Intertwining Digitalization and Sustainable Performance via the Mediating Role of Digital Transformation and the Moderating Role of FinTech Behavior Adoption

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Abstract: In the wake of digitalization, the emergence of novel technologies has urged financial institutes to embrace blockchain technology, which has led to a substantial improvement of their sustainability performance. Nowadays, digital transformation has strongly compelled banks to develop a positive behavior towards technology adoption in order to ensure their long-term business performance. This paper analyses the impact of corporate affinity for technology and blockchain technology adoption on the banks` sustainable performance under the mediating role of digital transformation and the moderating role of FinTech behavior adoption. The analysed data was collected from 371 employees working in the banking sector and six hypotheses were analyzed using structural equation modeling. The obtained results revealed that blockchain technology adoption and corporate affinity for technology positively influence a financial firm`s digital transformation and sustainable performance. Fintech behavior adoption moderates the relationship between digital transformation and sustainable performance, while digital transformation mediates the relationship between blockchain technology adoption, the corporate affinity for technology, and sustainable performance.

Keywords: Firm Performance, Digitalization, Corporate Affinity for Technology, Blockchain Technology Adoption, Digital Transformation, FinTech behavior adoption

Introduction

Digital evolution has made global industries rapidly adopt modern digital developments, thus supporting firms' sustainable performance. In recent years, financial institutes experiencing a wave of disruptive innovations have directed their focus toward digital transformation. Despite the progressive digital advancements, financing is still a challenging issue that has become the main reason for service failure. Many financial institutes today lack credit channels and transaction facilities, which calls their sustainability into question (Khalil et al., 2022; Kumar & Prakash, 2019).

In recent years, blockchain technology has emerged as a potential tool for eliminating banking challenges (Frizzo-Barker et al., 2020). Blockchain technology, a potential distributed ledger has gone beyond the cryptocurrency aspect to financial institutes. Blockchain features have developed new functionalities for financial firms that have changed their value proposition (Angelis & Ribeiro da Silva, 2019). Blockchain technological efficacy has enabled organizations to improve their sustainable performance, thereby narrowing down the financial gap in the traditional business model. In the financial sector, firms' digital technologies play an influential role in commercializing business activities. As such, blockchain technology is the driving force that has changed the face of the banking industry, being the core technology that has created promising prospects for firms' enduring performance (e.g. economic growth) (Ceptureanu et al., 2021; Khalil et al., 2022). In particular, this profound technology adoption has drastically improved the financial credit gap and has enabled banks to render high-quality services to their customers. This real-time ability has compelled global businesses to boost customer trust in the bank's commercial activities, leading many financial institutes to adopt self-service technologies. In this way, corporate affinity for technology plays a significant role in advancing banks' financial performance. Prior studies have

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shown that a firm`s digital integration radically streamlines its business process (Núñez-Merino et al., 2020), ultimately allowing it to achieve sustainable performance.

Hence, realizing the impact of digital transformation on a firm's sustainable performance has increased calls for the FinTech industry to adopt novel digital tools to meet customer demands. FinTech adoption is a controversial topic (Ryu & Ko, 2020)it has not reached the expected growth in the real world. As Fintech is innovative but inherently unpredictable, customers are still hesitant to adopt and use Fintech, which ultimately affects its growth. To achieve the sustainable development and growth of Fintech, an in-depth investigation of Fintech continuance intentions is required. To investigate continuous-use behavior in a Fintech context, this study focuses on two relevant issues: uncertainty and information technology (IT, and banks face challenges regarding technological inaccessibility (e.g. cyber risk, information theft, and data losses). Hence, these issues have inspired the FinTech industry to focus on ways of minimizing minimize such challenges. As such, to fill this research gap, the purpose of this paper is to investigate the effect of blockchain technology adoption and corporate affinity for technology in the context of digital transformation and sustainable performance. Also, it aims to extend this research topic by examining the mediating and moderating role of digital transformation and FinTech behavior adoption in the financial sector. The remainder of the paper is organized as follows. Section 2 outlines the literature review, Section 3 describes the research methodology, Section 4 discusses the obtained results, and Section 5 concludes this paper.

2. Literature Review

2.1 Blockchain Technology Adoption and Sustainable Performance

In the world of digitalization, financial institutes have played a critical role in expanding the hidden aspects of blockchain technology to improve firms' sustainable performance. Being a driver of the financial sector in recent years, blockchain technology has emerged as a promising tool in fostering banks' sustainable performance. This distributive technology has enhanced the global economic infrastructure, thus accelerating firms' sustainable performance (Abdullah et al., 2018; Khalil et al., 2022). Today, its growing pace has considerably enabled banking institutes to compete with the emerging sustainability issue. Blockchain technology has the potential to perform increasingly well on the competitive business market. As such, the prior literature shows that blockchain technology can improve a firm's economic and ecological value (Hassani et al., 2018; Purkovic et al., 2021), thereby ensuring its sustainable performance. Indeed, the literature on the implementation of blockchain technology is widespread in the banking sector, which leads to the following hypothesis:

H1: Blockchain technology adoption has a positive and significant impact on sustainable performance.

2.2 Blockchain Technology Adoption and Digital Transformation

In recent years, the financial industry has experienced unprecedented benefits of digitalization. Today, the implementation of blockchain technology has made banks relish the advantages of innovative transformations. Blockchain technology is the underlying value driver of digital transformation, as it fundamentally facilitates an open and scalable digital transformation system. Blockchain characteristics that provide superior features represent the most profound development of financial institutes in recent times (Wang et al., 2016). Its wide applications compel firms to understand the benefits of adopting it. In explaining this notion, prior research demonstrates that increasing blockchain adoption has made banks reorganize their business operations, thereby ensuring data transparency and traceability (Saheb & Mamaghani, 2021). Blockchain technology offers numerous benefits to the banking industry. Its promising features create a data-rich environment that allows financial firms to improve their business process. It fosters the banks' digitalization, efficacy, and operational services. Further, it marginalizes the firms' IT infrastructure, thus enhancing the firms' digital model (Zelenka & Podaras, 2021). Altogether, blockchain technology, by initiating a new wave of digital transformation, leads corporations to embracing novel transformation tools and techniques (Duy et al., 2018; Sarfraz et al., 2020). Hence, based on prior studies, the following hypothesis is proposed:

H2: Blockchain technology adoption has a positive and significant impact on digital transformation.

2.3 Corporate Affinity for Technology and Sustainable Performance

The evolution of firms' sustainable performance in banking has become a strongly debated topic. The significant development in previous years has compelled banking institutes to shape their social, economic, and ecological performance by embracing novel tools and techniques. Generally speaking, the recent technology adoption has made the firms focus on solving consumer problems. Today's customers of banks demand and expect banks to provide high-quality service with easy usage. Therefore, in recent years, banks have installed value-adding technologies (e.g. ATMs) to help customers manage their finances. In particular, one prior study explains that this phenomenon of self-service technology has assisted banks in achieving long-term profitability and performance (Sundararaj & Rejeesh, 2021). As such, these convenient technologies have led firms to achieve enduring sustainability and growth (Jaaron & Backhouse, 2019). Hence, in line with these studies, the current paper proposes the following hypothesis:

H3: Corporate affinity for technology has a positive and significant impact on sustainable performance.

2.4 Corporate Affinity for Technology and Digital Transformation

Over the years, the banking industry has undergone exponential technological changes. This shift has made today's corporations upgrade their conventional business activities with innovative services. Undoubtedly, this turning point has seriously attracted banks to direct their activities toward digitalization. Today, banks' digital integrations (e.g. artificial intelligence and mobile applications) have led them to embrace permanent changes in their business process (Núñez-Merino et al., 2020). In particular, recent technologies have determined financial institutes to adopt modern innovations, thus transforming business processes (Haddad & Hornuf, 2019). Altogether, digital technologies as the new channel for simplification have led the financial sector to digitalization more than other industries. Therefore, based on the review above, the current study proposed the following hypothesis:

H4: Corporate affinity for technology has a positive and significant impact on digital transformation.

2.5 The Mediating Role of Digital Transformation

Concerning the principle of digital transformation, sustainable banking seems to be a profound ideology that has motivated banks to adopt sustainable approaches. The firms` goal of sustainable performance has forced banks, by applying innovative technologies, to create and provide services and products that lead towards the well-being of society, ultimately providing economic benefits to the whole economy. In explaining this notion, one prior study shows that digital transformation enables firms to establish a culture centered on social, economic, and ecological performance (Tortorella et al., 2020). In the wake of digitalization, the adoption of blockchain technology has emerged as a fundamental tool fostering the banks' sustainable performance (e.g. economic performance). The statistics show that blockchain technologies have taken over different markets, with 77% of financial institutes likely to embrace blockchain technology by 2025 (Johnson & Sureshkumar, 2020). Therefore, this research indicates that today's financial sector is rigorously shifting to blockchain adoption to ensure sustainable growth. Digital transformation facilitates and promotes firms' sustainable practices. Indeed, today, blockchain technology has substantially revolutionized firms' business processes, thus leading them to achieving an enduring performance (Leng et al., 2020). Also, corporate technological affinity is crucial for maintaining a sustainable business process. In recent years, this impact of corporate technology integration (e.g. digitalization and automation) has allowed financial companies to achieve sustainable performance (Wang et al., 2022). This crucial change has enabled digital capabilities to improve business practices, thereby leading the digital transformation to accelerating the firms' sustainable performance. Additionally, a review of the previous literature reveals that digitalization has made banks responsible for society and the environment (Abor et al., 2019). Hence, in line with the previous literature, the following hypotheses are proposed:

H5: Digital transformation has a positive and significant impact on sustainable performance.

H5(a): Digital transformation mediates the relationship between blockchain technology adoption and sustainable performance.

H5(b): Digital transformation mediates the relationship between corporate affinity for technology and sustainable performance.

2.6 The Moderating Role of Fintech Behavior Adoption

Digital transformation has extended to the financial industry while making today's modernization the backbone of the FinTech revolution. FinTech refers to the convenient financing that allows institutes to expand economically. It fundamentally enhances finance quality by minimizing transaction costs and energy consumption, thereby contributing to a firm's economic performance (Deng et al., 2019). Banks today have a higher acceptance of emerging technologies due to the changes in the business environment that have altered banks' attitudes toward digital innovation, leading them to adopting the FinTech concept. The positive Fintech technological behavior adoption assists companies in embracing novel digital tools, thus transforming business practices. Prior research states that technological behavior inspires companies to reorganize and innovate, thus contributing to firms' sustainable performance. Hence, based on the literature presented, the following hypothesis is obtained (see Figure 1):

H6: Fintech behavior adoption moderates the relationship between digital transformation and sustainable performance.

Figure 1 shows the relationship between the six hypotheses proposed in this paper and the independent, dependent, mediator, and moderator variables.

3. Methodology

The study analyses the impact of blockchain technology adoption and corporate affinity for technology on sustainable performance. A quantitative research approach was adopted. The analysed data was collected from employees working in the banking sector of Pakistan. The data was collected from the banks in the three major cities of Karachi, Lahore, and Islamabad. A total of 500 questionnaires were distributed among the study participants. 410 completed questionnaires were received, out of which 371 were declared valid after data screening. The questionnaire was divided into two sections. The first section contained participants' demographic information, such as age, gender, bank location, and educational status.

The second part of the questionnaire included items related to dependent, independent, moderator, and mediator variables involved in the analysis. Statistical Package for the Social Sciences (SPSS) and Partial Least Squares Structural Equation Modeling (PLS-SEM) were used for data analysis. Correlation analysis was carried out to check the relationship between the independent and dependent variables, and structural equation modeling was conducted for hypothesis testing. The existence of common method bias was also checked using Harman's single-factor test. The analysis carried out has

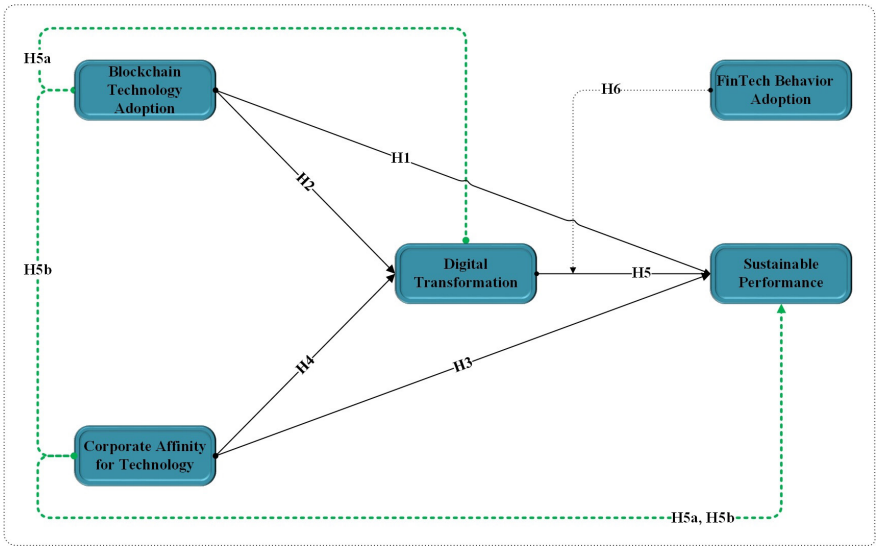

Figure 1. Theoretical Framework

had no common method bias because the variance extracted by one single factor was 9.921%, which is less than 50% (Khawaja et al., 2021; Podsakoff et al., 2003).

3.1 Measures

Blockchain technology adoption was measured on a 3-item scale adapted from Queiroz et al. (2021). In the current paper, Cronbach's alpha value for blockchain technology adoption was 0.789. Corporate affinity for technology was assessed on a 8-item scale, adapted from Fleming and Artis (2010). The sample items included "Bank X seems comfortable implementing new technology" and "Bank X offers the latest technologies." In this paper, Cronbach's alpha value for corporate affinity for technology was 0.910.

The mediator variable (digital transformation) was measured on a 7-item scale adapted from Nayal et al. (2022). Cronbach's alpha value for digital transformation was 0.908 in the current analysis. Sustainable performance was measured on a 5-item scale adapted from Gelhard & von Delft (2016). In this analysis, Cronbach's alpha value for sustainable performance was 0.870. The sample items included "Our reputation in terms of sustainability is better than the sustainability reputation." The moderator variable (FinTech behavior adoption) was assessed on a 4-item scale adapted from Abdul-Rahim et al. (2022). Cronbach's alpha value for FinTech Behavior adoption was 0.885. The sample items included "I always use contactless debit/credit/prepaid Cards".

4. Results and Discussion

Table 1 shows the study participants' demographics. Frequency analysis was conducted to analyze the gender, age, location, educational status, marital status frequencies, and valid percentages against the total sample size. 199 males and 172 females participated in this analysis. Most of the study participants were located in Lahore (208). Out of 371 participants, 132 employees had Master's degree qualifications. Participants' marital status was equally distributed between single (50.9%) and married (49.1%).

Table 1. Study Participants` Demographics

Items	Participants (N=371)	(%)
Male	199	53.6
Female	172	46.4
City		
Multan	85	22.9
Lahore	208	56.1
Islamabad	78	21
Age		
25-30	67	18.1
31-40	107	28.8
41-50	127	34.2
51-60	70	18.9
Education		
Bachelor`s degree	56	15.1
Master`s degree	132	35.6
M.Phil.	113	30.5
Others	70	18.9
Marital status		
Single	189	50.9
Married	182	49.1

Table 2 shows the reliability and validity values for blockchain technology adoption, the corporate affinity for technology, digital transformation, Fintech behavior adoption, and sustainable performance. The theoretical study model consisted of 27 items for independent (blockchain technology adoption and corporate affinity for technology), dependent (sustainable performance), mediator (digital transformation), and moderator variables (Fintech behavior adoption).

Table 2. Validity & Reliability Analysis

Construct	**α**	**CR**	**AVE**
Blockchain technology adoption	0.789	0.789	0.555
Corporate affinity for technology	0.910	0.909	0.558
Digital transformation	0.908	0.908	0.585
Fintech behavior adoption	0.885	0.885	0.659
Sustainable performance	0.870	0.870	0.574

The values of factor loading for all the items were higher than 0.6, as it was suggested by Hair et al. (2010). CAT_1 has the lowest factor loading value, 0.650, while FTBA_3 has the highest factor loading value, 0.890. Nunnally (1978) suggested that the average variance extracted (AVE) value should be higher than 0.5. The average variance extracted (AVE) and composite reliability (CR) were checked in the SEM.

In this analysis, all the values of AVE were higher than 0.5. In this study, Cronbach's alpha value for blockchain technology adoption, the corporate

affinity for technology, digital transformation, Fintech behavior adoption, and sustainable performance were 0.789, 0.910, 0.908, 0.885, and 0.870, respectively.

Table 3 shows the value of discriminant validity obtained after an analysis using Fornel & Larcker criterion & HTMT criterion. The values of the latent constructs were below 0.9 (Henseler et al., 2015). Thus, it demonstrates that each latent construct measurement was completely discriminatory against all the others. Figure 2 displays the graphical representation of the Measurement Model. The latent constructs are in circle shapes, while the items are in rectangle shapes.

Kock (2015) suggested that variance inflation factor (VIF) value should be lower than 3.3. Table 4 shows that the VIF values for all the constructs are lower than 3.3.

Table 5 shows the direct relationship between the analysed hypotheses. Each of the proposed direct-effect paths had a p-value below the accepted threshold of 0.05; they were all found to be statistically significant. Table 5 illustrates H1: Blockchain technology adoption has a positive and significant impact on sustainable performance ($\beta = 0.303$, $p < 0.05$). H2 states that blockchain technology adoption has a positive and significant impact on digital transformation ($\beta = 0.365$,

Table 3. Fornel & Larcker & HTMT-based Analysis

Construct	1	2	3	4	5
1. Blockchain technology adoption	**0.745**	0.600	0.566	0.207	0.630
2. Corporate affinity for technology	0.602	**0.747**	0.552	0.107	0.605
3. Digital transformation	0.566	0.554	**0.765**	0.344	0.605
4. Fintech behavior adoption	0.208	0.105	0.343	**0.812**	0.308
5. Sustainable performance	0.63	0.608	0.607	0.309	**0.757**

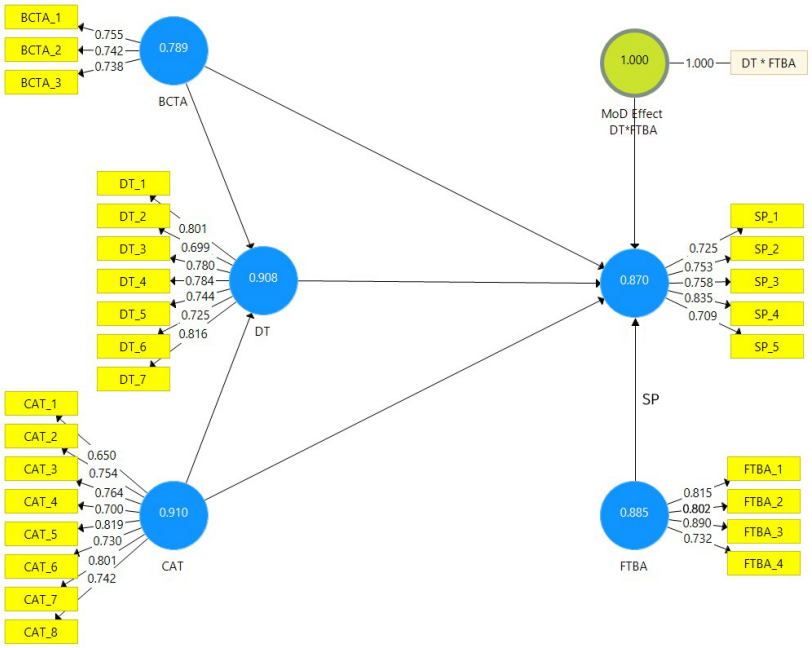

Figure 2. Measurement Model

Table 4. Variance Influence Factor

Construct	1	2	3	4	5
1. Blockchain technology adoption			1.568		**1.796**
2. Corporate affinity for technology			1.568		**1.780**
3. Digital transformation					**2.018**
4. Fintech behavior adoption					**1.17**
5. Sustainable performance					

Table 5. Direct Hypothesis Testing

Hypothesis	Variables Direct Relationships	Beta	SE	t-values	p-values
H1	BCTA ➔ SP	0.303	0.077	3.916	***
H2	BCTA ➔ DT	0.365	0.09	4.065	***
H3	CAT ➔ SP	0.286	0.072	3.999	***
H4	CAT ➔ DT	0.334	0.087	3.832	***
H5	DT ➔ SP	0.293	0.074	3.958	***

*Note: n= 371, BCTA = Blockchain technology adoption, SP = Sustainable Performance, DT= Digital transformation, CAT= Corporate affinity for technology, SE= Standard Error ***p<.001*

$p < 0.05$). H3 states that corporate affinity for technology has a positive and significant impact on sustainable performance ($\beta = 0.286$, $p < 0.05$). H4 states that corporate affinity for technology has a positive and significant impact on digital transformation ($\beta = 0.334$, $p < 0.05$). H5 states that digital transformation has a positive and significant impact on sustainable performance and was accepted in this analysis ($\beta = 0.293$, $p < 0.05$). As such, all of the five direct hypotheses were accepted in this analysis.

Table 6 shows the results of the mediation analysis. H5(a) states that digital transformation mediates the relationship between blockchain technology adoption and sustainable performance. H5(a) was accepted ($\beta = 0.107$, $p < 0.05$). H5(b) states that digital transformation mediates the relationship between corporate affinity for technology and sustainable performance. H5(b) was accepted ($\beta = 0.098$, $p < 0.05$). Figure 3 shows the results of structural equation modeling.

Table 6. Mediating Hypothesis Testing

Hypothesis	Indirect- Hypothesis	Beta	SE	t-Aalues	p-values
H5(a)	BCTA ➔ DT ➔ SP	0.107	0.037	2.851	**
H5(b)	CAT ➔ DT ➔ SP	0.098	0.037	2.625	**

*Note: n= 371, BCTA = Blockchain technology adoption, SP = Sustainable Performance, DT = Digital transformation, CAT= Corporate affinity for technology, SE= Standard Error **p<.01*

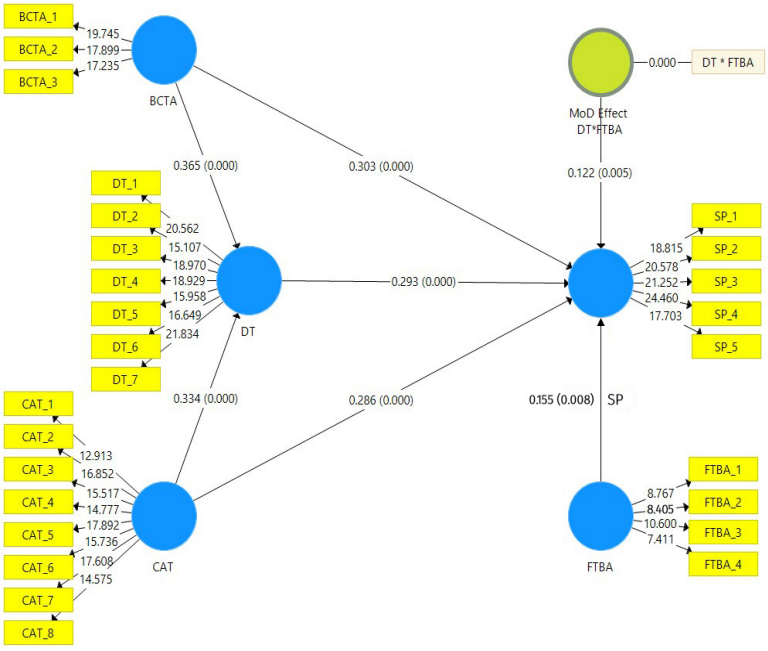

Figure 3. Results of Structural Equation Modeling

Similarly, the results for H6 showed that the moderating effect of adopting Fintech behavior between digital transformation and sustainable performance was significant ($\beta = 0.122$, $p < 0.05$). Table 7 also shows the conditional direct effects. Thus, H6 was approved in this analysis. Figure 4 displays the moderating effect of Fintech behavior adoption.

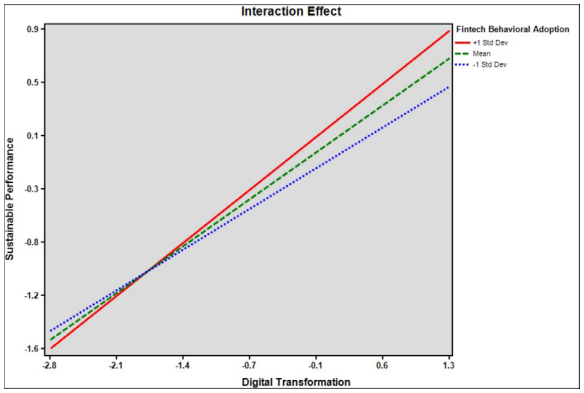

Figure 4. Moderating effect of FinTech behavior adoption

This analysis significantly contributes to the literature by providing evidence in favor of digital transformation. Blockchain technology is a new revolution in the banking industry that has drastically upgraded payment processes and services (Mishra & Kaushik, 2021), thus ensuring firms' sustainable performance. In the wake of digitalization, this fundamental tool has led financial institutes to create value for the stakeholder (Chang et al., 2020). Fundamentally, in this regard, previous studies suggest that corporate affinity for technology has emerged as a vital factor in satisfying stakeholder needs, thus contributing to firms' sustainable performance (Ibrahim & Alola, 2020). Indeed, while struggling to succeed on the financial market, banks have strongly embraced novel technologies, thus fulfilling their customers' needs. Today, self-serving digital tools have been embraced by companies to digitally transform their means so as to foster their sustainable performance (Frank et al., 2019). Enhancing the opportunities offered by digital transformation, the evolving digital technologies have successfully led firms to achieving a sustainable performance (Dalenogare et al., 2018). In this regard, the development of blockchain technology has facilitated considerable changes in the world's finance sector. Struggling in the dynamic economic environment, banks have undergone massive transformations, seeking ways to improve their sustainable performance (Leng et al., 2020; Semenas et al., 2021). Undoubtedly, this trend has led to the transformation of the traditional banking structure through the FinTech behavior legacy. FinTech setups have enabled financial institutes to carry out the transformation process, thus reinforcing firms' enduring performance (Chang et al., 2020). Hence, the obtained results verify the previous assumptions included in the analysed hypotheses.

5. Conclusion

This paper analysed the relationship between adoption of blockchain technology, corporate affinity for technology, and sustainable performance in the banking industry. It found that banks have moved toward sustainability through digitalization. The obtained results indicated a positive relationship between blockchain technology adoption, digital transformation, the corporate affinity for technology, and sustainable performance. Also, the results confirmed the positive mediating and moderating role of digital transformation and FinTech behavior adoption nexus for digital transformation and sustainable performance.

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Table 7. Moderated Regression Analysis

Hypothesis	Moderating Effects	Beta	SE	T-Value	p-value
H6	Interaction DT*FTBA➔ SP	0.122	0.044	2.792	**
Conditional effects					
	Level of the Moderator	**Effects**	**Boot SE**	**LLCI**	**ULCI**
H6	+1 Std Dev	0.607***	0.074	0.461	0.753
	Mean	0.536***	0.049	0.440	0.633
	-1 Std Dev	0.466***	0.051	0.365	0.566

*Note: n= 371, SP = Sustainable Performance, DT = Digital transformation, FTBA = Fintech behavior adoption, SE= Standard Error **p<.01*

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