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# Fintech Services and the Drivers of Their Implementation in Small and Medium Enterprises

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**Abstract:** Fintech has been one of the biggest agents of change in the financial sector worldwide, deserving an in-depth analysis as the aim of this study (including factors leading to its adoption, consequences, etc.). During the COVID-19 pandemic, the financial area and Fintech services allied to technology has increased efficiency, convenience, and security. To better understand this type of service, the research follows a quantitative methodology. The quantitative method included a questionnaire survey of companies that are Fintech customers, totaling 49 valid responses from firms (collected over a three-month period and which involved sending over a thousand emails to numerous companies). The response rate was low due to both the pandemic and the conjuncture with major war, which are generating uncertainty in business. The analysis was based on descriptive statistics, an assessment of the metric qualities of the scales, reliability and an Exploratory Factor Analysis, Pearson correlations and Hypothesis testing. The positive and significant effect of the technological context (perceived convenience, usefulness and effectiveness and perceived safety and trust) and the organizational context (ecological footprint reduction and internal cost reduction) on Fintech service adoption intention was confirmed. Hypothesis Three was partially confirmed since only consumer trends and reputation perception have a positive and significant effect on the intention to adopt Fintech by SMEs. The moderating effect of the environmental context in the relationship between the technological context and the intention to adopt Fintech by SMEs was partially proven, but the same was not verified in the relationship between the organizational context and the intention to adopt Fintech by SMEs. Portugal seems to be on the same adoption path as the rest of the western world, and Fintech services will undoubtedly increase, in a kind of revolution in which the strongest and those able to adapt to the markets and their needs will survive.

**Keywords:** Fintech; finance; digital finance; SaaS; digital innovation; COVID-19; e-commerce; disruptive innovation; Fintech ecosystem

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## 1. Introduction

Fintechs (which could be defined as "Innovative and disruptive financial services by non-financial companies", where information technology is the key factor [1], p. 543) have been the most prominent global driver of change in the financial industry [2]. This sudden change thus makes it complicated to analyze the emancipation of new business models and the entry of new competitors and applications in financial services [3]. This transformation has taken place in services such as digital payments, insurance, or active wealth management [3], due to factors such as the rapid evolution of technology, macroeconomic change, the regulatory environment and changing consumer expectations [3].

The restrictions due to the COVID-19 pandemic and subsequent quarantine led to the use of tools such as contactless (payments), better prices, and greater portability [4].

Through this digitalization, it has been possible to perform financial services remotely, revolutionizing this sector and the entire economy [2]. Indeed, current e-commerce trends revolve around convenience and security [4]. Although most of the technology on which Fintech innovations are based is not new, financial institutions have only recently introduced them into their services and products [5].

Between January and June 2020, e-commerce grew its global traffic by about 35.5% [2], leading the Fintech industry to produce digital products and applications that has led to a better consumer experience. Indeed, both entrepreneurship and innovation are crucial factors for e-commerce organizations to succeed [6]. In fact, COVID-19 forced several industries, including the Fintech sector, to innovate and accelerate their creative (and digital) process to find solutions to the new economic challenges caused by the pandemic [7]. Moreover, in conditions of economic crisis, there is a need for cost reduction [5]. Now, technology has become a way for companies to help cut costs; this is where Fintech entrepreneurs also focus. Innovation thus emerges as a critical success factor [5].

It is estimated that the confinement required by various governments worldwide has led to a 21% to 26% increase in daily transfers from mobile financial applications [8]. Additionally, these have also led to negative consequences, such as an increase in fraud—theft of credit card information and banking information in order to divert money, as an example [9]—thus giving rise to a severe problem due to the recent increasing digitalization of the economy [10]. One of the characteristics of the new digital age is that it takes on different forms and dimensions at a daily pace [10]. Although banks are less likely to accept change (in terms of their business formation and other characteristics), they have adjusted to the changes in the business environment. Consequently, they have begun to adopt and apply some processes imposed by digitalization [10]. Fraud leads to substantial financial losses. According to a study prepared by [11] covering the US financial services industries, it is estimated that for every dollar of fraud loss, financial services firms currently incur $3.25 in costs. They are related to the value of the transaction itself, adding the fees and interest incurred, fines and legal fees, investigation and labor costs, and ending with external recovery expenses [9]. In addition, this requires the institution or the trader and the end consumer to spend significant time in investigation [9].

In terms of regulation, one of the most significant milestones in cybersecurity is the enactment of the new European Payment Services Directive (PSD2), which helped foster competition and made payments more secure at the European level [12]. In addition, the General Data Protection Regulation (GDPR) and the e-Privacy Regulation were created at the European level and are currently under constant discussion [12].

The primary objective of the research is to understand and explore in more detail the concept of Fintech and its implementation in different business models and corporate strategies. It also aims to assess which innovative features in technology, in this case, Fintech services, lead to their adoption by SMEs (Small and Medium Enterprises), using hypothesis building based on the TOE Framework (Technology–organization–environment Framework). As for the impact of the pandemic crisis on the financial sector and the economy in general, the objective is to understand how COVID-19 affected Fintechs in their different business applications, namely in services related to online B2B and B2C transactions, and what led companies from different segments to resort to Fintechs. In addition to the points mentioned above, the research allows us to understand consumer trends—both at the B2B and B2C level—in the use of new technologies in the financial sector, studying these in more detail using samples obtained at the technological level.

As the COVID-19 pandemic has emphasized and indeed accelerated, the financial area and Fintech services allied to technology have increased efficiency, convenience, and security for their customers. Hence, we see Fintech services playing an increasingly important role in the future. We advise traditional banks to modernize and follow suit or perhaps suffer the dire consequences of not taking into account this innovative sector, which has taken the world somewhat by surprise. Though we foresee that there will always be more conservative customers who will remain customers of the traditional banking sector,

setting up Fintech start-ups may also be an answer to the Fintech competition by banks, as for their part Fintech services are also evolving into the more traditional banking sector.

## 2. Literature Review

### *2.1. Definition of Fintech*

FinTech, Financial Technologies, is an emerging topic in the business world [13] and several definitions of Fintech exist in the literature. Ref. [14] define Fintech as an emerging process resulting from combining financial and IT services. These cover the entire spectrum of financial services and products traditionally provided by financial institutions [14]. Ref. [15] define Fintech as a technical process resulting from the development and establishment of new financial software that could affect the traditional system in its entirety. Fintech could thus improve the performance of financial services by expanding these to mobile environments [15]. In [1], Fintech is defined as "innovative and disruptive financial services by non-financial companies, where IT is the key factor".

Fintech has a long history [16] that can be divided into three phases, despite being usually mentioned as a recent industry. The first part, Fintech 1.0, was the phase of developing mainframe computers, SWIFTS, and ATMs, among others. In the next era, FinTech 2.0 was composed of the Internet and IoT. Currently, Fintech is transitioning from the FinTech 2.0 to FinTech 3.0 phase, in which more technologies will be developed [13] Fintech is developing rapidly in different contexts, leading to innovations in products and services [17,18]. Many estimate that Fintech is the beginning of a revolution that will reshape the financial ecosystem, creating new winners and losers [3].

The most common categories of Fintech are money transfer and payment services, investments and savings, budget and financial management, loans and insurance [19]. Fintechs, thus, become essential for increasing the diversity and accessibility of services and stimulating the development of the financial sector [20,21].

### *2.2. COVID-19 Impact*

COVID-19 fostered the sudden development of e-business models. The pandemic increased online shopping and accelerated the replacement of offline shopping, causing many physical shops to establish an online presence over time [22]. In the European case, the pandemic increased digital financial services as well as the development of Fintech. It also accelerated the transition from paper to digital and the process of payment methods from traditional to contactless in a short period [22].

The pandemic crisis strains societies, governments, markets, businesses and individuals. The economic, human and financial costs are increasing dramatically, impacting all countries quite heavily, with emerging market developing countries more exposed [23]. Despite the potential benefits, SMEs are lagging behind large enterprises when it comes to the adoption of digital technologies. SMEs' digital adoption focuses chiefly on essential services, and gaps widen as they develop. The pandemic crisis has accelerated SME digitalization [24]. Business surveys conducted globally since the beginning of COVID-19 highlight that there has been a rapid uptake of telecommuting and digital sales channels among SMEs, notifying an acceleration in their digital transformation [24]. However, barriers to adoption still exist [24]. Furthermore, due to the current environment, where physical contact has been avoided to curb the transmission of COVID-19, digital wallets and other types of transactions that do not involve contact have emerged as very convenient alternatives [23].

### *2.3. Presentation of the Conceptual Model and Research Hypotheses*

Five hypotheses were elaborated based on the conceptual model represented in Figure 1.

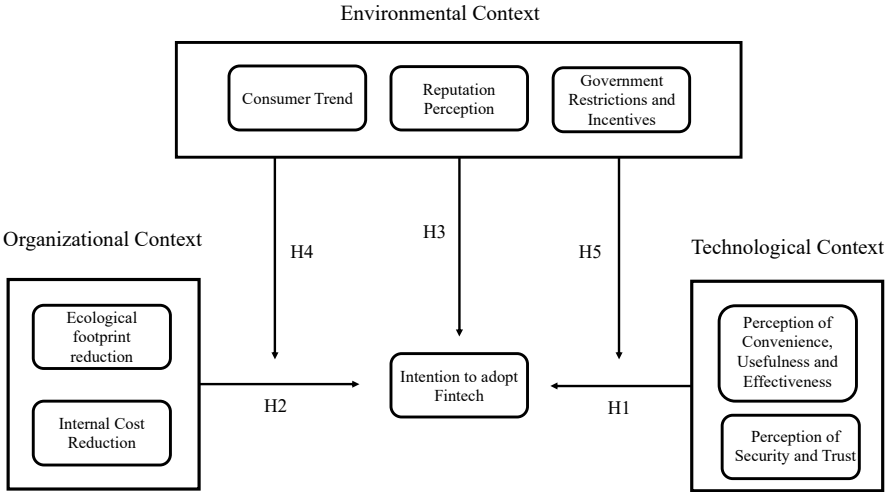


**Figure 1.** Proposed conceptual model.

Regarding the variables, two of them are independent: the "Technological Context" and the "Organizational Context ". The "Environmental Context" is an independent and moderating variable because it affects the nature of the relationship between the variables "Technological Context" and "Organizational Context" and the dependent variable. The dependent variable is thus "Intention to adopt Fintech", as this is the one that may change depending on changes in the other variables [25].

#### 2.3.1. TOE Framework

The TOE Framework classifies the Technology, the Organization and the Environment into three factors that lead an organization to adopt a particular innovation [26]. The TOE Framework is the most commonly recognized and used in the scientific area to analyze the potential factors that could affect the process of adoption of technological innovation by companies and prevent potential risks caused by the failure of the innovation adoption [27] in having a solid theoretical basis and empirical support [28]. Indeed, its variables have been tested several times in adopting other technologies, such as e-commerce, enterprise systems or e-procurement [29–31].

The present research describes the factors related to the three primary constructs and the hypotheses formulated.

#### 2.3.2. Technological Context—Convenience, Utility, and Effectiveness

The technological context includes technologies that are relevant to the company, both those that are already in use and those that are available in the market but are not being used [32]. The present research considers two characteristics in the context of SMEs' adoption of Fintech services: "convenience, usefulness and effectiveness" and "perceived safety and trust in Fintech services".

Convenience is related to location and time flexibility [33]. Convenience is thus one of the most important factors in mobile and online services [34]. Indeed, this is one of the extrinsic motivations of Fintech, derived from portability and immediate accessibility [35]. Users thus do not need to travel to financial institutions [1], such as bank branches.

Fintechs have made it possible to reduce the funding gap for small businesses by introducing new business models related to information technology and improving the services of existing financial institutions [36,37]. The emergence of Fintechs has also led to the disintermediation of financial services [38,39]. Furthermore, expectations by SMEs to perform better affect the adoption of Fintech services [40]. SMEs increasingly demand

banking services that have experiences at the level of internet and mobile usage, at the level of technologies used in their personal lives. A survey by Javelin Research mentions that 56% of SMEs showed interest in better digital tools at the banking level [41]. Indeed, Fintech services have made the lives of small entrepreneurs more accessible and provided them with well-being due to the reduction of financial bureaucracies (such as time-consuming procedures, identity checks and waiting times, for example) [42].

Perception of Safety and Trust

Safety risk is the potential loss related to a fraud or hack that compromises Fintech transactions [1]. Concerning e-services, the security risk is related to the likelihood of privacy invasion, becoming a concern for consumers of Fintech services [43]. Indeed, the willingness of SMEs to share data with third parties is also one of the main determinants for adopting a Fintech service [44]. Trust in technology companies (in this case, Fintechs) affects adoption by SMEs [45]. Adopters are more willing to share in relation to the more value in return they have [44].

Safety perception reflects consumers' perceptions regarding the uncertainty that the system used can securely transact [46,47]. Indeed, perceptions of safety in the transaction system through a Fintech service will cause positive consequences on adoption [1]. On the other hand, perceived risk negatively impacts the adoption of the technology [48,49]. According to the literature, Fintechs increase the security of services. Knowing that cybersecurity, payment fraud and identity theft are concerns for businesses, biometric security options increase substantially, making a difference to the consumer experience in the future [42]. Emerging technologies thus promise to give new security tools to financial leaders [45]. At the governmental level, the European Union's Directive on Network and Information Security, developed to protect online markets for cloud services or banking and healthcare systems, stands out [50,51].

In the future, a sudden growth in the adoption of Fintech by SMEs is expected to happen due to their readiness to share data. In a study conducted by consultancy EY, 70% of SME adopters mentioned being willing to share banking data selectively and securely with financial service companies if it helps improve their business [51].

Based on the literature mentioned above, the following hypothesis was developed:

**Hypothesis 1.** *The Technological context ((a) perceived convenience, usefulness and effectiveness and (b) perceived safety and trust) has a positive and significant effect on Fintech service adoption intention.*

2.3.3. Organizational Context

According to the TOE Framework, the organizational adoption of a given technology could be affected by its organizational context [52]. The organizational context refers to the resources and characteristics of the organization, such as intra-organizational communication processes, size of the organization or number of resources [26]. The present research analyses two characteristics within the organizational context that lead to SMEs adopting Fintech services: "Internal Cost Reduction" and "Reduction of the Company's Ecological Footprint".

Internal Cost Reduction

Digital technologies have allowed a reduction of transaction costs related to market activities. These technologies make the company more efficient, raising its productivity and performance [24]. Companies actively seek technological solutions to increase efficiency and reduce costs [44].

Regarding costs related to accessing finance, SMEs at all stages of their life cycle face structural barriers in accessing sources of finance, which are crucial for innovation [53]. According to a study prepared by [54], some examples of existing barriers include lack of collateral, poor financial skills, and lack of awareness and knowledge about financing

alternatives. As for market-related barriers, information asymmetry between company management and financial institutions stands out, as well as relatively higher transaction and lending costs for financing institutions to serve SMEs [54]. Indeed, digitization is crucial in reducing borrowing costs for SMEs at each stage of the lending process [41]. The rise of Fintechs has led to a "world" of new opportunities, and companies can offer more services for a lower price [42]. Experts claim that "Fintechs have the potential to be disruptive and transform the financial sector, making it more transparent, secure and less expensive" [55] (p. 1). Fintechs also offer financial products usually offered only by traditional financial institutions. Indeed, there is a great diversity of products and providers within the service of Fintechs. In addition, better risk management is offered due to instant feedback from the user's customer [56]. Therefore, it is pivotal that SME entrepreneurs keep up to date with the latest developments in Fintech [42].

Ecological Footprint Reduction

Environmental risks and climate change are currently attracting particular attention, even in the financial sector. The European Union recently approved a Green Deal, committing to becoming a climate-neutral economy, dramatically reducing emissions by 2050 [57]. The Green Deal recognizes that sustainable finance plays a crucial role in achieving the goals and describes it as a "pillar in reform" [57].

Having as the primary objective the focus of available funds for projects of sustainable character supported by the work of a group of technical experts on sustainable finance and following the recommendations given by the High-Level Expert Group [58], the European Commission organizes its action based on ten main objectives, giving us the most relevant examples: (1) creating labels and standards for green financial products; (2) promoting investment in sustainable projects; (3) incorporating sustainability into portfolio management and the provision of financial advice; (4) developing sustainability benchmarks; (5) clarifying asset managers and institutional investors' obligations; (6) incorporating sustainability into prudential requirements; (7) developing accounting rules and strengthening sustainability disclosure; (8) promoting sustainable corporate governance [59,60].

To strengthen their core competitiveness, SMEs will be obliged to promote the progress of green technology innovation [61]. The demand for more sustainable investments has grown substantially among institutional investors due to fears such as reputational implications [57]. Both millennials and Generation Z, who are increasingly responsible for running start-ups, tend to focus on concerns about environmental, governance and social policies. Indeed, these concerns are gradually being questioned by Fintechs [62]. Crowdfunding is a primary means of collaboration between sustainable finance and Fintechs. This involves companies receiving many small amounts from other users through an online platform. In effect, these green crowdfunding platforms can help environmentally sustainable businesses receive funding and raise cheaper, faster, and more accessible finance. These also offer investors opportunities to invest their money in more sustainable initiatives [57]. Furthermore, the COVID-19 pandemic demonstrated the link between finance and technology and sustainability, as all countries were forced to rethink traditional models and rely more on technology and sustainability [57].

Having analyzed the two innovative characteristics within the organizational context, the following Hypothesis was established:

**Hypothesis 2.** *The organizational context ((a) ecological footprint reduction and (b) internal cost reduction) has a positive and significant effect on SMEs' intention to adopt Fintech.*

2.3.4. Environmental Context

The environmental context of the TOE Framework features the availability of suppliers, the dogmatic environment of the organization, the industry structure [26,63], the regulatory environment, the dominant influence within the value chain that drives the firm to innovate, among other features [64,65] cited in [26]. The research thus analyses these characteristics

in the environmental context: Reputation and Branding, Government Restrictions and Incentives and Consumer trends.

Reputation and Branding Perception

The paper developed by [66] argues that brand image is an intangible asset with plenty of economic value that develops a varied reflection of positive effects on users. The effect of service providers' image and the brand has an important influence on providing trustworthy services to users, and this effect also positively promotes users' achievements for their intended purposes [67]. Concerning the case of Fintech, the literature shows that brand influences users' perception of quality [68] and value [69]. Moreover, since the adoption process of Fintech entails the provision by the user of private personal information, Ref. [70] proposed that a good brand image is essential to improve user trust and reduce risk.

Government Restrictions and Incentives

Some countries have taken additional measures to help SMEs accelerate the digital transition [71]. These policies are framed as more structural approaches to strengthen SMEs' post-crisis competitiveness and ability to address future environmental and social challenges [24]. Regulators and governments play a vital role in promoting and adopting electronic payments. In Europe, for example, the most recent reform in payment regulation, the second directive on payment services—called PSD2—introduced a maximum limit of 0.3% and 0.2% for interchange fees for credit and debit card transactions, respectively [72].

As part of the Portuguese Recovery and Resilience Plan, Portugal aims to invest in the digitalization of companies. The investment "TD-C16-i03—Catalyzing the Digital Transition of Enterprises" has included programs such as the dematerialization of invoicing, which aims to automate the process of qualified electronic signatures for issuing invoices with SAFE—Electronic Invoice Signature Service—as well as to encourage the mass use of digital invoicing in transactions, both B2B and B2C. Another program is related to certification seals for Cybersecurity, Privacy, Usability and Sustainability, which aims to invest in four certification platforms: cybersecurity, sustainability, usability, and privacy. In addition, it also aims to disseminate the capabilities of the various conformity assessment bodies or technical research laboratories and the granting of seals [73].

Consumer Trends

Several studies have analyzed the impact of consumer pressure on SMEs' adoption of new technology and found it to be significant [74–77]. With the continued digitization of the financial industry and the adoption of Fintech services by the industry itself and consumers, the volume of investment in the financial sector has grown continuously since 2010. The value of an investment in companies in Fintechs globally in 2019 was more than double that of 2017 [78], as an example.

According to [44], consumers have shown high awareness of Fintech services. Globally, 89% of consumers are aware of the existence of mobile payment platforms, and 82% are aware of Fintech-driven non-bank money transfers. The extensive integration of payment propositions given by Fintech services with retail, both offline and online, leads to consumers being presented with a varied choice of payment options at the time of purchase, consequently increasing awareness [44]. Digital payment platforms were already experiencing a boom in both the United States of America and China. Apple Pay (Cupertino, CA, USA) and Alipay (Hangzhou, China) have dramatically changed the way people transact, thereby offering contactless and secure payment options via mobile devices [79]. Although both platforms are growing, Alipay outperforms Apple Pay. Bain & Company found a 9% adoption of Apple Pay among US consumers, compared to 81% adoption of Alipay among Chinese consumers [79].

At a national level, in an interview given to Marketeer magazine, Alexandre Fernandes, Head of Business Development at Klarna Portugal, mentions that "Portugal is an exciting

market, even though it is small because the Portuguese are early adopters in terms of technology—and that is why other digital banks, such as Revolut or N26, have been successful in the country." [80] (p. 87). At the B2B level, Alexandre Fernandes adds that [80]:

> "Klarna acts as a search engine for local brands, which now have access to an ecosystem of 90 million customers. "( . . . ) in Portugal, it will be fundamental to attract SMEs. The e-Commerce market comprises a percentage of large Portuguese companies, another percentage of international brands, and then there is a huge "long tail" of small national brands that together represent a very significant cake for this economy." (p. 89)

Fintechs are the critical driver "for financial development, inclusion, social stability and integrity, and consequent sustainable development by building an infrastructure for an innovative digital financial ecosystem" [81]. Conventional methods of service delivery are outdated, thus being challenged by modern and more technologically powerful channels [82]. Indeed, Fintechs make financial services more efficient and accessible to customers [83]. Furthermore, the digital offering opens doors to a new customer base who prefer digital options. Therefore, business leaders should be aware of these trends, as a greater variety of options brings more customer convenience and, consequently, potential revenues [84].

Based on the above literature, the following hypotheses were made:

**Hypothesis 3.** *The environmental context ((a) consumer trends, (b) reputation perception and (d) government restrictions and incentives) has a positive and significant effect on the intention to adopt Fintech by SMEs.*

**Hypothesis 4.** *The environmental context ((a) consumer trends, (b) reputation perception and (c) government restrictions and incentives) has a moderating effect on the relationship between the organizational context ((a) ecological footprint reduction and (b) internal cost reduction) and the intention to adopt Fintech by SMEs.*

**Hypothesis 5.** *The environmental context ((a) consumer trends, (b) reputation perception and (c) government restrictions and incentives) has a moderating effect on the relationship between the technological context ((a) perceived convenience, usefulness and effectiveness and (b) perceived safety and trust) and the intention to adopt Fintech by SMEs.*

## 3. Materials and Methods

### *3.1. Data Collection Procedure*

Forty-nine participants collaborated in this study voluntarily, and all of them were considered for further statistical analysis because they met the necessary conditions for participation in this study. The total data collection took place between March 2022 and May 2022. This questionnaire was placed online through the Microsoft Forms platform. In order to obtain data, direct messages were sent through the LinkedIn social network and emails were sent to different employees of several SMEs. The sampling is non-probability, convenience and intentional sampling of the snowball type [25] through the motivation of a leader [85].

### *3.2. Participants*

The 49 participants in this study are companies based in Portugal, thus providing firmographic data. As far as the company's seniority is concerned, the average number of years of seniority of the companies that responded is 15 years, with a standard deviation of 10.29. Concerning the sector of the company, it was verified that the majority of the surveyed companies fell into the sector "Consulting, scientific, technical and similar activities", representing 28.6% of the respondents, followed by "Other service activities". Regarding the size of the respondent enterprises, it was found that the majority (42.9%) of enterprises

define themselves as "Microenterprise", and the least represented size is "Large Enterprise" with 4.1%. It was also verified that, in terms of area of activity, the percentage is quite balanced between "Internal Market" (51%) and "Internal and External Market" (49%). It was also verified that 81.6% of the surveyed companies have up to 50 partners. Regarding the use of Fintech services, 51% of the respondents answered "yes". Of those who answered "yes", it was found that "Online accounting and payroll tools; Online invoicing and invoice management tools and Online payment processors" was the group of multiple options with the most responses (6.1%). Regarding the frequency of use of Fintech services, it was concluded that 32.7% of respondents frequently use these and 18.4% sometimes.

### *3.3. Data Analysis Procedure*

IBM Statistics for Windows v.28.0.0 software (BM Corp. Armonk, NY, USA) was used to process the quantitative data collected with the questionnaire. To test validity, since these are new instruments, exploratory factor analyses (EFA) were performed using the Kaiser-Meyer-Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity (or weighted least squares method [86]) to check whether the tests are sufficiently correlated with each other [87] to proceed with the factor analysis subsequently. Internal consistency was tested by calculating Cronbach's alpha, whose value should be equal to or greater than 0.70, thus demonstrating that the questions of the elaborated scale are internally consistent [25]. The sensitivity of the items was tested by calculating measures of central tendency and shape. The association between variables was tested using the study of Pearson's correlations. As for the hypotheses formulated in this study, they were tested by performing simple and multiple linear regressions.

### *3.4. Instruments*

To measure the intention to adopt Fintech services, we used the instrument developed [88] consisting of 5 items classified in a 5-point Likert-type rating scale (from 1 "Strongly Disagree" to 5 "Strongly Agree"). After the EFA was performed, a KMO of 0.76 was obtained, with a total variance explained of 77.82%. Bartlett's test of sphericity proved to be significant ($p < 0.001$). It was also found that this instrument is unidimensional. As regards internal consistency, it has a Cronbach's alpha value of 0.93.

To measure the perceived usefulness of Fintech services, an instrument composed of 7 items was built based on other instruments such as those developed by [44,88]. These items are rated on a 5-point Likert-type rating scale (from 1 "Strongly Disagree" to 5 "Strongly Agree"). In the EFA, we obtained a KMO of 0.69 and Bartlett's test of sphericity proved to be significant ($p < 0.001$). The EFA indicated the existence of two factors that explained 71.98% of the total variability of this instrument. Item 1 had to be removed because it had a low factorial weight on the scale. After the semantic analysis of the items, we decided to assign to factor one the designation of perceived effectiveness of Fintech services (items 2, 3 and 4) and factor two the designation of perceived usefulness (items 5 and 6). As for the internal consistency, a Cronbach's alpha of 0.82 was obtained for the dimension of effectiveness and 0.50 for the dimension of usefulness.

The Perception of safety and trust in Fintech services was measured through an instrument composed of 9 items, classified on a 5-point Likert-type rating scale (from 1 "Strongly Disagree" to 5 "Strongly Agree"). Five of these nine items belong to an instrument developed by [88]. The other four items were based on other instruments, such as those developed by [88] and by [44]. In the EFA, a KMO value of 0.64 was obtained, considered reasonable, and Bartlett's test of sphericity was significant at $p < 0.001$. It was found that the factor structure of this scale is based on two factors, which explain 60.06% of the total variability of the scale. After the semantic analysis of the items, we decided to assign to factor 1 the designation of trust (items 1, 3, 4, 6 and 7) and to factor 2 the designation of security (items 2, 5, 8 and 9). As regards internal consistency, a Cronbach's alpha of 0.85 was obtained for the trust dimension and 0.58 for the safety dimension.

The need for internal cost reduction was measured by an instrument consisting of 3 items, based on other instruments such as those developed by [44,89]. These items are rated on a 5-point Likert-type rating scale (from 1 "Strongly Disagree" to 5 "Strongly Agree"). In the EFA, a KMO value of 0.63 was obtained, and Bartlett's test of sphericity was significant at $p < 0.001$. The factor structure of the scale in question was based on only one factor, with an explained variance of 58.68%. As regards internal consistency, Cronbach's alpha was 0.65.

The evaluation of the importance of the characteristics presented by Fintech services for the company was measured by an instrument composed of 7 items, based on the items of an instrument developed by [44]. These items are rated on a 5-point Likert-type rating scale (from 1 "Strongly Disagree" to 5 "Strongly Agree"). In the EFA, a KMO value of 0.78 was obtained. As for Bartlett's test of sphericity, it was significant with $p < 0.001$. It was found that the scale's factor structure is based only on one factor, explaining 68.89% of the total variability of the scale. Regarding internal consistency, a Cronbach's Alpha of 0.92 was obtained.

The Perception of Reputation and Image/ Branding of Fintech services was measured based on the instrument developed by [66] and rated on a 5-point Likert-type rating scale (from 1 "Strongly Disagree" to 5 "Strongly Agree"). In the EFA, a KMO value of 0.48 was obtained; however, Bartlett's test of sphericity was significant, with the value at $p < 0.001$. It was also found that the factor structure of this scale is based on two factors, which explained 70.35% of the total scales' variability. After performing a semantic analysis of the items, it was decided to designate factor one as Branding (items 1, 2 and 4) and factor two as Reputation (items 2 and 5). As for the internal consistency, a Cronbach's Alpha of 0.77 was obtained for the Branding/Image dimension and 0.54 for the Reputation dimension.

Government restrictions and incentives were measured by three items, based on the instrument developed by [44] and on directives from the [90]. These items are rated on a 5-point Likert-type rating scale (from 1 "Strongly Disagree" to 5 "Strongly Agree"). In the EFA, a KMO value of 0.50 was obtained, thus considered weak, and Bartlett's test of sphericity was significant with $p < 0.001$. The factor structure of the scale is based on only one factor, explaining 73.66% of the total variability of the scale. Concerning the internal consistency, a Cronbach's Alpha of 0.64 was obtained.

Two items measured the reduction of the ecological footprint based on European Commission directives (2021) [91] and rated on a 7-point Likert-type rating scale (from 1 "Strongly Disagree" to 7 "Strongly Agree"). The EFA obtained a KMO value of 0.79, and Bartlett's test of sphericity was significant at $p < 0.001$. It was found that this scale's factor structure is based on a factor, explaining 79.40% of the scales' variability. As for the internal consistency, a Cronbach's alpha of 0.74 was obtained.

Neither the instruments nor their component items grossly violate normality. Only in the government restrictions and incentives instrument was it necessary to remove item 1 for grossly violating normality.

## 4. Results

### *4.1. Descriptive Statistics of the Variables under Study*

To understand the answers given by the respondents in the questionnaire, descriptive statistics of the items were performed. As can be seen in Table 1, the participants revealed levels significantly above the central point in all variables under study, especially the importance of the characteristics of Fintech services ($t(48) = 6.83$; $p < 0.001$; $M = 3.69$; $SD = 0.71$), the perception of the image of Fintech services ($t(48) = 8.85$ $p < 0.001$; $M = 3.65$; $SD = 0.51$) and the perception of reduced ecological footprint ($t(48) = 5.67$; $p < 0.001$; $M = 4.90$; $SD = 1.11$), concluding that these are the variables that have the most weight in the decision making regarding the adoption of Fintech services by companies.

### *4.2. Descriptive Statistics of the Variables under Study*

Next, the direction and intensity of the association between the variables under study were studied using Pearson's correlations (Table 2)

**Table 1.** Descriptive statistics of the variables under study. Source—IBM SPSS Statistics v.28.0.0.

| Variable | t | *p* | Mean | Standard Deviation |
|---|---|---|---|---|
| Intention | 2.31 ** | 0.013 | 3.36 | 1.08 |
| Effectiveness | 4.92 *** | <0.001 | 3.44 | 0.63 |
| Utility | 5.32 *** | <0.001 | 3.41 | 0.54 |
| Trust | 5.33 *** | <0.001 | 3.44 | 0.57 |
| Safety | 3.68 *** | <0.001 | 3.30 | 0.56 |
| Cost Reduction | 5.01 *** | <0.001 | 3.39 | 0.55 |
| Importance | 6.83 *** | <0.001 | 3.69 | 0.71 |
| Image | 8.85 *** | <0.001 | 3.65 | 0.51 |
| Reputation | 4.83 *** | <0.001 | 3.23 | 0.34 |
| Governmental Restrictions | 3.25 *** | 0.001 | 3.32 | 0.68 |
| Reduction of the Ecological Footprint | 5.67 *** | <0.001 | 4.90 | 1.11 |

Note. ** $p < 0.01$; *** $p < 0.001$.

**Table 2.** Pearson Correlations—IBM SPSS Statistics v.28.0.0.

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Intention | – | | | | | | | | | | |
| 2. | Effectiveness | 0.37 *** | – | | | | | | | | | |
| 3. | Utility | 0.39 *** | 0.23 | – | | | | | | | | |
| 4. | Trust | 0.53 *** | 0.54 *** | 0.26 * | – | | | | | | | |
| 5. | Safety | 0.22 | 0.08 | 0.50 *** | −0.06 | – | | | | | | |
| 6. | Cost Reduction | 0.43 *** | 0.55 *** | 0.16 | 0.63 *** | −0.11 | – | | | | | |
| 7. | Importance | 0.40 *** | 0.36 * | 0.18 | 0.15 | 0.31 ** | 0.27 * | – | | | | |
| 8. | Image | 0.40 *** | 0.32 * | 0.17 | 0.30 * | 0.03 | 0.33 *** | 0.47 *** | – | | | |
| 9. | Reputation | 0.35 ** | 0.28 ** | 0.32 ** | 0.32 ** | 0.36 ** | 0.18 | 0.31 ** | 0.13 | – | | |
| 10. | Governmental Restrictions | 0.10 | 0.13 | −0.25 | −0.02 | −0.31 * | 0.28 | 0.14 | 0.34 * | 0.17 | – | |
| 11. | Reduction of the Ecological Footprint | 0.32 ** | 0.30 ** | 0.01 | 0.23 | −0.13 | 0.36 ** | 0.15 | 0.43 ** | 0.08 | 0.66 *** | – |

Note. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Perceived effectiveness of Fintech services (r = 0.37; $p < 0.01$), perceived usefulness of Fintech services (r = 0.39; $p < 0.01$), perceived trust of Fintech services (r = 0.53; $p < 0.01$), Cost Savings (r = 0.43; $p < 0.01$), Importance of Fintech services features (r = 0.40; $p < 0.01$), perceived Image Reputation of Fintech services (r = 0.40; $p < 0.01$), perceived Reputation and

of Fintech services (r = 0.35; $p < 0.05$) and reduced Ecological Footprint (r = 0.32; $p < 0.05$) are positively and significantly correlated with the intention to adopt a Fintech service.

The perceived effectiveness of Fintech services is positively and significantly related to the perceived trust in Fintech services (r = 0.54; $p < 0.01$) and to cost reduction (r = 0.55; $p < 0.01$). In addition, the perceived effectiveness of Fintech services is positively marginally significant related to the Importance of Fintech features (r = 0.36; $p < 0.10$) and to the perceived Reputation and Image of Fintech services (r = 0.32; $p < 0.10$). It is also positively and significantly related to perceived Reputation and Image of Fintech services (r = 0.28; $p < 0.05$) and reduced Ecological Footprint (r = 0.30; $p < 0.05$).

Security (r = 0.50; $p < 0.01$) is positively and significantly correlated with the usefulness of the Fintech service. Cost Reduction (r = 0.63; $p < 0.01$), perceived Reputation and Image of Fintech services (r = 0.32; $p < 0.05$) are positively and significantly correlated with trust in Fintech services.

Regarding Security, it is positively and significantly related to Importance of Fintech services features (r = 0.31; $p < 0.05$), perceived Reputation of Fintech services (r = 0.36; $p < 0.05$) and Government Restrictions and Incentives (r = 0.31; $p < 0.05$).

The perceived Reputation and Image of Fintech services (r = 0.47; $p < 0.01$), as well as the Reputation of Fintech services (r = 0.31; $p < 0.05$), are positively and significantly correlated with the Importance of Fintech service features. Reduced Ecological Footprint (r = 0.43; $p < 0.05$) is positively and significantly correlated with perceived Reputation and Image of Fintech services.

Government restrictions and incentives (r = 0.34; $p < 0.10$) are positively and significantly correlated with the perceived reputation of Fintech services. Reduced Footprint (r = 0.43; $p < 0.05$) is positively and significantly correlated with perceived reputation of Fintech services.

Finally, with regard to Governmental Restrictions and Incentives, this is positively and significantly related to Footprint Reduction (r = 0.66; $p < 0.01$).

### *4.3. Hypothesis Testing*

Regression analyses were performed to test and verify the hypotheses formulated and presented above. In this study, the predictor variables are the perceived Effectiveness, perceived Utility, perceived Trust, and perceived Safety in H1 and H5, the reduced Ecological Footprint and reduced Costs in H2, and H4, the Importance of Fintech service features, the Perception of Reputation, the Perception of Image and government restrictions and incentives in H3 and H4 and H5.

In order to analyze Hypothesis 1, Linear Regressions were performed in order to verify the functional relationship between the predictor variables and the dependent variable in question (Table 3) [86].

**Table 3.** Linear Regression of H1 (Source—IBM SPSS Statistics v.28.0.0.).

| Predictor Variable | Dependent Variable | F | *p* | $R^2_a$ | β | t | *p* |
|---|---|---|---|---|---|---|---|
| Effectiveness | Intention | 7.09 *** | 0.002 | 0.20 | 0.30 ** | 2.28 ** | 0.027 |
| Utility | | | | | 0.32 ** | 2.40 ** | 0.021 |
| Trust | | 12.09 *** | <0.001 | 0.32 | 0.55 *** | 4.55 *** | <0.001 |
| Safety | | | | | 0.26 ** | 2.14 ** | 0.038 |

Note. ** $p < 0.05$; *** $p < 0.01$.

The results indicate to us that effectiveness (β = 0.30; $p = 0.027$) and usefulness (β = 0.30; $p = 0.027$) have a positive and significant effect on Fintech adoption intention. The model explains 20% of the variability in the dependent variable. The model is statistically significant (F (2, 46) = 7.09; $p = 0.002$).

Trust (β = 0.55; $p < 0.001$) and security (β = 0.26; $p = 0.038$) have a positive and significant effect on the intention to adopt Fintech. The model explains 32% of the variability in the dependent variable. Furthermore, the model is statistically significant (F (2, 46) = 12.09; $p < 0.001$).

Thus, Hypothesis 1—H1 is confirmed: Technological context ((a) perception of convenience, usefulness and effectiveness and (b) perception of safety and trust) has a positive and significant effect on the intention to adopt Fintech services.

Similarly, in order to study Hypothesis 2, linear regressions was performed (Table 4).

**Table 4.** Linear Regressions of H2 (Source—IBM SPSS Statistics v.28.0.0.).

| Predictor Variable | Dependent Variable | F | *p* | $R^2_a$ | β | t | *p* |
|---|---|---|---|---|---|---|---|
| Reduction of the Ecological Footprint | Intention | 5.19 ** | 0.027 | 0.10 | 0.32 ** | 2.28 ** | 0.027 |
| Internal Cost Reduction | | 10.68 *** | 0.002 | 0.19 | 0.43 *** | 3.27 *** | 0.002 |

Note. ** $p < 0.05$; *** $p < 0.01$.

It can be seen from the results that reducing the ecological footprint (β = 0.32; $p = 0.027$) has a positive and significant effect on the intention to adopt Fintech. The model explains the variability of the dependent variable by 10%. The model is statistically significant (F (1, 47) = 5.19; $p = 0.027$).

Regarding cost reduction (β = 0.32; $p = 0.002$), the results indicate that it has a positive and significant effect on the intention to adopt Fintech. The model explains 19% of the variability of the dependent variable, also being statistically significant (F (1, 47) = 10.68; $p = 0.002$).

Thus, Hypothesis 2—H2 is confirmed: The organizational context ((a) Reduction of the Ecological Footprint reduction (b) internal cost reduction) has a positive and significant effect on the intention to adopt Fintech by SMEs.

Regarding Hypothesis 3 (Table 5), the results indicate that Image/Branding (β = 0.36; $p = 0.007$) and reputation (β = 0.30; $p = 0.027$) have a positive and significant effect on Fintech adoption intention. The model explains the variability of the dependent variable by 22% and is also statistically significant (F (2, 46) = 5.72; $p = 0.005$).

**Table 5.** Linear Regressions of H3 (Source—IBM SPSS Statistics v.28.0.0.).

| Predictor Variable | Dependent Variable | F | *p* | $R^2_a$ | β | t | *p* |
|---|---|---|---|---|---|---|---|
| Image | Intention | 5.72 *** | 0.005 | 0.22 | 0.36 *** | 2.80 *** | 0.007 |
| Reputation | | | | | 0.30 ** | 2.34 ** | 0.024 |
| Importance | | 9.04 *** | 0.004 | 0.14 | 0.40 *** | 3.01 *** | 0.004 |
| Governmental Restrictions | | 0.052 | 0.474 | 0.01 | 0.11 | 0.72 | 0.474 |

Note. ** $p < 0.05$; *** $p < 0.01$.

The results also verified that the Importance of Fintech service features (β = 0.40; $p = 0.004$) has a positive and significant effect on Fintech adoption intention. In addition, the model explains the variability of the dependent variable by 14%. This is statistically significant (F (1, 47) = 9.04; $p = 0.004$).

However, concerning government restrictions and incentives (β = 0.11; $p = 0.474$), the results indicate that these do not have a positive and significant effect on the intention to adopt Fintech. The model explains 1% of the variability of the dependent variable. The model is thus not statistically significant (F (1, 47) = 0.52; $p = 0.474$).

Based on the results, Hypothesis 3—H3 is partially confirmed: The environmental context ((a) consumer trend, (b) perceived reputation and (c) government restrictions and incentives) has a positive and significant effect on SMEs' intention to adopt Fintech.

Regarding hypotheses 4 and 5, to test the moderating effect, it was first necessary to center the independent variable and the moderating variable to create the interaction

variables, thus avoiding multicollinearity problems [92]. The variances of the variables in question are not affected; however, their means go to the value of 0. Indeed, the moderating effect is quite crucial because specific factors may reduce or increase the direction or magnitude of the effect of one or more predictor variables on the dependent variable [86]. Next, a two-step multiple linear regression was performed, where the first step introduced the independent variable and the moderator variable, and the second step introduced the interaction variables.

Regarding the multiple linear regressions referring to Hypothesis 4, as shown in Table 6, the moderating effect of the environmental context on the relationship between the ecological footprint and the intention to adopt Fintechs was not proven.

**Table 6.** Moderating effect of environmental context on the relationship between Ecological footprint reduction and intention to adopt the Fintech service (Source—IBM SPSS Statistics v.28.0.0.).

| Independents Variables | Intention to Adopt Fintech | |
|---|---|---|
| | β Step 1 | β Step 2 |
| Ecological Footprint | 0.26 | 0.27 |
| Importance | 0.22 | 0.14 |
| Image | 0.20 | 0.22 |
| Reputation | 0.21 | 0.21 |
| Governmental Restrictions | −0.13 | −0.09 |
| Footprint × Importance | | −0.17 |
| Footprint × Image | | 0.01 |
| Footprint × Reputation | | −0.06 |
| Footprint × Governmental Restrictions | | −0.05 |
| Overall F | 3.86 ** | 2.20 * |
| $R^2$ | 0.31 | 0.34 |
| Δ | | 0.03 |

Note. * $p < 0.10$; ** $p < 0.05$.

Similar to the previous result, the moderating effect of the environmental context on the relationship between cost reduction and the intention to adopt Fintech was also not proven (Table 7).

**Table 7.** Moderating effect of environmental context on the relationship between cost reduction and Fintech service adoption intention (Source—IBM SPSS Statistics v.28.0.0).

| Independents Variables | Intention to Adopt Fintech | |
|---|---|---|
| | β Step 1 | β Step 2 |
| Cost Reduction | 0.29 | 0.32 |
| Importance | 0.16 | 0.12 |
| Image | 0.21 | 0.21 |
| Reputation | 0.21 | 0.22 |
| Governmental Restrictions | −0.03 | −0.01 |
| Cost Reduction × Importance | | 0.04 |
| Cost Reduction × Image | | −0.08 |
| Cost Reduction × Reputation | | −0.11 |
| Cost Reduction × Governmental Restrictions | | −0.01 |
| Overall F | 4.51 *** | 2.43 ** |
| $R^2$ | 0.34 | 0.36 |
| Δ | | 0.02 |

Note. ** $p < 0.05$; *** $p < 0.01$.

From these two results, we conclude that Hypothesis 4 is not proved—H4: The environmental context ((a) consumer trend, (b) perception of reputation and (c) government restrictions and incentives) has a moderating effect on the relationship between the organi-

zational context ((a) Ecological footprint reduction and (b) internal cost reduction) and the intention to adopt Fintech by SMEs.

Concerning the multiple linear regressions referring to Hypothesis 5, as indicated in Table 8, the moderating effect of the environmental context on the relationship between the perceived Effectiveness of Fintech services and the intention to adopt the Fintech service was not proven.

**Table 8.** Moderating effect of environmental context on the relationship between perceived effectiveness of Fintech services and intention to adopt Fintech services (Source—IBM SPSS Statistics v.28.0.0).

| Independents Variables | Intention to Adopt Fintech | |
|---|---|---|
| | **β Step 1** | **β Step 2** |
| Effectiveness | 0.18 | 0.22 |
| Importance | 0.16 | 0.30 * |
| Image | 0.23 | 0.04 |
| Reputation | 0.23 | 0.09 |
| Governmental Restrictions | 0.03 | 0.15 |
| Effectiveness × Importance | | 0.31 * |
| Effectiveness × Image | | −0.31 * |
| Effectiveness × Reputation | | −0.22 |
| Effectiveness × Governmental Restrictions | | 0.07 |
| Overall F | 3.72 *** | 3.01 *** |
| $R^2$ | 0.30 | 0.41 |
| Δ | | 0.11 |

Note. * $p < 0.10$; *** $p < 0.01$.

The results indicate to us that there is a marginally significant interaction effect of importance (β = 0.31; $p = 0.063$) and image (β = −0.31; $p = 0.067$) on the relationship between efficacy and intention to adopt Fintech (Table 8). The model explains 41% of the variability in the dependent variable. The model is statistically significant (F (5, 43) = 3.01; $p < 0.01$). Given the limitations of the sampling in question and the small sample size [86], it was decided to include this variable.

In order to verify this interaction, we developed an interaction graph between the two variables (Figure 2). For employees with high perceptions of the importance of the characteristics of Fintech services for the company, when compared to employees with low perceptions, the perception of the effectiveness of Fintech becomes relevant for their adoption.

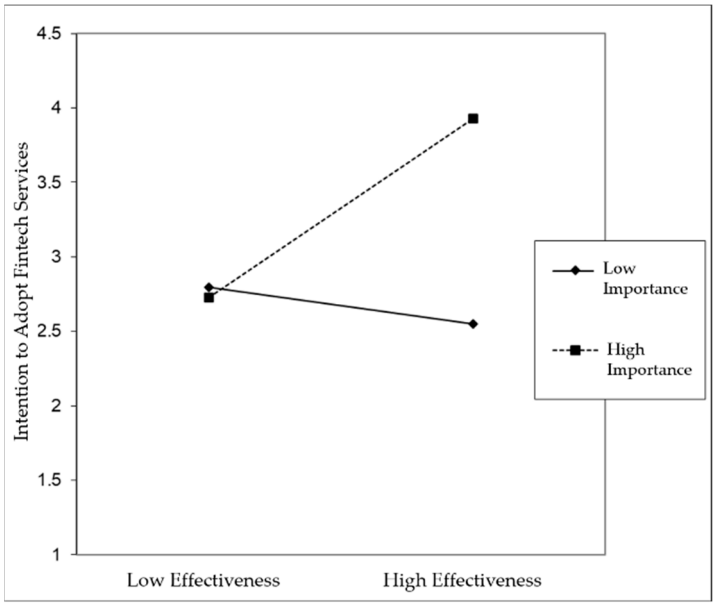


**Figure 2.** Interaction Importance of Characteristics of Fintech services to the firm × Perception of Effectiveness of Fintech services (Source: Microsoft Excel 365).

In turn, for employees with a low perception of the image of Fintech, when compared to employees with a high perception, the perception of the effectiveness of Fintech services becomes relevant for their adoption (Figure 3).

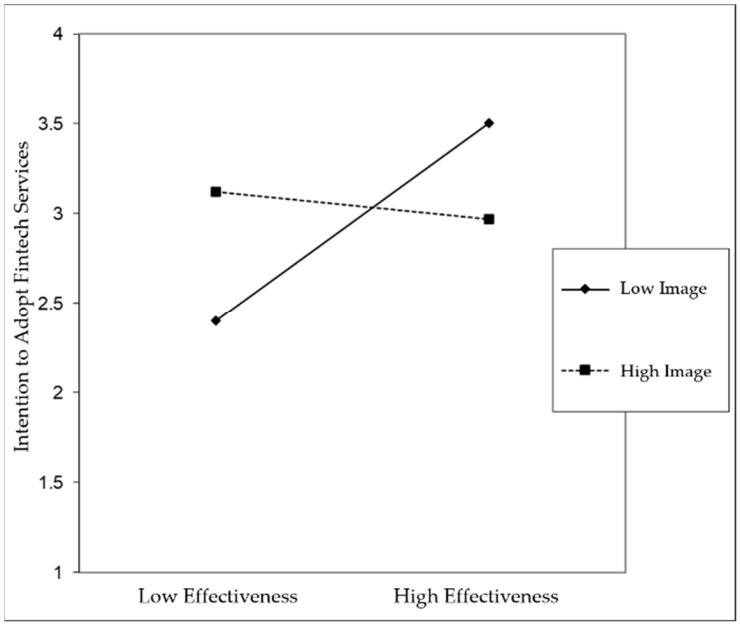


**Figure 3.** Interaction Perception of Image of Fintech Services × Perception of Effectiveness of Fintech Services (Source: Microsoft Excel 365).

Regarding the moderating effect of environmental context on the relationship between perceived usefulness of Fintech services and intention to adopt Fintech services, the results indicate that there is a marginally significant interaction effect of the perceived reputation of Fintech services ($\beta = -0.25$; $p = 0.069$) on the relationship between perceived usefulness of Fintech services and intention to adopt Fintech services (Table 9). The model also explains 45% of the variability in the dependent variable, and this is statistically significant

(F (5, 43) = 3.54; $p < 0.01$). Given the limitations of the sampling in question and the small sample size [86], it was also decided to include this variable.

**Table 9.** Moderating effect of environmental context on the relationship between perceived usefulness of Fintech services and intention to adopt Fintech services (Source—IBM SPSS Statistics v.28.0.0).

| Independents Variables | Intention to Adopt Fintech | |
|---|---|---|
| | β Step 1 | β Step 2 |
| Usefulness | 0.29 ** | 0.23 |
| Importance | 0.18 | 0.28 * |
| Image | 0.20 | 0.01 |
| Reputation | 0.20 | 0.07 |
| Governmental Restrictions | 0.12 | 0.20 |
| Utility × Importance | | 0.24 |
| Utility × Image | | −0.25 |
| Utility × Reputation | | −0.25 * |
| Utility × Governmental Restrictions | | 0.20 |
| Overall F | 4.50 *** | 3.54 *** |
| $R^2$ | 0.34 | 0.45 |
| Δ | | 0.11 |

Note. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

As in the previous model, a graph of interactions was also developed (Figure 4), and it was concluded that for employees with low perceptions of reputation when compared to employees with high perceptions, the perceived usefulness of Fintech services becomes relevant to their adoption.

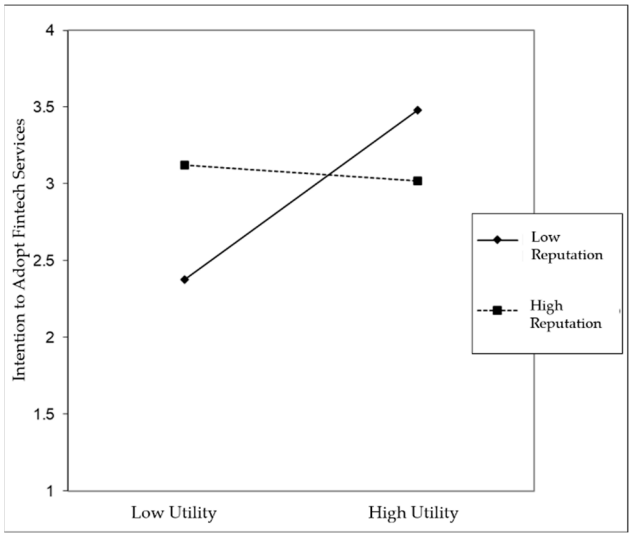


**Figure 4.** Interaction Perception of Reputation of Fintech Services × Perception of Usefulness of Fintech Services (Source: Microsoft Excel 365).

As shown in Table 10, the moderating effect of the environmental context on the relationship between perceived trust in Fintech services and the intention to adopt Fintech services was not proven. Indeed, the model explains 44% of the variability in the dependent variable and is statistically significant (F (5, 43) = 3.37; $p < 0.01$).

**Table 10.** Moderating effect of environmental context on the relationship between perceived trust in Fintech services and intention to adopt the Fintech service (Source—IBM SPSS Statistics v.28.0.0).

| Independent Variables | Intention to Adopt Fintech | |
|---|---|---|
| | β Step 1 | β Step 2 |
| Trust | 0.41 *** | 0.55 *** |
| Importance | 0.23 | 0.22 |
| Image | 0.13 | 0.06 |
| Reputation | 0.14 | 0.14 |
| Governmental Restrictions | 0.07 | 0.01 |
| Trust × Importance | | −0.21 |
| Trust × Image | | −0.02 |
| Trust × Reputation | | −0.05 |
| Trust × Governmental Restrictions | | 0.03 |
| Overall F | 6.15 *** | 3.37 *** |
| $R^2$ | 0.42 | 0.44 |
| Δ | | 0.02 |

Note. *** $p < 0.01$.

Concerning the moderating effect of environmental context on the relationship between perceived safety of fintech services and the intention to adopt fintech services, the results indicate that there is a significant interaction effect on the importance of the characteristics of fintech services for firms (β = −0.30; $p = 0.040$) on the relationship between perceived safety of fintech services and the intention to adopt fintech services (Table 11). There is also a marginally significant interaction effect of reputation (β = 0.27; $p = 0.082$) on the relationship between safety and fintech adoption intention. The model explains 47% of the variability in the dependent variable. The model is statistically significant ($F(5, 43) = 3.76$; $p < 0.01$). For the same reason of the limitations of the sample in question and the small sample size [86] it was decided to include this variable.

**Table 11.** Moderating effect of environmental context on the relationship between perceived safety in Fintech services and intention to adopt the Fintech service (Source—IBM SPSS Statistics v.28.0.0).

| Independent Variables | Intention to Adopt Fintech | |
|---|---|---|
| | β Step 1 | β Step 2 |
| Safety | 0.10 | 0.46 ** |
| Importance | 0.16 | 0.10 |
| Image | 0.27 * | 0.23 |
| Reputation | 0.24 * | 0.04 |
| Governmental Restrictions | 0.07 | 0.13 |
| Safety × Importance | | −0.30 ** |
| Safety y × Image | | −0.26 |
| Safety × Reputation | | 0.27 * |
| Safety × Governmental Restrictions | | −0.08 |
| Overall F | 3.41 ** | 3.76 *** |
| $R^2$ | 0.28 | 0.47 |
| Δ | | 0.19 ** |

Note. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

Using a graph of interactions, it was possible to conclude that for employees with low perceptions of the importance of the characteristics of Fintech services for the company, when compared to employees with high perceptions, the perception of Fintech security becomes relevant for adoption (Figure 5).

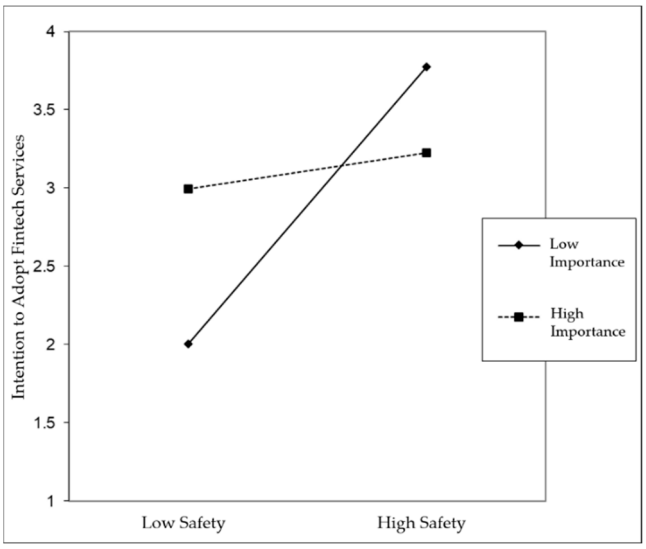


**Figure 5.** Interaction Perception of Importance of the characteristics of Fintech Services × Perception of Security of Fintech Services (Source: Microsoft Excel 365).

For employees with high perceptions of the reputation of Fintech services for the company, compared to employees with low perceptions, the perception of security of Fintech services also becomes relevant for the adoption of the services in question (Figure 6).

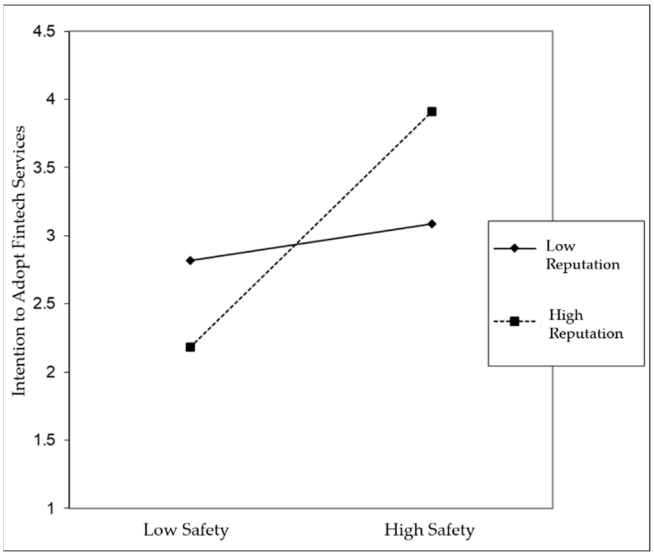


**Figure 6.** Interaction Perception of Reputation × Perception of Security of Fintech Services (Source: Microsoft Excel 365).

Based on the results obtained, Hypothesis 5—H5 is partially confirmed: The environmental context ((a) consumer trends, (b) perceived reputation and (d) government restrictions and incentives) has a moderating effect on the relationship between the technological context ((a) perceived convenience, usefulness and effectiveness and (b) perceived trust and security) and the intention to adopt Fintech by SMEs.

After analyzing the results obtained, Table 12 was prepared, indicating the hypotheses that were confirmed and those that were rejected.

**Table 12.** Results of the Presented Hypotheses.

| Hypotheses | Result |
| --- | --- |
| H1: The Technological context ((a) perceived convenience, usefulness and effectiveness and (b) perceived safety and trust) has a positive and significant effect on Fintech service adoption intention. | Confirmed |
| H2: The organizational context ((a) ecological footprint reduction and (b) internal cost reduction) has a positive and significant effect on SMEs' intention to adopt Fintech. | Confirmed |
| H3: The environmental context ((a) consumer trends, (b) reputation perception and (c) government restrictions and incentives) has a positive and significant effect on and the intention to adopt Fintech by SMEs. | Partially Confirmed |
| H4: The environmental context ((a) consumer trends, (b) reputation perception and (c) government restrictions and incentives) has a moderating effect on the relationship between the organizational context ((a) ecological footprint reduction and (b) internal cost reduction) and the intention to adopt Fintech by SMEs. | Rejected |
| H5: The environmental context ((a) consumer trends, (b) reputation perception and (c) government restrictions and incentives) has a moderating effect on the relationship between the technological context ((a) perceived convenience, usefulness and effectiveness and (b) perceived safety and trust) and the intention to adopt Fintech by SMEs. | Partially Confirmed |

## 5. Discussion

The main objective of this exploratory study was to understand the causes that led to the adoption of Fintech services in small and medium-sized enterprises. The research has filled a gap in the literature since few studies exist on the causes that lead to adopting these services in the Portuguese business fabric, namely in the current context of COVID-19, and the consequences of these implementations for organizations.

Through the questionnaire, it was possible to study the formulated hypotheses and confirm Hypothesis 1, related to the technological context of the TOE Framework. As previously mentioned in the literature by [42], adopting Fintech services leads to facilitating tasks for entrepreneurs, making their actions more effective. Furthermore, and as stated by [45], trust in Fintech technology affects businesses' adoption of Fintech services.

Regarding Hypothesis 2, based on the impact of the organizational context for adopting Fintech services by companies, the results of the quantitative analysis prove the hypothesis, converging with the literature. Indeed, several authors, such as [44], mention that organizations actively seek technological solutions to reduce their costs. In addition, related to the reduction of the ecological footprint, the literature highlights that more and more companies have highly present issues relating to environmental risks and climate change, these being the target of much attention [57].

Concerning Hypothesis 3, related to the environmental context, the results partially proved that only the perception of image and reputation and the importance of the characteristics of Fintech services have a positive and significant effect on their adoption. Government restrictions and incentives are not yet of significant importance for the adoption of Fintech services, thus leading to the conclusion that current digitalization support programs, for example, are not yet strong enough to lead companies to join this type of service. However, at a national level, with the new objectives for the digitalization of companies being inserted in the new Portuguese Recovery and Resilience Plan [73], as an example, the current paradigm may change.

Regarding Hypothesis 4, already inserted as a moderating effect of the other variables, none of the variables inserted in the environmental context has a moderating effect on the relationship between the organizational context and the intention to adopt Fintech services by SMEs. The results indicate that the Image and Reputation of the services, as well as the importance of the services' characteristics, do not affect how the ecological footprint and the reduction of costs relate to the intention to adopt the services. Although the

literature mentions that there are government incentives such as investment in sustainability platforms [73], aiming at a sustainable digital transition for organizations and that the greater variety of digital options brings potential revenues (with a new customer base that prefers digital) [84] and consequently cost reduction, these variables are not yet a "force" to moderate the organizational context. However, this can also be justified by the small sample size and research time.

Regarding Hypothesis 5, and as could be verified with the analysis of the results, this Hypothesis was partially confirmed, with only the moderating effect of the environmental context in the relationship between perceived trust in services and the intention to adopt not being proven. Thus, it is concluded that the environmental context does not play an essential role in moderating the trust variable, which is not in line with authors such as [70], who mention that a good image is essential in order to improve trust and subsequent adoption of Fintech services. As mentioned in the previous Hypothesis, the small sample size and research time may justify the rejection of this variable. The other moderating effects (environmental context in the relationship between perceived effectiveness, perceived usefulness, and perceived safety to adopt Fintech services) were positive and significant for the adoption of services. The results show that, for the most part, the environmental context does have a moderating effect on the relationship between technological context and service adoption.

Furthermore, it was also found when performing the analysis of the variables that, overall, the most significant variables are the importance of the characteristics of Fintech services ($t(48) = 6.83$; $p < 0.001$; $M = 3.69$; $SD = 0.71$), the perceived image of Fintech services ($t(48) = 8.85$ $p < 0.001$; $M = 3.65$; $SD = 0.51$), and the perceived reduction of the carbon footprint ($t(48) = 5.67$; $p < 0.001$; $M = 4.90$; $SD = 1.11$). With the result of the variables and the interaction graphs mentioned above, it is proven that not only the perceived image of Fintech services and the importance of Fintech features are the most important moderators, but they are also the three most important dimensions within the environmental context.

One of the objectives of this research was to understand how the pandemic context contributed to adopting Fintech services. Through descriptive statistics of the quantitative results, it was possible to verify that only 36% of respondents stated that the company became financially digitalized during the pandemic. This leads to the conclusion that COVID-19 was not a motivating factor for adopting this type of service, contradicting authors such as [24], who state that the pandemic crisis accelerated digitalization and the rapid acceptance of digital sales channels among SMEs.

## 6. Conclusions

In the last decade, there has been a sudden transformation in the area of digital services and channels linked to finance [3], with Fintech being the "engine" causing this major metamorphosis of the sector [2]. This change has occurred in various aspects of Fintech, including digital payments, insurance, and asset management [3]. Indeed, the study aimed to understand the reasons that led companies to opt for this type of service and the process of innovation of Fintech services. To this end, a questionnaire was developed and launched to employees from different companies and sectors, to delve deeper into the problem of the study. After collecting the data, it was treated using IBM SPSS Statistics V.28.0.0 and Microsoft Office Excel 365 software.

The present study thus proposes a model inserted in the TOE Framework that predicts the adoption of Fintech by SMEs. Furthermore, the study gives a complete overview of the factors that lead to the adoption of Fintechs and the ecosystem and innovation behind them. With the research, it was possible to understand the dynamics of the SME finance sector, particularly its development in the COVID-19 context. Furthermore, by obtaining the results of the different hypotheses developed, it was possible to understand the factors that lead to the adoption of Fintech services and whether the various dimensions of the TOE Framework relate to each other. The study also allowed us to understand the most essential variables when adopting Fintechs, with the conclusion that aspects such as security, image

or reputation are taken into consideration. Another aspect taken into consideration was the reduction of the ecological footprint on the part of the companies, thus concluding that this is a topic that may be further explored in future research. The analysis also helped to verify the technological level of the SMEs in the sample, as well as their main technological characteristics. In addition, it highlighted the importance of digitization of companies and the consequences that it harbours.

In terms of policy implication, a main response by the all-powerful banking sector may be to increase regulation and bar entry to the sector by Fintech services via certain policy making. We could not be more against this, and letting the market flow and work, as Adam Smith admonished ("the invisible hand" hypothesis [93,94], will bring benefits to all, especially to customers seeking the best and safest financial solutions to their needs.

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**Informed Consent Statement:** Written informed consent has been obtained from the patient(s) to publish this paper.

**Data Availability Statement:** The data presented in this study are available on request from the corresponding authors. The data is not publicly available since, in their informed consent, participants were informed that the data was confidential and that individual responses would never be known, as data analysis would be of all participants combined.

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## References

1. Ryu, H.-S. What Makes Users Willing or Hesitant to Use Fintech? The Moderating Effect of User Type. *Ind. Manag. Data Syst.* **2018**, *118*, 541–569. [CrossRef]
2. Sebastiani, S.; Kazi, M.S. The Local FinTech Opportunity in a Post COVID-19 World. 2020. Available online: https://www.google.com.hk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwiHyMvv5uv5AhU1gMYKHURVAAUQFnoECAsQAQ&url=https%3A%2F%2Fwww.pwc.com%2Fm1%2Fen%2Fpublications%2Fdocuments%2Flocal-fintech-opportunity-post-covid-19-world.pdf&usg=AOvVaw0hLdi_k7Kh5K0g9kaVmQ3y (accessed on 27 April 2022).
3. Arslanian, H.; Fischer, F. The Rise of Fintech. In *The Future of Finance*; Springer International Publishing: Cham, Switzerland, 2019.
4. Gu, S.; Ślusarczyk, B.; Hajizada, S.; Kovalyova, I.; Sakhbieva, A. Impact of the COVID-19 Pandemic on Online Consumer Purchasing Behavior. *J. Theor. Appl. Electron. Commer. Res.* **2021**, *16*, 2263–2281. [CrossRef]
5. Schindler, J. FinTech and Financial Innovation: Drivers and Depth. *Financ. Econ. Discuss. Ser.* **2017**. [CrossRef]
6. Gonçalves, R.; Martins, J.; Pereira, J.; Cota, M.; Branco, F. Promoting E-Commerce Software Platforms Adoption as a Means to Overcome Domestic Crises: The Cases of Portugal and Spain Approached from a Focus-Group Perspective. In *Trends and Applications in Software Engineering*; Mejia, J., Munoz, M., Rocha, Á., Calvo-Manzano, J., Eds.; Springer International Publishing: Cham, Switzerland, 2016; pp. 259–269. ISBN 978-3-319-26285-7.
7. Priyatingsih, K.; Triantono, H.B. Fintech Accelerates Economic Recovery Solutions from COVID-19. In Proceedings of the 6th International ACM In-Cooperation HCI and UX Conference (CHIuXID), Jakarta & Bandung, Indonesia, 21–23 October 2020; pp. 25–28.
8. Fu, J.; Mishra, M. *The Global Impact of COVID-19 on Fintech Adoption*; Swiss Finance Institute: Zürich, Switzerland, 2020.
9. Sinha, S.; Huraimel, K.A. *Reimagining Businesses with AI*; John Wiley & Sons, Inc.: Hoboken, NJ, USA, 2020.
10. Mekinjić, B.; Grujić, M.; Vujičić-Stefanović, D. Influence of Digitalisation and Technological Innovations in the Financial Market on the Development of the Financial Market. *Ekon. Preduz.* **2020**, *68*, 270. [CrossRef]

11. Lexis Nexis LexisNexis®Risk Solutions 2019 True Cost of Fraud™ Study. 2019. Available online: https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwj4iN34mOr5AhUQ-4UKHaxgCIAQFnoECAsQAQ&url=https%3A%2F%2Frisk.lexisnexis.com%2F-%2Fmedia%2Ffiles%2Ffinancial%2520services%2Fresearch%2Flnrs-2019-true-cost-of-fraud-financial-report-services-and-lending-nxr14106-00-1019-en-us.pdf&usg=AOvVaw0jNYicEEeUsdpDptmjcpu3 (accessed on 27 April 2022).
12. Spínola, C.; Orgeira, J.; Moreira, M. *FinTech Report*; Nova School of Business & Economics: Lisbon, Portugal, 2020.
13. Leong, K.; Sung, A. FinTech (Financial Technology): What Is It and How to Use Technologies to Create Business Value in Fintech Way? *Int. J. Innov. Manag. Technol.* **2018**, *9*, 74–78. [CrossRef]
14. Arner, D.; Barberis, J.; Buckley, R. The Evolution of Fintech: A New Post-Crisis Paradigm? 2015. Available online: https://ssrn.com/abstract=2676553 (accessed on 27 April 2022).
15. Lee, T.H.; Kim, H.W. An Exploratory Study on Fintech Industry in Korea: Crowdfunding Case. In Proceedings of the International Conference on Innovative Engineering Technologies, Bangkok, Thailand, 7 August 2015.
16. Quirk, E. The Intersection of ERP and Fintech. Available online: https://solutionsreview.com/enterprise-resource-planning/the-intersection-of-erp-and-fintech/ (accessed on 24 July 2022).
17. Arner, D.W.; Buckley, R.P.; Zetzsche, D.A.; Veidt, R. Sustainability, FinTech and Financial Inclusion. *Eur. Bus. Organ. Law Rev.* **2020**, *21*, 7–35. [CrossRef]
18. Zveryakov, M.; Kovalenko, V.; Sheludko, S.; Sharah, E. FinTech Sector and Banking Business: Competition or Symbiosis? *Econ. Ann.-XXI* **2019**, *175*, 53–57. [CrossRef]
19. Moreira, M.D.N. Fintech Report—An Overview of The Iberian Fintech Market. 2020. Available online: https://run.unl.pt/bitstream/10362/106855/1/2019-20_S1-24155-36-Mariana_Moreira.pdf (accessed on 27 April 2022).
20. Gabor, D.; Brooks, S. The Digital Revolution in Financial Inclusion: International Development in the Fintech Era. *New Political Econ.* **2017**, *22*, 423–436. [CrossRef]
21. Swartz, K.L. Stored Value Facilities: Changing the Fintech Landscape in Hong Kong. *J. Investig. Compliance* **2017**, *18*, 107–110. [CrossRef]
22. Hasan, R.; Ashfaq, M.; Shao, L. Evaluating Drivers of Fintech Adoption in The Netherlands. *Glob. Bus. Rev.* **2021**, 1–14. [CrossRef]
23. Arner, D.W.; Barberis, J.N.; Walker, J.; Buckley, R.P.; Zetzsche, D.A. Digital Finance & the COVID-19 Crisis. *SSRN Electron. J.* **2020**. [CrossRef]
24. Kergroach, S. SMEs Going Digital: Policy Challenges and Recommendations, Going Digital Toolkit Note, No. 15. 2021. Available online: https://goingdigital.oecd.org/data/notes/No15_ToolkitNote_DigitalSMEs.pdf (accessed on 27 April 2022).
25. Saunders, M.N.K.; Lewis, P.; Adrian, T. *Research Methods for Business Students*, 8th ed.; Pearson: Harlow, UK, 2019.
26. Baker, J. The Technology–Organization–Environment Framework. In *Information Systems Theory*; Dwivedi, Y., Wade, M., Schneberger, S., Eds.; Springer: New York, NY, USA, 2012; Volume 28, pp. 231–245. [CrossRef]
27. Bijker, M.; Hart, M. Factors Influencing Pervasiveness of Organisational Business Intelligence. In Proceedings of the Third International Conference on Business Intelligence and Technology (BUSTECH), Valencia, Spain, 27 May–1 June 2013; pp. 21–26.
28. Oliveira, T.; Martins, M.F. Literature Review of Information Technology Adoption Models at Firm Level. *Electron. J. Inf. Syst. Eval.* **2011**, *14*, 110–121.
29. Kowtha, N.R.; Choon, T.W.I. Determinants of Website Development: A Study of Electronic Commerce in Singapore. *Inf. Manag.* **2001**, *39*, 227–242. [CrossRef]
30. Wang, Y.-M.; Wang, Y.-S.; Yang, Y.-F. Understanding the Determinants of RFID Adoption in the Manufacturing Industry. *Technol. Forecast. Soc. Chang.* **2010**, *77*, 803–815. [CrossRef]
31. Zhu, K.; Kraemer, K.L.; Dedrick, J. Information Technology Payoff in E-Business Environments: An International Perspective on Value Creation of E-Business in the Financial Services Industry. *J. Manag. Inf. Syst.* **2004**, *21*, 17–54. [CrossRef]
32. Collins, P.D.; Hage, J.; Hull, F.M. Organizational and Technological Predictors of Change in Automaticity. *Acad. Manag. J.* **1988**, *31*, 512–543.
33. Okazaki, S.; Mendez, F. Exploring Convenience in Mobile Commerce: Moderating Effects of Gender. *Comput. Hum. Behav.* **2013**, *29*, 1234–1242. [CrossRef]
34. Kim, C.; Mirusmonov, M.; Lee, I. An Empirical Examination of Factors Influencing the Intention to Use Mobile Payment. *Comput. Hum. Behav.* **2010**, *26*, 310–322. [CrossRef]
35. Kuo-Chuen, D.L.; Teo, E.G. Emergence of FinTech and the LASIC Principles. *J. Financ. Perspect.* **2015**, *3*, 24–36.
36. Haddad, C.; Hornuf, L. The Emergence of the Global Fintech Market: Economic and Technological Determinants. *Small Bus. Econ.* **2019**, *53*, 81–105. [CrossRef]
37. Pokorná, M.; Sponer, M. Social Lending and Its Risks. *Procedia Soc. Behav. Sci.* **2016**, *220*, 330–337. [CrossRef]
38. Huynh, T.L.D.; Hille, E.; Nasir, M.A. Diversification in the Age of the 4th Industrial Revolution: The Role of Artificial Intelligence, Green Bonds and Cryptocurrencies. *Technol. Forecast. Soc. Chang.* **2020**, *159*, 120188. [CrossRef]
39. Lashitew, A.A.; van Tulder, R.; Liasse, Y. Mobile Phones for Financial Inclusion: What Explains the Diffusion of Mobile Money Innovations? *Res. Policy* **2019**, *48*, 1201–1215. [CrossRef]
40. Najib, M.; Ermawati, W.J.; Fahma, F.; Endri, E.; Suhartanto, D. FinTech in the Small Food Business and Its Relation with Open Innovation. *J. Open Innov. Technol. Mark. Complex.* **2021**, *7*, 88. [CrossRef]
41. Mills, K.; McCarthy, B. How banks can compete against an army of fintech start-ups. *Harv. Bus. Rev.* **2017**, *13*, 1–5.

42. Sanchiz, C. How Fintech Is Helping Small Businesses Grow-Sage Advice US. Available online: https://www.sage.com/en-us/blog/the-small-business-owners-guide-to-fintech/ (accessed on 13 June 2022).
43. Lwin, M.; Wirtz, J.; Williams, J.D. Consumer Online Privacy Concerns and Responses: A Power–Responsibility Equilibrium Perspective. *J. Acad. Mark. Sci.* **2007**, *35*, 572–585. [CrossRef]
44. Ernst & Young. Ernst & Young Global FinTech Adoption Index 2019, pp. 1–44. Available online: https://assets.ey.com/content/dam/ey-sites/ey-com/en_gl/topics/banking-and-capital-markets/ey-global-fintech-adoption-index.pdf (accessed on 27 April 2022).
45. Statista Number of Fintech Startups Globally by Region 2021 | Statista. Available online: https://www.statista.com/statistics/893954/number-fintech-startups-by-region/ (accessed on 13 June 2022).
46. Lee, E.-Y.; Lee, S.-B.; Jeon, Y.J.J. Factors Influencing the Behavioral Intention to Use Food Delivery Apps. *Soc. Behav. Personal. Int. J.* **2017**, *45*, 1461–1473. [CrossRef]
47. Morosan, C. Theoretical and Empirical Considerations of Guests' Perceptions of Biometric Systems in Hotels. *J. Hosp. Tour. Res.* **2012**, *36*, 52–84. [CrossRef]
48. Lam, S.Y.; Shankar, V. Asymmetries in the Effects of Drivers of Brand Loyalty Between Early and Late Adopters and Across Technology Generations. *J. Interact. Mark.* **2014**, *28*, 26–42. [CrossRef]
49. Shin, D.-H. Modeling the Interaction of Users and Mobile Payment System: Conceptual Framework. *Int. J. Hum. Comput. Interact.* **2010**, *26*, 917–940. [CrossRef]
50. Schuermann, P.; Schuermann, T. How a Cyber Attack Could Cause the Next Financial Crisis. *Harv. Bus. Rev.* **2018**, *8*, 1–6.
51. Bull, T. How FinTechs Are a World of Choice for Small and Medium-Sized Enterprises; EY: 2019; pp. 1–9. Available online: https://www.ey.com/en_gl/banking-capital-markets/how-fintechs-are-a-world-of-choice-for-small-and-medium-sized-enterprises (accessed on 27 April 2022).
52. Chau, P.Y.K.; Tam, K.Y. Factors Affecting the Adoption of Open Systems: An Exploratory Study. *MIS Q.* **1997**, *21*, 1–24. [CrossRef]
53. OECD. *OECD SME and Entrepreneurship Outlook 2019*; OECD Publishing: Paris, France, 2019; ISBN 9789264374805.
54. OECD. *The Missing Entrepreneurs 2017: Policies for Inclusive Entrepreneurship*; OECD Publishing: Paris, France, 2017; ISBN 9789264283596.
55. Kabulova, J.; Stankevičienė, J. Valuation of FinTech Innovation Based on Patent Applications. *Sustainability* **2020**, *12*, 10158. [CrossRef]
56. Moro-Visconti, R.; Cruz Rambaud, S.; López Pascual, J. Sustainability in FinTechs: An Explanation through Business Model Scalability and Market Valuation. *Sustainability* **2020**, *12*, 10316. [CrossRef]
57. Macchiavello, E.; Siri, M. Sustainable Finance and Fintech: Can Technology Contribute to Achieving Environmental Goals? A Preliminary Assessment of 'Green FinTech'. *SSRN Electron. J.* **2020**. [CrossRef]
58. High Level Expert Group on Sustainable Finance-Secretariat Provided by the European Commission, Financing a Sustainable European Economy. Final Report 2018 by the High-Level Expert Group on Sustainable Finance. Secretariat Provided by the European Commission. 2018. Available online: https://ec.europa.eu/info/sites/default/files/180131-sustainable-finance-final-report_en.pdf (accessed on 27 April 2022).
59. Busch, D. Sustainability Disclosure in the EU Financial Sector. In *Sustainable Finance in Europe*; Springer: Cham, Switzerland, 2021.
60. Siri, M.; Zhu, S. Will the EU Commission Successfully Integrate Sustainability Risks and Factors in the Investor Protection Regime? A Research Agenda. *Sustainability* **2019**, *11*, 6292. [CrossRef]
61. Jiang, X.; Shen, J.H.; Lee, C.-C.; Chen, C. Supply-Side Structural Reform and Dynamic Capital Structure Adjustment: Evidence from Chinese-Listed Firms. *Pac. Basin Financ. J.* **2021**, *65*, 101482. [CrossRef]
62. Mayor, T. Fintech, Explained | MIT Sloan. Available online: https://mitsloan.mit.edu/ideas-made-to-matter/fintech-explained (accessed on 27 April 2022).
63. Awa, H.O.; Ukoha, O.; Emecheta, B.C. Using T-O-E Theoretical Framework to Study the Adoption of ERP Solution. *Cogent Bus. Manag.* **2016**, *3*, 1196571. [CrossRef]
64. Mansfield, E. Industrial Research and Technological Innovation. *Econ. J.* **1968**, *78*, 676–679. [CrossRef]
65. Mansfield, E.; Rapoport, J.; Romeo, A.; Villani, E.; Wagner, S.; Husic, F. The Production and Application of New Industrial Technology. *Acad. Manag. Rev.* **1977**. [CrossRef]
66. Hu, Z.; Ding, S.; Li, S.; Chen, L.; Yang, S. Adoption Intention of Fintech Services for Bank Users: An Empirical Examination with an Extended Technology Acceptance Model. *Symmetry* **2019**, *11*, 340. [CrossRef]
67. Park, E.; Kim, H.; Ohm, J.Y. Understanding Driver Adoption of Car Navigation Systems Using the Extended Technology Acceptance Model. *Behav. Inf. Technol.* **2015**, *34*, 741–751. [CrossRef]
68. Riyadh, A.N.; Bunker, D.; Rabhi, F. Barriers to E-Finance Adoption in Small and Medium Sized Enterprises (Smes) in Bangladesh. In Proceedings of the 5th Conference on Qualitative Research in IT, Brisbane, Australia, 17 November 2010.
69. Shapiro, S.L.; Reams, L.; So, K.K.F. Is It Worth the Price? The Role of Perceived Financial Risk, Identification, and Perceived Value in Purchasing Pay-per-View Broadcasts of Combat Sports. *Sport Manag. Rev.* **2019**, *22*, 235–246. [CrossRef]
70. Chandra, S.; Srivastava, S.C.; Theng, Y.-L. Evaluating the Role of Trust in Consumer Adoption of Mobile Payment Systems: An Empirical Analysis. *Commun. Assoc. Inf. Syst.* **2010**, *27*. [CrossRef]
71. OECD Coronavirus (COVID-19): SME Policy Responses-OECD. Available online: https://read.oecd-ilibrary.org/view/?ref=119_119680-di6h3qgi4x&title=Covid-19_SME_Policy_Responses (accessed on 27 April 2022).

72. European Commission Payment Services Directive and Interchange Regulation: Frequently Asked Questions. Available online: https://ec.europa.eu/commission/presscorner/detail/pt/MEMO_13_719 (accessed on 14 February 2022).
73. Recuperar Portugal Investimento RE-C01-I01-Recuperar Portugal. Available online: https://recuperarportugal.gov.pt/2021/06/13/investimento-td-c16-i03/ (accessed on 14 February 2022).
74. Chatzoglou, P.; Chatzoudes, D. Factors Affecting E-Business Adoption in SMEs: An Empirical Research. *J. Enterp. Inf. Manag.* **2016**, *29*, 327–358. [CrossRef]
75. Kumar, D.; Fenn, C.J.; Normala, S.G. Technology Disruption and Business Performance in SMEs. *Relig. Rev. Cienc. Soc. Humanid.* **2019**, *4*, 130–138.
76. Maduku, D.K.; Mpinganjira, M.; Duh, H. Understanding Mobile Marketing Adoption Intention by South African SMEs: A Multi-Perspective Framework. *Int. J. Inf. Manag.* **2016**, *36*, 711–723. [CrossRef]
77. Nugroho, M.A.; Susilo, A.Z.; Fajar, M.A.; Rahmawati, D. Exploratory Study of SMEs Technology Adoption Readiness Factors. *Procedia Comput. Sci.* **2017**, *124*, 329–336. [CrossRef]
78. Norrestad, F. Consumer Fintech Adoption Rates Globally from 2015 to 2019, by Category. Available online: https://www.statista.com/statistics/1055356/fintech-adoption-rates-globally-selected-countries-by-category/ (accessed on 27 April 2022).
79. Gross, I.; Kriffy Perez, K.; Quah, B.-L. Why Hasn't Apple Pay Replicated Alipay's Success? Available online: https://hbr.org/2020/09/why-hasnt-apple-pay-replicated-alipays-success (accessed on 11 April 2022).
80. Almeida, D. Lisboa Queremos romper com a banca tradicional. *Marketeer* **2022**, 86–89.
81. Zhang-Zhang, Y.; Rohlfer, S.; Rajasekera, J. An Eco-Systematic View of Cross-Sector Fintech: The Case of Alibaba and Tencent. *Sustainability* **2020**, *12*, 8907. [CrossRef]
82. Anagnostopoulos, I. Fintech and Regtech: Impact on Regulators and Banks. *J. Econ. Bus.* **2018**, *100*, 7–25. [CrossRef]
83. Hommel, K.; Bican, P.M. Digital Entrepreneurship in Finance: Fintechs and Funding Decision Criteria. *Sustainability* **2020**, *12*, 8035. [CrossRef]
84. Newman, D. Accounting for Change: Why Finance Should Lead Technology Adoption. Available online: https://www.sage.com/en-us/blog/why-finance-should-lead-technology-adoption/ (accessed on 13 June 2022).
85. Vilelas, J. *Investigação-O Processo de Construção Do Conhecimento*; Edições Sílabo.: Lisboa, Portugal, 2020; ISBN 9789895610976.
86. Marôco, J. *Análise Estatística Com o SPSS Statistics*, 8th ed.; ReportNumber, Lda: Pêro Pinheiro, Portugal, 2021; ISBN 9789899676374.
87. Leite, P. *Working Like You Mean It: Contribuição Para A Tradução E Validação De Uma Escala De Meaningful Work*; ISPA–Instituto Universitário Ciências Psicológicas, Sociais e da Vida: Lisboa, Portugal, 2018.
88. Le, M.T.H. Examining Factors That Boost Intention and Loyalty to Use Fintech Post-COVID-19 Lockdown as a New Normal Behavior. *Heliyon* **2021**, *7*, e07821. [CrossRef] [PubMed]
89. Lee, I.; Shin, Y.J. Fintech: Ecosystem, Business Models, Investment Decisions, and Challenges. *Bus. Horiz.* **2018**, *61*, 35–46. [CrossRef]
90. República Portuguesa Certificação de Maturidade Digital-Portugal Digital. Available online: https://portugaldigital.gov.pt/avaliar-a-maturidade-digital-e-certificar-a-sua-empresa/certificacao-de-maturidade-digital/ (accessed on 28 May 2022).
91. Comissão Europeia. Proposta de Regulamento do Parlamento Europeu e do Conselho relativo às obrigações verdes europeias. Available online: https://eur-lex.europa.eu/resource.html?uri=cellar:e77212e8-df07-11eb-895a-01aa75ed71a1.0017.02/DOC_1&format=PDF (accessed on 28 May 2022).
92. Aiken, L.S.; West, S.G. *Multiple Regression: Testing and Interpreting Interactions*; SAGE Publications, Inc.: Newbury Park, CA, USA, 1991.
93. Smith, A. *The Theory of Moral Sentiments*; Penguin Classics: London, UK, 2010; ISBN 9780143105923.
94. Smith, A. *An Inquiry into the Nature and Causes of the Wealth of Nations*; Liberty Fund: Carmel, IN, USA, 2003; ISBN 978-0865970069.