Article
Digital Transformation as an Enabler to Become More Efficient in Sustainability: Evidence from Five Leading Companies in the Mexican Market
Regina Diaz 1,*, and Raul Montalvo 2

1 EGADE Business School, Tecnologico de Monterrey, Carlos Lazo 100, Santa Fe 01389, Mexico 2 EGADE Business School, Tecnologico de Monterrey, Avenida General Ramon Corona 2514, Zapopan 45201, Mexico * Correspondence: reginadiaz@tec.mx

Abstract: Not only was Digital Transformation (DT) accelerated by the COVID-19 pandemic, but over recent years some companies have already developed actions related to DT. It is well known that DT has many benefits, such as improving business models, making communication channels more efficient and facilitating decision-making. Furthermore, amongst others, one big challenge of DT is to contribute to areas related to sustainability. The objective of this article is to offer an exploratory review of how a small sample of leading Mexican companies have used DT as an enabler to be more efficient in some sustainability-related issues. The companies analyzed in this paper belong to different sectors: communication services, retail, financial, food and beverages, and materials. Through the identification of DT initiatives and implementations across time, a radar chart was constructed in order to identify, as a first approach, those related to sustainability in order to identify evidence of what some companies are doing in this regard. In addition, actions were grouped under the Business Dimensions defined by Deloitte Development LLC in order to emphasize the focus given by the organizations. One of the main conclusions from the evidence is that indeed big companies have a digital strategy agenda but not necessarily related to sustainability, but also that it is collaterally affected positively due to the economies of scale and operational improvements, from DT. This a qualitative primary study that can be reinforced in the future with analytical evidence that can measure impacts, effects, etc., to enrich strategies that relate to both DT and sustainability.

Keywords: digital transformation; business management; sustainability; qualitative study research; Mexican market

1. Introduction

Digital Transformation has many benefits, such as improving business models, making communication channels more efficient and facilitating decision-making. Furthermore, there are some possibilities of very positive effects of DT in areas of sustainability. The authors of the research paper “Digital transformation, sustainability, and purpose in the multinational enterprise” discuss how environmental and pandemic crises in combination with digitization are presenting the multinational enterprises with increasing geopolitical, organizational, and market tensions [1]. Digital transformation is perceived not only as a change in certain technology but also as a large transition that will ultimately change our lives for the better. Findings reveal that it is possible to suggest a research framework that considers digital transformation as a driver and a predecessor of sustainability. To survive the digital revolution, companies need to enhance their digital capabilities and balance their economic, environmental, and social impacts [2].

The main DT actions that have had an impact on Sustainability were identified considering that these actions contribute to achieving the objectives of the United Nation Sustainable Development Goals (SDGs) [3]. Additionally, a radar chart was constructed
to visually identify the actions of a group of companies over the years. In addition, some actions were grouped under the Business Dimensions defined by Deloitte Development LLC [4] to better identify their impact and scope.

During the last three years, research studies on digital transformation have increased around the world. This situation derived from knowing the effects of the COVID-19 pandemic in different sectors. Sustainability analysis is also involved in these studies. The COVID-19 pandemic was found to be an unfortunate accelerator regarding both consumers’ habits and organizations’ innovation and digital transformation, breaking with the past and leading to new sustainable growth business models [5].

For companies, the development of human capital competencies and digital skills is fundamental to achieve sustainability. In their study, the authors analyzed the development of digital transformation and relevant competencies for employees through a survey method [6]. The pandemic effectively disrupted previous operational models and imbued changes such as telework and digital adoption that are pervasive and may potentially last beyond the pandemic [7].

In their research paper, the authors propose a critical digital transformation for building a resilient and sustainable post-COVID-19 supply chains for developing countries [8]. Interestingly, Japanese authors developed a research paper where they purposed a cross-border, public–private partnership approach on utilizing smart technology for better governance on emergency preparedness and building stronger partnership engagement on a real-time basis [9].

The COVID-19 pandemic crisis created the window of opportunity (WOP) in the digital industry and digital applications, but the WOPs are unevenly distributed among firms, time, and locations [10]. In his article, Ivo Prezzuto, came to the conclusion that the dramatic event of the COVID-19 pandemic as a severe health crisis will likely leave lasting economic and social scars across the world in the years to come, but it will also probably be the catalyst for a brighter, more sustainable, and inclusive future [11].

Some recent studies have analyzed the relation between DT and sustainability in a practical way, finding very interesting results. Using structural equation model (SEM) analysis from the partial least square (PLS) approach, the results show that customers, data and innovation, which are drivers that companies should work on during a digital transformation, have a significant impact on companies’ quest to reach sustainability [12].

By focusing on the digital toolbox employed by pioneering organizations, they propose a research agenda that generates novel questions for entrepreneurship, business models, and ecosystems as well as new ways of thinking about trust and institutional logistics [13]. In their paper, the authors present insights on how the boundary work lens can advance our understanding of alignment processes between focal organizations and their external stakeholders, required for sustainable business model innovation [14].

Using a multiple case research design, this paper investigates the impact of the implementation of Industry 4.0 with specific emphasis on digital transformation of the sustainability dimensions [15].

Digital transformation is an enabler to become more efficient. In the study “Effects of digitalization on financialization: empirical evidence from European Countries”, the author suggests the importance of digital transformation in the business and public sector in augmenting the depth and efficiency of financial markets [16]. The use of modern digital technology, such as big data and cloud computing, is extremely important to ensure the security of the energy system, especially the availability of energy [17]. However, improvement of resource efficiency is only present when the digital transformation process reaches a certain level [18].

Many studies about DT and Sustainability have been developed in European companies. Since analyzing the impact on global markets in small and medium-sized towns [19] until analyzing e-participation platforms, apps or social media platforms (European and Central Asia SCs) for identifying Smart Cities construction differences between developed vs. developing countries [20]. Previous studies have explored the potentials of digital
transformation for achieving the United Nations Sustainable Development Goals (SDGs), especially in a developing economy such as Nigeria [21], and applying semi-structured interviews, the authors holistically examined the sector in Brazil from a Logistics 4.0 perspective to assist companies and government in the transition to digital transformation [22].

Digitization in Mexico still has a long way to go for many companies, but that does not mean that there is no interest, both in Mexico and the region in general [23]. According to Forbes (2020), 81% of companies in Mexico have already started some process of digital transformation [24]. Selected companies have implemented digital transformation in different ways, some details are mentioned below. During their research, it was identified that América Móvil has purchased the following applications: In-House ATS for Applicant Tracking System in 2016, NetCracker Technology Digital Business Enablement for OSS/BSS in 2015, Cisco IronPort Cloud Email Security for Secure Email Gateways (SEGs) in 2020 and the related IT decision-makers and key stakeholders [25]. Infrastructure projects in Mexico for smart retail systems include tools through which retail consumers can easily access the retailer’s e-commerce functions from their smartphones and avoid visiting a location [26].

In Mexico, there are three key digital banking trends (1) open banking initiatives, (2) improvements to banking accessibility and (3) digital payments [27]. Although digitalization and automation are very important for the Mexican food and beverage industry, the key component is data [28]. The food sector has to face specific challenges: changes in seasonal demand, increased demand for differentiated SKUs, increased regulatory or quality restrictions, and the increasingly complex production planning and its escalation to industrial production [29]. It is recognized that in the materials sector digital transformation is not only in terms of machinery and tools to work in the field, but above all, it is recognized in the adoption of specialized software for remote management needs of construction projects in the new working conditions [30]. Our present study covers a gap in the research by focusing on the top five Mexican companies.

Very interesting findings were the result of an exploratory review of how the leading companies within the digital transformation market have addressed sustainable development [31]. In our research, we adopt a similar methodology adopting an inductive, qualitative approach based on an examination of published Mexican companies’ sustainable reports.

Our objectives lead to the following research questions about the main Mexican companies (RQs):

RQ1. What are the Digital Transformation actions that have had an impact on Sustainability during the last five years?

RQ2. What are the main investments of these companies to achieve Sustainability?

The present research paper is organized into two major sections. In the first part, we provide a description of DT actions performed by each company during the period of 2017 to 2021. In the second part, the amount invested in different sustainable actions is shown. Sustainability reports contain very varied information. Although they belong to the same company, they may vary in their presentation and content from year to year. To identify the amounts of investments that were specifically allocated to Digital Transformation activities to achieve Sustainability, we suggest conducting subsequent studies, such as another study that could involve interviews, conducting surveys or another type of research methodology.

2. Literature Review

2.1. Digital Transformation

Digitalization describes how digital technologies can be used to alter existing business processes [32]. Digitization is key both to opening new businesses, to improving the customer experience and to optimizing coordination between processes at an international level [33–37]. Digital transformation occurs in response to changes in digital technologies, increasing digital competition and resulting digital customer behavior [36]. DT implies fundamental changes in the activities of organizations based on the use of digital technologies [38].
Research studies on digital transformation have been developed in different countries and demonstrate the interaction of digital transformation with different areas of study, some examples are mentioned below. The impact and transmission mechanisms of digital economy development on the transformation and upgrading of industrial structures through a fixed effects model were investigated in China [39]. The authors maintained that in Ukraine the state plays an important role in the digitalization process, as it is the main driver of this process [40]. The aim of Rowan et al. (2022) research is to describe the applicability of digital transformation to actualize the benefits and opportunities of paludiculture activities and enterprises in the Irish midlands with a global orientation [41].

The COVID-19 crisis represented a new type and quality of challenge for companies; companies in all industries and of all sizes had to adapt their business models to changing environmental conditions within a short period of time [42]. Organizations attempted to mitigate the negative effects of fighting COVID-19 using digital business model responses [43].

2.2. Sustainability

In 1987, the United Nations Brundtland Commission defined sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” [44]. The Sustainable Development Goals form the framework for improving the lives of populations around the world and mitigating the hazardous man-made effects of climate change [44]. Findings reveal that it is possible to suggest a research framework that considers digital transformation as a driver and a predecessor of sustainability [2].

A wide range of topics interact with DT, allowing researchers to develop different kinds of studies. The authors of “Digital Transformation and Environmental Sustainability: A Review and Research Agenda” identified the disruptions driven by digital transformation in the environmental sustainability [45]. Additionally, they developed a framework that communicates and sets the direction for future research by linking digitalization, business model innovation, and sustainability in industrial settings [46]. A very interesting research agenda on entrepreneurship, business models, and ecosystems was proposed by George et al., (2020) by focusing on the digital toolbox employed by pioneering organizations [13].

Digitalization plays a major role in contributing towards the United Nations Sustainable Development Goals [47]. The new and rapidly spreading trends of digitalization, the circular economy, and servitization are forcing firms to develop new types of competitive advantages [48]. Authors’ findings encourage firms to seize the opportunity of digital transformation to embrace sustainability, because the implementation of these two concepts requires radical changes at the business model level [12]. Without transformation of existing businesses, both economic and environmental challenges of the future cannot be solved sustainably [47]. To survive the digital revolution, companies need to enhance their digital capabilities and balance their economic, environmental and social impacts [2].

The concept of “Industry 4.0” is expected to bring a multitude of benefits for industrial value creation [49]. In order to become ‘4.0 compliant’, an enterprise must adapt its organization and business approaches, and these changes may lead to a significant impact on sustainability [50].

3. Materials and Methods

Sample selection: This study includes some of the top Mexican market companies which actually are listed in the MSCI Emerging Market Index for Mexico as the top five. The MSCI Emerging Markets Index is designed to reflect the performance of large- and mid-cap securities in 24 emerging markets [51]. Thus, only America Movil L, Walmart Mexico V, Grupo Financiero Banorte O, FEMSA Unit UBD, and Grupo Mexico B were selected. Each of these five companies exceeds 10 billion dollars float-adjusted market cap, which is a measure of a company’s current worth as determined by the total market value
of all its “free-floating” shares of stock. The MCSI Top 10 constituents list is: America Movil L, Walmart Mexico V, Grupo Financiero Banorte O, FEMSA Unit UBD, Grupo Mexico B, CEMEX CPO, Grupo Aerop Pacifico B, Grupo Bimbo A, Grupo Aeroportuario B and Grupo Financiero Inbursa O [51].

These companies belong to different sectors of the Mexican Market: communication services, retail, financial, food and beverages, and materials. This situation will help us to understand more broadly the research question posed previously. It is worth mentioning that all these companies are listed on the Mexican stock exchange. America Móvil is the leading provider of integrated telecommunications services in Latin America and, excluding China and India, is the largest company in terms of wireless subscribers. Through the development of a world-class integrated telecommunications platform, they offer their customers a portfolio of value-added services and enhanced communications solutions in 23 countries in Latin America, Central and Eastern Europe [52]. Walmart de México and Centro America is one of the most important retail chains in the region. They have more than 231,000 associates working in more than 3000 units that include self-service stores and membership price clubs. They are present in six countries: Mexico, Guatemala, El Salvador, Honduras, Nicaragua and Costa Rica [53]. Grupo Financiero Banorte is a leading financial institution in Mexico with the best business diversification. It operates under a universal banking model, also offering a wide variety of products and services through its brokerage house, pension and insurance companies, afore, investment funds, as well as leasing and factoring companies and the warehouse [54]. FEMSA Unit UBD is a Mexican multinational beverage and retail company, it operates the largest independent Coca-Cola bottling group in the world and the largest convenience store chain in Mexico. Through their business units they employ approximately more than 320 thousand collaborators in 13 countries: Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Nicaragua, Panama, Peru, United States of America and Uruguay [55]. Grupo Mexico is a leading company in copper production, cargo transportation and infrastructure, with a global presence developing activities in Mexico, Peru, USA, Argentina, Chile, Ecuador and Spain [56].

Research Methodology: the study adopts an inductive, qualitative approach based on an examination of published company reports [31]. This research study is divided in two main sections. The first part seeks to identify the digital transformation actions that these companies have carried out from 2017 to 2021 that contribute to achieve sustainability. To fulfill this purpose, DT actions were identified considering that these actions contribute to achieving the objectives of the United Nation Sustainable Development Goals (SDGs) [3]. A detailed analysis of the annual sustainability reports of these companies for that period was developed. After a first phase of codifying, a radar chart was constructed in which the main actions of each company are observed over time. Moreover, actions were grouped under the business dimensions defined by Deloitte Development LLC [4] to trace the path that the companies followed across time. Secondly, part of the purpose is to show the investment necessary to achieve Sustainability; information also is commonly shown in the annual reports, whether they were DT activities or not. It is important to mention that the aim of this study is to complement other numerical or qualitative analyses previously mentioned in the literature review, as a way to find, analyze and relate evidence of the relation between DT and sustainability and a classification proposed by Deloitte as mentioned before.

4. Results

4.1. First Part: DT Activities That Contribute to the UN SDGs

A detailed qualitative analysis of Sustainability Reports was carried out to identify the DT activities that contribute to the UN SDGs [3]. Appendix A includes a table with the SDGs accomplished per each company, whether they were DT activities or not, just to easily observe the commitment to Sustainability that companies have made.
4.1.1. Identifying DT Actions That Enable Sustainability

- America Movil L. Digital transformation actions to achieve sustainability:
  - 2017: server virtualization; development of “Capacitate CARSO platform”; cloud migration process was completed; digital channel sales doubled compared to 2016; paperless project; customer service improvement: self-service platforms, digital signature, platforms to manage call center and IVR; and single RAN project [57].
  - 2018: Building of the best fiber optic network; the launch of three new satellites; server virtualizations continue; digital channel sales doubled compared to 2017; digital signature was implemented in many countries; single RAN project in final stage; and the launch of 4.5G Network [58].
  - 2019: A total of 300 employees worked remotely on a platform that centralizes web content; begin the deployment of the architecture of IoT HUB; A1 Telekom Austria Group uses innovative logistics concepts as well as video conferencing; Austria Group also uses sustainable propulsion models such as electric, hybrid and gas vehicles [59].
  - 2020: Implementation of Network Function Virtualization; integrating big data analytics and artificial intelligence components to evaluate customer experience; promoting a very ambitious omnichannel project; deployment of 5G network in A1 Telekom Austria Group and Claro Brazil [60].
  - 2021: Provide Internet access to 520.4 million people, 10.3 million more than in 2020; Aprende.org—an accessible and free educational platform; after COVID-19 pandemic, priorities changed [61].
  - America Movil L. maintains that they constantly invest in modernizing their infrastructure, capacity, products and services. These investments allow them to be better prepared to address the future requirements of communication technologies, such as the 5G network, the Internet of Things (IoT), cloud-based services or artificial intelligence, among others [59].

- Walmart Mexico V. Digital transformation actions to achieve sustainability:
  - 2017: Integration of the physical store channels and digital platforms; launch of Marketplace functionality in walmart.com.mx; relaunch of the portal sams.com.mx; Sam’s Clubs have a modality Club Pickup; eight million followers on Facebook; development of the Paperless Automated Registration System (SPARK), a food safety system [62].
  - 2018: Equipment of physical stores and digital platforms to meet the new consumption patterns; integration of Bodega Aurrera into omnichannel scheme; interaction with customers through WhatsApp, Facebook and Twitter; launch of “Cooking with your Morralla”, the first cooking reality show on social networks in Mexico; launch of “Cashi, Mas que Efectivo” platform; e-commerce sales are gaining strength; launch of Zone 18, a business incubator that supports digital transformation [63].
  - 2019: For the first time, customers use WhatsApp to request orders; apps available on Android and iOS; deployment of FlexPOS, a system to manage the point of sale, allowing for more payment options; migration of the payroll process into SAP; launch of The Data Office initiative to evolve into a company capable of generating more advanced analytical solutions using data; development of a recommendation model on digital platforms; and launch of technological tools to prevent money laundering [64].
  - 2020: Welcomed Walmart Express, a format with efficient assortment, low prices, and a stronger omnichannel value proposition; launch of prepaid mobile phone service in Mexico called BAIT (Bodega Aurrera Internet and Telephone); seeking to adapt to the COVID-19 situation, they rely even more on data to understand the changes in clients’ habits and the new normality [65].
  - 2021: Through Walmart Connect, they offer advertising spaces leveraged on their massive omnichannel reach; beginning of Customer-Centric Culture training program and advanced in the implementation of the customer journey methodology; growth of the network connectivity; self-checkout: customers to scan their products and pay for them themselves; Scan&Go: members can use their cell phones to purchase their
products; incorporation of electric vehicles and they are developing omnichannel transport models [66].

- Walmart Mexico V. mentioned that technology and the use of data have become one of their main tools to achieve their growth. They are accelerating digital transformation, investing in the development of new technological capabilities that allow them to turn data into information, on the basis of which we make important business decisions [64]. The evolution of the market and the digital adoption of their clients led them to accelerate and improve their shopping experience to position themselves as omnichannel leaders, simplifying the commercial, eCommerce and administration operation [66].

- Grupo Financiero Banorte O. Digital transformation actions to achieve sustainability:
  - 2017: Promotion of digital collaboration among employees to hold online meetings and video conferences to reduce CO2e; installation of remote sales and self-service technologies in ATMs; efficient use of paper in operations through the use of digital media and cross-selling; electronic file function eliminates print clauses and photocopies; promotion of responsible printing through paperless application; Seguros Banorte Mobile Adjuster tool allows adjusters to collect claim information in digital documents; paperless option as a default configuration for Banorte credit card customers with online banking service and token; Green Rooftop [67].
  - 2018: Implementation of more than 60 new functionalities to reposition Banorte Mobile Banking; founding partner of the Monterrey Digital Hub; development of information-based solutions; release the interactive chat and virtual assistant service, based on artificial intelligence (AI); authentication through biometrics to access Banorte’s mobile banking application; cash withdrawal without plastic at the ATM, using smartphones; digital card, enabling secure purchases in electronic stores; elimination of tickets in ATM, receipt of transactions are electronically send [68].
  - 2019: Personalized offers by the analysis of preferences of the customers; development of new e-commerce functionalities; incorporation of new payment methods such as CoDi®; creation of the cyberintelligence working group with other financial institutions, recognized by the Association of Banks of Mexico; new multi-channel sales platform [69].
  - 2020: The health emergency served as a catalyst for change; significant progress in terms of value offer, origination, use campaigns and loyalty program; using Banorte Movil application, customers manage all the credit card services digitally (generate, block, request replacement, manage limits); 97% of the total accounts with individuals receive their digital account statement; customers can request shifts for branch service through WhatsApp; strengthening of strategic alliances with fintechs (PayClip) [70].
  - 2021: Multi-year strategic alliance with Google Cloud [71].

- Grupo Financiero Banorte O. considers they do not want to be a digital bank, rather they want to develop their capabilities to do banking in a digital world. Therefore, they focus their technological processes to allow the client to operate their services with a single click [68].

- FEMSA Unit UBD. Digital transformation actions to achieve sustainability
  - 2017: Solistica operations implemented efficient route planning and integrating new technologies [72].
  - 2018: Enable the Intelligent Energy Automation and Control System in many work centers [73].
  - 2019: Promotion of financial inclusion through Oxko banking operations; supplier portal offers advantages for local suppliers; incorporation of control technologies to make efficient use of energy; new technological generation in distribution centers, which allow us to optimize the process of assortment to stores; incorporation of multi-temperature vehicles and carried out logistics intelligence work to draw more efficient distribution routes [74].
• 2020: Social intervention program called “Live dancing” was implemented under a non-face-to-face modality; launch of “Social Development” (app) which employees could find activities for social service activities [75].

• 2021: Partnership with Ria Money Transfer so customers can receive up to USD $100 at any Oxxo store; launch of Spin Card, for use of digital banking and payment in electronic commerce; increasing connectivity in 30 ‘neighborhood stores’ in Queretaro. Offering a network range of up to 30 m to provide customers internet access; incorporate the use of electric vehicles: Coca-Cola FEMSA Brazil incorporated its first fleet of 20 vehicles 100% electric and Solistica Colombia tested solutions and low-emission vehicles such as Electric Tricycles [76].

• FEMSA Unit UBD defines sustainability as the ability to generate the social, environmental and economic conditions needed to operate today and grow over time in harmony with the environment and society. They base their actions on an underlying commitment to ethics and values, and they organize sustainability approach along three pillars: “Our People, Our Planet and Our Community” [72].

• Grupo Mexico B. Digital transformation actions to achieve sustainability:
  - 2017: Educational platform www.educacionsaludyvida.org was created [77].
  - 2018: A total of 10 interactive capsules were prepared for our YouTube channel (educational platform) [78].
  - 2019: A digital training platform called Universidad-i was developed; The Community Care Service CCS is widely disseminated through print and digital media (social networks and via email) [79].
  - 2020: Community development model adapted through a digital migration of activities; digital communication campaigns were carried to promote prevention and detection measures for COVID-19; incorporation to the international digital anti-corruption platform TRACE (Anti Bribery, Compliance, Solutions); 90% of all product, service and payment acquisition processes are digital [80].
  - 2021: Launch of The Fundación Grupo México Corporate Volunteering Platform; output channels were expanded to be able to position the messages aimed at the different publics of interest (social networks such as Facebook, Instagram, YouTube and LinkedIn) [81].

• Grupo Mexico B. infrastructure division has a Sustainable Development area that facilitates and monitors the implementation of the sustainability strategy in all business units through four pillars: sustainable investments, environmental protection, policies and communication [79].

4.1.2. Codifying DT Actions That Enable Sustainability

The DT activities were codified to group all the activities of the Mexican companies. A radar chart was constructed in which the main actions can be observed over time. The chart includes the actions developed by two or more companies across 5 years. The coding of the activities was reviewed by an expert in the implementation of digital transformation projects. Figure 1 shows the DT performed by five companies during 5 years.

4.1.3. Codifying DT Actions under the Business Dimensions

Published in 2018, Deloitte’s Digital Maturity Model claims to be the first pan-organisational digital model, covering five core business dimensions: customer, strategy, technology, operations, and organization and culture [4]. DT actions were grouped under Deloitte’s Business Dimensions to show the path Mexican companies have been following over the last five years. Table 1 contains these findings.
Figure 1. DT actions that contribute to the achievement of Sustainability by the main Mexican companies from 2017 to 2021.

Table 1. Mexican Companies Digital Transformation activities which contribute to Sustainability achievement by Business Dimensions for the last 5 years.

| Business Dimensions       | 2017 | 2018 | 2019 | 2020 | 2021 |
|---------------------------|------|------|------|------|------|
| Customer                  | A W B| A W  | W G  | A B  | B G  |
| Strategy                  | W    | B F  | W B  | F    |
| Technology                | A    | A B  | A W B| A G  | W B F|
| Operations                | A W B F| W B F| A W B F| A W G| F    |
| Organisaton and Culture   | G    | G    | G    | A F  | W G  |

A: America Movil; W: Walmart; B: Banorte; F: Femsa; G: Grupo Mexico.

America Movil has made large investments since 2017, such as the acquisition of three satellites to support its operations. Walmart was the pioneer in developing applications on cell phones for customers. Banorte reacted to the pandemic by allowing remote banking operations and preventing customers from going to branches. DT Femsa’s efforts have focused in Oxxo’s operations, and in recent years during the acquisition of electric and hybrid transport fleets. Grupo Mexico developed volunteer programs, educational platforms and digital communication campaigns against COVID-19.

4.2. Second Part: Investments to Achieve Sustainability

This section provides the amounts invested in sustainable actions obtained from the annual sustainability reports [57–81]. Tables 2–6 exhibit results for each company.
Table 2. America Movil L. Sustainable Investments.

| Sustainable Report (Year) | Sustainable Investments Infraestructure (Billion MXN) |
|-------------------------|--------------------------------------------------|
| 2017                   | 137.0                                           |
| 2018                   | 151.8                                           |
| 2019                   | 151.8                                           |
| 2020                   | 129.5                                           |

Table 3. Walmart Mexico V. Sustainable Investments.

| Sustainable Report (Year) | Sustainable Investments Fixed Assets (Billion MXN) | Comments on Investments |
|--------------------------|--------------------------------------------------|-------------------------|
| 2017                     | 17.426                                           | Reinvest in key initiatives such as prices, salaries, eCommerce and digital, logistics and 134 new stores (100 in Mexico, 34 in Centro America). |
|                          |                                                  | 42% to improve and modernize the current base of stores |
|                          |                                                  | 36% invested in 125 new stores (78 in Mexico, 47 in Centro America) |
|                          |                                                  | 22% assigned to eCommerce, Technology, Logistics and Perishables |
| 2018                     | 17.933                                           | 40% allocated to remodeling and maintaining existing stores |
|                          |                                                  | 28% to opening 161 new stores (134 in Mexico, 27 in Centro America) |
|                          |                                                  | 20% to redesigning the logistics network |
|                          |                                                  | 11% to technology and eCommerce |
|                          |                                                  | 1% to the perishables network |
| 2019                     | 20.575                                           | 43% allocated to the remodeling and maintenance of existing stores |
|                          |                                                  | 27% to the opening of 82 new stores (63 in Mexico, 19 in Centro America) |
|                          |                                                  | 16% to eCommerce and technology |
|                          |                                                  | 14% to the redesign logistics network |
| 2020                     | 16.728                                           | 44% remodeling |
|                          |                                                  | 23% opening 131 new stores (122 in Mexico, 9 in Centro America) |
|                          |                                                  | 17% investments in logistics |
|                          |                                                  | 16% allocated to eCommerce and technology |
| 2021                     | 20.466                                           | 23% opening 131 new stores (122 in Mexico, 9 in Centro America) |
|                          |                                                  | 17% investments in logistics |
|                          |                                                  | 16% allocated to eCommerce and technology |

Table 4. Grupo Financiero Banorte O. Sustainable Investments.

| Sustainable Report (Year) | Sustainable Investments (Million Pesos) | Comments on Investments |
|--------------------------|----------------------------------------|-------------------------|
| 2017                     | 13.8                                   | Construction, renovation and maintenance of videoconference rooms |
|                          | 1.2                                    | Green Rooftop, including investment in the SMS platform for the management of environmental indicators |
|                          | 16.53                                  | Renovation of air conditioning equipment and installation of anticyclonic curtains |
| 2019                     | 42,628                                 | Social development projects |
| 2020                     | 49,354                                 | Social development projects |
| 2021                     | 23,172                                 | Impact investments |
Table 5. FEMSA Unit UBD. Sustainable Investments.

| Sustainable Report (Year) | Sustainable Investments (Million Pesos) |
|--------------------------|----------------------------------------|
| Year         | Community | Planet | People |
| 2017         | 454.8     | 658.7  | 1,600.0 |
| 2018         | 854.0     | 618.7  | 1,386.0 |
| 2019         | 750.0     | 1,023.0| 867.0   |
| 2020         | 507.0     | 890.0  | 1,009.0 |
| 2021         | 486.0     | 673.0  | 1,326.0 |

Table 6. Grupo Mexico B. Sustainable Investments.

| Sustainable Report (Year) | Sustainable Investments |
|--------------------------|-------------------------|
| 2017                     | Mining Division environmental investments reached USD $325 million |
| 2018                     | Mining Division environmental investments reached USD $264 million |
| 2019                     | Approximately 3.0% of net profits were used to make corporate social responsibility investments that contribute to the SDGs in the communities surrounding the operations. |
| 2020                     | Social and environmental investments, expenses and donations totaled USD $463 million. Investments and operating expenses that support the SDGs approximately totaled USD $379.4 million |
| 2021                     | Investment of USD $289 million in social projects and donations |

During the year 2021, America Movil invested more than 260 million pesos (12.6 million dollars) in corporate citizenship programs and philanthropic contributions, of which 52.9% was donated in kind, including the donation of services [61].

To continue building the future of its operation, Walmart invests in the renovation of its existing stores, builds new stores and invests in technology. These investments contribute to the fulfillment of the SDGs as can be seen in Table A1 in Appendix A.

Sustainability reports contain very varied information. Although they belong to the same company, they may vary in their presentation and content from year to year. To identify the amounts of investments that were specifically allocated to Digital Transformation activities to achieve Sustainability, we suggest conducting subsequent studies. Another study could involve interviews, conducting surveys or another type of research methodology.

5. Caveats

The purpose of this section is to discuss the issues of (i) endogeneity, (ii) the short sample period, and (iii) confounding variables.

Endogeneity. Both the independent (digital transformation) and dependent (sustainability) variables of interest in this study are endogenous choices by firms. That is, firms endogenously choose how much to invest in digital transformation and how much to engage in corporate sustainability, and such choices are defined based on a variety of endogenous factors which are not observed by the econometrician [82]. The ideal setting to claim (causally) that “digital transformation is the underlying driver (or cause) of more efficient corporate sustainability” would entail exogenous variation in digital transformation—i.e., firms changing their adoptions of digital transformation policies in an arbitrary or whimsical manner. Although COVID-19 itself is a market-wide phenomenon driving digital transformation, it stands to logic that cross-firm differences in digital transformation also reflect firm-specific characteristics such as size, financial constraints, and other economic fundamentals.

It is worth mentioning that an alternative design to investigate whether digital transformation causally affects sustainability would be a future field for firms with different levels
of digital transformation. The comprehensive systematization of 153 published articles performed by Guandalini (2022) revealed that the relation between digital transformation and sustainability emerged as extremely fragmented into sectors, functions and even methodologies [83]. In the Chinese context, digital transformation is positively correlated with performance, investing in digital technologies, employee digital skills and digital transformation strategies that help to improve performance and maintain their sustainable development [84]. This investigation with clear quantitative indicators and data is a great opportunity for future work.

Similar studies have been conducted in Mexico. Through their study about the impact of business modernization on the sales performance, the authors define modernization as the adoption of physical structures and tangible practices of organized retail chains [85]. Focused on micro and small companies, the authors maintain that those companies that changed their activities to online sales increased with respect to their activities before the pandemic [86]. Digital transformation strategies for corner stores during the pandemic were analyzed [87]. Carrying out the empirical research in multiple companies from technologically advanced sectors in Mexico (automotive, aerospace and services) made it possible to explore the conditions of the analog to digital transformation process [88]. The innovative structure in Mexico presents serious limitations in terms of technical and organizational capabilities of the firms to incorporate digital technologies in their production processes [89].

Short period. The sample period considered in the paper is relatively short (2017–2021). This limits the generalizability of the study, especially considering that the adoption of digital technologies by large corporations is a trend that started years before the beginning of the sample. The short sample period limits the external validity of the findings of this research study.

Confounding variables during the period in question. In addition to the sample period being short, important trends happened during the period in question:

- The popularity of ESG investing increased considerably. The preferences of ESG investors affect ESG managers’ willingness to engage in opportunistic trading without significantly affecting their real portfolio decisions [90]. Such an increase may have driven the change in the dependent variable of the study through channels unrelated to digital transformation.
- Central banks of developed nations and emerging market economies conducted various rounds of quantitative easing. Unconventional monetary policies successfully shifted downward the term structure of disaster risk for domestic equities in the COVID–19 pandemic [91]. Monetary expansions directly affect liquidity and capital availability, which it turn affect firms’ investments, both in digital transformation and in sustainability projects.
- The period in question also coincides with expansionist fiscal policies. Deteriorating deficits are associated with increasing financial distress of the banking sector and higher levels of loan-loss provisions [92]. Widening deficits affect aggregate credit risk, which in turn spills over to corporate investments.

6. Discussion

The purpose of this study was limited to an exploratory analysis, in order to offer an additional review of how some leading Mexican companies have used Digital Transformation, which in some cases happened to become an enabler to be more efficient in some areas of sustainability. We analyzed the annual Sustainability Reports of the top five companies in the Mexican market, which belong to different sectors: communication services, retail, financial, food and beverages, and materials.

Published in 2018, Deloitte’s Digital Maturity Model remains the first pan-organisational digital model, covering five core business dimensions: customer, strategy, technology, operations, and organization and culture [4]. DT actions were grouped under Deloitte’s Business Dimensions to show the path Mexican companies have been following during the
last five years and the SDGs to which these actions contribute were identified according to Table A1 in Appendix A. The obtained results are briefly described below.

Customer dimension refers to providing an experience where customers view the organization as their digital partner using their preferred channels of interaction to control their connected future on and offline [4]. This consists of actions such as developing chatbots [64,70], e-commerce [60,62,67], digital marketing [58,66,67,79], self-service platforms [57,66,70], and social media [63,81], contributing to achieving SDGs 1,4,5,8,9,10,11,16 and 17 [3].

Strategy focuses on how the business transforms or operates to increase its competitive advantage through digital initiatives; it is embedded within the overall business strategy [4]. Digital transformation strategies in Mexican leading companies involve new line business [65], omnichannel [63,69], banking operations [74], and fintech [76], contributing to achieving SDGs 1,2,5,8,9,10,11,12 and 17 [3].

Technology underpins the success of digital strategy by helping to create, process, store, secure and exchange data to meet the needs of customers at low cost and low overheads [4]. Technology covers biometrics [68], cloud computing [57,71], cybersecurity [64,69,80], digital cards [68], enterprise apps [66,68], fiber optic [58], infrastructure [57,58,64,76] and satellites acquisition [58], IoT [59], network function virtualization [60], and server virtualization [57], contributing to achieving SDGs 1,3,4,5,7,8,9,10,11,12,13,16 and 17 [3].

Operations involve executing and evolving processes and tasks by utilizing digital technologies to drive strategic management and enhance business efficiency and effectiveness [4]. This consists of the implementation of many actions such as artificial intelligence [60,63,68,73], big data [60,64,74], business intelligence [59,65,69,72], digital migration of activities [80], digital tickets [68], paperless [57,62,67], payment methods [63,69,76,80], and suppliers’ portal [80], contributing to achieving SDGs 1,4,5,8,9,10,11,12,13 and 17 [3].

Organisation and Culture involves defining and developing an organizational culture with governance and talent processes to support progress along the digital maturity curve, and the flexibly to achieve growth and innovation objectives [4]. This consists of actions to promote changes in culture [61,75,78], development of corporate volunteering platform [81], educational platforms [77], and self-training platforms [61,66,79], contributing to achieving SDGs 1,3,4,5,7,8,9,10,11,12,13,16 and 17 [3].

Carrying out the empirical research in multiple companies from technologically advanced sectors in Mexico made it possible to explore the conditions of the analog to digital transformation process [88]. As can be seen in Table 1, the digital transformation actions developed by the companies do not follow the same order in the different companies; some have chosen to invest in different strategies before others according to their plans, budgets and above all to the needs of each sector. Crisis periods are a perfect opportunity to develop innovation activities that allow organizations to excel and achieve goals even in the most difficult times [86]. COVID-19 forced companies to implement TD actions to survive during the quarantine period.

This research has many practical implications. After the global COVID-19 pandemic, a global concern has arisen to be more sustainable to preserve the ecosystem and reduce the possibility of new pandemics. Digital transformation is of great public interest because it is innovative and provides a glimpse of the future. Having this in mind, companies are invited to publicly disclose their results. Companies can take advantage of this sustainability trend to communicate their activities and achievements to achieve it. Large companies in Mexico issue their Sustainability Reports, investors and other stakeholders can access to them, but final consumers would feel very happy and would strengthen their loyalty to brands if they knew about their digital transformation strategies to be more sustainable. SME’s companies are also invited to develop digital transformation activities to reach sustainability and, likewise, advertise among their consumers and users.

Theoretical contributions. This research provides findings to better understand how digital transformation and sustainability can be related. This study can provide findings by supporting the results of previous studies on the Mexican companies in implementing
digital transformation to be more sustainable. This study focuses on the investments performed by leading companies in the Mexican market in maintaining the company’s sustainability. The results of this study expand the literature on how digital transformation can contribute to achieve sustainability of large companies in Mexico.

Future research is expected to consider digital transformation correlation with performance (Teng et al., 2022), which will be worth investigating if Mexican companies invest in digital technologies, employee digital skills, and digital transformation strategies help to improve performance and maintain their sustainable development. The research has not included any face-to-face interviews, or focus group sessions, with representative from those companies. However, the authors believe that it provides a platform for future research. It is recommended for further research to use other types of companies, selecting companies that are known for harming the environment.

7. Conclusions

This article examined the digital transformation actions as enablers of sustainability for the top five companies in Mexican market (RQ1) and attempted to identify the key elements of their activities and the investments done during the period of 2017–2021 (RQ2). The authors recognize that this exploratory review has its limitations, not least that it draws its material from a selective review of the extant academic literature review and from the corporate websites of the leading companies in the Mexican market.

There have been some recent research initiatives in Mexican companies’ DT. Anderson (2022) concludes that the largest improvements come from the initial few modernizing changes, after which returns are diminishing [85]. It was demonstrated that large companies developed digital transformation strategies to promote corner stores continuity [87] and the introduction of technology in companies becomes a necessity to continue their activities and avoid definitive closure [86].

It is well known that the impact that big companies exert over the economy, Mexico not being the exception, some of the reasons are: the generation of jobs, the relationship with suppliers, the impact with customers and the responsibility that they have with society and the environment. This study shows under a different approach that companies are committed to comply with the UN SDGs and that DT can contribute to sustainability. DT has not been a straight path for Mexican companies, but it is a set of activities that have been developed by the leading companies in a different order and in different periods of time, depending on their specific needs and the opportunities identified.

One of the main conclusions from the evidence is that indeed big companies have a digital strategy agenda which is not necessarily related to sustainability, but also that it is collaterally affected positively due to the economies of scale and operational improvements from DT. This a qualitative primary study, that can be reinforced in the future with analytical evidence that can measure impacts, effects, etc., to enrich strategies that relate both DT and sustainability.

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Appendix A

Figure A1. UN SDGs [3].

Table A1. Mexican companies UN SDG Contribution per year (2017–2021).

| Company         | Sustainable Report (Year) | UN SDG Contribution |
|-----------------|---------------------------|---------------------|
| America Movil   | 2017                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2018                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2019                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2020                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2021                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
| Walmart Mexico  | 2017                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2018                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2019                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2020                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2021                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
| Banorte         | 2017                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2018                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2019                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2020                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2021                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
| Femsa           | 2017                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2018                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2019                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2020                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2021                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
| Grupo Mexico    | 2017                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2018                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2019                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2020                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
|                 | 2021                      | ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ |
The fact that any cell is empty does not mean that there are no actions that contribute to that SDG, but rather that it was not possible to identify in the Sustainability Annual Report an action expressly related to that SDG.

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