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A Grounded Theory Approach to Technology Adoption in SMEs: An Analysis of Handicraft Companies in Morocco**

Abstract

Purpose – Technology is considered a tool of competency enhancement and a source of innovation and competitive advantage for small and medium-sized enterprises (SMEs). Although many studies examined the drivers and barriers of technology adoption in SMEs, little is known about handicraft companies (HCs) operating in emerging market settings. This paper aims to analyse and better understand HCs' attitudes and behaviours towards technology implementation.

Design/Methodology/Approach – We conducted an in-depth qualitative analysis to uncover the idiosyncratic experiences related to new technology adoption in HCs located in Morocco. We drew on the underlying principles of grounded theory approach because it allows for new realities and novel interpretations of complex phenomena to emerge directly from the field.

Findings – We developed a grounded theory of technology adoption in HCs operating in emerging market settings. This resulted in the identification of a comprehensive process that managers rely on before deciding on a new technology, which is composed of three stages: (1) need recognition, (2) technology approval, and (3) adoption decision. We have also uncovered the intervening conditions that play a crucial role in technology-related decision-making at each stage.

Practical Implications – Our study could help managers to gain an in-depth understanding of the intricacies associated with technology adoption in HCs and to be better equipped when attempting to implement new technologies in their own entrepreneurial firms.

Originality/Value – This research goes beyond the mere identification of obstacles and motives of technology adoption by advancing a well-defined framework for usage in the understudied handicraft sector in emerging market settings.

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Introduction

New technologies have altered the conventional ways of doing business, becoming a crucial element in the development and growth of small and medium-sized enterprises (SMEs). Technology implementation brings a wide range of benefits to companies, helping to identify new business opportunities (Chang et al., 2022; Levy & Powell, 2003), enhancing the value creation process (Ünal et al., 2019), and boosting organisational performance and competitiveness (Boothby et al., 2010; Plewa et al., 2012). Yet, despite the vital role that SMEs play in the economy of most nations, they are still lagging behind in the pace of adoption of new technologies (Spraggon & Bodolica, 2008). These entities face many obstacles, such as lack of resources, inadequate infrastructure, and insufficient managerial support, that prevent the successful implementation of the new technology (Gangopadhyay, 2019).

Although technology represents a significant contributor to the economic prosperity of handicraft companies (HCs), its deployment in this setting remains limited (Chatterjee et al., 2008; Yadav & Mahara, 2019). For the sustainability of these enterprises and the handicraft sector as a whole, it is necessary to improve their technologies (Shafi, 2021). By adopting new technologies, this sector may eradicate many crucial problems that obstruct its successful development in the long run. HCs may be given the opportunity to rely on online portals to advertise more widely, disseminate promotional events, foster customer awareness, and communicate more effectively about product characteristics in terms of price, quality, and availability (Ghosal & Prasad, 2020).

Many quantitative studies have been conducted to date to identify the obstacles to technology adoption in SMEs. However, little research effort has been deployed to examine this topic in the context of HCs through the lens of qualitative methodologies. Moreover, the extant empirical evidence is embedded primarily within developed markets whose socio-political, economic, and institutional realities cannot be generalised and extended to other national settings. In this paper, we aim to bridge these gaps by analysing the technology adoption processes of HCs operating in Morocco. We ask the three following questions. (1) What are the key reasons behind HCs not adopting new technologies? (2) What are the motives, attitudes, and decision-making patterns of HCs actors in emerging nations regarding new technologies? (3) What is the decision process followed by HCs in the adoption of a new technology?

To answer these questions, we conducted a qualitative inquiry (Bodolica & Spraggon, 2015) using the grounded theory principles. Grounded theory was deemed appropriate because it focuses on processes and actions rather than solely direct relationships (Strauss & Corbin, 1997). Consistent with Glaser and Strauss (1967), we combined our inductive study results with findings from prior research to generate major theoretical categories. This enabled us to conceptualise the HCs' technology adoption process as composed of three stages, including need recognition, technology approval, and decision-making. Our study offers the following contributions to the literature. First, it provides a grounded understanding of technology adoption processes in HCs in emerging countries. Second, it advances a theoretical framework that illustrates the attitudes, motivations, and decision-making attributes of HCs' technology adoption. Third, the findings of this paper could help researchers and practitioners to explain, anticipate, and evaluate the technology adoption strategies of HCs.

Literature Review

Technology Adoption in SMEs

Our review of the specialised literature (Bodolica & Spraggon, 2018) suggests that SMEs adopt a new technology either to solve problems related to costs, production, planning, logistics, and sales (Shojanoori et al., 2015) or to discover new opportunities once the need had been identified (Ardichvili & Cardozo, 2000). This type of business activity plays a central role in the adoption of new technology, with commerce-based firms being more inclined to adopt new technologies than those in manufacturing or service domains (Soares-Aguiar & Palma-dos-Reis, 2008). Advanced technologies enable companies to better deal with an uncertain environment to overcome competitive forces (Choi & Shepherd, 2004; Oviatt & McDougall, 2005). Technology adoption goes through a progressive stage process that differs from one company to another (Levy & Powell, 2003). In HCs, the assessment stage is considered as a prerequisite to technology adoption before making the ultimate decision (Sarosa, 2007).

Companies in the handicraft sector face many challenges related to a turbulent environment characterised by technological advancements, increased worldwide competition (Vadakepat & Khateeb, 2012), and mounting industrialisation trends (Rogerson, 2000). Therefore, HCs may adopt new technologies to spread awareness about their handicrafts and improve their working conditions in production, sales, and promotion (Atiquzzaman et al., 2021). Both experiential and information technologies are considered key factors for HCs' performance because they can help increase sales by transforming consumers' purchase experience in their favour (Sari, 2020). Digital technologies can change the entire craft business and improve HCs' competitiveness by offering new opportunities provided by the online market (Damoska & Erceg, 2019).

Typically, the technology deployment in HCs does not go beyond using the internet to create websites, adopting e-commerce as a sales channel, and relying on some modern technologies for product design and innovation (Chatterjee et al., 2008; Yadav & Mahara, 2019). Extant literature identifies the reasons behind the sluggishness of technology adoption in SMEs, with key barriers being the perceived lack of benefit, mistrust of the IT industry, lack of time, low computer literacy, dependency on external consultants, high equipment and connectivity costs, cultural barriers, risk aversion, and insufficient funding (Hinson & Sorensen, 2006; Pighin, 2017; Scupola, 2003). Manager-perceived usefulness, the difficulty of use (Wijaya & Budiman, 2019), the technicality of technology, and lacking competencies (Dumasari et al., 2020) are critical factors that may inhibit the new technology spread in HCs operating in emerging economies.

Factors Affecting Technology Adoption

Four categories of factors contribute to technology adoption in organisations, including aspects related to the firm, its managers, the external environment, and the technology itself (Mustafa et al., 2023; Taylor & Owusu, 2012; Waarts et al., 2002). Company size and its structure are critical firm-related estimators of technology adoption decisions (Peltier et al., 2012; Soares-Aguiar & Palma-dos-Reis, 2008; Wang et al., 2010). Smaller-size firms may lack the needed financial resources to acquire needed technology (Sánchez-Medina, 2011), while a complex organisational structure may increase the technology implementation costs due to an increased administrative complexity (Gurbaxani & Whang, 1991).

Key stakeholders' characteristics, such as managers' and owners' degree of risk tolerance (Oviatt & McDougall, 2005), locus of control (Abay et al., 2017; Taffesse & Tadesse, 2017), and attitudes toward change (Peltier et al., 2012; Stewart et al., 2003) can act as complementary pathways on the road toward new technology adoption (Shiau & George, 2014). Market conditions, including access to labour and capital (Mudemba et al., 2020; Yadav & Mahara, 2019) and government regulations (Ali & Osmanaj, 2020), are among the environmental factors that have a direct impact on firms' technology-related decision-making. Technology-savvy competitors and their market success can motivate managers to prioritise new technologies to learn and gain an edge (Niaki et al., 2019). When responding to market volatility, technology helps businesses in the mission of developing a competitive advantage over rivals (Kerimoglu et al., 2008).

Factors related to the technology itself are associated with switching costs and provider trust (Spraggon & Bodolica, 2015). When switching costs (e.g., replacement costs, employees' learning and training costs) of a certain innovation are high, the possibility of its implementation is reduced (Avlonitis & Panagopoulos, 2005; Burnham et al., 2003). Because new technology often implies higher employee costs due to the need to hire extra skilled workers, human resources become a

prominent factor in the approval of technology adoption in organisations (Nguyen, 2009). The amount of trust offered by the provider is also of huge importance for convincing managers to adopt new technology (Lippert & Govindarajulu, 2006).

Theories of Technology Adoption

One of the most influential technology adoption theories is the Technology Acceptance Model (Davis, 1989), which explains how users accept technology under the influence of human aspects. Individuals' acceptance of new technology depends on perceived usefulness and ease of use. The specific perceptions people develop toward the usefulness and ease of use of a certain technology constitute the determinants of intention to adopt or reject new technology (Silva, 2015). The Unified Theory of Acceptance and Use of Technology suggests that the behavioural intention and, ultimately, the behaviour of using a certain technology is driven by four constructs: performance expectancy, effort expectancy, social influence and facilitating conditions, while gender, age, experience, and voluntariness of use are treated as moderators of usage intention and behaviour (William et al., 2015). In the Diffusion of Innovation Model, individuals are classified based on how quickly they are likely to adopt new technology, going from innovators to early/late majority and laggards (Rogers, 1995). To stimulate widespread adoption, an innovation must be diffused among the members of society, with innovation, communication channels, time, and social system representing the four key components of this diffusion (Sahin, 2006).

Many conceptual frameworks have been employed in empirical studies to develop relevant sets of constructs to theorise on technology adoption patterns in various organisational settings (Oliveira & Martins, 2011; Spraggon & Bodolica, 2017). It is worth noting that most research conducted to date is focused on technology adoption at the individual level (Stephen & Toubia, 2010). Yet, the Technology, Organization and Environment model identifies the boundary conditions within the enterprise that significantly affect the process of technology adoption, namely the technological, organisational, and environmental contexts (Oliveira, 2011). Our study espouses the Technology, Organization and Environment framework because it deals with the firm-level adoption of technology.

Methodology

Study Context

Morocco's artisanal sector is well-known worldwide, constituting a representative emerging market setting that is worthy of further examination (Haouam & Mokhtari, 2019). Despite the economic potential, high innovativeness, and entrepreneurial capacities it holds (Dassouli et al., 2022), the sector suffers from many structural problems, informal arrangements, and delayed technology integration in its production or management processes (Ktiri et al., 2017). HCs in Morocco

may have a better chance of surviving in international markets by relying on technology to innovate, enhance the know-how, boost product quality, and enlarge distribution networks (Ahouzi & Haddou, 2019). The sector is loosely regulated and heavily dependent on tourism, barriers to entry are low, and supply often exceeds demand, resulting in major price drops (Nachouane & Knidiri, 2019). HCs stores are small and inconveniently located and lack a consistent display of products by specific categories, discouraging the use of pictures or videos to promote sales. Commonly, Moroccan HCs are family businesses that have been inherited from ancestors, representing the main source of revenue for the family. The majority of manager-owners are men (Hejaji & Fahssis, 2018) who have a high school degree or some professional training (El Adnani, 2010).

The government made considerable efforts to ensure that the identification of Moroccan handicraft products is based on labelling strategies. Consequently, "Made in Morocco" became a reference for good product quality, boosting the export performance of local handicrafts (Aounzou et al., 2022). Social media communication and online selling have grown substantially over the past years, allowing craftsmen to employ technology tools for the enhancement of their company's competitiveness (Hammou et al., 2020). Although the recent COVID-19 pandemic underscored many structural weaknesses of the industry (El Oudri & Kanit, 2021), it also brought about a change in managerial perspectives and a heightened realisation of the benefits that technology can bring to the handicraft sector. Indeed, local artisans acknowledged that many HCs in Morocco survived during the lockdown periods thanks to online selling, triggering a positive change in managers' mindsets and attitudes toward technology.

Data Gathering

Moroccan craft production is concentrated in several regions or activity poles that are known for their high-quality products, namely Rabat-Sale, Marrakech, Tangier, Essaouira, Safi, and Fez-Meknes. We collected our data in Fez-Meknes, which has always played a significant economic role throughout Moroccan history. The craft constitutes the most important activity sector and the most represented professional category in the region, where five out of ten heads of family belong to the body of craftsmen. The crafts manufactured in Fez-Meknes cover a broad range of products, such as jewellery, furniture, clothing and accessories, zellij, and tannery.

Our sample (see Table 1) is composed of 30 Moroccan firms with different types of craft production, including pottery (25.8 %), brassware (22.58 %), tannery (22.58 %), ceramics (12.9 %), Zellij (9.6 %), and agri-food (6.45 %). We considered HCs that have implemented basic software to manage accounting, production, and stock or that have created websites or an account on social media to promote sales. Companies' selection was based on theoretical sampling, which is the most recommended technique when using grounded theory (Thomson, 2010). This

technique requires the sample to be composed of subjects who have been exposed to the phenomenon being studied (Glaser & Strauss, 1967). Therefore, we approached participants who have experienced at least one of the primary technologies mostly adopted by SMEs, such as ERP, CRM, and internet-based tools (Cooper et al., 2005).

Data were gathered using semi-structured interviews, non-participant observations, field and meeting notes, internal documentation reviews, and industry-related publications. Semi-structured interviews were preferred to focus the conversation on issues related to technology adoption while allowing for some freedom for respondents to tell their stories in their own way. Interviews took place from June 2020 to January 2021 and lasted between one and two hours, depending on participants' availability and technology-related experience. In over 75 % of cases, a follow-up interview with the same manager was needed to corroborate perspectives and ask for clarification. A written consent was given by each manager agreeing to participate in the study and for their personal and company names to be publicly disclosed. During the interviews, notes were actively taken to prevent data contamination from methodological bias.

Table 1. Sample characteristics

Company name	Description	Manager name	Technology type
Fesnaji Fakhari	Zellij and pottery for local and international markets; over 60 employees; DHs 32 million in revenue (2019)	Naji Fekhari (**1**)	Website, ERP, social network account
Ste Khli3 Ahl Fes	Agri-food company producing artisanal meat (khli3); 50 employees; DHs 24 million in revenue (2019)	Omar Aouad (**2**)	Microsoft Office (access, excel), accounting software
Poterie Bellamlih "Belpot"	All types of pottery; 30 employees; DHs 18 million in revenue (2019)	Mohamed Bellmlih (**3**)	Website, production and sales management software
Touhaf Fes	Artisanal pottery for local and French markets; 40 employees; DHs 20 million in revenue (2019)	Mohamed Thaifa (**4**)	Website, CRM, accounting and management software
Zinapar	Artisanal and industrial Zellij; 30 employees; DHs 30 million in revenue (2019)	Rachid Tourhali (**5**)	Account on social networks, accounting software
Les Porcelaines De Marrakech	Pottery and interior decoration; 30 employees; DHs 17 million in revenue (2019)	Chakib Besta (**6**)	Account on social networks
Zellige et Poterie Thaifa	Export of Zellij; 40 employees; DHs 27 million in revenue (2018)	Mohamed Thifa (**7**)	Accounting software
Ste Khli3 Benkirane	Agri-food industry; 30 employees; DHs 16 million in revenue (2019)	Mohamed Benkirane (**8**)	Social media account, accounting software
Ziyad Design	Brassware industry; 20 employees; DHs 10 million in revenue (2019)	Mohamed Bendaoud (**9**)	Microsoft Office, software to manage production and stock
L'Art du Bronze	Brassware industry; 25 employees; DHs 11 million in revenue (2019)	Mohamed Guemani (**10**)	Microsoft Office, software to manage production and stock
Poterie Morocco Magic	Artisanal products in ceramics/pottery, with a worldwide shipping service; 40 employees; DHs 12 million in revenue (2019)	Younes Benmostapha (**11**)	Social network account, software to manage production and stock
Fes Céramique Travel	Tiling and pottery laying, miscellaneous works, ceramics, and import-export trade; 40 employees; DHs 29 million in revenue (2019)	Jouahri Abdelilah (**12**)	Accounting and production management software

Company name	Description	Manager name	Technology type
Sté Sofacodec	Pottery exporting to Europe; 50 employees; DHs 32 million in revenue (2019)	Larbi Megzari (**13**)	Social network account, management software
Ste Porcelaine De Fes	Pottery/ceramics; 30 employees; DHs 18 million in annual revenues	Benkirane Fadi (**14**)	Social network account, CRM, management software
Dinanderie "R2A"	Brassware industry; 20 employees; DHs 10 million in annual revenues	Abdelatif El-Hazaz (**15**)	Accounting and management software
Dar Artisanat	Brassware products; 20 employees; DHs 9 million in annual revenues	Mohamed Soussi (**16**)	Social network account
Tannerie De Boujaad	Tannery industry; 100 employees; DHs 50 million in annual revenues	Mohamed Zakraoui (**17**)	Social network account, CRM
Tannerie Jalal	Tannery industry; 50 employees; DHs 10 million in annual revenues	Mohamed Ouadghiri (**18**)	Social network account, management/accounting software
Tannerie Mohammadia	Tannery industry; 200 employees; DHs 10 million in annual revenues	Ahmed Lmouden (**19**)	Management/accounting software
Sté Moroccan Copper Silver Art	Brassware industry; 20 employees; DHs 7 million in revenue (2019)	Ibrahim el Baroudi (**20**)	Social network account, management/accounting software
Le Dinandier Sarl	Brassware products; 20 employees; DHs 9 million in revenue (2019)	Azzedine Iraqui (**21**)	Accounting software
La Touche D'Artisant	Brassware products; 30 employees; DHs 9 million in revenue (2019)	Fatine zizi nacer (**22**)	Social network account, management/accounting software
Tannerie Skin	Tannery industry; 100 employees; DHs 12 million in annual revenues	Hanane Taoui (**23**)	Management/accounting software
STAG	Tannery industry; 80 employees; DHs 10 million in annual revenues	ElMaataoui Zakraoui (**24**)	Social network account, management/accounting software
Sicontact Company	Tannery industry; 45 employees; DHs 7 million in annual revenues	Thami Amraoui **(25)**	Accounting software
Somatam	Tannery industry; 90 employees; DHs 13 million in annual revenues	Hussein Motahr (**26**)	Management/accounting software
Moroccan Ceramic Materials	Pottery/ceramics production; 10 employees; DHs 6 million in revenue (2019)	Mohamed Serghini (**27**)	Social network account
Ghorghiz Cerame	Ceramics production; 47 employees; DHs 8 million in revenue (2019)	Redouan Merroun (**28**)	Social network account, management/accounting software
Belpot	Pottery production; 10 employees; DHs 5 million in revenue (2019)	Abdelhak Bellamlih (**29**)	Social network account, accounting software
Poterie Serhini	Pottery production and international exporting; 40 employees; DHs 13 million in revenue (2019)	Younès Serghini (**30**)	Website, social network account, management/ accounting software

The open-ended questions that were used to gather relevant information were divided into three sections. The first was dedicated to understanding the key triggers of technology adoption in sample firms; the second dealt with major factors associated with the approval of new technology; and the third section covered the set of actions related to the final decision to adopt the selected technology. To overcome

the language barrier, interviews were conducted mostly in Arabic (occasionally in French) and later translated into English. All interviews were recorded using a digital voice recorder and subsequently transcribed into text to enable subsequent analysis. We relied on the qualitative data analysis software Nvivo to identify prevalent categories and relevant concepts that emerged from our data (Bodolica et al., 2021).

Data Analysis

Because empirical studies on technology adoption in HCs from emerging economies are scarce, we drew on the principles of grounded theory to answer our research questions. Prior inquiries conducted in SME settings (Peltier et al., 2012; Waarts et al., 2002) might not be applicable to HCs due to their idiosyncratic nature and behaviour. Moreover, extant studies on HCs (Taylor & Owusu, 2012; Yadav & Mahara, 2019) did not go beyond decision-related factors and a more comprehensive examination of the entire process of technology adoption is still needed. As an inductive method, grounded theory allows for the building of a theory around the phenomenon being studied while grounding the theoretical development in empirical data (Bodolica & Spraggon, 2021). According to Strauss and Corbin (1997), this method enables new theoretical accounts related to change, process, position, and sequence to emerge directly from the field.

To generate a theoretical understanding of the investigated phenomenon, a thematic content analysis was performed using open, axial, and selective coding (Corbin & Strauss, 1990). During the open coding step, various categories of information were extracted from interview transcripts to form abstract concepts that represent basic units of analysis. The axial coding step consisted of interconnecting the extracted categories in new ways to establish relationships among them. The process concluded with selective coding that allowed the building of a theoretical framework by integrating extracted categories into causal conditions that revealed meaningful relationships within the data.

To check the validity of our research, we ensured that the procedures were followed and that the requirements of the four types of triangulation were satisfied (Creswell & Miller, 2000). Methodology triangulation was reached by relying simultaneously on three sources of data, namely interviews, observations, and documentation. Having all the authors involved in the different steps of the data collection and analysis process allowed us to achieve investigator triangulation. By referring to multiple theories of technology adoption in SMEs to interpret emergent realities from the field, we secured both theoretical saturation and theory triangulation (Glaser & Strauss, 1967). Finally, data source triangulation was guaranteed because empirical data were gathered from different managers who worked in different HCs that produced different types of craft (Flick, 2004).

We then looked for inter-coder reliability by randomly picking 15 interviews to be coded independently by two coders. The obtained Cohen's Kappa value of 0.89 was significant, pointing to a high level of agreement between the two coders and ensuring the reliability of our research. Furthermore, the conclusions reached at the end of our study were submitted to the interviewed managers for their review and approval. Several representative quotes were extracted from the interviews and included in the presentation of our findings to allow the reader to follow our logic from data collection to interpretation and analysis.

Results: Theory Building

Below, we present the grounded theory of technology adoption in HCs, which incorporates a set of tightly interrelated concepts that form a unified whole that emerged from the field.

Theoretical Framework

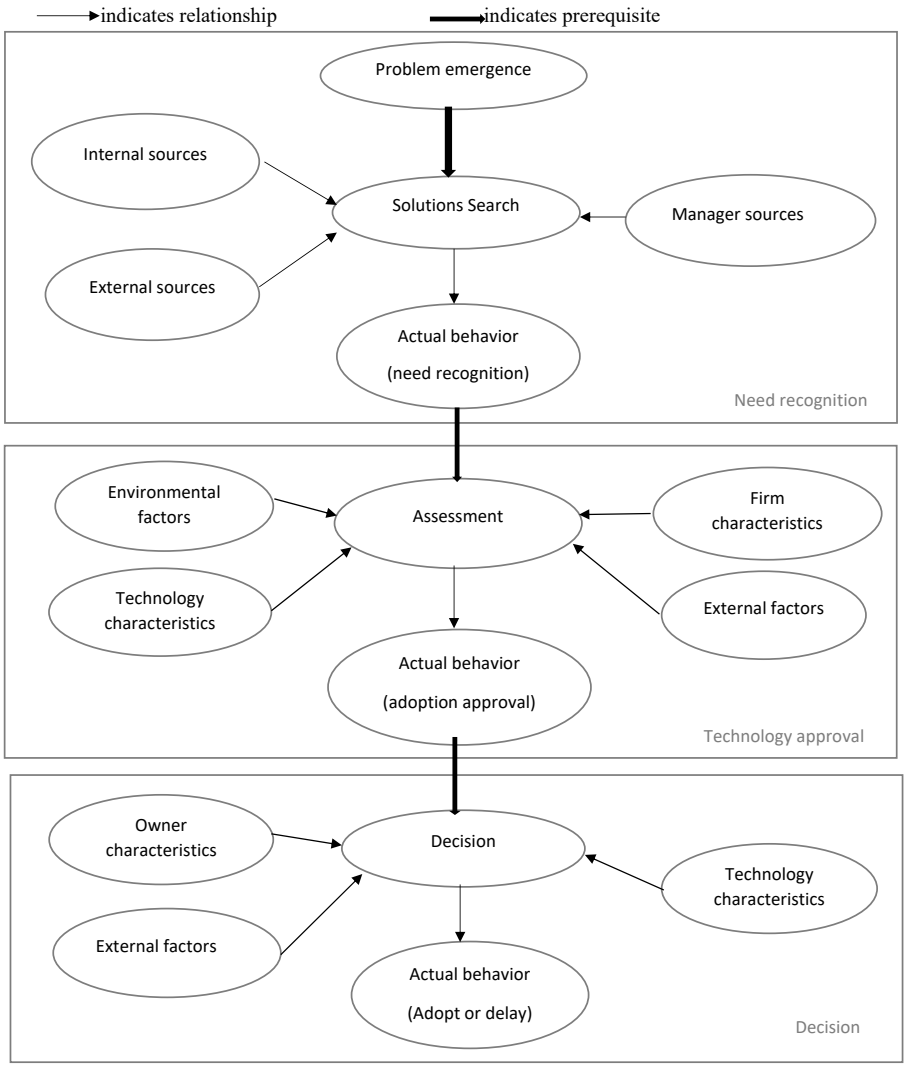
Drawing on the paradigm model of Corbin and Strauss (1990), we built a representative HCs' technology adoption process (see Figure 1) to unveil the reasons behind the adoption of new technology. One of the major benefits of this model is its ease of understanding due to its lower complexity and fewer explored objects. Hence, we developed a separate model (models 1, 2, and 3) for each stage of HCs' technology adoption, where the core category, along with the causal and intervening conditions, and the action/interaction strategy are created and presented apart from the general model.

The first part of the framework is the need recognition stage (model 1), where managers start realising the necessity of adopting a new technology. The core strategy is the solution fit since it is the primary issue in the first stage, where managers start searching for solutions to the problem. The identification of technology adoption as a solution has a direct impact on the actual behaviour (need recognition), which is the action/interaction strategy. The intervening conditions at this stage that represent the sources from which the solution fit was advanced are the internal sources (within the company), external sources (company's environment), and manager sources (owners and their network). We built on Corbin and Strauss (1990), who maintain that the consequences of actions as a response to a given phenomenon can shift to become the conditions affecting the next set of actions happening in a sequence.

The second stage (model 2) is concerned with deciding about the feasibility of adopting a new technology as a solution to the problem at hand. The core category here is the assessment phase, which directly impacts the actual behaviour of deciding whether the chosen technology matches the identified organisational conditions or the intervening conditions. The latter group refers to external factors (from the firm environment that shape its behaviours and decisions), technology factors (its

characteristics), and firm factors (internal features). The action/interaction strategy here is the technology fit, and one of its consequences is the decision to adopt the chosen technology.

Figure 1. Theoretical framework



If technology fits the company's structure and goals, the third stage (model 3) that deals with the final decision to adopt technology takes place. The intervening conditions that influence the decision refer to owner characteristics, external factors, and technology characteristics. The consequence in this case would be to either

adopt or postpone the new technology. The three stages are interdependent since each one is a prerequisite for the other to happen. An overview of categories, concepts, and interview quotes for the entire theoretical framework is presented in Table 2.

Table 2. Categories, Concepts, and Representative Quotes

Concepts	Definition	Representative quotes
Solution Search		
Employees	Employee's idea to solve a problem using new technology	"I always like to hear from employees because they are the best positioned to help with problems' resolution due to their daily exposure to business operations" (Manager 1, interview #1);
		"The idea of selling online came from one of my employees who had considerable experience in that field" (Manager 3, interview #1)
Antecedence	When the firm/manager experienced the use of technology to solve the problem at hand	"The basic software we adopted so far helped us to plan our production. We believe it will be beneficial to adopt new software to manage our relationship with customers and solve problems of responsiveness and delivery delays" (Manager 10, interview #2)
Customers	Customers' idea to use new technology to solve an issue they had with the company	"We received many requests from our customers to have Instagram and Facebook pages to allow viewing our products, prices, and promotions. For them, it is obvious that we are present on social media" (Manager 22, interview #1)
Competitors	When managers realise that competitors are using new technology to solve problems at hand	"It's only when I started realising that most of our competitors are using e-commerce to boost sales and target worldwide customers that I began employing new technologies to solve the problem of decreasing exports" (Manager 11, interview #1)
Level of education	Manager's education as a driver of tech (vs non-tech) problem resolution	"I have always wanted to change my dad's old way of managing the business by adopting the concept of e-commerce I have been exposed to during my university years" (Manager 18, interview #2)
Social network	Manager's social network as a driver of tech problem resolution	"The idea was my brother's, who is studying at UPF" (Manager 9, interview #1)
		"It was my friend who studied in Canada who advised me to adopt CRM" (Manager 4, interview #1)
Assessment		
Government	Degree of government support to a firm when seeking new technology adoption	"My firm benefited from the strategic vision for the development of new ICT pursued by the Moroccan government, which made it possible to integrate ICT into a large number of companies" (Manager 30, interview #1);
		"I am more persuaded to adopt a new technology if it is supported by the government because we all know how much it supports the artisanal sector" (Manager 5, interview #2)
Market conditions	Technological infrastructure and support provided by the market	"I am afraid of implementing a technology that comes from developed countries and not finding the necessary workforce to support me in the post-implementation phase if needed." (Manager 8, interview #2);
		"I will be more encouraged to adopt advanced technology if I can get some payment facilities" (Manager 16, interview #1)
Ownership costs	Installation, administration, and coordination costs of new technology	"Advanced software is very costly" (Manager 5, interview #2);
		"Technologies are usually costly and difficult to implement" (Manager 26, interview #1)

Concepts	Definition	Representative quotes
Compatibility	Technology compatibility with the company's needs, values, and systems	"New technologies are not made for brassware companies with their traditional character" (Manager 21, interview #2); "When I looked at the specificities of the ERP, I realised that it is what my company actually needs" (Manager 1, interview #1); "I was really in need of a software like CRM to manage the relationship with customers" (Manager 4, interview #1)
Switching costs	Costs of technology replacement, of hiring new competencies to handle technology use	"Cost is the most important factor I considered when deciding to create a website" (Manager 3, interview #1); "The main barrier for us to adopt more developed software is the cost" (Manager 5, interview #2) "I chose *Sage Comptabilité 100* because it is less costly than the other choices I had" (Manager 2, interview #1)
Structure	Impact of firm structure on technology adoption	"The structure of artisanal production is not actually in favour of technology use" (Manager 15, interview #1); "New technology adoption is for big companies that have skilled workers and favourable infrastructure" (Manager 19, interview #1)
Size	Impact of firm size on technology adoption	"The investment capacity of my company is limited; this is why I can only go for basic technologies". (Manager 23, interview #1) "Technological needs of small companies are different from big ones." (Manager 11, interview #1)
HR competence	Level of technology use and awareness among employees	"The artisanal sector's workforce is composed mainly of low competency, unskilled labour" (Manager 15, interview #2); "I am aware that introducing a new software in the company means hiring new employees to handle it, which limits my choices in terms of advanced software" (Manager 29, interview #1)
Decision		
Risk tolerance	Risk-taking as an undeniable component of business decisions	"Adopting CRM was a risk to take" (Manager 4, interview #1); "I was aware of the risk of implementing this software, but business is all about taking risks" (Manager 17, interview #1)
Locus of control	Belief that outcomes depend on one's own actions rather than external events	"It's not only about me, but it's the entire company that should adhere to the use of new technology" (Manager 8, interview #2); "The reaction of my employees toward the adoption of a new way of working is unpredictable" (Manager 11, interview #1)
Change attitude	General acceptance of something new and the extent to which a person is open to change	"My cousin's experience with CRM at his company motivated me a lot" (Manager 14, interview #1); "It was difficult to convince my employees to adhere to a new way of working using ERP" (Manager 1, interview #2)
Competitors' success	When managers notice the success of their competitors when using new technology	"I felt it became an obligation to create a social media account, especially when I see that many Moroccan potteries are already using it to sell their products" (Manager 12, interview #1); "One of Tajemouati employees told me how they saved money and time by using this software" (Manager 4, interview #1)
Market uncertainty	Lack of knowledge of future market changes and their business impact	"I took the decision to create a website because the world is changing rapidly around us, and our company needs to follow the trend" (Manager 3, interview #1)

Concepts	Definition	Representative quotes
Perceived value	Perception of the added value that the new technology brings	"Initially, I was not convinced to hire an entire team to manage firm sales through Facebook and Instagram, but my son convinced me that revenues from these sales will exceed those employees' salary" (Manager 20; interview #1)
Provider trust	Degree to which the provider offers trust, insurance, and warranty to managers	"I took the final decision when the provider guaranteed an after-sale follow-up until the software became operational" (Manager 14, interview #2) "It was the ERP seller who convinced me at the end with all the facilities and services he offered" (Manager 1, interview #1)

Model 1. Need Recognition

The need recognition model is displayed in figure 2.

Problem Emergence

HCs are not contemplating adopting new technology unless it becomes a necessity for survival or an apparent solution to an emergent problem. Most managers explained that they would not consider adopting new technology unless there was a clear need for it. "My company is fine with the old way of manufacturing crafts, so why should I search for something new?" (Manager 2, interview #1). "It's not easy to change the traditional way of working, unless it is proven to not be efficient anymore" (Manager 17, interview #1). Among the most frequently mentioned problems of HCs that may be fixed by technology adoption are related to product design and innovation, planning and management of production, logistics, sales promotion, customer needs' identification and cost reduction.

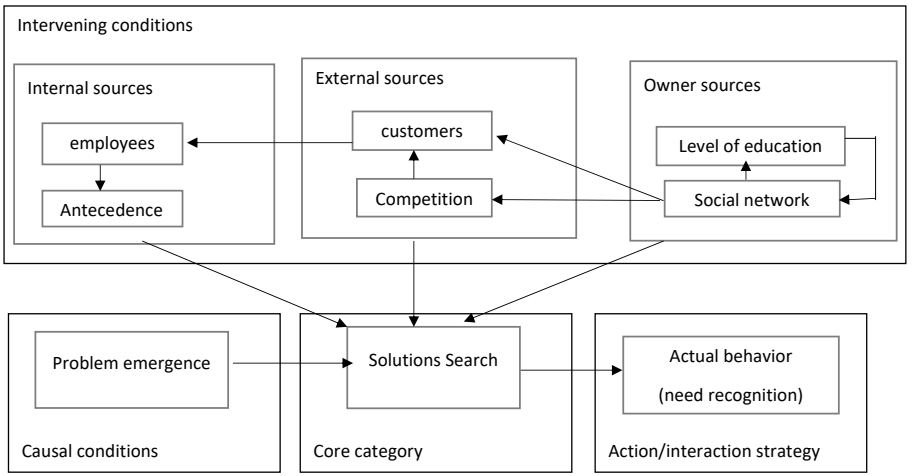
Solutions Search

There are many sources from which a solution based on technology adoption can emerge. The technology solution may be suggested by company employees or induced by external stakeholders, such as customers or competitors. Another source that positively impacts the choice of technology as a solution is related to managers' traits, such as their level of education and their social network.

Actual Behavior: Need Recognition

The need recognition occurs as a result of the solution search. Managers expect the new technology to be the most suitable solution to the problem at hand and recognise that their organisation needs it to confront competition and increase performance. "Information technology and e-business are a necessary path that our company must take sooner or later, despite any inconvenience" (Manager 20, interview #1). "With global digitisation and all that's happening around us, it became a necessity to follow the trend of technology adoption if you want your company to survive in the face of increased competition" (Manager 30, interview #2).

Figure 2. Need Recognition Model



Intervening Conditions

Internal sources – refer to employees and precedence. In many HCs, some employees have higher levels of education than their recruiter and were hired to bring up new competencies to the enterprise (Bhat & Yadav, 2016). Hence, they are more likely to suggest a new technology for intra-firm adoption. 29 % of managers admitted that new technology was not their idea, but rather the idea of one of their young and highly educated employees.

Antecedence can also play an important role in forging the idea of technology adoption (Lippert & Govindarajulu, 2006). 12 % of respondents indicated that they thought of new technology as long as their prior experience with technology brought success to their company. "Our sales have increased noticeably after using social media as a promotion tool. This is why I thought that if we opt for software like CRM, it may increase our firm's overall performance" (Manager 4, interview #1).

External sources – are represented by customers and competitors. Customers can pressure firms to adopt new technologies, as managers and salespersons aim to fulfil customers' needs and secure their satisfaction (Ryding, 2010). 13 % of sample companies adopted new technologies because their customers suggested that. "Once, we had a problem with delays due to the bad management of orders with one of our customers. He suggested we use software like ERP to coordinate our activities more effectively. I took his suggestion seriously and started analysing the feasibility of adopting this technology" (Manager 1, interview #1).

18 % of managers said their technology considerations originated from their discovery that their competitors are using it. "After conducting our benchmarking and

noticing that some of our competitors are developing a competitive advantage by using advanced technology, we came to realise that we must do the same" (Manager 4, interview #2). "In a highly competitive environment where HCs operate, you cannot afford to be surpassed technologically by your rivals. Once you realise that competitors are using technology and benefiting from it, you should follow the trend if you want to survive" (Manager 24, interview #2). Competitors can also affect the focal company's customers, who may complain that other firms are offering superior service and product quality. "One of my clients told me once that our major rival has a better delivery service as it is managed through software where the customer can track the delivery and the routing of its merchandise" (Manager 30, interview #2).

Owner sources – are related to owner characteristics, such as the level of education and the existence of social networks. Well-educated managers opt for technology adoption faster than less educated ones (Bortamuly & Goswami, 2015). 19 % of our respondents were the initiators of technology adoption, 97 % of whom have a university degree. Other participants revealed that they mined the new technology idea from their social network (e.g., family, friends, former colleagues). Even if people from the manager's social network are working in industries other than crafts production, their positive experience with technology could be projected to the specific HC's situation. "I have a friend working in a multinational who advised me to implement software to deal with problems in sales and production and to manage customer relationships in the same way as his company does" (Manager 13, interview #1).

Model 2. Technology Approval (Figure 3)

The technology approval model is displayed in figure 3.

Assessment

The next step is to assess the feasibility of the idea and its compatibility with the HC's resources and competencies. It is essentially weighing the firm's gains against the losses that the adoption of a new technology may entail. It is the step where a deeper analysis of the fit between the company's needs and the technology's value added is required. "New ideas are always good, but not all ideas can be suitable to any company. We must use only those ideas that match the organisation in terms of costs and benefits" (Manager 2, interview #2). "There is always a risk of adopting something new, and that risk can be minimised only if the feasibility evaluation in the pre-decisional stage was conducted effectively" (Manager 29, interview #2).

Actual Behavior: Fit / Disapproval

Following the assessment stage, managers consider whether the new technology can be adopted or not based on two criteria. First, the company must have the

financial, technical, and human capital skills to support such decisions. Second, the technology must bring some added value to the firm, solve the problem at hand, and be compatible with organisational competencies. If the two conditions are satisfied, the adoption of the chosen technology is approved; otherwise, the entire idea is rejected or postponed for later. "It is only after in-depth research about all the features of CRM software, ranging from its cost to subsequent implementation and routinisation, that I was actually convinced to adopt it" (Manager 13, interview #1). "Although ERP seemed to be the best solution to our problem, we realised that our firm cannot cover the costs and challenges incurred by the implementation of this software" (Manager 26, interview #2).

Intervening Conditions

External characteristics – refer to government support and market conditions. The government is a critical factor that may influence the business activities of HCs (Kazungu, 2020) by boosting the adoption of new technologies. The Moroccan government supports the technological improvement of the craft sector by facilitating access to technology through organised forums and events or via its institutions that provide information on a needs basis. "Our government gives much attention to the artisanal sector and encourages entrepreneurs to digitise the workflow by offering financial aid and subventions" (Manager 25, interview #2).

Another aspect that HC managers consider prior to making technology-related decisions about the new technology refers to the existence of a supportive technological infrastructure within the market through ease of access to credit and labour. "My major fear is not being able to find skilled employees to back up any problems that might surge after the implementation of the new technology. The level of technological knowledge within the Moroccan workforce is very weak because of the high illiteracy rate" (Manager 2, interview #1). The opportunities that the market offers to get credit to finance the cost associated with new technology are also of critical importance. "Adopting technology to increase performance is always a good idea, as long as funding can be found easily. I am talking about the ease of getting credit from banks" (Manager 22, interview #2).

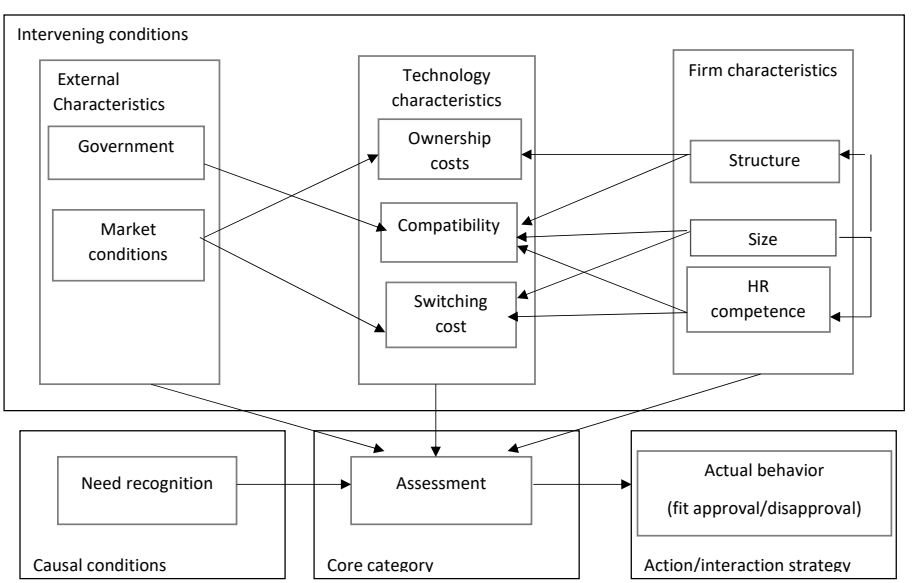
Technology characteristics – refer to the cost-benefit tradeoff when managers weigh the financial costs, compatibility, and switching costs against the benefits brought by the new technology to approve its adoption. Most respondents were primarily concerned with possessing needed resources in terms of capital, time, and people when adopting a new technology. "Our technology adoption decision depends heavily on the cost of doing so" (Manager 25, interview #1). Many managers did not conduct a proper search to have an idea of the real costs of technology and operated on the assumption of the perceived high cost of buying tangible assets and paying higher wages to technology-savvy employees. Yet, while the market may provide opportunities to lower the associated costs, the company's complex struc-

ture may increase the technology adoption costs because of superior administrative complexity.

Our respondents showed concern for ensuring technological compatibility, which indicates the extent to which a technology is perceived to be consistent with existing organisational values, needs, and past experiences. "Advanced software is not designed for a company like ours, which is specialised in the tannery and employs low-skilled labour" (Manager 26, interview #2). The internal features, ranging from the scope of activities to firm size and human resources (HR) competencies, also have an impact on the compatibility factor. "What we lack in Morocco is the skilled labour. I think that new technologies are incompatible with the kind of workforce we have in the firm" (Manager 15, interview #1).

The cost of switching from the old techniques to introducing the new ones includes the acquisition cost along with the costs of learning and training the employees who are unfamiliar with technology uses. Our analysis unveils that when switching costs are high, the possibility of technology adoption is reduced. "Why would I install a new technology that costs a lot of money, while I am satisfied with the old one?" (Manager 10, interview #1). In the model, multiple arrows indicate that switching costs are impacted by firm size and HR competencies. As firm size and HR competencies increase, switching costs become less relevant for decision-making. Market conditions may also impact the perception of switching costs, depending on whether the market can offer the guarantees and knowledge necessary to facilitate the switching process (Spraggon & Bodolica, 2021).

Figure 3. Technology Fit Approval Model



Firm characteristics – include organisational structure, firm size, and HR competencies. Our sample has a hierarchical structure that slows the information flow and makes the administrative tasks harder (Mustafa et al., 2022). Managers view the implementation of new technology as a hard task because their relationship with employees is not based on trust and open information exchange, which are beneficial to a firm's success. It is rather a coercive relationship based on fear and individualistic goals, where each member searches for their own interest as part of the entire country's business culture. We noticed that a two-way link exists between the firm structure and firm size, which is measured in terms of the total number of employees and investment capacity. "Our company is small, and it cannot afford to digitise its activities like big organisations, even if I know that it will be beneficial to us" (Manager 28, interview #2).

When approving the new technology, managers are concerned with their employees' lack of competencies and abilities to deal with it, which may result in implementation failures. Technology adoption also implies higher employee costs due to the need to hire extra skilled workers. "It is easy to buy a new technology, but what's difficult is to find the people to make it run" (Manager 2, interview #1). We also found that the larger the company size, the higher the level of employees' technology skills, suggesting that firm size influences HR competencies in HCs.

Model 3. Decision Making

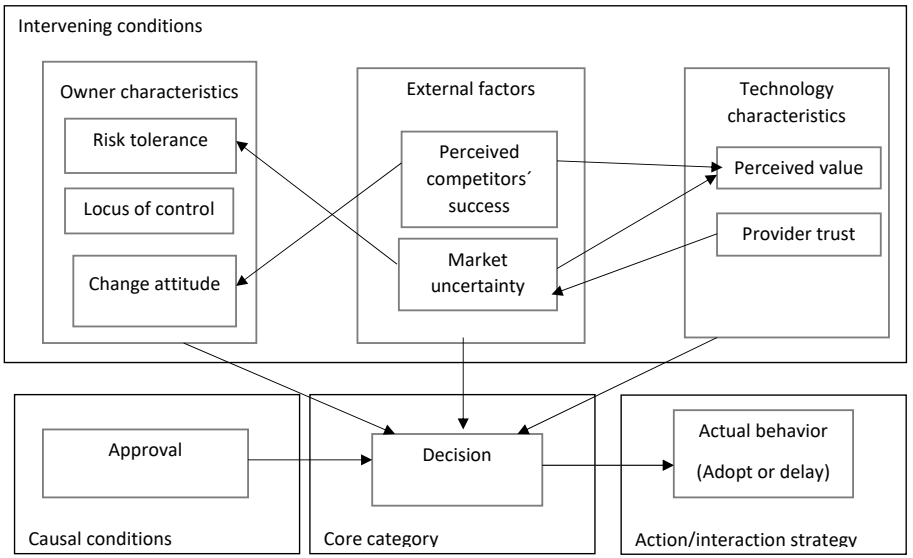
Decision Making

The technology fit approval is the causal condition that drives the occurrence of the core category of decision-making. Managers conduct research to rely on valid data when making decisions to avoid the inconveniences brought by incomplete or wrong information. "I cannot decide to go for a technology before making a deep search about it" (Manager 4, interview #1). Most respondents were concerned with evaluating the fit between the perceived and the real value added by including additional considerations in the post-implementation phase. The decision-taking model is displayed in figure 4.

Technology Adoption (actual behavior)

We found that the core category (decision-making) directly influences the final behaviour (technology adoption). Implementing new technology is one of the hardest decisions made by HCs, despite the increased pressure to embrace the digital trend for managing their business more effectively (Bodolica & Kasih, 2021). These decisions are controversial and convoluted due to multiple stakeholders being involved who often favour the status quo at the expense of change.

Figure 4. Decision Model



Intervening Conditions

Owner characteristics – include risk tolerance, locus of control, and change in the attitude of the manager, who can create a positive environment for technology adoption by providing support and focusing employees' attention on the importance of innovation. Managers who make the decision to adopt new technology, despite their fear of potentially negative outcomes on their business, are people who have high-risk tolerance. "I believe in the saying 'the higher the risk, the higher the possible returns'; and this was what made me adopt the ERP system for my business despite my limited knowledge in the field" (Manager 1, interview #1). Most managers indicated that risk-related fear can be absorbed if the rate with which new technologies emerge is slow; that is, as market volatility decreases, the risk tolerance increases.

The degree of people's locus of control affects the type of decisions they make (Selart, 2005). HCs managers believe that, to adopt a technology successfully, there are many external factors outside their control that should be combined and integrated. Their high level of external locus of control made them think twice before making the final decision about new technology. Decision makers' attitude toward change is also of critical importance in this context. Managers were shown to fear the change induced by adopting something new, mostly due to the negative perceptions of their employees and their resistance to change. "If I force my workers to align with a new way of doing things by introducing an unfamiliar technology,

they will simply resist this change with negative reactions, such as sabotaging or taking the 'I don't know' stance" (Manager 28, interview #2).

External factors – refer to the perceived competitors' success and market uncertainty. Competitive forces can shape industry dynamics, putting pressure on managers to adopt new technologies to secure firm performance and longevity. "Even if the advantages of selling online were obvious to me, it took me a lot of time before going for it. The decision came after realising that most of our competitors are selling online and making a good profit margin from this business" (Manager 23, interview #1). "I was motivated to enhance our production capacity by acquiring a new manufacturing technology because our competitors did it" (Manager 11, interview #1).

Many respondents noted that the craft industry is characterised by high market uncertainty. This is because customer tastes are constantly changing, the competition keeps increasing, and the emergence of new trends and innovations can easily impact business success and the ability to gain competitive advantage (Spraggon & Bodolica, 2018). "We cannot know what's coming next, but one thing is certain – adopting a new technology can help us overcome the tough competition and maintain our position in the market" (Manager 17, interview #2).

Technology characteristics – include the perceived value and provider trust. The perceived value of a given technology should be high enough to overcome the doubts and fears associated with it. All managers who adopted a new technology had a positive perception of the advantages it may bring to the company. They considered the ease of use, the usefulness, and the acceptance by workers as determinants of their positive perception of a certain technology. If managers perceive the technology as an added value that is easy to use and useful, they approve its adoption. "After the research I conducted, I was convinced that creating a website to sell brassware will be very beneficial to my company" (Manager 30, interview #1).

The decision-making process is also impacted by provider trust, which is the degree to which a manager has confidence in a technology provider, either from previous experience or from the provider's established reputation. As an emergent factor in technology adoption decisions, the source of provider trust is the manager's concern for the implementation phase, which includes maintenance and monitoring. Managers need reassurance regarding the post-implementation phase, which is directly related to the technology provider itself. Their final decision was backed up by a warranty from providers to assist their firm whenever needed. "CRM system is much more complicated than the other software we used to have. This is why I was so meticulous about the after-sale service" (Manager 17, interview #2).

Discussion of the Results

Although many studies have been conducted to date to determine the factors affecting technology adoption by SMEs in developed nations, extant findings cannot be generalised to an emerging country like Morocco (Bodolica et al., 2019). HCs in these markets have their own culture, philosophy, and experience based on the unique challenges they have gone through over the years (Taylor & Owusu, 2012). They operate under different sets of managerial, organisational, and environmental rules and limitations. Our research seeks to advance the successful technological development of the Moroccan artisanal sector because it was conducted with the aim of assessing, analysing, and understanding the process of adoption of new technologies in HCs.

This study drew on the principles of grounded theory to uncover and develop a well-defined and comprehensive process through which HCs adopt a new technology. The advanced framework of technology adoption differs from the extant processes discussed in the literature (Shiau & George, 2014), which focus primarily on the implementation of information technology tools in developed countries. The proposed process, which is specifically tailored to the needs of the artisanal industry in emerging economies, differs from the previously developed theories of technology adoption at the organisational level.

The problem identification is the starting point of the process, with the solution search being the next action managers undertake to address the problem at hand. The technology-related solution can emerge from different sources, such as internal (i.e., employees or antecedence), external, or managerial sources. Lippert and Govindarajulu (2006) found that antecedence can play a sizeable role in forging the idea of technology adoption. It can also originate from external sources via a suggestion provided by customers or if the company's competitors are already experiencing it (Niaki et al., 2019). The personal traits of managers, in the form of educational level and social networks, are among other sources that can impact the choice of technology adoption that were discussed in the literature (Shiau & George, 2014; Taylor & Owusu, 2012).

The next step is technology approval, where the core category is technology assessment. The main goal is to assess the feasibility and compatibility of the new technology with the company's needs and systems, with the assessment stage serving as a prerequisite for the final decision (Sarosa, 2007). The intervening conditions are the external factors, technology characteristics, and company characteristics. The diffusion of innovation theory (Rogers, 1995) identified the perceived features of the technology itself (i.e., relative advantage, compatibility, complexity, trialability, and observability) as factors affecting any innovation acceptance. Yet, we extended the list by adding both external (i.e., government support and market conditions) and internal (i.e., structure, size, HR competencies) factors as intervening conditions to the approval of the new technology. The organisational structure (Aremu et

al., 2018) and governmental policies (Baker, 2012) can have a considerable impact on technology adoption decisions.

The final decision is made based on three intervening conditions, namely the owner features, external factors, and technology characteristics. Competitors' success is a significant technology adoption driver (Soares-Aguiar & Palma-dos-Reis, 2008; Zhu et al., 2003), but prior studies have failed to consider market uncertainty, perceived value, and provider trust as intervening conditions. Although some authors acknowledged managers' centrality in technology-related attitudes and behaviours (Lee & Kim, 2007; McGowan & Madey, 1998), our research identifies risk tolerance and locus of control as personality traits that impact the final decision.

The Technology, Organization and Environment framework proposed by Baker (2012) considers that the entire decision process is influenced by the technological, organisational, and environmental contexts. However, this framework was used differently at each stage of our process, with the exact type of factors that influence the core category being extracted and tailored specifically to the handicraft sector. As stated by Eze et al. (2019), technology adoption is a dynamic process, and multiple factors can influence it at different stages.

Conclusion

This study's findings may assist managers and official parties interested in the development of the artisanal sector in emerging countries to minimise the barriers to technology adoption and increase the overall incentives. Marketers and vendors of new technologies can follow the logic of the advanced process to promote and market their products. Managers and stakeholders can address the issue of low workforce quality by offering their employees relevant training to improve their skills and lower their resistance to technology-driven change. It is also highly beneficial to attend international exhibitions and industry forums to build experiential knowledge and seek technology-savvy partners on a global scale (Spraggon & Bodolica, 2012). Government authorities may enforce a policy of inter-ministerial cooperation to incorporate technology within the artisanal sector, which must be transformed rapidly by upgrading its methods and equipment to better integrate into the modern economy.

Contributions and Future Research

Our research aims to make two contributions to theory and practice. First, it fills the gap in the literature by providing an in-depth understanding of the convoluted technology adoption process in HCs. The theoretical framework advanced in this article contributes to unveiling the motives and barriers to technology adoption among HCs in emerging economies, as well as identifying the sequence of actions and behaviours that lead to the final decision. Second, our framework conceptuali-

sation draws on the principles of grounded theory, helping researchers to explain, anticipate, and evaluate the technology adoption strategies of HCs.

Our study limitations relate to the nature of qualitative methodology, which does not possess a predefined detection indicator and relies heavily on the subjective judgment of the researcher (Bodolica et al., 2015). As such, we are unable to establish relationships among the different variables of the grounded model that would be generalisable to the entire population of HCs from emerging nations. Therefore, future research efforts could be directed toward the conduct of larger-scale inquiries to hypothesise meaningful relationships and test the advanced theory in other empirical settings. The process of technology adoption developed in this study does not consider the post-decision stage. An ethnographic inquiry could be conducted to follow the concerned managers in time and space to determine the antecedents of technology adoption, the attitudes during the process, and the post-adoption experiences of HCs

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Appendix 1. Interview Guide

Section 1: *Questions related to the manager's socio-demographic profile*
Q1: How old are you?
Q2: What is your level of education?
Q3: What is your firm's capital?
Q4: How many employees does your company have?
Q5: What is the structure of your company?
Section 2: *Questions related to the perception and integration of technology within the company*
Q6: What types of technology are you using and why did you implement them?
Q7: What is your opinion about the use of technology in the handicraft sector?
Q8: Is technology an essential component of export performance for HCs?
Q9: Do you think that the implementation of technology can help HCs solve certain problems?
Q10: If so, can you give an example of problems that could be solved through technology adoption?
Q11: Why did you choose to implement a new technology in the first place?
Q12: Where did the idea to integrate a new technology into your work processes come from?
Q13: Would you be willing to adopt a technology that you are not familiar with or which is beyond your expertise?
Q14: Are you the type of person who would be the first to adopt a new technology in the market, or would you rather wait for it to become mainstream before adopting it?
Q15: Do you think that technology can help you develop a competitive advantage in the market?
Q16: Do you think that new technology implementation may generate added value to your customers?
Section 3: *Questions about factors impacting the adoption decision*
Q17: Where did the idea of adopting a new technology emerge from? Was it yours or someone's else?
Q18: What factors did you consider when thinking about adopting a new technology?
Q19: What was the perceived usefulness you had about the technology before you adopted it?
Q20: What benefits did you gain from the new technology?
Q21: Did you consider factors related to your employees when making the choice?
Q22: Did you go over the information search to help you make the decision?
Q23: Where did you search for such information?
Q24: When having a choice between two technologies, which one would you choose and why?
Q25: What factors induced you to make the final decision?
Q26: Was the final decision made only by you or was someone else involved too?