.

Externally, synergies were promoted with actors in the digital ecosystem (suppliers, institutions, third sector entities) with the aim of enriching the SDT with shared learning and extending its impact to the value chain.

These networks were energised through monthly focus groups facilitated using agile methodology, led by the five “digital leaders” appointed in each company. Their role was twofold: to generate collective intelligence on barriers and accelerators of change, and to adapt strategies iteratively based on the teams’ direct experience.

- Results: substantial improvement in technology adoption

The activation of the ethical–social dimension, in coordination with the political–contextual dimensions, generated a turning point in the results. Between months 12 and 15 of the process, technology usage rates far exceeded the 50% threshold set as a target, reaching levels of 55% to 78% depending on the tool and the company. These results, summarised in Tables 2 and 3, reinforce the central hypothesis of the study: only through the balanced articulation of the three dimensions of the WWP-SDT model is sustainable technology

adoption possible, aligned with a systemic approach that integrates processes, people and purpose, simultaneously activating the three axes of the WWP model [10].

Table 2 and Figure 4 present the evolution of key organizational and cultural indicators associated with the ethical–social dimension of the WWP–SDT model. In all cases, after the implementation of this dimension, the defined 50% threshold was exceeded.

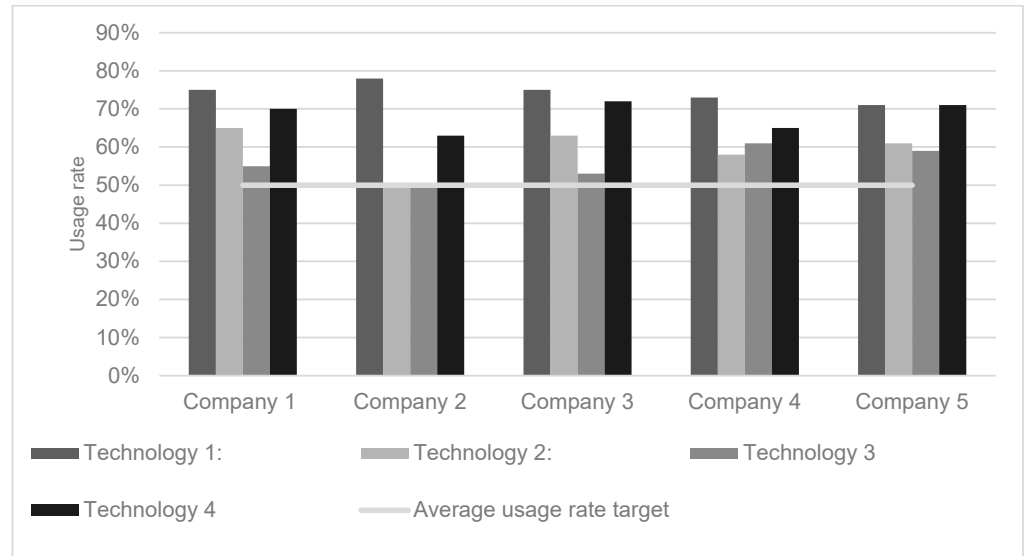


Figure 4. Comparison of process objective adoption rates vs. rates after phases 1 and 3. Application of P-C and E-S dimensions. Source: Own elaboration.

These results are shown in the following tables:

Table 2. Adoption rates of technologies after phases 1 and 3. Application of PC and E-S dimensions.

	Company 1	Company 2	Company 3	Company 4	Company 5
Technology 1:	75%	78%	75%	73%	71%
Technology 2:	65%	50%	63%	58%	61%
Technology 3:	55%	50%	53%	61%	59%
Technology 4:	70%	63%	72%	65%	71%

Source: Own elaboration.

Table 3. Comparison of initial adoption rates vs. adoption rates after phases 1 and 3. Application of P-C and E-S dimensions.

	Objective	Phase 1	Phase 3
Technology 1:	50%	7.16%	74%
Technology 2:	50%	6.15%	59%
Technology 3:	50%	4.92%	56%
Technology 4:	50%	4.08%	68%

Source: Own elaboration.

Comparisons between companies suggest that differences in adoption levels could be linked primarily to the ethical and social dimensions of the model, particularly to factors related to organizational culture, leadership involvement, and governance maturity. Companies that prioritized the ethical–social dimension of the WWP–SDT model—through active communication, participatory decision-making, and visible leadership support—achieved higher usage rates and stronger alignment with sustainability objectives. Conversely, those with more centralized structures or limited engagement from top management exhibited slower and less consistent progress.

Table 3 and Figure 5 present a comparison of adoption rates for each technology before and after the implementation of the ethical–social phase. The results show that, across all technologies, the increase in usage rate surpasses the 50% target defined as the objective, confirming the positive impact of this dimension on user engagement and technological integration.

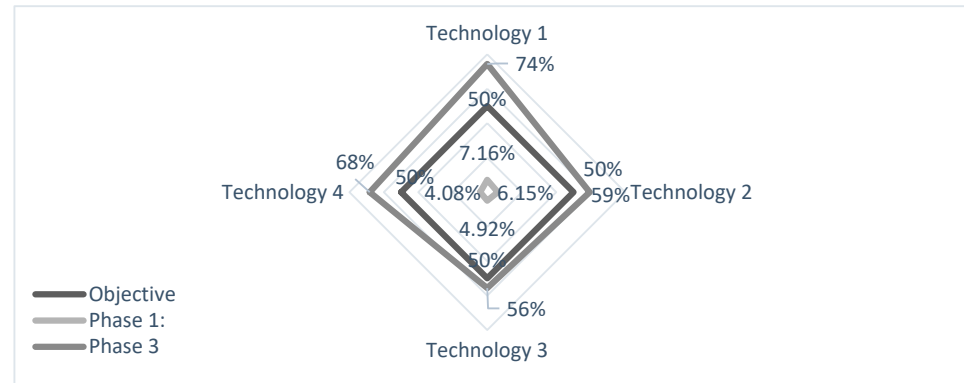


Figure 5. Comparison of initial adoption rates vs. adoption rates after phases 1 and 3. Application of P-C and E-S dimensions. Source: Own elaboration.

4.3. Technical–Business Dimension: Operational Transformation and Sustainable Results

The third dimension of the WWP-SDT model, the technical–business dimension, corresponds to the final phase (phase 4) of the sustainable digital transformation process and focuses on the practical application of technological resources and agile methodologies to effectively transform organisations’ internal processes, business models and operations, with a clear focus on sustainability.

This dimension is based on the premise that technical actors are the main source of innovation within organisations [20], capable of designing solutions that improve the efficiency, quality and environmental impact of business processes. This dimension is closely linked to the IPMA model’s area of practice competencies, which brings together the knowledge, skills and abilities required for the technical execution of projects [58] and is expressed operationally through digital tools, quality standards, impact indicators and continuous improvement cycles.

- From technological deployment to process redesign

In the five participating companies, the initial technological deployment focused on implementing collaboration, information sharing and agile working tools (shared cloud, collaborative documentation, videoconferencing, agile models). However, the initial results at the start of the process showed a low level of technology adoption, with usage rates between 0,78% and 9%, well below the 50% threshold established as the minimum impact (see Table 1). This gap reflected a mismatch between technical availability and organisational adoption, highlighting that a transformation focused exclusively on technology is not sufficient. This situation was interpreted as evidence of the need to implement the following phases of the model, the ethical–social and political–contextual phases (already discussed in the previous sections), without which the technical–business dimension cannot realise its full potential.

Once these two phases were implemented, companies began a process aimed at operationally transforming business processes and models by increasing the adoption rate of digital technologies and aligning with sustainability principles. This phase coincided with the second year of the study and activated the three dimensions of the WWP model in an integrated manner.

- Technologies as levers for operational sustainability

The redesign of processes was supported by already available technologies, now articulated through specific plans for use and learning guided by digital leaders and dashboards. Companies began to use these tools not only as channels of communication and work, but also as vehicles for energy efficiency, reduction in paper use, reduction in face-to-face travel and optimisation of information flow.

Technical impact indicators, both quantitative and qualitative, were established, linking the use of technology to sustainable goals. For example: Reduction in the environmental impact of employee travel (Greater than 30% in three companies). Elimination of physical formats and duplicate processes (Greater than 80% document digitisation). Improvement in the internal satisfaction index linked to the new working environment (increases of between 18% and 32%, measured by internal surveys).

This change in approach, which integrates the principles of socio-technical systems design, highlights the importance of not only digitising existing processes, but also structurally redefining them under new sustainability values and objectives [18].

- Consolidation of results and technical maturity

Between months 12 and 15 of the process, the data revealed a substantial improvement: technology adoption rates far exceeded the minimum threshold, with values between 55% and 78% depending on the tool and the company (see Tables 2 and 3). This improvement cannot be attributed solely to the technical component, but rather to the cross-cutting and integrative governance model, in which the technical–business dimension is aligned with the ethical–social (capabilities and culture) and political–contextual (leadership and strategy) dimensions.

This result shows that technical maturity does not depend exclusively on the infrastructure or resources available, but on their functional and relational integration within the organisational system, as also pointed out by numerous authors [20,26].

To provide a clearer view of how each component of the WWP–SDT model contributed to the overall outcomes, Table 4 summarizes the marginal effects of its three core dimensions—technical–entrepreneurial, ethical–social, and political–contextual—highlighting their respective focuses and observed results across the participating companies.

Table 4. Marginal Contributions of the WWP–SDT Model Dimensions.

WWP–SDT Dimension	Main Focus	Observed Contribution/Marginal Effect
Technical–Entrepreneurial	Digital efficiency and technological implementation	Improved speed and reliability of technology adoption; optimization of digital workflows
Ethical–Social	Cultural alignment and people-centered transformation	Strongest driver of behavioral change and sustained adoption; enhanced collaboration and engagement
Political–Contextual	Institutional governance and sustainability integration	Strengthened leadership commitment and coordination across departments; alignment of digital and sustainability agendas

5. Discussion of Results

The results of the study confirm the central hypothesis of the article: Sustainable Digital Transformation (SDT) can only be achieved through the balanced integration of the three dimensions of the WWP (Working with People) model—political–contextual, ethical–social, and technical–business dimensions. This integration is a necessary condition for overcoming the limitations of fragmented approaches and achieving significant and sustainable impacts over time.

The longitudinal research shows how the progressive and coordinated activation of these three dimensions enabled organisations to overcome the initial barriers to change, substantially increase technology adoption rates and consolidate a culture of sustainable innovation. Based on this analysis, five main findings are identified that provide empirical and conceptual evidence for the academic and professional debate on the implementation of SSD in large organisations:

1. Leadership and integrative strategy as articulating elements of SDT (Political–Contextual dimension)

The political–contextual dimension, activated from phase 1 of the WWP-SDT model, was essential for establishing a cross-cutting vision, defining clear sustainability objectives, and ensuring active sponsorship from senior management.

This dimension made it possible to create governance structures that aligned the three key departments: Technology, Human Resources and Communication. This shared leadership facilitated the articulation between the technical and social dimensions of change, as proposed by the IPMA [58] approach and organisational change management frameworks.

Once the internal governance model was consolidated, the deployment of the model gained legitimacy, coherence and the ability to activate the entire process. This distributed governance was key to integrating real-time learning and adjusting interventions through agile mechanisms such as monthly focus groups.

This finding coincides with the recommendations of the IPMA [58] and the change management principles of Prosci [35], which emphasise the importance of active sponsorship and consistency between strategic and operational objectives. Leadership deployed in this way legitimises the project within the organisation, highlights the sustainable benefits and the new agile, digital and secure working model, and also facilitates activation and coordinates actions.

2. The human factor as the main catalyst for transformation (ethical–social dimension)

The low levels of technology adoption detected in the initial measurement (between 3% and 9%) show that technological deployment alone does not generate impact if it is not accompanied by a strategy to involve people. This finding highlights the critical role of the human factor in organisational change processes, in line with previous studies [20,26].

It is only when the ethical–social dimension is activated in its two phases—the consolidation of alliances and the activation of internal communication, training, capacity building and the generation of sustainable digital behaviours—that an increase of more than 50 percentage points (between 65% and 70% adoption rate) occurs. This indicates that digital capacity building and a culture of sustainability are key catalysts for mobilising the transformative potential of technology, in line with the principles of the Prosci ADKAR model [35].

This evidence confirms that digital transformation demonstrates its impact on people, not just on technology, as authors such as [26] also point out. Capacity building, awareness raising and value alignment are the turning point that triggered the dynamics of change.

Furthermore, the growing presence of emerging technologies such as generative artificial intelligence reinforces this conclusion: the greater the technological disruption, the greater the need for people to be able to adapt, relearn and act ethically. DST cannot therefore be separated from an anthropocentric and formative approach [22,23].

3. The technical–business dimension drives the leap in impact when activated in conditions of organisational maturity.

The results of the study show that the technical–business dimension, linked to the implementation of digital tools, agile methodologies and process redesign, does not act as

a trigger for transformation, but rather as an accelerator whose effectiveness depends on prior organisational preparation.

In the first measurement (initial phase), after technological deployment, with no impact on skills or culture, usage rates ranged from 0.78% to 9%, well below the 50% threshold set as the minimum target. This low adoption revealed that technology does not generate transformation, and that its impact is conditioned by human, cultural and strategic factors [20,26].

Once the integrated deployment of the political–contextual (leadership, governance, vision) and ethical–social (digital capabilities, communication, culture of sustainability) dimensions took place, sufficient organisational maturity was achieved to fully activate this third dimension. It was from that moment on that technological tools began to be used as real levers for operational transformation and sustainability: reduction in travel (30%), digitisation of processes (80%) and improvements in the working environment (18–32% increases in internal satisfaction).

These results reinforce the thesis that the technical–business dimension becomes a driver of impact only when it acts on fertile ground: a prepared culture, developed capabilities and a shared strategy. In methodological terms, this finding validates the logic of sequential and synergistic implementation of the WWP-SDT model and suggests that technical maturity should not be confused with mere technological availability, but rather understood as a state of functional integration between processes, people and organisational purposes.

4. Sustainability as a vector for the integration of digital transformation (intersection of the three dimensions)

The WWP-SDT model made it possible to link new digital behaviours with tangible benefits in terms of sustainability (reduction in travel, document digitisation, energy efficiency, improvement in organisational well-being). This finding is particularly relevant, as it responds to the regulatory (Directive 2014/95/EU) and strategic (SDGs) requirements faced by large companies in Europe.

By integrating sustainable objectives into the definition of indicators, processes and organisational culture, companies succeeded in making digital transformation transcend instrumental logic and become a project with a shared purpose, aligned with ethical values and social responsibility. This finding reinforces what [7,10] proposes: the convergence between digitalisation and sustainability is not optional, but a strategic requirement for organisations that aspire to generate long-term value and respond to regulatory and social demands (Directive 2014/95/EU, SDGs).

5. Synergy between management models: IPMA and Prosci as structural activation frameworks

A distinctive feature of the WWP-SDT model is its ability to integrate international project management and organisational change frameworks. The study demonstrated that the articulation between the IPMA practice competencies (technical scope) and the elements of Prosci's ADKAR model (human scope) provides a robust methodological architecture for deploying SDT with consistency and follow-up.

In particular, the phases of the ADKAR model—Awareness, Desire, Knowledge, Ability, and Reinforcement—were deployed in parallel with communication, awareness-raising, training, and engagement actions, facilitating the transition to new working models. This made it possible to measure the evolution of change qualitatively and quantitatively, through adoption rates, satisfaction, participation in collaborative networks, and monitoring of good practices. In this sense, the model demonstrates scalability and practical applicability in complex contexts.

While the results indicate a positive relationship between the implementation of the WWP–SDT model and the increase in adoption rates, these findings should be interpreted with caution. The observed improvements may also reflect concurrent external factors that were not explicitly controlled for in this study. Although data consistency was monitored, no formal control group was established, and as discussed later, future research should incorporate sensitivity analyses or quasi-experimental designs to better isolate the causal contribution of the WWP–SDT model.

6. Conclusions and Limitations

Taken together, these results validate the holistic approach of the WWP–SDT model, showing that sustainable digital transformation is not merely a technical process, but a multidimensional organisational intervention. Success lies in the ability of organisations to integrate the three dimensions of the model—Political–Contextual, Ethical–Social, and Technical–Business—thus generating a profound organisational impact.

Furthermore, this study provides a replicable and adaptable framework that can serve as a basis for future research and applications in other sectors. It also aligns the principles of project management (IPMA) and organisational change (Prosci/ADKAR) with the demands of sustainability. It thus contributes to the field of sustainability management and digital transformation by providing concrete, empirically validated and conceptually grounded methodological proposal.

Ultimately, SDT cannot be managed as an isolated technical process, but rather as a systemic transformation that requires leadership, culture, training, technology and purpose. Organisations that integrate these dimensions not only improve their adoption rates and operational efficiency, but are also better positioned to face the challenges of the future.

The study has some limitations that should be considered. First, its proven effectiveness in large organizations, the WWP–SDT model presents some contextual and scalability limitations that should be acknowledged. Its successful implementation depends strongly on the existence of formal governance structures, participatory leadership, and sustained engagement from top management. These conditions are more easily met in large corporations with mature digital ecosystems than in small or medium-sized enterprises (SMEs), where resource constraints and informal organizational cultures may limit its applicability. Future research should therefore explore adaptations of the model to smaller firms and different cultural settings, assessing how its methodological principles can be simplified or scaled to varying organizational realities.

Another limitation is the possible subjectivity in the interpretation of qualitative data obtained through interviews and focus groups, despite efforts to maintain objectivity. Furthermore, the time frame of the study may not be sufficient to observe all the long-term effects of implementing the STD model.

- The following Future Research Directions indicate the main lines for extending and validating the WWP–SDT model in diverse organizational contexts.
- Expand the study to include a more diverse sample of companies, including small and medium-sized enterprises, to improve the generalisation of the results.
- Conduct long-term follow-up of participating companies to assess the sustainability and long-term impact of the SDT model.
- Incorporate more robust data triangulation methods to reduce potential subjectivity in the interpretation of qualitative data.
- Consider include control or comparison groups to better isolate the causal contribution of the WWP–SDT model from parallel organizational dynamics or policy effects.
- Explore the applicability of the model in different industrial sectors to assess its versatility and adaptability.

- Incorporate more complete and detailed sustainability metrics to strengthen the quantitative assessment of the WWP–SDT model’s impact. Collecting net pre/post data on environmental, social, and governance indicators would allow for a more precise evaluation of the model’s contribution to sustainable digital transformation.

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