Ctrl+Alt+Sustain: the role of algorithmic and organisational trust in sustainable digital transformation

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Citation:

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Abstract

Despite the increasing interest of organisations in integrating advanced digital technologies, many digital transformation efforts fail to deliver long-term, sustainable value to the organisations and the stakeholders. Focusing on the impact of Non-Fungible Tokens (NFTs) in the Peer-to-Peer economy, as a case of digital transformation towards Industry 4.0, this conceptual study explores the role of algorithmic and organisational trust as facilitative drivers of sustainable digital transformation. Drawing on Lewin's change theory model and technology adoption literature, we identify four key phases in the sustainable digital transformation process (Initiating, Transforming, Re-positioning, and Sustaining). This paper contributes to the existing literature on digital transformation in several ways. First, we reconceptualise the digital transformation process as a dynamic, non-linear process and develop a conceptual model for sustainable digital transformation following a '*plan-action-result-evaluation'* strategic approach. Second, we argue that there is a relocation of trust towards technology and organisations, which impacts further upstream in the digital transformation process. This paper integrates the discussion between trust (algorithmic and organisational) and digital transformation, highlighting the need for parallel processes in creating the conditions for a sustainable transformation process.

Keywords: Digital Transformation, Algorithmic trust, Organisational trust, Non-Fungible Tokens (NFTs), Peer-to-Peer (P2P) economy

1. Introduction

During the past decade, several factors including the COVID-19 pandemic, cultural shifts and the rise of new technologies (such as artificial intelligence, 5G connectivity, extended reality and blockchain technologies) accelerated digital transformation in many industries (Joshi et al., 2024; Apostolidis et al., 2021; Carroll & Conboy, 2020). During this period, businesses across various sectors have been under increasing pressure to adopt new technologies and processes to ensure efficiency, competitiveness and operational continuity (Roy et al., 2025; Zheng et al., 2025; Singh et al., 2021). Nevertheless, despite the potential of these technologies, not all digital transformation efforts are successful, as oftentimes they fail to create a long-lasting improvement in the organisation or are abandoned shortly after the initial adoption of the technology (Oludapo et al., 2024; Libert et al., 2016). This underscores the role that various factors can play in the digital transformation process, including lack of planning and infrastructure, organisational culture and readiness to adopt new technologies, societal impact, as well as management-related factors such as employee emotions and resistance to change (Oludapo et al., 2024; Apostolidis et al., 2022; Nurhas et al., 2022). As such, several studies have highlighted the importance for researchers to move beyond the short-term view of technology adoption and focus on a more macroscopic lens to explore digital transformation as a long-term process, taking into consideration its contribution to sustainable value, i.e., its long-lasting effect on the organisation and its various stakeholders (Rupeika-Apoga & Petrovska, 2022; Singh et al., 2021). Few studies, however, have distinguished between short- and long-term digital transformation and explored the factors that affect the transition towards a more sustainable digital

This study contributes to the existing literature by focusing on the development of a sustainable digital transformation framework, drawing on change management theories and the concept of trust as an important element of technology adoption and sustainable value creation. Several studies (e.g., Baudier et al., 2023; Zhao et al., 2018; Fan et al., 2018) acknowledge that stakeholder trust can be an important facilitator (or barrier) to technology adoption. Particularly concerning recent technological developments, such as artificial intelligence (AI), machine learning and blockchain, studies highlight the relevance of trust in the technology, the algorithm and the platform in the adoption and use of such technologies (Toufaily & Zalan, 2024; Lee, 2018). To date, however, there has been limited research on the impact of trust on the digital transformation process. Contributing to existing research on (sustainable) digital transformation, the current study explores the role of algorithmic and organisational trust in this process and proposes a non-linear, dynamic view of sustainable digital transformation.

To explore the role of trust in (sustainable) digital transformation, the case of digital transformation in the Peer-to-Peer (P2P) economy has been chosen as the context for this study. The P2P sector has attracted a lot of attention, as novel technologies have fundamentally reshaped how individuals interact with each other and exchange goods, services and resources (Alqayed et al., 2022; Apostolidis et al., 2021). While existing studies provide valuable insights into the way that digital platforms can support P2P interactions and value creation, they largely overlook the unique dynamics of the P2P

economy and the role of trust in facilitating its digital transformation, particularly as P2P

transactions rely heavily on trust between parties (Rana et al., 2023; Apostolidis &

Haeussler, 2018). This paper aims to address this gap by focusing on the adoption of

blockchain technologies, more specifically Non-Fungible Tokens (NFTs), to support P2P

digital asset transactions, which represents a significant yet underexplored aspect of

digital transformation. As blockchain-based digital assets, NFTs, offer a mechanism to

authenticate and verify ownership, creating new opportunities for commodifying digital

assets, art, and collectibles (Wang et al., 2021). Despite their potential, the regulation of

the NFT marketplaces and valuation of NFTs remain ambiguous, e.g. due to unclear and

lenient legal frameworks and the lack of clear economic metrics (Upadhyay & Upadhyay,

2025; Bloomberg, 2021), which affect trust in this technology and negatively influence

their adoption. This ambiguity, coupled with the rapid evolution of blockchain

technology, presents a fertile ground for academic inquiry.

This study aims to address the growing challenge of managing the digital

transformation process and sustaining digital value in the P2P economy amidst rapid

technological advancements. Specifically, we investigate the fundamental issues

surrounding trust and its impact on the digital transformation of P2P transactions.

Although existing literature has extensively examined peer trust as the central driver in

P2P transactions (e.g., Zhai et al., 2022; Belermino & Koh, 2020; Apostolidis &

Haeussler, 2018), there is limited research on the role of trust (e.g., algorithmic and

organisational) as critical facilitators of the digital transformation. These gaps in

understanding trust dynamics in the digital transformation of organisations and the role

of emerging, decentralised technologies such as blockchain and NFTs motivate this

research and highlight the need for a comprehensive examination of these elements.

Based on the above, our work makes two key contributions to the digital transformation literature. First, we draw on Lewin's (1958) three-stage model of change, commonly used in organisational and change management studies, to explore the specific challenges and opportunities in the digital transformation of P2P economies, using the context of NFTs to support P2P asset transactions. By integrating elements of trust, technology, and organisational dynamics, we use Lewin's (1958) to develop a theoretical framework that provides a holistic approach to understanding and managing digital asset transactions. Second, we explore the trust-enhancing aspects of blockchain-based technologies, particularly algorithmic and organisational trust. To date, several studies have called for research that explores the role and implications of technologies such as the blockchain (Upadhyay & Upadhyay, 2025; Myers, 2021; Rowe, 2018), emphasising the growing importance of understanding how these technologies shape interactions, governance, and trust. Our study demonstrates that the digital transformation process involves a relocation of trust, shifting reliance from peer trust to system-based trust mechanisms, which offer greater scalability and reliability in digital environments, and can support the digital transportation process.

The remainder of this paper is structured as follows: Section 2 provides an in-depth review of the relevant literature, focusing on change management frameworks, their applicability to manage and evaluate digital transformation and the evolving role of trust in this process. Section 3 outlines our proposed conceptual framework, detailing its theoretical underpinnings and practical applications, and discusses the adaptation of Lewin's change model to the unique requirements of P2P economies, emphasising the

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interplay between trust and technology. Section 4 discusses our framework, including its potential applications and implications of algorithmic and organisational trust for sustainable digital transformation. Finally, Section 4 concludes with a discussion of the implications for theory and practice, along with recommendations for future research.

2. Literature review

2.1 Digital transformation

In the context of Industry 4.0, digital technologies continue to evolve, disrupting industries and transforming business models and processes (Veile et al., 2022; Bazan & Estevez, 2022). This evolution of new technologies, such as big data, AI and blockchain, led to an accelerated movement towards digital transformation, as companies are increasingly looking for effective strategies to leverage these technologies and sustain their operations and competitiveness in this rapidly changing and dynamic environment (Bresciani et al., 2021; Chanias et al., 2019).

The rapid and continuous transformation of business models and processes however also brought changes in the way digital transformation is explored in academic literature, from a concept focusing on the potential of new technologies to enable business improvements (Fitzgerald et al., 2013) to perspectives that incorporate the strategic leverage of resources and creation of new value propositions, considering the organisation, the economy and the society as a whole (Kao et al., 2024; Gong & Ribiere, 2021). In their systematic literature review, Zhu et al. (2021) explain how digital transformation research has developed since its embryonic (early 2000s) stage and identify three levels of inquiry in the academic investigation of digital transformation: Strategic, Operational and Industry levels. The authors use their findings to highlight the

need for researchers to move beyond focusing on the application of specific digital tools and technologies and investigate how effective digital transformation strategies can be developed more holistically, taking into consideration organisational agility, structure transformation and value propositions offered by the digital business models.

In line with the above, researchers argue that looking at digital transformation beyond organisational silos and specific digital channels, services and processes is necessary for a successful digital transformation, which often requires continuous reshaping of an organisation's resources, structure and capabilities (Kane et al., 2015; Setia et al., 2013; Fitzgerald et al., 2013; Veit et al., 2014). The change experienced with digital transformation will bring challenges, not only during the technology adoption stage but also later in the process as organisations and their operations rely more on the new technologies. Therefore, organisations undergoing significant digital shifts could incorporate change management into their digital transformation strategies to overcome challenges and successfully generate short-term and long-term digital value to support a more robust and sustainable digital transformation (Setia et al., 2013). The above arguments suggest that a more holistic, long-term view of digital transformation as an organisational change may be required to enable organisations to innovate and/or renew existing products/services, operations or business models, enabling them to adapt to new digital technologies and trends.

2.2 Change management as a lens to explore digital transformation

In their work, Feliciano-Cestero et al. (2023) offer a list of commonly used theories in digital transformation research, including transaction cost theory, resource-based theory and dynamic capabilities theory, highlighting the need for employing and developing new theoretical lenses that can contribute towards capturing the complexities of new, cutting-

edge technologies and the impact they can have on existing business models and processes. Following a systematic review of the digital transformation literature, Hanelt et al. (2021) explain how digital transformation is moving organisations to change and adopt more malleable designs that enable continuous adaptation. The authors argue that traditional organisational change theories need to be adapted further by taking into consideration the nature of digital technologies (particularly their pervasiveness and the dynamics they induce) and the dynamic and non-linear nature of digital business ecosystems within which the change is taking place.

As such, to better understand how we can manage and evaluate the digital transformation of organisations more effectively, we need to draw from existing organisational change models and develop them further, considering the fast-paced technological developments, dynamic and non-linear digital business environment, and organisational agility and digital value proposition required. Lewin's (1958) change management model offers an interesting theoretical lens through which to explore more holistically the process of digital transformation, as it moves beyond the adoption of new technology and allows the active consideration of the interaction between change (digital transformation) and stakeholders (human behaviour) throughout the digital transformation process (before, during and after).

In general, a theory of change describes how the activities undertaken by an intervention (including a project, programme or policy) contribute to a chain of outcomes that lead to intended or observed impacts. Lewin's three-stage model of change focuses on the driving forces that facilitate or hinder change and how those involved in the change agree that the change is necessary, collaborate towards the desired result, and ensure the support of the relevant leadership. Lewin's theory of change is composed of three stages: a) *Un-freezing* - initiating the desired change, b) *Changing* - implementing the desired

change and c) *Re-freezing* - solidifying the desired change to achieve the required outcomes (Figure 1).

Please insert Figure 1 here.

Despite its wide application, there continues to be criticism of Lewin's (1958) model of change. Often this is about the language which was used in describing the stages being static. For example, Weick and Quinn (1999, p. 361) argue that *"episodic change follows the sequence unfreeze-transition-refreeze, whereas continuous change follows the sequence freeze-rebalance-unfreeze"*. Similarly, Palmer and Dunford (1996, p. 709) argued that Lewin's model *"produces assumptions of both linearity (that changes develop in sequence, always progressing) and teleology (that managers know where they are taking the organization). Such assumptions may be at odds with the context in which change occurs"*. Although Lewin's approach to change has often been described as diagnostic and positivistic (Endrejat & Burnes, 2024), scholars have subsequently purported the importance of adopting a non-linear view of Lewin's model of change to allow for increasingly complex social and organisational environments (Styhre, 2002).

Endrejat and Burnes (2024) demonstrate how Lewin's foundation of topological psychology (the social behaviour that occurs in the context of the changing environment) can be applied to contemporary aspects of behavioural science and organisational dynamics. As such, the applicability of Lewin's (self-professed) dynamic model of change has been discussed in many contexts, including changes related to digital transformation within organisations (e.g., Bellantuono et al., 2021; Rosenbaum et al., 2018). These studies have demonstrated how Lewin's change management frameworks

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can support digital transformation efforts and how Lewin's work can be developed further to take into consideration concepts such as organisational readiness, employee engagement, technological adaptability, stakeholder resistance and group dynamics (Davis & Brown, 2018; Rosenbaum et al., 2018). These studies, however, also explain how introducing other relevant concepts and frameworks is essential to align traditional change management models with the rapid pace of digital innovation (Davis & Brown, 2018; Rosenbaum et al., 2018). Furthermore, Cummings et al. (2015) explain how the "change as three steps" process supported by models based on Lewin's (1951) change management framework may need to be reconsidered and adapted, as it may be too simplistic and inappropriate to explain change in different contexts. Finally, researchers highlight its adaptability as a *"living organism that continually evolves and adapts"* (Endrejat & Burns, 2024, p. 92). These are the reasons why this framework was selected to underpin our contribution to describing dynamic and non-linear digital transformation.

2.3 Peer-to-peer platforms as the context for digital transformation

Given the increasing popularity of P2P platforms, as well as their reliance on peer engagement and support to maintain their operations which makes them more volatile and heterogeneous compared to more 'traditional' business models (e.g., Chasin et al., 2018), several studies have explored how digital technologies can support and facilitate commercial interactions among private individuals (Hawlitschek et al., 2018). Nevertheless, these 'grey' markets of digital artefacts have been heavily criticised due to a lack of transparency, lack of effective regulations, regular fraud cases and even money laundering activities (e.g., Guardian, 2019). In addition to the above, several digitally supported P2P economy platforms have been criticised for operating like 'traditional' centralised organisations, holding the dominant position in the interactions, while the profit produced by the peers is not distributed to the people that created it but is captured

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by the large intermediaries that operate the platforms or stakeholders who take advantage of these platforms to maximise their own benefit (Mintel, 2022).

The above highlights the need for a more effective digital transformation of the P2P economy that takes into consideration these issues and can offer a solution to these challenges. For instance, the adoption of decentralised blockchain technologies has been advocated recently to improve existing P2P platforms as they can arguably securely facilitate peer exchanges and can enable peers to organise their interactions and activities without the need for intermediaries (e.g., De Filippi, 2017). Nevertheless, despite the increasing interest in P2P exchanges of digital assets, there is currently limited research on the factors that can affect this digital transformation and the decentralisation of P2P economies. Although studies have identified several drivers and barriers that can affect digital transformation in different contexts (e.g., Jones et al., 2021; Peter et al., 2020), we argue that the decentralisation of the P2P economy presents unique challenges given the emphasis on peer transactions and the lack of intermediaries to monitor and manage the interactions.

In this context, the concept of trust appears to be particularly important for two main reasons. On one hand, trust has been identified as one of the main factors that can influence the initiating, sustaining, or breaking of P2P transactions, as generally, these transactions imply trusting strangers (Altinay & Taheri, 2019; Apostolidis & Haeussler, 2018; Ert et al., 2016; Guttentag, 2015). Therefore, 'trust through technology' is one of the drivers that can support the P2P economy, and lack of trust can be a major barrier in technology adoption and the digital transformation of the P2P economy. Furthermore, blockchain technology is reportedly able to replace (to some degree) trust in interactions (Devine et al., 2021; Hawlitschek et al., 2018), and as such, it can play an important role in the development of more effective and reliable P2P platforms. However, there is

currently limited research to explore how trust can affect the digital transformation process, as efforts are made to introduce, manage, and sustain digital technologies to support the development of more trustworthy platforms. Therefore, in the current study, we use the example of blockchain-based NFTs to explore how trust can affect the management and sustaining of digital transformation in the P2P economy.

2.4 Emergence of Non-Fungible Tokens (NFTs)

The emergence of the blockchain has created a myriad of applications which continue to have an impact on industries and traditional business processes. NFTs are blockchain-based cryptographic tokens that represent proof of ownership for digital assets (Wang et al., 2021). These tokens are created with unique properties and are underpinned with distinguishable code, that cannot be exchanged for a different asset of equal value (non-fungible). Finally, unlike other digital assets which utilise the blockchain for the recording of transactions, such as cryptocurrencies, NFTs are indivisible as they cannot be broken down into smaller units, and NFT owners are unable to transfer portions of the digital asset (Antonopoulos & Wood, 2018). The above characteristics have allowed NFTs to become a popular medium of choice for many digital content creators looking for alternative ways to generate revenue and engage with their stakeholders (Chalmers et al., 2022; Hofstetter et al., 2024). This suggests that NFTs provide many digital transformation opportunities to create new business models, secure processes, and increase revenue.

Furthermore, the use of blockchain technologies to support transactions and storage of NFTs can create a transparent and traceable ecosystem where the owner can remain anonymous (via a blockchain hash), but the ownership and the history of the digital asset can still be verified (Fernandez-Carames & Fraga-Lamas, 2020). Although

this may increase privacy and anonymity in transactions, it may also result in fraudulent activities, money laundering and opportunistic behaviours that are difficult to regulate, and therefore, it will affect its adoption by organisations and their stakeholders (Chalmers et al., 2022; He et al., 2023). Additionally, there are concerns regarding the environmental impact and electricity usage consumed by the widespread adoption of NFTs (He et al., 2023; Wang et al., 2021), as every NFT transaction, including smart contract processing, involves computational resources and storage, which use a significant amount of electricity.

Despite the barriers to digital transformation that the above challenges may create, NFTs have the potential to contribute to the digital transformation of organisations in many industries (including creative, sport, gaming and fashion industries), partly due to their role as a decentralisation instrument and a digital intermediary of P2P transactions. Nevertheless, the role of NFTs in digital transformation has not been explored in detail in the existing literature. Table 1 highlights this gap in the existing digital transformation literature concerning Industry 4.0 technologies. Therefore, in our study, we focus on the role of NFTs in the digital transformation of P2P transactions.

Please insert Table 1 here

3. Trust as an enabler of digital transformation

Since digital transformation can bring radical changes to organisations, and even industries, trust can play an important role in the digital transformation process (Jang et al., 2021). On one hand, emergent arcane technology can often lead to distrust from those that are unfamiliar with its intricacies (Kellogg et al., 2020) and can negatively affect technology adoption. This can be due to various factors, including ethical and data privacy concerns, as well as the lack of social presence and danger of fraudulent activities

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and opportunistic behaviours (Mostafa & Kasamani, 2022; Apostolidis et al., 2021). On the other hand, technology can offer opportunities to build or recover trust, as it can facilitate cooperation, stakeholder involvement and efficiency, and lead to the development of stronger relationships and structures, particularly in contexts where organisations need to facilitate trust relationships amongst various stakeholders (Devine et al., 2021; Curtis et al., 2010).

Morgan and Hunt (1994, p. 23) define trust as *"existing when one party has confidence in an exchange partner's reliability and integrity"*. They suggest that the integrity of the 'trustworthy' party will be associated with qualities such as *"consistent, competent, honest, fair, responsible, helpful and benevolent"*. Although the concept of trust has gained increased popularity in the last few decades, in the context of technology innovation, there are two major research gaps which the current study aims to address. First, although existing studies have explored the impact of trust, including governance trust (e.g., Backer et al., 2024) and trust in technology (Zhang, 2023), on digital transformation, in our study we argue that given the recent advances in technology, including automation and decentralisation, further research is required to explore in more detail the impact of other forms of trust such as algorithmic trust to support the digital transformation process of organisations today.

This view is in line with research which supports that the emergence and popularity of blockchain technologies led to a transformation of trust, from trust in a central authority or organisation (organisational trust) to trust being distributed among several stakeholders in the blockchain network (decentralised trust) (e.g., Duan & Zhu, 2024). Existing studies have provided evidence that the decentralisation of trust can enhance perceptions of resilience and security within a system, as no single stakeholder has the power to control and manipulate the system. Therefore, the adoption of

decentralised technologies can reportedly enhance transparency, perceived security, efficiency and overall trust across various settings, including food supply chains (Li et al., 2023), healthcare (Bak et al., 2023) and the transportation and logistics industry (Pournader et al., 2020).

In the context of P2P interactions, interpersonal and peer trust have been used more commonly to replace centralised trust in an organisation or platform. In our study, however, we propose that digital transformation will eventually transform this interpersonal/peer trust into algorithmic and organisational trust. Particularly in the context of blockchain-based technologies, recent studies highlight the importance of future research exploring the interactions between algorithmic, organisational and peer trust and how they can support the adoption of such technologies (Toufaily & Zalan, 2024; Devine et al., 2021). We suggest that stakeholders experiencing the digital transformation journey may be required to return to relying on algorithmic and organisational trust (instead of interpersonal or peer trust) for transformation to be successful. This is in line with existing research (e.g., Chawla, 2020), which suggests that although the technical elements involved in the protocol and the application of the blockchain (algorithmic trust) can affect their adoption and implementation, there are other (more social) layers of trust relating to benevolence, identification and transparency (organisational trust) that are equally important (see Table 2). Drawing on this, the current study explores the impact of these two types of trust (algorithmic and organisational) on the digital transformation journey.

Please insert Table 2 here.

3.1 Algorithmic trust

The adoption of new technologies by organisations requires that individuals (e.g., managers, employees, customers, investors, suppliers) have trust in the technology that they are engaging with (Barrane et al., 2021; Baudier et al., 2021). With the development of advanced technologies, users must increasingly place more reliance on automated systems and computational algorithms to make decisions (Toufaily & Zalan, 2024; Lee, 2018). Although in the past blockchain has been considered a trust-free technology, due to its ability to automatically create an immutable and publicly available record of interactions that is governed by the whole system (e.g., Hawlitchet et al., 2017; De Filippi, 2017), more recently authors have acknowledged that blockchain is not a trust-free technology, but requires a different type of trust, i.e. trust in the algorithm or code that facilitates and records each transaction (Toufaily & Zalan, 2024; Devine et al., 2021). As such, we argue that algorithmic trust can play an important role in the digital transformation process based on technologies like blockchain that rely on automation and algorithms.

3.2 Organisational trust

Pirson and Malhotra (2011, p. 1089) highlight that trust in organisations *"entails the willingness of individuals (customers, employees, etc.) to accept vulnerability to the actions of an organisation based on positive expectations"*. The trust that an individual has in the organisation to operate effectively is pivotal in digital transformation. Table 2 highlights that organisational trust pervades layers of the blockchain where algorithmic trust is also required, given that it is the responsibility of the organisation to ensure that the technical elements are executed correctly. In parallel, individuals must trust in the social layer of the blockchain and the organisation to transform the digital environment. It is at this stage where major transformation is occurring that trust dimensions of ability

(managerial competence), benevolence, integrity, transparency, and identification are required (see Table 3).

Please insert Table 3 here.

Naturally, some trade-offs need to be taken into consideration when discussing the dyadic relationship between trust in algorithms versus trust in humans. Dowding and Taylor (2024, p. 67) discuss the notion of these types of trust via a Principal-Agent approach, suggesting that *"algorithmic decision-making is beneficial if and only if human principals can trust algorithmic agents to act faithfully on their behalf"*. Thus, there is an emergent tension because humans need to 'allow' algorithmic decision-making to happen to 'prove' faithful decision-making (and build trust), however, they are reticent to do so because a lack of trust (in algorithms) exists to begin with. In the P2P economy, users rely on interpersonal (human-to-human) trust, however, new technology offers users the chance to move away from this type of trust, instead giving way to algorithms and platforms to make decisions (Chawla, 2020). However, users must also be able to trust the environment within which the code that forms the algorithms is constructed, implemented and maintained (i.e., the organisation) (Hawlitschek et al., 2018; Lustig and Nardi, 2015). Hence, organisational trust is a major component of the digital transformation landscape.

3.3 Conceptual model

Based on the above, it can be argued that, in the context of advanced technologies, adopting a change management lens to explore the sustainable digital transformation process can offer meaningful insights. First, in line with existing studies (e.g., Apostolidis et al., 2022; Singh et al., 2021; Chanias et al., 2019; Styhre, 2002), we argue that digital

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transformation should not be considered short-term and linear, but should be explored as a stepwise, dynamic process that can yield long-lasting change and sustainable value creation. This is also in line with studies that highlight the need for dynamic digital transformation, as organisations need to adjust and transform rapidly to remain relevant in an increasingly competitive economy (Warner & Wäger, 2019). Particularly in the context of the P2P economy, acknowledging the dynamic and non-linear process of digital transformation plays an important role in creating sustainable change within the organisation, considering how heterogeneous and dynamic P2P interactions and transactions can be, which can directly affect the process of digital transformation. Therefore, in our study, we draw on change management theories to develop a non-linear framework that explains sustainable digital transformation as a long-term, dynamic process.

Furthermore, responding to criticism regarding the generic nature of Lewin's (1958) framework, we use technology adoption literature to further develop and refine the three steps of change identified by the initial framework and consider the role of various stakeholders in the technology adoption process. Drawing on existing studies on the facilitators and impact of technology adoption in organisations (e.g., Papathomas & Konteos, 2023; Apostolidis et al., 2022; Cobos et al., 2016), we refine the model to reflect four steps of digital transformation.

Finally, in line with existing studies that highlight the importance of trust in the adoption of advanced technologies, such as AI- or blockchain-based technologies, we introduce the concept of trust in the process of digital transformation. The context of the digital transformation in the P2P transactions economy through the application of NFTs was selected, due to the importance of trust in this specific market and the potential that blockchain technologies (NFTs more particularly) have to replace more "traditional"

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versions of trust, such as interpersonal and peer trust, with trust towards the technology and the organisations facilitating or managing the transaction (e.g., Devine et al., 2021; Hawlitschek et al., 2018; Wang et al., 2021). We argue that this change also needs to be reflected in the digital transformation process. Utilising literature focusing on the important role that trust can play in P2P transactions (Altinay & Taheri, 2019; Apostolidis & Haeussler, 2018; Tussyadiah & Pesonen, 2018), and the development of blockchain technologies, such as NFTs, to support a "trust-free" interactions, we use the concept of trust to redefine the steps in Lewin's (1958) change management framework to reflect the various stages of digital transformation.

Taking into consideration the above points, our proposed conceptual model of sustainable digital transformation was developed (see Figure 2) based on Lewin's (1958) original change management framework, redefined based on recent digital transformation literature, to acknowledge the importance of trust in different stages of adoption and implementation of technologies in organisations. We have made several conceptual refinements to better capture a dynamic model for sustainable digital transformation. While the original theory of change used linear (static) language such as 'un-freezing' and 're-freezing' (Cummings et al. 2016), we have utilised language which reflects the fluid nature of organisational change proposed by more recent literature. This also allowed for better capturing of managerial implications for the processes that are required to be undertaken in the transformation (Styhre, 2002). Thus, the model is composed of four dynamic stages: *initiating*, *transforming*, *re-positioning,* and *sustaining*. The final stage is a unique and innovative addition to the original three-step model and is important when considering a sustainable digital transformation model that can continuously re-adapt to the changing micro- and macro-environment.

Please insert Figure 2 here.

The first stage, *initiating*, refers to recognising the need for change and the opportunities created by the digital technologies and trends available (e.g., artificial intelligence, Metaverse). This digital transformation stage has a catalytic power for companies to make fundamental changes in the way business is run and revenues are generated to create more value (Fitzgerald et al., 2013; Veit et al., 2014). In line with the change management framework (Lewins, 1958) and technology adoption literature (Apostolidis et al., 2022; Cobos et al., 2016), this first stage of digital adoption is about reconsidering the status quo, determining what needs to be changed and why, and identifying the appropriate technology that can support the change within the organisation. Trust-related considerations at this stage include fear of technology and lack of technological literacy and knowledge (Apostolidis et al., 2022). Therefore, realising this change requires initial trust in the technologies under consideration (McKnight et al., 2020; Li et al., 2008). As automation and algorithms are increasingly playing a pivotal role in technologies adopted by organisations, this initial trust in technology can be further refined as trust in the algorithms, including algorithmic fairness, accountability and transparency (Cabiddu et al., 2022; Shin & Park, 2019). The higher the algorithmic trust, the higher the probability of initiating the digital transformation process. In this stage, the algorithmic trust is closely followed by the initiation of a design or plan of how this digital technology can be introduced and transform the status quo in the industry. In the context of this study, this stage of the digital transformation could reflect the realisation of the opportunities offered by blockchain as the digital technology and the NFTs as a digital trend to improve P2P digital asset transactions and a plan to initiate the transformation process. In this planning stage of digital transformation for NFTs and digital asset trading,

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it will be essential that users have trust in both the organisation's ability to deliver these new products and services and reciprocal faith in individuals to complete technical tasks in their area of expertise (Chawla, 2020; Pirson & Malhotra, 2011). In addition, users would expect organisations to be transparent and share information that could compromise the security of their digital assets (i.e., anything that would make them vulnerable) (Mishra, 1996; Tschannen-Moran, 2000).

In the second stage, *transformation*, reflects the first step in Lewin's "Change" step and is aligned with the phases of digital evolution and technology implementation identified in earlier studies (e.g. Papathomas & Konteos, 2023; Kane et al., 2015) which involves the gradual digitisation of processes, offerings and channels. At this stage, action is taken to promote and support the digital transformation. Unlike other technology adoption models however, in the case sustainable digital transformation the aim of this stage is not merely creating value for the organisation in the short term by reducing adoption and implementation costs and maximising the benefits received by the introduction of the new technology, but to create value for the various stakeholders involved (Setia et al., 2013). In the context of this study, this happens through the development of platforms and tools that allow the decentralisation of P2P interactions (as a process digitisation example) by utilising NFTs as a digital asset (as an example of product/service digitisation). We suggest that both algorithmic and elements of organisational trust will be required at this stage. During the transformation process, ensuring the technical elements of NFTs and blockchain integration would be key to the ongoing success of the digital transformation process. As the digital transformation process occurs, we suggest that transformation manifests through the changing nature of trust, that is, a reduction in trust of individuals in P2P interactions and an increase in trust in technology (algorithms) and the organisations that operate the technology. Thus, this

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stage crosses into the organisational trust area because it is the managerial competence (ability) of the company's employees to ensure sound strategic vision and decision-making (Chawla, 2020; Pirson & Malhotra, 2011). For transformation to be successful there must be a degree of goal congruence within the organisation to work as a team to execute the transformational processes.

The third stage, *repositioning*, refers to changing the business model from traditional (non-digital) to digital. The business model concept offers companies the potential to tell a better story about how value is created, and most notably, it can increase consumer awareness of how value is delivered to the market (Papathomas & Konteos, 2023; Coombes & Nicholson, 2013). Digital transformation enables business model digitalisation through process and product/service digitalisation, which might lead to improved value creation. Within this stage, there is less emphasis on algorithmic trust (albeit still present) and a further increase in organisational trust. While algorithmic trust may reduce, it is important to understand that in the repositioning stage, the users of the newly transformed landscape will potentially interact with the revised business model (in this case, the NFT assets), thus, they must be able to trust in the technology. However, we expect that they are more likely to be reassured that the technology is effective through trust in the organisation (or platform). As a result, concepts relating to organisational trust, such as integrity, transparency, and benevolence, become increasingly important and can influence the progress of digital transformation at this stage. Users of the new business model will be looking for reassurance that the organisation is concerned with their wellbeing and, moreover, that business decisions are made with appropriate honesty and morality (Mayer et al., 1995). Finally, users are likely to trust when they feel the organisation is concerned with their well-being and is transparent when there are potential vulnerabilities (Mishra, 1996; Tschannen-Moran, 2000).

The final stage, *sustaining*, refers to maintaining digital value and the changes created by the digital transformation process. As digital technologies and trends increasingly lead to new business and revenue opportunities (Singh et al., 2021; Iansiti & Lakhani, 2014) that radically alter or make-obsolete existing business models, these need to be continually evaluated to unearth any issues and identify the strengths that will enable them to sustain the value created for the various stakeholders involved. As technologies develop at a rapid pace, this stage requires stakeholders to have ongoing trust in the organisation. We expect that dimensions of trust such as identification to be prevalent in this stage because users will want to be reassured that the organisation has their best interests in mind when making ongoing business decisions (i.e., to maintain the digital value that has been built though the transformation process) (Lewicki & Bunker, 1996; Sitkin & Roth, 1993). Other dimensions that may emerge include transparency, integrity, and benevolence, by continually evaluating the needs of the users and being willing to re-adapt the organisation to future-proof their relationships.

The new model reflects the important role of trust in the adoption and implementation of advanced technologies and how it can be conceptualised relative to the digital transformation stages. Although blockchain technology and NFTs can reportedly reduce trust-related issues in P2P interactions, we expect that increased amounts of trust are required throughout the transformation process because participating parties are required to place trust in the underlying algorithms and automation. Nevertheless, as new technologies (that are often very innovative and unfamiliar) are being introduced in the organisation, transforming products, processes and channels and permeating the whole of the business model, algorithmic trust needs to be replaced by organisational trust for the digital transformation to have a long-lasting effect. As such, we denote that both algorithmic and organisational trust are extremely relevant for sustainable digital

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transformation and can drive (or impede) the digital transformation process.

4. Discussion

The aim of the paper was to develop and investigate a model that explains the dynamic digital transformation in the P2P economy. Using the case of NFTs in P2P markets as the context of our investigation, a conceptual model has been developed based on Lewin's model of change, incorporating algorithmic and organisational trust as key facilitators in this process. By adopting a well-established model of change while utilising information from recent literature to develop and adapt it to represent more closely the digital transformation in the context of recent technological developments, such as blockchain-based technologies, we argue that our model offers significant contributions, especially in relation to the sustaining and evaluation of digital transformation.

4.1 Theoretical Implications

In terms of our contribution to the theory of digital transformation, using the context of NFTs in P2P asset transactions, we propose two key contributions. For our first contribution, our study proposes a sustainable digital transformation framework that can support sustainable change and the creation and maintenance of digital value. Based on the more traditional '*unfreeze-change-refreeze*' model of change, our conceptual model follows a '*plan-action-result-evaluation*' strategic approach to digital transformation, recognising also that digital transformation can be a dynamic, non-linear change process. In this respect, digital transformation has often been identified as a continuous change that can be triggered and shaped by digital technologies and digital trends (Hanelt et al., 2021).

Followingly, the role of trust is being discussed as an enabler (or barrier) of digital transformation, that can affect the direction of this process. Although earlier studies

support that the adoption of digital technologies can reduce the importance of trust (mainly trust in other people) during interactions (e.g., P2P transactions), it is at this stage we identify our second contribution as we argue that there is actually a relocation of trust, from trust in other people/stakeholders to trust in the algorithms and the organisations involved. This impacts further upstream in the digital transformation process, as this replacement by algorithmic and organisational trust can affect the introduction of new technologies and the transformation of more 'traditional' markets and industries that rely heavily on trust.

These findings not only extend our existing knowledge about (sustainable) digital transformation but also provide an alternative, more modern lens to explore technology adoption to support decentralization and P2P interactions and transactions in different contexts.

4.2 Managerial Implications

The development of the sustainable digital transformation model clarifies that developing and promoting algorithmic and organisational trust is fundamental for long-lasting digital transformation that can increase and sustain the digital value created for the various stakeholders. This paper poses that although interest in blockchain technologies like cryptocurrencies and NFTs has been decreasing in recent years, the role of these technologies as intermediaries of trust and the impact this has on the digital transformation process is still very relevant for organisations today. In our research, we explain the dangers of adopting a myopic view of digital transformation, which can result in failure to incorporate digital technologies meaningfully in an organisation and provide managers with a clear guide of how digital transformation should be approached as an organisational change, taking into consideration the role of trust. Contributing to existing

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studies, our model highlights that managers should focus on promoting algorithmic trust in the initial stages of the digital transformation, when key stakeholders are unfamiliar with the technology. This can take the form of educational campaigns and information sharing aiming to communicate in less technical terms how the algorithms and the technology can ensure trust in their interactions.

As this process moves through the stages of transformation, our model suggests that organisational trust increasingly comes into play to replace algorithmic trust. This relocation of trust must be effectively managed, as it can play a pivotal role in the strategic digital transformation process. As organisational trust may affect the later stages of the transformation process, which can support the long-term implementation of the new technology and the creation of new business models, managers should focus on strategies that strengthen perceptions regarding the transparency, security and benevolence of the organisation and/or the platform. Applying the above process can take different forms depending on the operational context and the industry, considering specific regulatory requirements, stakeholder expectations, and technological advancements relevant to each sector. For instance, within the healthcare industry, the adoption of blockchain technologies and the move towards more decentralised systems needs to prioritise first algorithmic trust, e.g. through ensuring robust data security measures and privacy protocols, followed by efforts to build organisational trust to mitigate resistance to the digitalisation of the business model (e.g., by employees and customers/patients), ultimately enhancing operational efficiency, value creation and organisational sustainability.

The second challenge for managers is adapting the culture of the organisation to make better future use of digital business model opportunities, acknowledging the dynamic, non-linear nature of digital transformation (Soluk & Kammerlander, 2021). The

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fluidity and dynamism of the proposed model allow a strategic approach to digital transformation, demonstrating how this can lead to P2P organisational efficiencies and revenue models. The challenge for managers is to identify the opportunities in these new business models, create appropriate revenue models and adopt a strategic approach to introducing new technologies. Particularly in the context of NFTs to support the digital transformation of P2P transactions, the use of blockchain technology can support interactions between users and improve the exchange of assets. This can potentially transform the whole industry. For this to take place, however, these organisations need to consider that on one hand, the introduction of NFTs may support more trustworthy P2P transactions, however, algorithmic and organisational trust need to be considered (and managed) throughout the digital transformation process.

4.3 Limitations and avenues for future research

For many organisations, the movement towards digital transformation was borne out of necessity due to external factors such as the pandemic, cultural shifts and technological developments. In our paper, we argue that there are still several gaps in existing knowledge regarding the We identify a couple of limitations which could provide an avenue for future research. In the first instance, our work is conceptual by nature, and there is significant scope to develop this further, using empirical research to strengthen its theoretical and practical contribution. The use of a blockchain-based technology (i.e., NFTs) in this context is innovative and novel and opens many opportunities in the development of new and exciting research. Future research could consider further applications of decentralized, blockchain-based technologies in different industries and how they can be used to digitally transform existing business models, taking into consideration the different stakeholders involved. Thus, this paper acts as a map for future practical work which could define blockchain technology usage from an information

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systems perspective. Secondly, in the future, researchers interested in the topical area could strengthen the theoretical components of the paper with empirical (qualitative and quantitative) data which would further explore and confirm the links between algorithmic and organisational trust, and their role within digital transformation.

5. Conclusion

This study set out to address the growing challenge of managing the digital transformation process effectively, and succeeding in maintaining long-term effects and sustaining digital value amidst the current landscape of rapid technological advancements and changes in the market. In so doing, we have developed a conceptual model of sustainable digital transformation which extends beyond the short-term adoption of "digital trends" and encompasses the significance of 'lasting change', acknowledging the role of algorithmic and organisational trust as a basis upon which sustainable transformation can occur. Based on existing literature, we highlight how sustainable digital transformation should be considered a dynamic, non-linear journey, and we acknowledge the importance of various factors that can affect the longevity, direction and effectiveness of this process. More specifically, we integrate discussion surrounding algorithmic and organisational trust as critical components in managing the transformation required with the people who constitute organisations and their interaction (trust) with the emergent technology. From a practical perspective, the knowledge we have developed in this paper could be critical to any business that is embarking on a digital transformation project to provide higher chances of long-term success.

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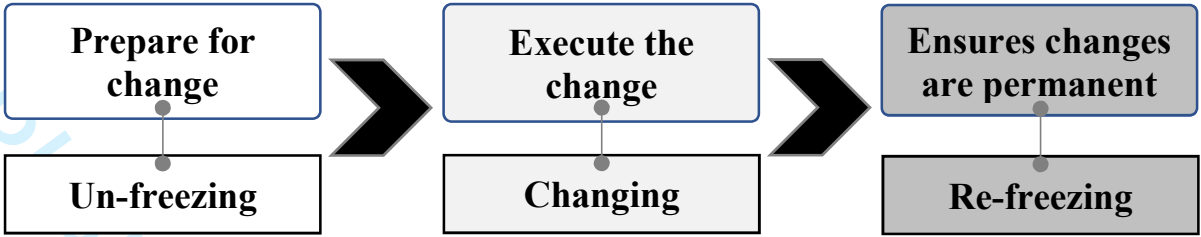56
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Prepare for change		Execute the change		Ensures changes are permanent
Un-freezing		Changing		Re-freezing

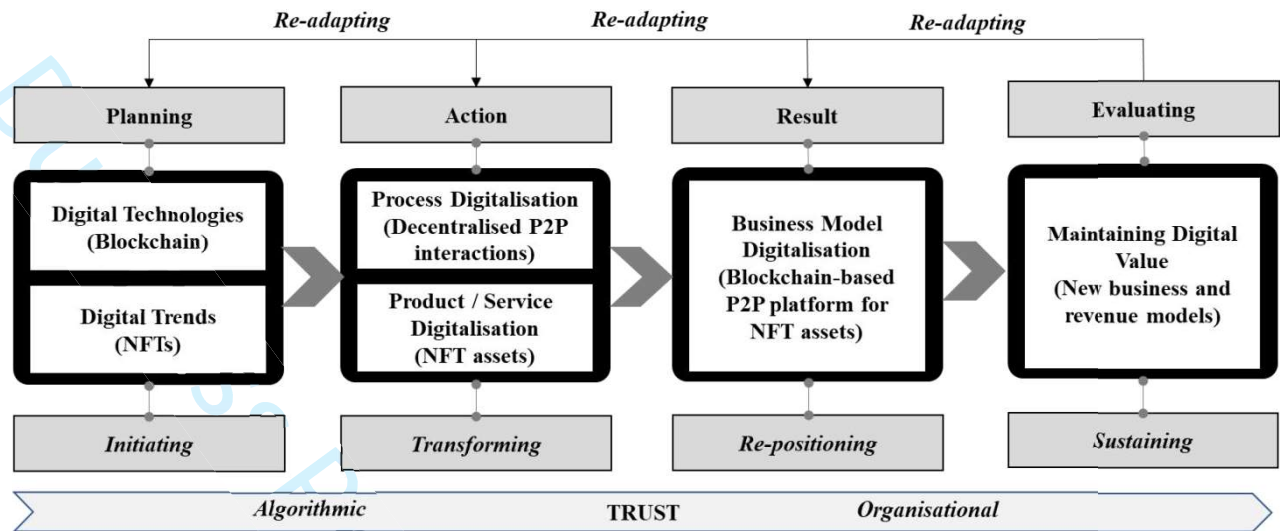**Figure 1** - Lewin's Theory of Change (1958) (Source: Authors own work)

Figure 2 - A dynamic digital transformation model for managing and evaluating sustainable digital value (Source: Authors own work)

Themes	RFID	IoT	NFT	BC	SC	BD	Salient points and research gaps
Digital transformation of strategies							
(Hanelt et al., 2021)	*					√	Supply chains are often at the centre of digital transformation. Thus, it is expected that most of the innovative digital transformation is in this area. Additionally, there is an intense focus on Big Data as part of digital transformation. This seems to suggest that digital transformation, in the initial stages, has a big focus on creating data driven approaches.
(Kraus et al., 2021)	*					√	
(Soluk & Kammerlander, 2021)	√					*	
(Jin et al., 2020)		√				√	
(Saarikko et al., 2020)	√	*				√	
(Chanias et al., 2019)						*	
(Kitchens et al., 2018)		*				√	
Digital transformation of processes							
(Cloos & Mohr, 2022)						√	The research surrounding digital transformation of process, highlights that the focus is on data inputs and potential data outputs. The focus at this stage is to understand the process of digital transformation, in addition the input of where the data comes from and how this data can then be utilized for digital transformation. In this phase the focus is on process development.
(Llopis-albert et al., 2021)						√	
(Nadkarni & Prügl, 2021)	√	√				√	
(Yu et al., 2021)	*	√				√	
(Baiyere et al., 2020)		√				*	
(Dutta et al., 2020)		√				√	
(Felsberger et al., 2020)						√	
(Wang & Wang, 2020)		*				√	
(Fenech et al., 2019)						√	
Digital transformation of structures							
(Harju et al., 2023)				*		√	In the digital transformation of structures, it is clear there is a wide focus on the main industry 4.0 technologies. Like the other two phases most of the research has a focus on the use of big data in this context. Interesting is the focus also on blockchain, while most of this work is conceptual our research suggests that the blockchain is seen as a transformational tool.
(Faruquee et al., 2021)				√		√	
(Verhoef et al., 2021)		√		√		*	
(Akter et al., 2022)		√		√		√	
(Akter et al., 2023)							
(Akter et al., 2024)					√		
(Lohmer & Lasch, 2020)		√		√		√	
(Núñez-Merino et al., 2020)		√		*		√	
(Clemons et al., 2022)		√		√		√	

Coverage: √ = significant; *= partial

Key: Radio Frequencey Identification (RFID); Internet of Things (IoT); Non Fungible Token (NFT); Blockchain (BC); Smart Contracts (SC); Big Data (BD))

Table 1 – Coverage of Industry 4.0 technology concepts in the digital transformation literature (Source: Authors own work)

Blockchain layer	Dimensions of trust	Algorithmic trust	Organisational trust
Internet layer	Ability (technical competence) Transparency	✓	✗
Protocol layer	Ability (technical competence) Transparency	✓	✓
Application layer	Ability (technical competence) Transparency	✓	✓
Social layer	Ability Benevolence Integrity Transparency Identification	✗	✓

Table 2 - Blockchain layers and trust (Source: Authors own work)

Dimensions of trust	Supporting Literature	Description
Managerial competence (ability)	Chawla (2020); Pirson & Malhotra (2011)	Organisational abilities denoting strategic vision and decision-making. Reciprocal faith in others to work towards team goals rather than narrow or self-interested agendas.
Technical competence (ability)	Chawla (2020); Pirson & Malhotra (2011)	Organisational ability to deliver superior products and services. Reciprocal faith in team members to successfully complete the tasks in their area of expertise.
Benevolence	Mayer et al. (1995)	Considers if the trustee exhibits goodwill toward the trustor and is concerned for the trustor's wellbeing.
Integrity	Mayer et al. (1995)	Gauges whether a trustee is perceived as forthcoming, honest, and of requisite moral character.
Transparency	Mishra (1996); Tschannen-Moran (2000)	The perceived willingness to share trust-relevant information with vulnerable stakeholders.
Identification	Lewicki & Bunker (1996); Sitkin & Roth (1993)	Concerned with the understanding and internalisation of the interests and intentions of the other party, based on shared values and commitment.

Table 3- Dimensions of trust adapted from Devine et al. (2021)