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# Confrontation-coping: A psychological approach to developing market exporting firms' intentions to adopt emerging technologies

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ABSTRACT

Based on the cognitive psychology theory of coping, we examined how the ability of developing market firms to confront and cope with advanced market importers' pressure to adopt emerging technologies may influence their adoption of such technologies. We also determined how this relationship is moderated by the disruptive and incremental key features of technology. To do so, we collected survey data via the LinkedIn accounts of Pakistani firms exporting to advanced economies. Our results show that confrontation-coping mediates the influence of importer pressure on exporter intentions to adopt emerging technology. Further, we found the positive effects of such pressure on confrontation-coping to be stronger when the technology is robustly disruptive. We also found that confrontation-coping strongly influences intentions to adopt in the presence of highly incremental technology. Our study makes theoretical contributions to technology adoption research and coping theory, as well as practical contributions to both exporting firms and emerging technology providers. Our findings also have important policy implications.

## 1. Introduction

In recent years, the rapid advancement of emerging technologies—such as big data, the Internet of things, 3D printing, blockchain, robotics, and artificial intelligence—have played an undeniable role in enhancing business performance and value creation by altering the business landscape and pushing firms to adjust and transform their value-chain activities on a global scale (Hannibal and Knight, 2018; Strange and Zucchella, 2017). These technologies offer firms critical opportunities to develop competitive advantages, thereby helping them to become dominant players in their industries (Rotolo et al., 2015).

Innovative emerging technologies are playing a particularly important role in the economic growth of emerging markets. For example, take Pakistan, the context of this study. A recent World Bank (2021) report proposes that emerging technologies can unlock the potential of Pakistan's export industry and improve its productivity, thus enabling the country to take a leap forward. However, the willingness or ability to adopt such technologies often differs between developing and advanced economy markets (Fang et al., 2011). Particularly, developing market firms (hereafter called DMFs) often face various resource constraints—including financial and skill-related ones—in implementing these technologies, and are usually slow in embracing them (de-Oliveira and Rodil-Marzábal, 2019; Xie et al., 2021).

As advanced economies are often much more accomplished in terms of R&D investment and technology adoption (Lee et al., 2013), DMFs are pressured to adopt emerging technologies in order to compete against or even just to maintain exchange relationships with their advanced market counterparts. Indeed, this pressure has been even more relentless during the current COVID-19 pandemic, as external challenges—such as supply chain issues—have exacerbated the need for firms to become agile through the adoption of technology aimed at improving their operations and business management (He et al., 2021; Herath and Herath, 2020; Kim et al., 2021; Vargo et al., 2021; Verma and Gustafsson, 2020). As the pandemic has pushed businesses to rely more on technology for their business processes (He et al., 2021; Herath and Herath, 2020; Vargo et al., 2021; Verma and Gustafsson, 2020), advanced market

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importers may have pressured DMFs to adopt emerging technologies in order to improve their production efficiency, product quality, and speed to market.

At the same time, the literature on technology adoption, such as that applying Davis' (1989) technology acceptance model (TAM), has shown that contextual factors are important predictors of technology adoption. These factors include the features of a technology (Plouffe et al., 2001), culture (Straub et al., 1997), and perceived risks and costs (Schmidthuber et al., 2020). Scholarly work has also extended to address psychological determinants such as social influence (Hsieh, 2021) and subjective norms (Cobelli et al., 2021). However, how such factors can explain the adoption of a technology in the presence of pressure exerted by external parties remains unclear. Also, while these factors cut across wide domains, those rooted in cognitive psychology remain underexplored.

Against this backdrop, we drew on Lazarus and Folkman's (1984) coping theory to investigate how DMFs can use coping—"*the thoughts and behaviors used to manage the internal and external demands of situations that are appraised as stressful*" (Folkman et al., 2004, p. 745)—as a psychological mechanism suited to confront the pressure exerted by advanced economy importers, thereby influencing their intentions to adopt emerging technologies. Coping theory further postulates that people either avoid or confront a problem (Folkman et al., 1986; Lazarus and Folkman, 1984). Confrontation-coping facilitates problem-solving and leads to positive outcomes, whereas avoidance-coping will ignore a problem, leading to negative outcomes (Aldwin and Revenson, 1987). In our study, we specifically focused on confrontation-coping in relation to the positive outcomes of emerging technology adoption.

Additionally, as coping behaviors may vary depending on the characteristics of external and internal demand (Folkman et al., 1986), it is important to examine the moderating conditions under which the technological pressure applied by importers on DMFs is more salient. Hence, the second question we sought to answer pertained to the extent to which technology-related factors may moderate how coping mediates the effects of importer technological pressure on emerging technology adoption. Specifically, we considered two kinds of emerging technologies: radically disruptive and incremental.

In addressing our two research questions, we made important contributions to developing market firm performance, as well as theoretical contributions to both the information technology and cognitive psychology literatures. While extant studies have considered various contextual and technology-related factors, little is hitherto known about how psychological coping may be relevant in the adoption of technology, especially when the adopting firms may have difficulties in embracing it and yet face external pressure to do so. We demonstrated how coping theory—which is primarily applied in the cognitive psychology literature (Carver et al., 1989; Duhachek, 2005; Duhachek and Kelting, 2009; Morales-Rodríguez and Pérez-Mármol, 2019; Sengupta et al., 2015; Tsarenko and Strizhakova, 2013)—can also be pertinent to the adoption of technology. In doing so, we answered the call for research aimed at extending the boundaries of the literature on the adoption of technology (Herz and Rauschnabel, 2019). Specifically, we address the call to link psychological theories with the technology adoption literature (Van Oorschot et al., 2018). We further contributed to the technology adoption literature by empirically examining the technological moderating factors (i.e., disruptiveness and incrementalism) under which firms may be more inclined toward emerging technology adoption, given the anxieties associated with such technologies. In doing so, our research unveils the complex relationships between DMFs' emerging technology adoption processes and contingent factors.

Due to their unfamiliarity with the economic value of emerging technologies, DMFs face psychological barriers. Our study provides managerial guidance aimed at encouraging DMFs to adopt radically disruptive emerging innovative technologies to sustain their business with advanced market importers. At the same time, technology development companies should focus on making the features of a technology incremental and easier for firms, as this would positively affect behavioral outcomes in relation to its adoption and create a win-win situation for both themselves and DMFs, especially given the lack of skills and weak absorptive capacity of the latter (Vlačić et al., 2019). As Pakistan has a large trade deficit (Trading-Economics, 2021), strengthening its export competitiveness through the adoption of technology is critical for its economy and productivity growth. Hence, from a policy perspective, the Pakistani government should provide institutional support in regard to skill enhancement through training and educational programs.

The rest of this paper is organized as follows. First, we present a review of the key literature and conceptualize our hypotheses. Next, we outline the methodology, followed by our analyses and findings. We then offer the theoretical, practical, and policy-related contributions arising from our findings. Finally, we highlight our study's limitations and present an agenda for future work.

## 2. Conceptual development

### 2.1. The mediating role of confrontation-coping in emerging technology adoption

Over the past century, accelerated globalization and technological breakthroughs have brought about a new era of global competition and technological development (Adner and Kapoor, 2016; Afuah, 2009; Kapoor and Klueter, 2020). In particular, innovative emerging technologies—such as big data, the Internet of things, blockchain, virtual reality, and artificial intelligence—are playing an undeniably critical role in enhancing business performance, pushing firms to adjust and transform their activities on a global scale (Hannibal and Knight, 2018; Strange and Zucchella, 2017). Similarly, Xu et al. (2021) suggested that keeping pace with emerging technologies is critical for globalization and innovation, while Vlačić et al. (2019) asserted that the adoption of technology can benefit firms by offering economies of scale. Consistent with this landscape, Khan et al. (2020) contended that DMFs must be agile when exporting to advanced economies and be proactive in regard to changing market requirements. As technological advancements are constantly creating new opportunities and challenges for businesses, DMFs need to harness such opportunities in order to enhance their competitiveness.

However, DMFs are usually slow in embracing technologies, possibly due to their resource constraints, including financial and skill-related ones (de-Oliveira and Rodil-Marzábal, 2019; Xie et al., 2021). Within the context of this study, recent studies have similarly highlighted that, to remain competitive, Pakistani exporters should adopt emerging technologies in a timely fashion (Elahi et al., 2021). In relation to generalizing these findings to other countries, Cui et al. (2016) lamented that developing market countries with higher export rates—such as South Africa, Brazil, and China—are less likely to engage in technological innovation. Consequently, advanced economy importers may pressure DMFs to implement technologies in order to enhance their industries' process and product quality. For example, importers may expect DMFs to adopt business processes that are consistent with their own requirements (Miocevic, 2020). Similarly, importer pressure can influence the product development and innovation of exporting firms (Silva et al., 2019). Pressure can also arise due to importers acting as important social referents in the adoption of emerging technologies, given the anxieties commonly associated with the latter (Nastjuk et al., 2020).

In relation to such pressure, Mick and Fournier (1998, p. 133) suggested that, when firms take a problem-solving approach, they are "*committed to learning the stimuli and changing its preferences and routines according to perceived requirement to address the challenge.*" In other words, in order to attain positive outcomes, DMFs need to confront any pressure to which they are subjected by means of a problem solving

approach (Cetindamar et al., 2009). In our study, we drew on Lazarus and Folkman's (1984) seminal work on coping theory to contend that DMFs can use coping—"*the thoughts and behaviors used to manage the internal and external demands of situations that are appraised as stressful*" (Folkman et al., 2004, p. 745)—as a problem-solving mechanism suited to confront any pressure applied by advanced economy importers to influence their intentions to adopt emerging technologies. Lazarus and Folkman (1984) saw coping as a mechanism suited to solve problems, thereby reducing the stress experienced by individuals by enabling them to deal with disruptive events. To DMFs, the adoption of emerging technology is one such critical disruptive event.

Coping theory, which is rooted in psychology, has been widely applied in the consumer behavior and psychology literatures (Tsarenko and Strizhakova, 2013). Although it has been applied across a wide range of domains—including process adaptation (Aldwin and Revenson, 1987; Brissette et al., 2002), motivation (Maheswaran and Agrawal, 2004), cognitive decision-making (Cavanaugh et al., 2007; Han et al., 2007), and health issues (Rippetoe and Rogers, 1987; Worthington and Scherer, 2004)—the theory has hitherto found limited application in the technology and business management literatures. Particularly, few quantitative studies have applied confrontation copying theory to the adoption of technology (Barlette et al., 2021).

The theory further postulates that, when internal or external demand arises, people either avoid or confront the problem (Folkman et al., 1986). Moreover, those who take a problem-solving coping approach (i.e., confrontation-coping) would exhibit positive outcomes (Aldwin and Revenson, 1987). By contrast, those who shun a problem (i.e., avoidance-coping) tend to experience negative outcomes. Thus, we proposed that a confrontation-coping approach will enable DMFs to better deal with importer pressure, which, in turn, will influence their intentions to adopt emerging technologies.

**Hypothesis 1**. Confrontation-coping mediates the influence of advanced market importer's technological pressure on the DMFs' intentions to adopt emerging technologies.

Extending Hypothesis 1, we further contended that the mediation effects of confrontation-coping may vary under different contextual conditions. This is consistent with the technology adoption literature, which shows that the adoption of technology should be considered in light of different contextual factors such as culture (Straub et al., 1997) and perceived risk and costs (Schmidthuber et al., 2020), and even social influence (Cobelli et al., 2021; Hsieh, 2021). In our study, we argued that two distinct types of technology—disruptive and incremental—will have different moderation effects on the strength of the mediating relationship theorized in H1.

### 2.2. The moderating effect of radically disruptive technologies

Disruptive technologies have the potential to unsettle existing supply chains and business models, which can have far-reaching implications for different types of industries and markets (Christensen, 1997). Under disruptive market conditions, firms need to adapt to external contingencies (Khan, 2020; Zhou et al., 2019). High rates of innovative technology emergence in an industry cause frequent occurrences of product or technology displacement (Ogbeibu et al., 2021). In the presence of radically disruptive technologies, firms are often compelled to engage in technological adoption (Santoro et al., 2020). This is because technological disruption promotes the introduction of emerging technologies, leading firms to innovate through adoption (Reischauer, 2018). Indeed, a fundamental concept of radical technological disruption is that those companies that are proactive in relation to the adoption of technology remain competitive, while those that do not may fail (Si and Chen, 2020). Similarly, the international business literature asserts that, through entrepreneurial approaches, DMFs can develop competitive advantages in advanced markets (Kotabe and Kothari, 2016) by overcoming their liabilities of foreignness and emergingness (Madhok and Keyhani, 2012).

However, to the best of our knowledge, no studies have hitherto empirically examined whether disruptiveness plays a role in the adoption of technology, especially in the presence of external pressure. In our study, we contended that the effects of technological importer pressure on a confrontation-coping approach may depend on the level of radical disruptiveness of a technology, with higher levels of turbulence having the potential to amplify the influence of external pressure on the adoption of technology. Specifically, when DMFs are pressured to adopt radically disruptive technologies, their confrontation-coping stance will increase in response to such heightened pressure. This occurs because, despite the benefits that they bring, disruptive technologies may unsettle or intimidate DMFs (Ogbanufe and Pavur, 2022) (Viswanathan and Sreekumar, 2019). Similarly, Valor et al. (2022) argued that the efficacy of coping is dependent upon the features of innovation. Hence, we hypothesized that:

**Hypothesis 2**. Advanced markets importers' technological pressure on DMFs' technology confrontation approach is positively moderated by radically disruptive technology features.

### 2.3. The moderating influence of incremental technologies

Compared to disruptive technologies, incremental ones have lower rates of advancement and innovativeness (Ogbeibu et al., 2021). Their evolution is manifested in the incremental diffusion and absorption of their key features and functions (e.g., ease of use and diffusion) (Guo et al., 2019). For example, a support system is more likely to be capable of dealing with the adoption of an incremental technology than with that of a disruptive one. As a technology confrontation approach stimulates technological specialization, it calls for changes in organizational activities and capability development—e.g., R&D decentralization, infrastructural changes, and learning (ElMaraghy et al., 2012). In another example, Kivi et al. (2012) mentioned that products and companies go through continuous evolution that is determined by incremental changes and the diffusion of technological features. When incremental technology is embedded in existing business paradigms, its application and adoption are supported (Hou et al., 2020).

From a market perspective, those DMFs that are contemplating the adoption of incremental technology are less likely to be concerned with importer pressure compared to those considering the adoption of disruptive technology. However, the relationship between confrontation-coping and the intention to adopt an emerging incremental technology may not be a linear one. From the theoretical perspective of psychological coping, problem-focused coping (i.e., confrontation) can resolve challenging situations (Valor et al., 2022). Similarly, research has shown that consumers do not adopt digital products if they get frustrated with the complexity of their implementation or lack the resources required to master them (Mick and Fournier, 1998). Hence, in regard to the adoption of incremental technology, incremental technology is likely to moderate the relationship between confrontation-coping and adoption intentions. Drawing from the above review of the literature on technology adoption, it can be inferred that the relationship is strengthened when a technology is highly incremental (e.g., it has a support infrastructure) as this would facilitate its adoption (Guo et al., 2019).

Despite the plausible moderating role played by a technology's incremental nature in the relationship between a coping confrontation approach and the intentions to adopt such technology, to the best of our knowledge, researchers have only hitherto focused on the direct impact of features such as ease of use on adoption intentions (Pai and Huang, 2011; Talukder et al., 2020). Hence, we proposed:

**Hypothesis 3**. The effect of the technology confrontation-coping approach on a DMF's intentions to adopt emerging technologies is positively moderated by incremental technology features.

Considering the three hypotheses outlined above, Fig. 1 illustrates our conceptual framework.

## 3. Methods

### 3.1. Research setting

Pakistan has a large trade deficit that could be reduced by an increase in exports (Trading-Economics, 2021). For the export sector in particular, emerging technologies are critical for the country's economic growth and can be a source of economic development (World Bank, 2021). However, as in the case in other developing markets with large export industries and economies that rely substantially on exports, such as South Africa and Brazil (Cui et al., 2016), Pakistani firms lack the know-how to implement the required technological advancements (Irfan et al., 2022). Due to a lack of finance and of the skills needed for such implementation, Pakistan is slow in embracing emerging technologies (de-Oliveira and Rodil-Marzábal, 2019; Xie et al., 2021). A recent study has similarly contended that Pakistani firms require digitalization capabilities to become agile (Ahmed et al., 2022). To compound this issue, they need to be responsive to their advanced export markets to enhance their own performance (Khan and Khan, 2021). Hence, they are likely to be pressured to adopt emerging technologies in order to compete against or even just to maintain exchange relationships with advanced market importers. This situation made the Pakistani export sector a suitable context to test our conceptual technology adoption framework.

### 3.2. Data collection

We identified our sample firms from a directory listing of Pakistani exporters to advanced economies (the UK, the USA, or both). We then invited their managers to participate in our survey by contacting them via their LinkedIn accounts. We used LinkedIn to ensure that our key informants would be fit for the purpose of our study. Previous studies have shown that LinkedIn is an effective source for data collection, as it ensures that the respondents are knowledgeable about the key aspects being studied (Khan, 2020; Lew and Sinkovics, 2013). Other scholars have also reported that LinkedIn is a reliable and efficient means to collect data (Bhatia, 2021). Although previous work has suggested that collecting data face-to-face is preferrable due to the reluctance of managers to participate in surveys that involve non-personalized approaches (Khan et al., 2020), this was not feasible due to the COVID pandemic. Hence, we used LinkedIn as a proxy for a personalized data collection approach.

The invitation message contained a Qualtrics survey link and stated the aim of our study as an academic exercise to understand how Pakistani exporters were performing in the face of the challenges presented by the prevailing market conditions. Our data collection began at the end of April 2021. We sent fortnightly reminders to those managers who had not yet responded.

Given that English is widely used commercially in Pakistan, the survey was developed in that language. Prior to the main survey, we submitted our questionnaire to an export industry expert to obtain feedback aimed at ensuring its quality and avoiding any potential bias. The managers were given no incentive for participation; however, the aggregate findings of this study were shared with them via LinkedIn as useful feedback. We first contacted 201 managers based on a sampling criterion of one respondent per firm. As per our sampling strategy, we considered only those managers who were primarily involved in strategic decision-making, particularly in regard to the adoption of emerging technologies. In total, we obtained 115 responses and. After deleting 28 incomplete ones and four outliers, we were left with a final usable sample of 83 responses. The profiles of the participants' firms are provided in Table 1.

### 3.3. Measures

All the measures used in our study were adapted from established sources and involved seven-point Likert scales (see Table 2 for the scale items). We also measured industry, market type, and firm size and age as categorical control variables.

#### 3.3.1. Importers' technological pressure

Four-items were adapted from Wu et al. (2003). The participants

**Table 1**
Participant firms' profiles.

| Participants | n | Industry type | n | Age (years) | n | Size (employees) | n |
|---|---|---|---|---|---|---|---|
| CEO/ Director | 6 | Textile/ clothing/ cotton | 44 | >0–5 | 5 | 1–250 | 64 |
| Export Manager | 77 | Food | 25 | >5–10 | 11 | >250–500 | 14 |
| | | Technology | 6 | >10–15 | 33 | >500 | 5 |
| | | Others | 8 | >15 | 34 | | |
| Total | 83 | Total | 83 | Total | 83 | Total | 83 |

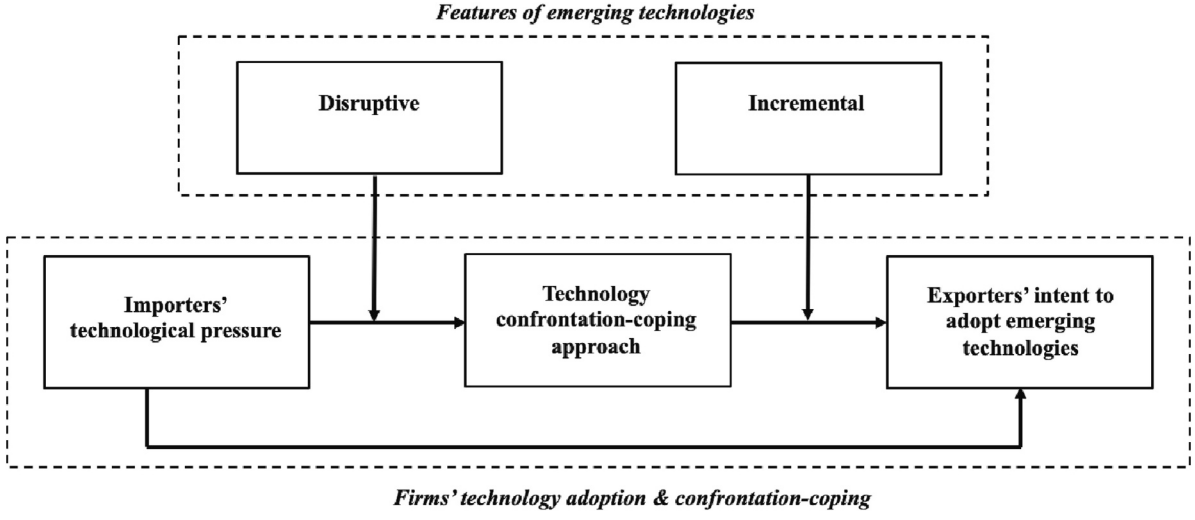


**Fig. 1.** Conceptual framework.

were asked to express their degree of agreement/disagreement on each item on a scale ranging from 1 to 7 (1 = strongly disagree; 7 = strongly agree) by taking into consideration recent external crises or shocks, such as the COVID pandemic.

#### 3.3.2. Confrontation-coping approach

Three items were taken from Mick and Fournier (1998). Considering key emerging technologies (e.g., internet of things, social media, 3D printing, artificial intelligence, etc.) in their industry during recent external crises or shocks, such as the COVID pandemic, the participants were asked to express their degree of agreement/disagreement regarding business approach in emerging technology adoption on a scale ranging from 1 to 7 (1 = strongly disagree; 7 = strongly agree).

#### 3.3.3. Radically disruptive technologies

Six-items were adapted from Ogbeibu et al. (2021). The participants were asked to express their degree of agreement/disagreement on each item on a scale ranging from 1 to 7 (1 = strongly disagree; 7 = strongly agree) by taking into consideration the impact of radical technology disruption on their businesses during recent external crises or shocks, such as the COVID pandemic.

#### 3.3.4. Incremental technologies

Five items were adapted from Guo et al. (2019). The participants were asked to express their opinion on the incremental features of key technologies (e.g., the Internet of things, social media platforms, 3D printing artificial intelligence, etc.) emerging in their industry on a scale ranging from 1 to 7 (1 = extremely low; 7 = extremely high) by taking into consideration recent external crises or shocks, such as the COVID pandemic.

#### 3.3.5. Intention to adopt emerging technologies

Three items were adapted from Obal (2013). The participants were asked to express their degree of agreement/disagreement on each item on a scale ranging from 1 to 7 (1 = strongly disagree; 7 = strongly agree) in regard to their respective firms' intentions to adopt emerging technologies in the future.

### 3.4. Common method bias

To check for the presence of common method bias, we followed Khan (2022) and included four theoretically unrelated items about restaurant performance. The questions were aimed at measuring the respondents' levels of satisfaction with a restaurant they had last visited in terms of personnel friendliness, availability of healthy options, cleanliness, and presentation on a seven-point scale (1 = strongly dissatisfied; 7 = strongly satisfied).

In addition to this marker variable, we took procedural steps to minimize potential common method bias. We carefully designed the questionnaire so that the statements would be easy to understand. The questionnaire was then reviewed by an independent expert scholar and an industry expert in order to ensure the quality and clarity of the questions. Further, we mixed the scale items in the questionnaire so that our respondents could not easily guess the observed relationships.

## 4. Analysis and findings

First, we performed an exploratory factor analysis in SPSS. In total, five factors emerged from such analysis. All items were loaded into their respective factors with the lowest item loading being 0.67. We then checked for scale reliabilities, and all Cronbach's α were found to be >0.83, supporting the adequate reliability of all scales (See Table 2).

The average variance extracted (AVE) and square of correlation are reported in Table 3. The AVE were all found to fall above 0.50 and to be greater than the highest square of the correlation between any two factors (0.26), thus supporting discriminant validity among the factors.

**Table 2**
Construct measurement.

| Constructs | Factor loading |
|---|---|
| Importers' technological pressure (α = 0.89) | |
| 1. Many of our importers are keen that our firm should implement emerging technology for business. | 0.87 |
| 2. Our relationship with major importers would have suffered if we had not implemented emergent technology. | 0.88 |
| 3. The importers may consider us backward if we do not implement emerging technologies for business. | 0.81 |
| 4. Our major importers demand the use of emerging technology for strengthening business relationships. | 0.89 |
| Radically disruptive technology features (α = 0.84) | |
| 1. There have been frequent occurrences of displacements of one or more of our organization's dominant product(s) or technology by an emerging technology. | 0.67 |
| 2. The nature of work in our organization is affected by the relatively rapid breakthrough of emerging technology(s) in our industry. | 0.76 |
| 3. New technology(s) in our industry have a broad potential scope of impact. | 0.77 |
| 4. Our organization has had to discontinue one of more innovation initiatives in recent months due to the influence of an emerging technology. | 0.83 |
| 5. In our industry, technological changes create a basis for new competitive innovation standards. | 0.69 |
| 6. The high rate of changing radical novelty in our industry has created increased uncertainty and ambiguity. | 0.75 |
| Confrontation-coping approach (α = 0.84) | |
| 1. We change our preferences, tendencies, routines etc. according to the perceived requirements of emerging technological adoption. | 0.87 |
| 2. We establish commitment and attachment to emerging-technology adoption. | 0.91 |
| 3. We dominate emerging-technology adoption by thoroughly learning its operations, strengths, and weaknesses. | 0.83 |
| Incremental technology features (α = 0.83) | |
| 1. The degree of innovativeness of emerging technology merges with existing paradigms. | 0.77 |
| 2. There is a potential of leading related technological developments, deployments, and applications. | 0.81 |
| 3. There is maturity and reliability of the supporting technologies or the related infrastructures. | 0.76 |
| 4. There is an easiness of diffusion of the innovation among its target users. | 0.80 |
| 5. Realization of certain functions can improve the satisfaction of users through the simplification of related technologies. | 0.72 |
| Intention to adopt emerging technologies (α = 0.86) | |
| 1. Our firm intends on increasing our use of emerging technologies. | 0.88 |
| 2. Our firm intends on gradually replacing the use of traditional platforms with emerging technologies. | 0.89 |
| 3. Our firm plans to increase the integration of emerging technologies in the future. | 0.88 |

We also calculated the Heterotrait-Monotrait (HTMT) ratio of the correlations (see Table 4). All HTMT ratios between any two variables of the study were found to be lower than the 0.85 threshold, thus supporting discriminant validity (Henseler et al., 2015).

The measurement model fit indices were found to be adequate (CFI = 0.90; IFI = 0.90, RMSEA = 0.08, CMIN/df = 1.51, $\chi^2 = 270.30$, df = 179, $p \leq 0.01$). The common latent factor was not found to result in a better fit ($\Delta\chi 2 = 92$, $\Delta df = 79$, $p = 0.15$). We then followed Lindell and Whitney's (2001) marker variable technique to check for common method bias. First, we analyzed the correlation between a theoretically unrelated marker variable (restaurant satisfaction) and the observed variables in our model. All observed variables were insignificantly related to the marker variable, satisfying the criteria (see Table 5). Next, we identified the lowest correlation between the marker variable and the intention to adopt emerging technologies (r = 0.02). We then used

**Table 3**
Means, correlations, and average variances extracted.

| Variables | Mean (S·D) | AVE | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| Importers' technological pressure | 5.46 (1.18) | 0.75 | 0.06* | 0.20** | 0.23** | 0.18** |
| Confrontation-coping approach | 5.15 (1.14) | 0.76 | | 0.05* | 0.24** | 0.19** |
| Radically disruptive technology feature | 5.28 (0.93) | 0.56 | | | 0.23** | 0.26** |
| Incremental technology features | 4.99 (1.05) | 0.60 | | | | 0.35** |
| Intent to adopt emerging technologies | 5.30 (1.21) | 0.78 | | | | |

Sq. of correlations are reported in italics and S·D indicates standard deviation.
** Implies significance at 0.01 level.
* Implies significance at 0.05 level.

**Table 4**
HTMT ratios.

| Constructs | 2 | 3 | 4 | 5 |
|---|---|---|---|---|
| Importers' technological pressure | 0.25 | 0.46 | 0.52 | 0.42 |
| Confrontation-coping approach | | 0.20 | 0.49 | 0.39 |
| Radically disruptive technology | | | 0.48 | 0.51 |
| Incremental technology | | | | 0.59 |
| Intent to adopt emerging technologies | | | | |

**Table 5**
Correlation table.

| Constructs | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Importers' technological pressure | 0.25* | 0.45** | 0.48** | 0.42** | 0.08 |
| Confrontation-coping approach | | 0.22* | 0.49** | 0.44** | 0.12 |
| Radically disruptive technology feature | | | 0.48** | 0.51** | 0.14 |
| Incremental technology features | | | | 0.59** | 0.09 |
| Intent to adopt emerging technologies | | | | | 0.02 |
| Marker (satisfaction with a restaurant) | | | | | |

** Implies significance at the 0.01 level.
* Implies significance at the 0.05 level.

this correlation as a proxy for common method bias by adjusting the correlations between all examined constructs. All correlations were found to remain significant after adjustment. Collectively, these results supported the absence of common method bias issues in our study.

We also addressed any endogeneity concerns by taking the following steps. First, our hypotheses were underpinned by theories that implied no reverse causality between the independent and dependent variables of the study (Rutz and Watson, 2019). Second, common method bias could also cause an endogeneity issue. We controlled for common method bias using procedural and statistical tests as reported above (Antonakis et al., 2014; Deng et al., 2016). Finally, given the cross-sectional nature of our survey, the questionnaire items were derived and adapted from established literature, and were mixed in order to ensure that our participants could not easily guess the relationships (Damali et al., 2016). Finally, we included control variables that might confound the results (Antonakis et al., 2014). Similar techniques were also adopted in recent studies (e.g., Ali et al., 2022).

Next, we analyzed the conceptual framework using PROCESS Macro Model 21 as it matched our conceptual model. Process Macro is widely used to examine mediation and moderation within a single model (Hayes, 2017). The Process model is accurate and precise as it generates results based on confidence intervals—so that, if zero does not lie between the intervals, significance is implied. We analyzed the model using 5000 bootstrapping estimations with a confidence interval of 95 %.

Table 6 shows that the confrontation-coping approach mediated the influence of importers' technological pressure on our sample firms' intentions to adopt emerging technologies. The significant direct effect of importers' technological pressure on our sample firms' intentions to adopt emerging technologies ($\beta = 0.35$, $p < 0.01$) became non-significant when the confrontation-coping approach was added to the model ($\beta = 0.12$, LLCI $= -0.08$, ULCI $= 0.32$). Hence, Hypothesis 1 regarding the mediating role of confrontation-coping was supported.

The results presented in Table 6 also show that importer technological pressure was found to positively influence the exporters' confrontation-coping approach ($\beta = 0.32$, LLCI $= 0.06$, ULCI $= 0.58$). Further, this relationship was found to be positively moderated by radically disruptive technologies ($\beta = 0.16$, LLCI $= 0.01$, ULCI $= 0.30$). Table 7 shows the conditional effects of such technologies. The effects of importer technological pressure and the confrontation-coping approach were found to grow stronger as the perceived impact of radical technology disruption increased. Hence, Hypothesis 2, which theorized the positive moderating effects of disruptive technologies, was found to be supported.

Similarly, Table 6 shows that the effect of the confrontation-coping approach on our sample firms' intentions to adopt emerging technologies was found to be positively moderated by incremental technologies ($\beta = 0.10$, LLCI $= 0.00$, ULCI $= 0.36$). Table 7 shows the conditional effects of incremental technologies. The effects of a confrontation-coping approach on our sample firms' intentions to adopt emerging technologies was found to grow stronger as technologies were rated as more incremental. This result supported Hypothesis 3, which posited the positive moderating effects of incremental technology. Fig. 2 illustrates the moderation effects of disruptive and incremental technologies.

As a robustness check, we reversed the roles of the moderators by testing whether incremental technologies influenced the relationship between importer pressure and the confrontation-coping approach, and

**Table 6**
Process Model 21 (moderated – mediation).

| Independent variables | Dependent variable: confrontation-coping approach | | | |
|---|---|---|---|---|
| | β | LLCI | ULCI | p-values |
| ITP | 0.32 | 0.06 | 0.58 | 0.02 |
| RDT | 0.10 | −0.15 | 0.35 | 0.42 |
| ITP X RDT | 0.16 | 0.01 | 0.30 | 0.04 |
| Controls | | | | |
| Market type | −0.03 | −0.28 | 0.20 | 0.75 |
| Industry type | −0.06 | −0.12 | 0.00 | 0.06 |
| Firm age | −0.16 | −0.41 | 0.10 | 0.23 |
| Firm size | −0.04 | −0.35 | 0.27 | 0.79 |

| Independent variables | Dependent variable: Intention to adopt emerging technologies | | | |
|---|---|---|---|---|
| ITP | 0.12 | −0.08 | 0.32 | 0.24 |
| CCA | 0.21 | 0.01 | 0.42 | 0.04 |
| ITF | 0.39 | 0.17 | 0.61 | <0.01 |
| CCA X ITF | 0.18 | 0.00 | 0.36 | 0.05 |
| Controls | | | | |
| Market type | −0.10 | −0.29 | 0.09 | 0.30 |
| Industry type | −0.04 | −0.09 | 0.01 | 0.10 |
| Firm age | 0.02 | −0.20 | 0.23 | 0.87 |
| Firm size | 0.12 | −0.16 | 0.39 | 0.40 |

Model summary, n = 83, r-sq = 0.187, p = 0.02.
ITP = importers' technological pressure; RDT = radically disruptive technology features, CCA = confrontation-coping approach, ITF = incremental technology features.

**Table 7**
The conditional effects of technology features.

| Radically disruptive technology | Importers' technological pressure ⟶ Confrontation-coping approach | | | |
|---|---|---|---|---|
| | β | LLCI | ULCI | p-value |
| Low RDT | 0.14 | −0.11 | 0.39 | 0.26 |
| Moderate RDT | 0.36 | 0.08 | 0.63 | 0.01 |
| High RDT | 0.47 | 0.13 | 0.81 | 0.01 |
| Incrementation technology | Confrontation-coping approach ➔ intent to adopt | | | |
| Low ITF | 0.04 | −0.19 | 0.29 | 0.70 |
| Moderate ITF | 0.22 | 0.01 | 0.43 | 0.03 |
| High ITF | 0.40 | 0.09 | 0.70 | 0.01 |

RDT = radically disruptive technology features; ITF = incremental technology features.

found no significant moderating effect (β = 0.12, p = 0.23, LLCI = −0.07; ULCI = 0.31). We also tested whether radically disruptive technologies moderated the effect of the confrontation-coping approach on our sample firms' intentions to adopt emerging technologies, and similarly found no significant moderation (β = 0.06, p = 0.55, LLCI = −0.13; ULCI = 0.25). Collectively, these results further supported the robustness of our model and reinforced our theoretical contentions regarding the roles of two moderators, as postulated in Hypotheses 2 and 3.

## 5. Discussion

The global market is increasingly characterized by demand for new technological solutions suited to improve the competitiveness of businesses. Recent research has shown that the COVID pandemic has led many sectors to adopt emerging technologies to maintain or improve the effectiveness of their business and operations (Amankwah-Amoah et al., 2021). This, however, has brought forth challenges linked to the inherent uncertainty and complexity involved in the adoption of such technologies. The uncertainty and complexity are exacerbated in the case of technologically laggard firms operating in developing markets. As the advent of emerging technologies requires pervasive and fluid capabilities (Nambisan et al., 2017), these challenges pose great difficulties to such firms, which often lack technological capabilities, face psychological barriers, or simply lack the resources needed to adopt and implement emerging technologies effectively. The Pakistani export sector represents such an instance, whereby its component firms are required to sense and respond to the requirements of advanced market importers despite facing the aforementioned challenges (Khan, 2020). Consistent with this situation, a recent study has emphasized the importance—and lack—of digitalization capabilities for Pakistani firms (Ahmed et al., 2022).

Accordingly, our study drew on the technology adoption (Davis, 1989) literature and on the psychological theory of coping (Lazarus and Folkman, 1984) to demonstrate that developing market exporters feel pressured by their advanced market importers to adopt emerging technologies, which leads them to adopt a confrontation-coping approach. The effect of importer pressure on the confrontation-coping approach is strengthened when the related emerging technologies are radically disruptive. Confrontation-coping fully mediates the influence of importer pressure on firms' intentions to adopt emerging technologies. Further, the effect of confrontation-coping on firms' intentions to adopt emerging technologies is positively moderated when technologies are of an incremental nature.

In the technology adoption literature, limited research has been conducted on coping strategies (Barlette et al., 2021). The extant applications of confrontation theory in the technology adoption literature are also mostly qualitative, and more empirical work is required in this regard (Barlette et al., 2021). Hence, our study addressed this theoretical gap by empirically examining the technology adoption and coping literature in the under-examined context of developing market firms exporting to advanced markets. As Edeh et al. (2020) argued, this is an important contribution, given that technology adoption studies conducted in the export context have mostly focused on developed markets.

### 5.1. Theoretical implications

While past studies have identified different antecedents of the intention to adopt technology, they have ignored some potential moderating and mediating mechanisms that could capture the full essence and conditions under which the related effects may vary. Therefore, our findings offer useful implications for research, as discussed below.

#### 5.1.1. The psychological aspect of the DMFs' technology adoption processes

Our study extends the existing theoretical body of knowledge by investigating an underexplored psychological mechanism that can drive DMFs exporting to advanced economies to adopt emerging technologies. To the best of our knowledge, ours is the first study to have looked at how the confrontation-coping approach taken by DMFs may influence their intentions toward adopting emerging-technologies, particularly when faced with external challenges such as those brought about by the COVID pandemic. As the economic value of emerging technologies is not well known (Kapoor & Klueter, 2021), organizations may face significant psychological barriers to their adoption. Hence, a central

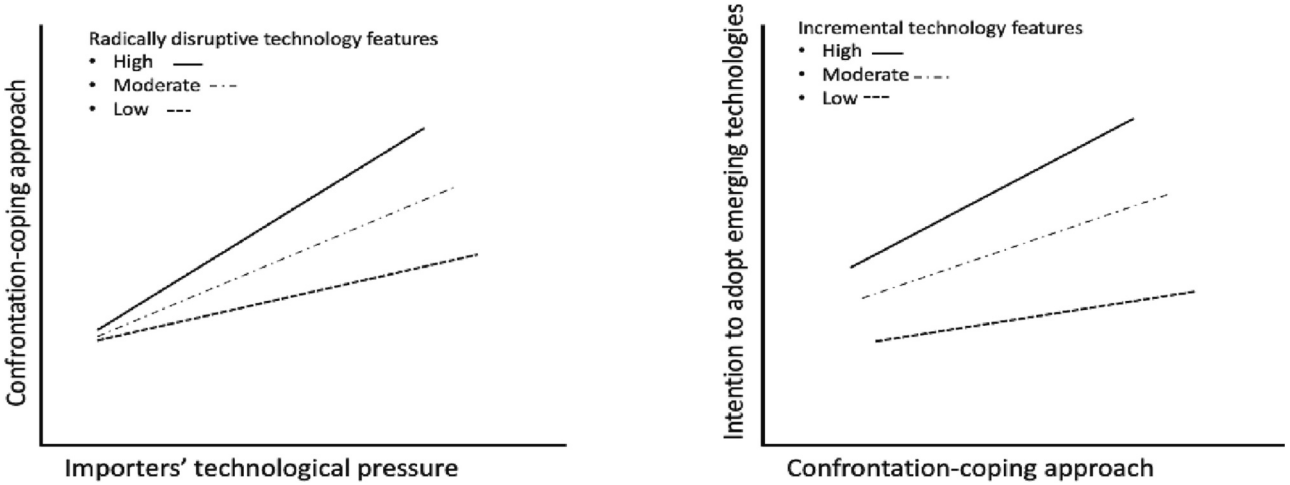


**Fig. 2.** Moderating effects.

contribution of our study is to address the adoption of technology through a psychological lens suited to guide DMF managers' decisions on resolving the problems originating from external pressure in crises such as the COVID pandemic. In this regard, a major contribution made by our research is to show that the confrontation-coping strategy acts as an enabling mechanism between advanced market importer pressure and the DMFs' intentions to adopt emerging technologies. These findings imply that the traditional approaches to technology adoption (Davis, 1989) may be unable to provide a complete picture of the underlying mediating mechanisms and of the intentions of technology-laggard firms to adopt emerging technologies. Thus, our findings provide unique insights into the psychological mechanism (i.e., confrontation-coping) at play in the adoption of emerging technologies by laggard firms.

#### 5.1.2. The technological contingent aspect of DMF competitiveness improvement

Past research has primarily studied the direct relationships between social or external factors and intentions to adopt technologies (Lin and Lin, 2008; Montalvo, 2006). Such research has also neglected the role played by the kind of technology. In this area, we demonstrated the moderating effects of two such kinds—disruptive and incremental. Our findings, which were reached considering important boundary conditions, suggest that the effect of importer technological pressure on the confrontation-coping approach is more persuasive in relation to radically disruptive technologies. This finding is consistent with those of past studies, which suggest that trade partner expertise can provide external motivation for a business to adapt its systems and approaches (Simatupang et al., 2002), mainly through technology diffusion (Lin and Lin, 2008).

The positive effects of the confrontation-coping approach on intentions to adopt emerging technologies are also stronger in the presence of incremental technologies. Indeed, the moderating mechanisms pertaining to the kind of technology (i.e., disruptive or incremental) resemble radical innovations and ease of use, respectively (Davis, 1989). As such, our findings imply that firms should not only confront the challenges and opportunities brought about by emerging technologies by learning and developing their capabilities of technology disruptions, but also the diffusion of incremental features to help them improve their business competitiveness. By integrating the technological and psychological aspects of DMF business behaviors, our analyses and findings offer fresh insights into the extant literature on technological changes and on their contingent impacts on the competitive improvement of small and technological-resource-scant developing economy firms via a psychological lens.

#### 5.1.3. Unveiling the complex moderated-mediation mechanisms of DMFs

Past studies on the adoption of technology have focused on issues pertaining to trust and perceived risk, such as those conducted in the context of internet banking and mobile internet (Alalwan et al., 2018; Kesharwani and Bisht, 2012; Yousafzai et al., 2009). These prior studies have ignored the confrontation-coping approach as a viable route through which firms can overcome the uncertainty associated with the adoption of emerging technologies. Van Oorschot et al. (2018) argued that scholars should consider psychological theories and factors in relation to the adoption of technology, as the current research is confined to psychological factors—such as information seeking, attitudes, and emotions—in relation to perceived ease of use and perceived usefulness (Gerli et al., 2022). By studying the confrontation-coping approach as a key mediating mechanism and technological features as moderating mechanisms, our study theoretically integrates the adoption of technology with psychology (coping), providing an understanding of the issue of technology adoption that either theory alone could not.

By combining coping-related mechanisms and the features of emerging technologies, our study offers a more fine-grained view of the psychological factors that can enhance the intention to adopt emerging technologies. Moreover, coping theory is mainly applied in the domain of psychology, health, or consumer marketing. We extended its application to the adoption of technology in the unique context of DMFs dealing with advanced economy trade partners. Past studies on the topic have predominantly focused on developed markets (Blichfeldt and Faullant, 2021; Fernandes et al., 2006; Holmes and Ferrill, 2005) and very little research had hitherto been conducted on developing market firms (An and Ahn, 2016; Ju and Sohn, 2015)—none of which had focused on the specific context of Pakistan. Hence, by studying an underexplored context, our study also makes a contribution from a contextual perspective.

### 5.2. Managerial implications

Technology adoptions, which are underpinned by entrepreneurial efforts, may bring to fruition new and efficient ways of doing business. While the adoption of emerging technology is vital in all societies, it is often much more critical for developing market firms seeking to develop new capabilities and grow. This is particularly pertinent as DMFs often receive limited governmental support in regard to knowledge dissemination, cost reduction, or inventory and quality control improvement. Thus, the study of the DMFs' intentions to adopt emerging technologies is important, as technological transition is a key potential enabler of economic growth (Si et al., 2020). Hence, besides its useful theoretical implications, our study offers practical contributions to developing market export managers.

Our findings suggest that, in the presence of radical technological disruption, managers should take a confrontation-coping approach toward emerging technologies, which will strengthen their firms' intentions to adopt technologies. These firms may face strong psychological barriers due to their unfamiliarity with the economic value of emerging technologies. Thus, the adoption of a confrontation-coping approach would enable them to better address the challenges associated with emerging technology adoption. Export managers as well as those responsible for the integration of emerging technologies should be psychologically prepared to cope with radically disruptive emerging technologies and overcome the uncertainties associated with them. Doing so would help them deal with the technological pressure exerted by advanced market importers.

Meanwhile, those companies that develop emerging technologies should focus on making their features incremental and easier for firms to address, as this would have a positive effect on adoption behavioral outcomes. This would create win-win situations for both technology providers and DMFs. Our findings also suggest that advanced market importers place technological pressure on DMFs through a confrontation-coping approach. Therefore, DMF managers need to work with importers and technology providers in order to understand and handle any challenges associated with emerging technologies.

In view of the COVID pandemic, DMF managers should start investing in digital capabilities aimed at growth and fostering long-term ties with advanced market trade partners. This is because of the critical importance for competitiveness of agility in technology adoption, especially in the export management context (Deng et al., 2014; Momaya, 2020). Emerging technologies may reduce costs, improve knowledge management, and enable better inventory and quality control management, which, in turn, can make it easier to do business. By integrating emerging technologies, DMFs can improve their global competitiveness both in the presence and in the wake of external crises.

### 5.3. Policy implications

Our study offers important implications for policymakers. There is little doubt that considerable government support and resources are required to promote the adoption of technology in developing markets like Pakistan. While such adoptions offer opportunities for development, they will not materialize unless firms address and learn about them

(Costantini and Liberati, 2014; Khan et al., 2019). Consequently, technology adoption through confrontation requires the development of skills through investment in education and training programs, as well as improving the infrastructure and providing access to information and key knowledge. In regard to the export sector, research institutes, and universities can create a more enabling learning environment. The government can promote awareness and offer institutional support for the nascent activities of DMFs (e.g., technological training, R&D incentives, and technology incubation) to encourage them to adopt innovative emerging technologies. Such institutional support would boost the DMFs' relationships with advanced markets and enhance their technological competence, thus upgrading their global value position. It is also worth noting that developing nation governments should chart those technology innovation trajectories and policies that would contribute to export and economic development by establishing innovation-creating actors—for instance through government-university-industry-stakeholder links (Lew and Park, 2021). In turn, these links could support the adoption and integration of emerging new technologies for innovation and internationalization.

### 5.4. Limitations and future research

While our study has broken new ground in the technology adoption literature by the use of a psychological lens, it does have some limitations that could be addressed by future studies. A particular shortcoming of our study is that it is focused on the single contextual market of Pakistan. As coping mechanisms may differ across national cultures, future studies could investigate different markets to enhance the generalizability of our findings (Fang et al., 2011). For example, comparative studies could consider developing vs. advanced markets, Middle East/North Africa (MENA) ones, or the so-called Next Eleven developing economies. Future research could comparatively examine developing and advanced market firms. Similarly, technological characteristics (e.g., incremental and radical) may differ across industries, and future studies could hence examine their respective influences across different sectors.

In addition, future studies could investigate larger samples of exporting firms and compare adopters and non-adopters of emerging technologies and advanced market importer pressure. Such studies could also examine the make (i.e., the internal development of emerging technologies), buy (i.e., the purchasing of hardware and software from the market), and ally (i.e., forming alliances to access key technologies) aspects of technology access and exporters' intention to adopt emerging technologies. These studies could focus on firm-level factors such as absorptive capacity and other psychologically related ones (e.g., emotions) and on the exporting firms' intention to adopt emerging technologies.

Another avenue for future research could involve the study of the dynamic capabilities that may help in technology confrontation, e.g., flexibility, proactive market sensing, and responsiveness (Khan, 2020), as well as absorptive capacity (Vlačić et al., 2019). Studies could also consider the moderating roles played by business models and strategic orientation in technology confrontation and intention to adopt. In our study, we did not control for exogenous variables such as competitor technology, international trade policy, firm profitability, and industry growth. Future work could control for these variables to better capture the DMFs' technology adoption and confrontation-copying processes. Furthermore, from a methodological perspective, we would recommend future scholars to adopt a mixed methodology design to distill deeper insights from interviews to support the empirical findings.

Future studies could examine the moderating role played by formal institutional support or non-market strategies in technology adoption capability (Dorobantu et al., 2017) and also the mediating roles played by technology adoption capability (Wu et al., 2019). In our research, we mainly focused on external technology-related moderating factors; future studies applying coping theory could consider internal factors such as learning capabilities or even motivation. Future research could consider the role played by effective government policies and programs in relation to the technology adoption and confrontation perspectives.

## CRediT authorship contribution statement

***Dr. Huda Khan:** Conceptualization; Data curation; Formal analysis; Methodology, Writing - original draft.

**Prof. Zaheer Khan:** Conceptualisation, Supervision; Reviewing, Writing.

**Associate Prof. Richard Lee:** Conceptualisation, Supervision; Reviewing, Writing.

**Prof. Yong Kyu Lew:** Conceptualisation, Supervision; Reviewing, Writing.

## Declaration of competing interest

None.

## Data availability

The authors do not have permission to share data.

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