01-026 – Analysing the sustainability impact of digital transformation projects: a case study using the Digital Sustainability Canvas – Análisis del impacto en la sostenibilidad de proyectos de transformación digital: caso de estudio con el Digital Sustainability Canvas

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Digital transformation projects (DTPs) are reshaping how organisations operate, but their impact on sustainability is often overlooked or ignored. This paper explores the Digital Sustainability Canvas (DSC), a visual tool for assessing sustainability impacts in digital projects in a clear, structured way. The DSC was developed in earlier research by combining elements of sustainability and business model tools and is useful for analysing impacts of digital transformation. While other tools assess sustainability in digital contexts, the DSC stands out by focusing on project-level work and helping users examine how digital initiatives affect resources, people, and value. It uses guiding questions and placeholders to explore areas like resource use, waste, governance, and stakeholder engagement. The paper presents its application through a case study from a marketing company, developed as part of an academic experience. The case offers realistic content and encourages reflection. The canvas has also been used in expert discussions, workshops, and postgraduate courses, helping improve content and relevance. These uses show the DSC supports understanding of sustainability impacts and encourages more thoughtful, responsible decisions. The study suggests tools like the DSC, with engaging teaching materials, can help prepare professionals to consider sustainability in digital project work.

Keywords: *Digital transformation projects; Digital Sustainability Canvas; Sustainability assessment; Case-based learning*

Los proyectos de transformación digital (DTP) están cambiando cómo operan las organizaciones, pero su impacto en la sostenibilidad a menudo se pasa por alto o se ignora. Este artículo presenta el *Digital Sustainability Canvas* (DSC), una herramienta para evaluar impactos de sostenibilidad en proyectos digitales de forma clara y estructurada. El DSC fue desarrollado en investigaciones previas combinando elementos de marcos de sostenibilidad y modelos de negocio, y resulta útil para analizar impactos de la transformación digital. Aunque existen otras herramientas para evaluar sostenibilidad en contextos digitales, el DSC destaca por centrarse en el nivel de proyecto y ayudar a examinar cómo las iniciativas digitales afectan a los recursos, las personas y el valor. Utiliza preguntas guía y bloques para explorar áreas como el uso de recursos, residuos, gobernanza y participación de grupos de interés. El artículo muestra su aplicación mediante un caso en una empresa de marketing, desarrollado como parte de una experiencia académica. El caso ofrece contenido realista y fomenta la reflexión. El DSC también se ha usado en debates, talleres y posgrados, ayudando a mejorar contenido y relevancia. Estas experiencias muestran que el DSC apoya la comprensión de impactos y decisiones más responsables.

Palabras claves: *Proyectos de transformación digital; Digital Sustainability Canvas; Evaluación de la sostenibilidad; Aprendizaje basado en casos de estudio*

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1. Introduction

Digital transformation projects (DTPs) are changing the way organisations operate, deliver value and engage with stakeholders (Wedaa & Bolatan, 2024). By adopting technologies such as artificial intelligence, big data and cloud computing, many companies aim to improve efficiency, increase flexibility and develop new services (Wedaa and Bolatan, 2024; Martínez-Peláez et al., 2023 However, the sustainability implications of DTPs often receive limited attention. These projects can increase energy use, e-waste and resource consumption, while also affecting social equity (Li, 2024; Ologeanu-Taddei et al., 2025).

Many of these impacts are indirect or emerge after project implementation, making them difficult to be detected with traditional project management approaches. Most frameworks still prioritise cost, time and scope, without fully addressing sustainability outcomes (Schipper and Silvius, 2017; Ologeanu-Taddei et al., 2025). Sustainability tends to be handled separately from the design and assessment of digital initiatives, limiting its influence on early project decisions (Roberstone & Lapiņa, 2023).

To address this issue, Maldonado and Otegi (2022) developed the Digital Sustainability Canvas (DSC), a visual tool to integrate sustainability into DTPs from the beginning. The DSC combines elements of the Business Model Canvas (Osterwalder and Pigneur, 2010), the Triple Bottom Line (Elkington, 1998), the UN Sustainable Development Goals (2015) and the Triple Layered Business Model Canvas (Joyce and Paquin, 2016). It also builds on the structure of the Digital Transformation Canvas (Remane et al., 2017), which points out the way digital innovation is reshaping business thinking.

The result is a single canvas with structured placeholders and guiding questions to support sustainability analysis across environmental, social and economic domains. Unlike broader strategic tools, the DSC is tailored for project-level use and encourages reflection during digital project planning. Its structure aligns with the Sustainable Project Management Canvas (Schipper & Silvius, 2017) but places stronger emphasis on sustainability issues specific to digital innovation.

The DSC has been applied in academic settings to support responsible decision-making and sustainability awareness. This paper applies the DSC to a real digital transformation project in a marketing company, using a case developed under the Digital Case Study Guideline by Wolff et al. (2025), which emphasises realistic content, clear structure and interdisciplinary learning.

The case offers practical data to work through the DSC and supports reflection on direct, indirect and unintended impacts. In educational contexts, this approach encourages students to understand how DTPs affect sustainability and prepares them for informed, responsible roles in future projects.

This paper is structured as follows: Section 2 presents the study's objectives. Section 3 outlines the methodology and case design. Section 4 introduces the DSC and its guiding questions. Section 5 describes the application of the canvas to a real case study. Section 6 presents the results. Section 7 discusses the main findings, and Section 8 offers final conclusions and suggestions for future research.

2. Objectives

The objective of this study is to is to demonstrate how the DSC can be applied effectively to a real DTP within an academic context. Beyond testing the tool's functionality, the study aims to

explore how a well-structured case study can foster meaningful engagement with sustainability issues in project-based learning environments.

The case used in this study is based on a real organisation and includes realistic context and sustainability-related data. This allows students to apply the DSC step by step, engaging critically with each of its components. Through this process, they are encouraged to identify and reflect on both the intended and unintended impacts of the digital transformation initiative.

The study focuses on three main goals:

- To illustrate how the DSC enables users to analyse sustainability impacts in a clear and structured way by applying it to a real DTP.
- To explain how the design and realism of a case study influence users' ability to meaningfully engage with sustainability through the DSC.
- To demonstrate how a real case studies enhance the educational use of the DSC by supporting reflection on the environmental, social and economic dimensions of DTPs.

These objectives contribute to the development of practical, sustainability-oriented teaching materials in project management education. The study demonstrates how visual tools such as the DSC can help prepare project managers for more responsible and informed decision-making in their professional roles.

3. Methodology and Case Design

This study is based on a case study approach for applying the DSC to a real DTP. The method focuses on applying the DSC step by step using a case that was specifically prepared for teaching and learning purposes. The case was developed following the Digital Case Study Guideline by Wolff et al. (2025), which outlines how to create interdisciplinary, open-ended and digitally supported cases to promote deeper learning in project-based contexts.

The key elements that make a case more effective for learning and reflection (Wolff et al., 2025) are:

- A realistic context based on actual digital transformation challenges.
- Integration of technical, organisational and sustainability content.
- A clear project narrative that supports understanding of the sequence of events.
- Opportunities to explore intended and unintended sustainability effects.
- Open-ended analysis to support critical thinking.

Wolff et al. (2025) also highlight the value of combining specialised knowledge from one field with collaboration across different disciplines, to better reflect how teams work in real organisations. They recommend using real business problems and supporting the case with digital materials such as documents, videos or interactive tools to make the learning experience more engaging and realistic.

These principles guided the structure of the case used in this research. The case was based on a real DTP and included information on project goals, technologies used and indicators of environmental, social and economic impact. This ensured that users had enough context and detail to complete each section of the DSC.

The canvas was applied using the full set of guiding questions to fill in all the 11 sections. This process helped explore direct, indirect and unintended impacts, allowing for structured reflection on sustainability in the digital project. The aim was not to evaluate outcomes or measure learning performance, but to show how the DSC functions when supported by a well-

designed case that encourages users to connect information, reflect critically, and consider broader sustainability implications.

4. The Digital Sustainability Canvas (DSC)

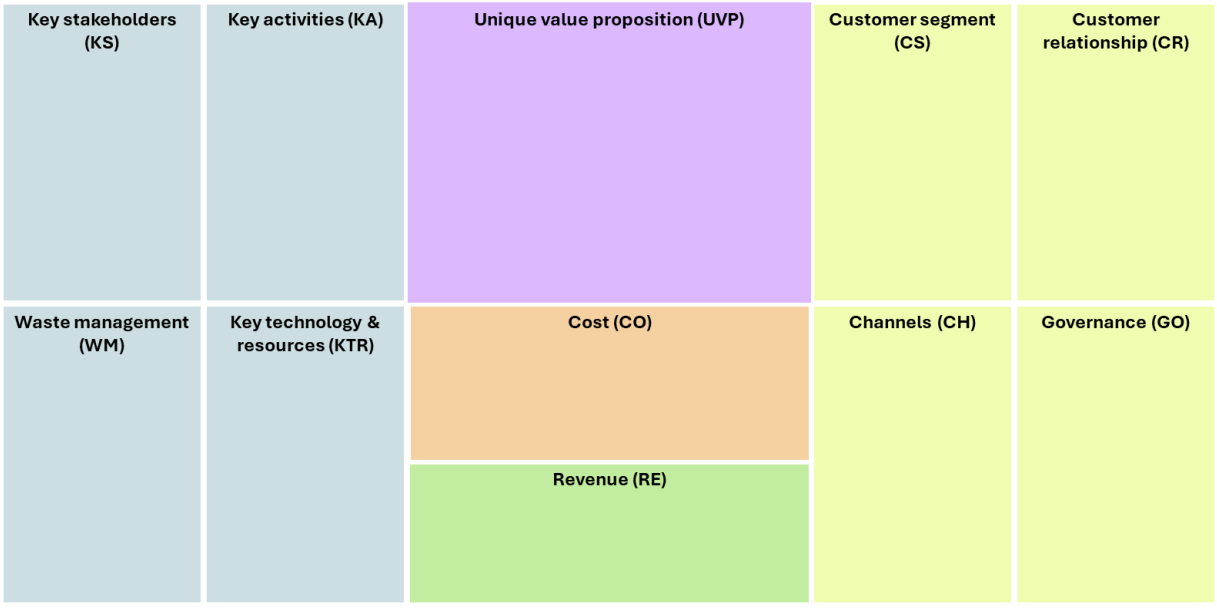
The DSC is the main framework used in this study to examine DTPs from a sustainability perspective. It was selected for its practical format, clarity and its ability to integrate environmental, social and economic dimensions into project-level decisions. This section presents its origins, structure and supporting concepts, along with the guiding questions that help apply the canvas in educational and professional contexts.

4.1 Structure and Foundations of the DSC

Maldonado and Otegi (2022) developed the DSC (Figure 1) as a visual tool to identify, and assess the sustainability impacts of DTPs. It responds to the lack of tools focused on integrating sustainability at the project level in a clear and accessible format. Its conceptual layout is based on several fundamental models, such as the Business Model Canvas (Osterwalder & Pigneur, 2010), the Triple Bottom Line (Elkington, 1998), the UN Sustainable Development Goals (UN, 2015) and, especially, the Triple Layered Business Model Canvas (TLBMC) (Joyce & Paquin, 2016), which combines economic, social and environmental analysis in business model innovation. The DSC simplifies the three layers of the TLBMC into one canvas for easier use in practice.

In adapting these frameworks to digital transformation, the DSC focuses specifically on digital projects, where sustainability is often not fully being considered. On the other hand, tools such as the Sustainable Project Management Canvas (Schipper & Silvius, 2017) and the Digital Transformation Canvas developed by Remane et al. (2017) were also reviewed in Maldonado and Otegi's (2022) research. However, unlike these tools, which focus more broadly on project governance or business model transformation, the DSC is designed to be used during the analysis and planning of specific digital initiatives, allowing users to visualise how sustainability concerns relate to concrete project decisions.

Figure 1: Digital Sustainability Canvas (DSC) (own elaboration).



The DSC (Figure 1) includes 11 main placeholders: Unique Value Proposition (UVP), Customer Segments (CS), Customer Relationships (CR), Channels (CH), Governance (GO), Key Stakeholders (KS), Key Activities (KA), Key Technologies and Resources (KTR), and Waste Management (WM). It also includes Cost and Revenue sections to help contextualise business implications, though these are not the primary focus for sustainability analysis. Each placeholder is supported by guiding questions that help users assess aspects such as energy use, digital inclusion or waste generation.

By encouraging users to consider direct, indirect and unintended impacts, the DSC encourages a more holistic view of outcomes. This structure helps identify risks and opportunities aligned with sustainability, while also promoting collaborative discussion, especially useful in educational settings. The canvas has been applied in workshops and classrooms to support sustainability awareness among professionals starting out in their careers.

This study contributes to the literature by showing how DSC can be used as an analytical and educational tool, supporting sustainability learning in digital project contexts in which integrated thinking is often lacking.

4.2 Sustainability Analysis Through Guiding Questions

For the analysis of the impact of DTPs on sustainability, it is helpful to have a clear method for identifying what information should be considered in each section of the DSC. To support this process, the canvas includes a set of guiding questions for each placeholder. These questions help users decide what to include and encourage them to consider not just technical or functional aspects, but also the social, environmental and economic dimensions of their projects.

The questions are based on learning principles from the Digital Case Study Guideline by Wolff et al. (2025), including realistic context, interdisciplinary thinking, critical reflection and access to meaningful data. With this foundation, the DSC becomes more than a planning tool. It also supports thoughtful analysis and active learning about sustainability in DTPs.

Each placeholder includes one general question that helps define its focus, followed by two questions that invite users to reflect on sustainability-related aspects. These include environmental impacts, social outcomes, and economic considerations, as well as indirect or unintended consequences. This question-based structure promotes a broader and more integrated view of DTPs. Table 1 presents the placeholders of the DSC, the corresponding guiding questions, and the educational principles they reflect.

Table 1: Alignment of the guiding questions with the DSC placeholders (own elaboration).

Placeholder	Guiding Question	Design Principle (Wolff et al., 2025)
Unique Value Proposition (UVP)	What makes the project valuable or different from others? What positive environmental, social, or economic impacts does it create? What unintended effects might result from the value it delivers?	Realistic context Critical reflection Data and material
Customer Segments (CS)	Who are the main users or customers of this project? How might these groups be affected socially, economically or environmentally either directly or	Interdisciplinary content Realistic context Data and material

	indirectly? What groups may be excluded or underserved?	
Customer Relationships (CR)	How are customer relationships built and maintained (e.g., mobile app)? What social risks or benefits are associated with these interactions? What are the environmental and economic implications of managing these relationships?	Critical reflection Interdisciplinary content
Channels (CH)	What channels are used to deliver the project's value (e.g., web, mobile, in-person)? What environmental impacts are linked to these delivery methods? How do these channels affect social accessibility or inclusion?	Realistic context Interdisciplinary content
Governance (GO)	What structures are in place to guide project decisions (e.g., internal policy)? How does governance influence environmental, social and economic performance? Are decision-making processes inclusive and transparent?	Critical reflection Realistic context Data and material
Key Stakeholders (KS)	Who are the key stakeholders (e.g., internal teams, partners, suppliers, users)? How do these actors shape or are affected by the project? What environmental concerns relate to their involvement?	Realistic context Interdisciplinary content Data and material
Key Activities (KA)	What are the main tasks or processes involved in delivering the project (e.g., data collection)? What are the environmental and social impacts of these activities? What opportunities exist to improve sustainability in these processes?	Interdisciplinary content Critical reflection Data and material
Key Technologies & Resources (KTR)	What technologies and resources are required (e.g., cloud services)? What are their environmental footprints? Do their use or sourcing generate social or economic risks or benefits?	Interdisciplinary content Realistic context
Waste Management (WM)	How does the project generate and manage waste (e.g., digital, physical, energy)? What strategies are used to reduce environmental harm? How could waste processes be improved for greater sustainability?	Realistic context Critical reflection
Cost (CO)	What are the main financial costs (e.g., energy use)? How do these relate to environmental or social investments? Are there more cost-effective alternatives that support sustainability goals?	Interdisciplinary content Critical reflection Data and material
Revenue (RE)	What is the revenue model for the project (e.g., subscriptions)?	Critical reflection

	How does it support or limit social and environmental sustainability? Can the model promote responsible customer behaviour (e.g., fair pricing, eco-options)?	Realistic context Data and material

The first column shows the DSC's placeholders. It identifies the key components of a DTP, including value creation (UVP), stakeholder engagement (CS, CR, KS), delivery methods (CH), project governance (GO), key operations (KA), technology and resources (KTR), and sustainability-related factors such as waste (WM), cost (CO) and revenue (RE). Together, they provide a complete view of the project's structure and impact areas.

The second column of the table offers guiding questions that help users explore each section from a sustainability perspective. These questions highlight direct impacts as well as broader aspects such as accessibility, inclusion and long-term considerations. They support critical thinking and help users connect project information with its real-world consequences.

The third column, Design Principle, shows how each set of questions connects to the educational ideas proposed by Wolff et al. (2025). These principles aim to support case-based learning through realism, interdisciplinary content, active thinking and access to relevant information. Each placeholder in the canvas is linked to one or more of these principles, depending on the type of reflection and learning it encourages. For example, sections like Governance or Key Technologies are supported by both realistic context and access to meaningful data, while others such as Customer Relationships or Key Activities help promote critical thinking across different disciplines. This alignment strengthens the role of the DSC as a learning tool, making it easier to analyse DTPs in a way that is both structured and meaningful.

The use of guiding questions ensures that learners can follow a structured approach to completing the DSC while gaining a clearer understanding of how sustainability connects to digital transformation. This supports the broader aim of the canvas, which is to foster more reflective and responsible decisions when planning or analysing DTPs.

5. Design of the Real DTP Case Study

To explore DSC can be applied in practice, this study used a real DTP as a case study. The selected project offered a relevant example of how sustainability impacts can be integrated into digital transformation processes in a marketing company. The case was also designed as a learning tool to support reflective and structured engagement with the DSC. The following sections describe the context of the project, the educational approach used to present it, and how the information provided aligns with each component of the DSC.

5.1 ERA Case Study Description

This case study focuses on a digital transformation initiative implemented by ERA, a marketing company based in Azerbaijan. Founded more than 25 years ago, ERA has positioned itself as a leader in market research and consumer insights in the region. The project aimed to modernise the company's operations by adopting digital systems that could improve service delivery and internal workflows. Key changes included transitioning to cloud-based tools, using data analytics platforms to guide marketing strategies, and automating aspects of client interaction and content creation.

The transformation was driven by the need to improve competitiveness, reduce operational costs and offer more flexible, technology-based services to clients. In particular, ERA introduced tablet-based fieldwork, real-time dashboards, and customer segmentation tools

powered by predictive analytics. These updates were designed to improve the speed and accuracy of data collection and reporting, while reducing paper usage and manual work.

To develop the case, the research team maintained direct collaboration with ERA's project managers and operational staff throughout the digital transition. This allowed for the collection of both quantitative and qualitative information about the transformation. Data included figures on energy consumption, infrastructure investments and digital waste practices, as well as observations related to stakeholder roles, customer engagement and organisational decision-making.

As part of the transformation, ERA implemented a centralised digital workflow platform to improve communication between departments and reduce task duplication. Job roles were also adjusted, with some staff receiving training in digital tools and others shifting to new responsibilities. Remote collaboration tools were introduced to support more flexible work practices. These changes reflect common organisational shifts seen in digital transformation projects across service industries.

The transformation produced both sustainability gains and new challenges. ERA reduced its reliance on printed materials and improved targeting in marketing campaigns, which contributed to resource savings. At the same time, increased energy use from cloud computing and the management of digital waste, such as electronic devices and batteries, became areas of concern. These trade-offs offer a realistic basis for analysing the project through the DSC.

5.2 Case Study Design

This case study was developed with the aim of supporting the learning process that links DTP and sustainability mindset. Rather than presenting a complete story with fixed outcomes, the structure invites users to explore, reflect and make sense of the project through the DSC.

The case includes selected information on project goals, technologies used, and changes in operations and roles. While some details are specific, others are open enough to allow users to raise questions, link ideas, and consider how different parts of the project affect sustainability. This flexible format encourages critical thinking and active participation by simulating a real project.

The content was prepared to align with each placeholder of the DSC. For example, descriptions of cloud platform use relate to resource and energy discussions, while information about customer interaction supports analysis of social inclusion. This makes it easier for learners to connect what they read with the sections of the canvas in a practical way. By working through each component, users can explore how environmental, social and economic considerations emerge in everyday project decisions.

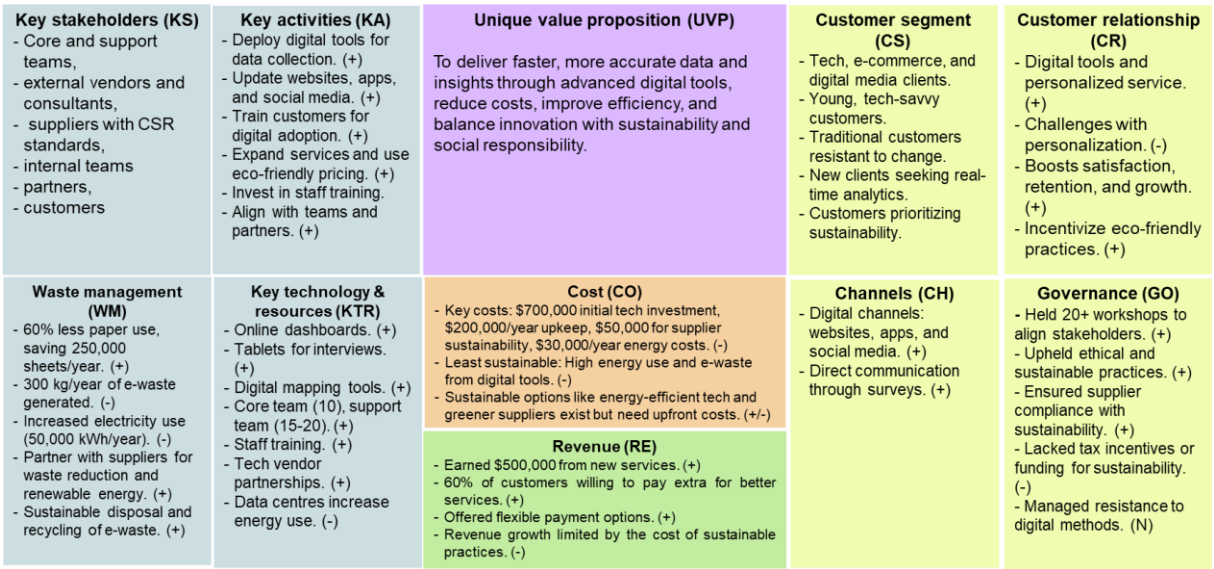
The design also encourages users to move from describing what happened to thinking about what that means. As they apply the canvas, they are guided to reflect on the wider effects of project decisions. This helps develop the habit of considering sustainability as part of everyday work in DTPs. It also supports learning in group or individual settings, allowing the case to be adapted to different teaching formats or workshop sessions.

6. Results of the DSC application

Figure 2 shows the completed DSC for the ERA digital transformation, offering a visual summary of how the different components of this DTP relate to sustainability. The canvas captures both positive (+) and negative (−) impacts across environmental, social and economic dimensions. By using the DSC systematically, the analysis shows direct results but also

indirect and less visible impacts, supporting a more complete and thoughtful view of the project's implications.

Figure 2: ERA's DSC (own elaboration).



The completed DSC (Figure 2) reflects how ERA's digital transformation affected a wide range of sustainability factors. The Unique Value Proposition showed that the initiative delivered faster, data-driven marketing insights, improving efficiency while promoting responsible innovation. However, it also raised concerns about unintended consequences for stakeholders not aligned with this new approach. At the same time, it raised concerns about potential unintended impacts on stakeholders less aligned with digital-first strategies.

For Customer Segments, the project primarily benefited digital-savvy clients, but it also highlighted a risk of excluding more traditional customer groups who may be less comfortable with digital tools. The Customer Relationships placeholder showed to enhanced customer satisfaction through personalisation, while also indicating implementation challenges in tailoring services effectively across diverse user profiles.

The Channels section showed positive contributions to transparency and customer engagement through digital platforms. However, these gains were balanced by concerns related to social accessibility and higher energy demand from always-connected services. In the area of Governance, the canvas noted strong stakeholder involvement and ethical alignment, although financial incentives for sustainability remained limited.

The Key Stakeholders placeholder identified a broad ecosystem, including internal staff, external partners, and customers, each with differing needs and levels of influence. Effective coordination across these groups played a key role in risk management and impact delivery. For Key Activities, the transformation involved digital training, platform deployment and content automation. These efforts increased efficiency and supported eco-conscious practices, though they also raised issues such as energy use and frequent hardware renewal.

Regarding Key Technologies and Resources, the project relied on data centres, tablets, and cloud tools to improve service delivery. Although some measures were taken to reduce environmental impact, the increased energy demand highlighted areas for further improvement. Waste Management efforts, such as reduced paper use and e-waste handling, had a positive effect, but overall digital waste increased as more devices and batteries were used and replaced.

Finally, the Cost and Revenue sections illustrated the financial realities of digital transformation. While initial investments were high and slowed short-term profitability, but the analysis highlighted long-term potential through improved service value and customer willingness to engage with more sustainable aspects.

Together, these findings show how the DSC supports a detailed and structured evaluation of sustainability in digital projects. The ERA case made these dynamics visible and offered a meaningful example of how sustainability can be embedded into digital project design.

7. Main findings from the case study

The application of the DSC in the DTP case study highlighted several key insights about the relationship between digital change and sustainability. These findings are based on the structured use of the canvas and the analysis supported by the case study.

Second, the research showed how the case's clarity, content, and structure influenced user engagement with the DSC. The case was designed using the Digital Case Study Guideline (Wolff et al., 2025), which helped ensure that each section offered just enough information to support analysis, while still requiring interpretation and critical thinking.

Third, the case study proved to be a valuable resource for educational use, particularly in project management and sustainability courses. Its combination of real-world relevance and open-ended questions helped users connect the technical and social aspects of digital projects. This process supported deeper understanding and encouraged learners to think about sustainability as an integral part of digital project planning, rather than just a last-minute idea.

Overall, the findings demonstrate the potential of structured case studies and tools like the DSC to improve sustainability awareness in project-based learning. They also suggest how teaching materials can be designed to prepare future professionals to make more informed and responsible decisions in digital transformation settings.

8. Conclusions

This paper presented the application of the DSC through a detailed and realistic case study based on a DTP. The tool helped identify and visualise sustainability impacts across environmental, social and economic areas in a clear and structured way. By guiding users through a structured exploration of both direct and indirect effects, as well as unintended consequences, the tool supported a more comprehensive and reflective understanding of the sustainability challenges associated with DTP.

The use of the Digital Case Study Guideline (Wolff et al., 2025) contributed to building a case that was both realistic and open to interpretation. This approach encouraged learners to connect decisions with sustainability outcomes, supporting active learning through real-world analysis. The case structure, aligned with the guiding questions of the DSC, enabled users to explore and discuss how project elements such as technology, governance, and customer interaction affect sustainability in different ways.

Overall, the results show that the DSC serves effectively as an analysis framework and learning tool. Its visual design and integrated approach encourage users to observe patterns, examine project dynamics and consider multiple viewpoints. This contributes to more informed planning and decision-making in DTP.

Future research could explore how DSC can be applied in a rage of sectors and contexts. There is also potential to develop interactive versions of the canvas to enable collaboration,

real-time input and wider use in academic and professional environments. These developments can support the continued integration of sustainability into DTPs.

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