The use of technology in facing the COVID-19 negative consequences and the associated opportunity for digital entrepreneurship in KSA

Sami Alanzi and Vanessa Ratten
La Trobe University, Melbourne, Australia

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Abstract

Purpose – This article introduces the key findings from investigating technology's role in mitigating the business slowdown enforced by the COVID-19 pandemic and the associated increased reliance on technological means among Saudi firms and citizens to facilitate business operations and other daily life routines, and the impact of this increase in technology adoption on the Saudi digital ecosystem and creating an inviting environment to digital entrepreneurship.

Design/methodology/approach – A qualitative interview methodology is undertaken to understand Saudi managers' perceptions about the COVID-19 pandemic and digital entrepreneurship.

Findings – A significant finding is that now than ever before, the Saudi market is ready to accommodate more digital entrepreneurial ventures and digitalisation support services. Due to the pandemic's negative implications on the Saudi economy and the business slowdown associated with social distancing measures, a substantial increase in digital orientation and a need for technological solutions were noticed among Saudi firms. This means more attention needs to be placed on how Saudi firms can capitalise on the knowledge economy and digital revolution.

Originality/value – Saudi citizens have become more reliant on technology to manage daily activities and shop for their needs, creating opportunities for digital entrepreneurship to serve and fulfil firms' and people's increased demand for technology solutions.

Keywords Entrepreneurship, Ecosystem, Saudi Arabia, Technology, Solutions, Digital, Digitalisation, Business, Economy, Pandemic, COVID-19

Paper type Research paper

Introduction

The COVID-19 pandemic has dramatically influenced the global economy, business and people activities in unprecedented ways (Apostolopoulos *et al.*, 2021). However, while there was much change in terms of working life, the increased usage of technology helped many organisations to overcome the unprecedented situation forced by the COVID-19 pandemic (Ratten, 2022). The significant growth in using technology and online communication channels in the daily routine of people and business operations to minimise physical contact, accordingly, control the virus spreading and the number of infections while sustaining business and life progress was evident (Almeida *et al.*, 2020). The digitalisation trend is anticipated to be extended to each area and inspire new digital products and services that embrace flexibility, contactless interaction and new ways of working. These new conditions

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will encourage talents and entrepreneurs from different locations globally to start technology-based ventures despite the spatial separation (Penco *et al.*, 2023).

The COVID-19 pandemic challenged the different aspects of organisations' activities. Many organisations have been propelled to embrace new working arrangements and practices and have encountered intense pressure to market their products through digital channels. They have experienced profound changes and resorted to digital-based solutions to survive and retain their customers (Almeida *et al.*, 2020). In many cases, companies had to transform their business into a digital-based business model and ensure the successful inclusion of all stakeholders, including employees and customers, in the digitalisation process, which is a fundamental factor for successful teamwork during crisis times (Berger, 2020). According to Verhoef *et al.* (2021), this digital transformation is characterised by utilising cutting-edge technologies and digital systems, innovative business patterns, new production techniques and knowledge-based products and services.

Although digitalisation is not a new trend, the implications of the COVID-19 pandemic increased the challenges the companies face during their digital transformation (Dana *et al.*, 2022a). Before the pandemic, these challenges were mainly associated with the organisations' technological capabilities and other industrial challenges, while in the era of COVID-19, these challenges extended to include the successful inclusion of all stakeholders in the transformation process to ensure business continuity (Hai *et al.*, 2021). Furthermore, the occurrence of digital transformation was extraordinarily fast. Organisations had to implement digital transformation processes regardless of their readiness or experience. They, inevitably, are driving along the course of digital transformation. However, an essential query is whether they are equipped for this transition (Almeida *et al.*, 2020). Matt and Rauch (2020) argue that some organisations have achieved notable progress in digitalising their work processes and activities. However, they are not yet fully qualified to overcome the digital transformation challenges entirely.

Typically, digitalisation enforces tremendous organisational restructuring processes, a high focus on agility and intensive standardisation and automation processes to maximise the capacity and quality of the organisation's response to customers (Pearce, 2018). At the current time, it is crucial to commence thinking regarding the post-COVID-19 phase and to plan how we can leverage and convert these challenges into opportunities for entrepreneurship. In this vein, Iivari *et al.* (2020) and Secundo *et al.* (2021) described the pandemic as "a storm" that led to accelerating the technological changes required for the digitisation process and opening a broad window for digital entrepreneurship to overcome the challenges of the digital transformation. Indeed, the new conditions posited by COVID-19 made the organisation's technological capabilities and innovative technological solutions inevitable for business continuity (Datta and Nwankpa, 2021; Zahra, 2021).

Currently, many governments worldwide are stimulating digital innovation and the adoption of the latest technologies to support the environment and create new digital entrepreneurship ecosystems that provide the requirements of digital labour and interaction and embrace a greater shift towards automation (Bai *et al.*, 2021; Brem *et al.*, 2021). Businesses continuously pursue acquiring digital means and technologies to sustain steady operations during the pandemic, driven by their need to improve efficiency and profitability efficiency despite the complicated market conditions forced by the COVID-19 pandemic (Volberda *et al.*, 2021). Many organisations from different sectors, such as manufacturing and public service, may have limited digital knowledge or restricted orientation towards implementing and monitoring technological advancements internally (Dana *et al.*, 2022b). Thus, they are open to external parties to carry out the digital job on their behalf and fuel the demand for digital entrepreneurship globally (Szalavetz, 2020).

During the COVID-19 pandemic, several measures were introduced to combat the spread of the virus and mitigate its fatal consequences, leading to a significant slowdown in almost

all economies worldwide. At the same time, digital entrepreneurial movements saw a substantial uprise in an attempt to maintain businesses running based on less-contact interaction among the organisations' internal staff and between the organisations and their customers (Ratten, 2020; Shareef *et al.*, 2021). The increased uncertainty and complexity of the situation shifted the orientation towards technological entrepreneurship to address the enforced physical challenges and restrictions (Modgil *et al.*, 2022). According to Muñoz *et al.* (2020), the literature on entrepreneurship confirms that entrepreneurial activities typically grow during times that hold a high level of uncertainty, raising the organisations' risk appetite, as traditional ways of handling issues could not be fruitful, and taking more risk could incorporate more opportunities for survival and growth.

During the last two decades, driven by the giant leap in internet tools and communication technology, digital entrepreneurship has attracted more entrepreneurs, leading to a significant increase in start-ups and entrepreneurial ventures that offer innovative technological solutions for business problems (Abubakre *et al.*, 2021; Secundo *et al.*, 2021). Bai *et al.* (2021) argue that the COVID-19 pandemic has fuelled the transition to digitalisation. Many organisations flocked towards digitalisation, creating business opportunities, such as the digitalisation of the organisations' work processes and services, which expands the scope for technology entrepreneurship (Jafari-Sadeghi *et al.*, 2021). The digitalisation of organisations' operations has contributed to creating of many platforms that add value and boost innovation in business activities, relying on the technological innovation of individuals and entrepreneurs (Brem *et al.*, 2021).

Due to the COVID-19 pandemic being a recent phenomenon, there is currently not much research focussed on the Saudi context that focusses on the role of digital innovation through an entrepreneurial ecosystem environment. Therefore, this study contributes to the literature on the COVID-19 crisis and entrepreneurship in new country contexts. Furthermore, it utilises a knowledge spillover and entrepreneurial ecosystem theoretical framework to understand stakeholder behaviour. This is an important contribution to the literature in terms of understanding how crisis environments are influenced by digital change. Thus, this study investigates how technology played a significant role in assisting Saudi firms to overcome the economic slowdown and other negative implications of the COVID-19 pandemic. Also, it explores the current conditions of the Saudi digital ecosystem and existing digital entrepreneurship opportunities.

Digital entrepreneurship

It is well-established that entrepreneurs and successful entrepreneurship ventures can significantly stimulate economic growth and raise individual and national wealth (Ribeiro-Soriano, 2017). Many studies that have addressed the impact of entrepreneurship practices on the economic performance in developed countries have confirmed the positive effect of entrepreneurship on their economic prosperity, combating unemployment and boosting innovation (Tajvidi and Tajvidi, 2020). On the other hand, technology development generated what is known as the social media network, enabling broad scope for entrepreneurs to capture opportunities, introduce creative marketing practices and extend their businesses (Alharthi, 2021). Digitalisation has promoted organisations' success and supported business resilience and sustainability, particularly during crises (Tim *et al.*, 2021). Therefore, the integration of entrepreneurship and technology or digital-based means for managing and running business operations is called digital entrepreneurship (Le Dinh *et al.*, 2018). It refers to a specific class of entrepreneurship in which business operations partially or entirely take place digitally rather than manually (Hull *et al.*, 2007).

According to Guthrie (2014), digital entrepreneurship is a technology-based phenomenon where establishing a business and generating income occur through merchandising goods

through digital platforms and electronic networks. It chases and leverages new business opportunities emerging from continuous media and internet technology advancements (Davidson and Vaast, 2010). Kaufman and Horton (2015), Reis *et al.* (2018) argue that digitalisation can be considered the essential outcome of digital entrepreneurship and typically affects three organisational dimensions: externally, with the main focus on enriching customer experience and introducing value through user-friendly digital tools; internally, with a focus on restructuring business operations and processes; and holistically, by impacting the entire organisational system and creating a new business model. In the same vein, Sussan and Acs (2017) argue that digital entrepreneurship can address different types of businesses, whether commercial, public or social organisations and should consider the technological capabilities of all agents involved in the business, internally and externally, which constitute the digital entrepreneurship ecosystem. This conclusion leads to the concept of the digital ecosystem.

Digital ecosystem

The concept of the digital ecosystem is linked to social and economic development and stimulated by information and communication technology (Li *et al.*, 2012). Kraus *et al.* (2018) argue that digital entrepreneurship heavily relies on the existing digital ecosystem in terms of its structure and format. Adjusting the digital ecosystem to suit the offered entrepreneurial products and services shapes digital entrepreneurship activities. Therefore, the initiatives of the digital ecosystem typically seek to stimulate cultural and technical change in the organisations' networks and work practices, including technological and social elements that steer interactions within the digital ecosystem (Fu, 2006; Kraus *et al.*, 2018). According to Li *et al.* (2012), the digital ecosystem is a self-regulating, sustainable and developable system composed of various interconnected digital entities that focus on interactions and information exchange between entities to raise the system's innovation, profitability and growth.

Enhancing the digital ecosystem can improve entrepreneurial activities in many fields, such as business and service, knowledge management, social networking and education (Sussan and Acs, 2017). In simple words, the digital ecosystem is built based on digital components and settings, such as applications and online platforms for virtual interaction, software for training or data processing, regulations, contractual framework, etcetera. These digital components are typically innovative and can be operated either by humans or automatically and represent the digital ecosystem infrastructure and support knowledge integration, formatting, evolution and distribution among the components of the digital ecosystem (Li *et al.*, 2012; Purbasari *et al.*, 2021).

In defining the characteristics of the entrepreneurial ecosystem, Acs *et al.* (2014) argue that productive entrepreneurial ecosystems typically spotlight entrepreneurship opportunities by defining trends, determining positions and behaviours and measuring the capabilities of both customers and firms. Accordingly, entrepreneurship is a dependent outcome of the entrepreneurial ecosystem, and a healthy entrepreneurial ecosystem is characterised by its capacity to produce, feed and support entrepreneurship growth (Purbasari *et al.*, 2021). Due to technological advancements and expansion in digitalisation, digital technology has become an integral component of the entrepreneurship ecosystem, creating what can be called a digital entrepreneurial ecosystem, which combines two ecosystems, the entrepreneurial ecosystem with a focus on agencies and organisations and digital ecosystems with a focus on digital infrastructure and online users (Sussan and Acs, 2017).

The digital entrepreneurial ecosystem incorporates entrepreneurs who typically establish digital ventures and start-ups, producing digital outcomes and services and innovative digital solutions for businesses and multiple users (Hsieh and Wu, 2019). Entrepreneurs appreciate the digital ecosystem outputs; in addition to the digital solutions, it provides

platforms for entrepreneurs to test and improve their innovation within a cooperative environment (Kraus *et al.*, 2018).

Methodology

This research uses a qualitative approach for data collection and analysis. This was due to the need to collect information during the COVID-19 crisis that enabled specific issues and responses to be probed in more detail. The data used in this article were drawn from a semi-structured interview with a sample of 34 entrepreneurs and managers of firms that operate within different Saudi business sectors. The selection process embraced a purposeful sampling technique to recruit participants who occupy a high level in their hierarchical organisational structure and likely have the necessary information that could help achieve the research aim and objectives (Saunders *et al.*, 2009). Purposeful sampling means that people with specific characteristics as in this case being based in Saudi Arabia and a manager are sought, thereby meaning the general population is not interviewed as it would mean that no specific work characteristics were being requested. After the initial purposeful sampling approach was utilised, a snowball sampling approach was used to find interviewees and arrange the interviews. This meant the first people interviewed were then asked for suggestions on other people who were also based in Saudi Arabia and in a management role. Snowball sampling provides a way for others to recommend those with similar characteristics making it a more efficient search strategy. Thematic analysis using content analysis techniques was employed to analyse interviewees' responses of a subsample of 13 participants selected from the original research sample due to the content of the interviews having substantially more detail in terms of digital entrepreneurship than the other interview transcripts. The following findings were then extracted from their answers to the questions that addressed the implications of COVID-19 on corporate's entrepreneurial orientation, ways of improving corporate coping mechanisms and the emergent business opportunities during the pandemic. Table 1 displays the demography of the selected subsample (13 out of 34 participants of the original research sample).

Transition to digitalisation to mitigate the pandemic implications on business

It is noticeable from the participants' responses that there is a significant shift in Saudi businesses' orientation towards adopting more technology and improving the existing technical capabilities to sustain business operations and face the fatal consequences of the COVID-19 pandemic. This, in turn, paves the way to enhance the digital ecosystem in The Kingdom of Saudi Arabia (KSA), which can create more opportunities for digital entrepreneurship (Hsieh and Wu, 2019; Kraus *et al.*, 2018). In terms of using technology to face the pandemic implications within Saudi corporates, most participants confirmed that they resorted to a swift digitalisation process. While companies were not yet ready for such a transition, digitalisation was necessary to maintain work processes, face the severe staff shortage and minimise physical contact among employees and between the company's representatives and customers to reduce the spread of the virus.

For instance, Manager 1 stated that

> We had to adapt to using new technologies and communication platforms to keep the business running. The company switched to automated work operating channels, somewhat reducing the number of staff working in the building and reducing face-to-face interaction. Also, this stopped hiring replacement staff, so there was no cost increase and stopped some non-profit activities.

Many companies have relied on technology to report and track their employees' health conditions, infections, recovery and the required help in managing staff health and well-being.

Table 1.
Respondent details

#	Duration/ mins	Gender	City	Age	Position	Exp. (Yrs.)	Industry	No. of employees	Interview method	Type
1	24:47	Male	Riyadh	48	SVP/Mgr., retail collections and recovery dept.	25	Banking	200	Phone call	Manager
6	12:20	Male	Riyadh	40	Head of corporate account management unit	17	Retails	40	Face to face	Manager
9	17:45	Male	Riyadh	37	Head of financial	16	Energy	50	Face to face	Manager
10	27:20	Male	Riyadh	40	Chief finance officer	15	Investment	150	Face to face	Manager
11	20:46	Male	Riyadh	45	Secretary-general	23	Charitable foundation	10	Phone call	Manager
15	20:05	Female	Dammam	39	Co-founder	4	Sport centre	3	Phone call	Manager
17	17:08	Male	Riyadh	31	Head of products analysis	12	Retails	550	Face to face	Manager
20	19:36	Male	Riyadh	40	Chief executive officer	13	Charitable foundation	10	Face to face	Manager
21	17:10	Male	Riyadh	45	Chief compliance and AML officer	18	Banking	80	Phone call	Manager
23	15:47	Male	Riyadh	37	Financial manager	13	Travel and tourism	55	Phone call	Manager
27	18:04	Male	Dammam	43	Support office manager	14	Oil and gas	2000	Phone call	Manager
29	26:46	Male	Riyadh	51	Vice president	31	Retails	650	Phone call	Manager
33	13:03	Male	Riyadh	29	Founder	7	Coffee industry	350	Phone call	Entrepreneur

Source(s): Table by authors

Manager 27 pointed out that

> We developed our company-own application to be used by employees to report their health status and required assistance. Also, the app included information about the virus and instructions on how employees can handle the situation and where to seek medical help if they got infected.

Some other companies have leveraged their existing technological capabilities and built on their technology infrastructure to rapidly transition to digitalisation and capture some opportunities that emerged during the pandemic.

For instance, manager 10 declared that

> We at our company rely heavily on technology, and the fact that we already have advanced technologies in place has made it easier for us to adjust our technological capabilities to adapt to the changes enforced by the COVID-19 pandemic.

Participant 9, a manager, stated that

> The centre has a good technical base and is fully prepared to cope with work conditions like these during the pandemic.

Another Participant 11, a manager, pointed to some benefits that the company gained, and they were not planned or expected

> When the pandemic started, and we noticed a significant business slowdown and a huge staff shortage, we decided to rush into automating most business processes and adopt online mode for other business activities. The decision aimed at streamlining work processes and sustaining sales. However, we also benefited from saving time that is usually wasted travelling, meetings, and logistics, and we noticed good savings in the operation costs. These advantages encourage the management to go further into digitalisation, even after the pandemic finishes.

Opportunities for digital entrepreneurship

While the pandemic cast a dark shadow over the business environment globally, influencing a large proportion of the Saudi business sector adversely, technological innovation and the digital economy stand as crucial solutions to overcome the current situation. This enabled businesses and communities to interact effectively in a dynamic process, and creating more ideas and opportunities for entrepreneurial ventures (Bessonova and Battalov, 2020). Analysing the participants' responses indicated that the current situation stimulated creativity among organisations and entrepreneurs, increased their attention to digital solutions and the importance of improving the existent digital ecosystem and generated a business environment open to technology-based products and services.

For example, participant 15 (entrepreneur) stated

> The current situation encouraged the idea of online business, so we became more reliant on online sales and developed our services to suit online settings. The outcomes exceeded our expectations, encouraging us to make a significant breakthrough and introduce Yoga products and online classes. This is a new domain in Saudi Arabia, and it opened a second business area for us. People liked the idea, especially because they stay too much in homes behind their computers.

Other participants' responses highlighted the tremendous shift in work settings to the remote working mode, emphasising the importance of innovative and reliable communication technology channels to streamline business activities. Also, remote working meant that people and organisations embraced technology even more, leading to a significant change in the digital ecosystem in Saudi Arabia, consequently, opportunities for digital entrepreneurship.

For instance, participant 6, a manager, declared

> We did not pay much attention to communication technologies in the past, as physical interactions and face-to-face meetings were the only ways to discuss and plan our business actions. When the pandemic started, we had to find different ways of communication. Now we appreciate running our meetings anytime, anywhere; we don't have to be physically in one place, and we are thinking of investing more in new technologies to save effort and time in doing work.

Similarly, responses from participants 20 and 21 implied a positive impact on accelerating the companies' readiness for a significant digitalisation shift. Many companies equipped their operations and staff with the required technologies and tools, which could be perceived as a significant move towards adjusting the digital ecosystem in Saudi Arabia. On the other hand, technology products and applications have become an integral part of people's lives. People have become significantly reliant on these technologies for communication and shopping, which attracted the attention of Saudi companies to the importance of using the same means to reach customers.

Participant 20, a manager, stated

> The pandemic brought about a positive impact because more people switched to technology. We can see this effect now in the active usage of technology products among organisations and people. People use technology for shopping, and companies introduce their services and products to people through technology.

Participant 1, a manager, said

> I believe the coronavirus pandemic has contributed significantly to sensitising customers and organizations and directing them to use available technology. And therefore, currently, the client prefers and can communicate through automated communication channels provided by the organisations.

Another participant, 21, a manager,

> We used our technological capabilities to provide our staff with devices, laptops, and communication programs necessary to remote working. Also, we trained our staff on how to use these technologies to ensure they can communicate effectively and respond to customers promptly.

Participant 29, a manager

> The (IT) department was Interested in providing applications and securing the required servers so that we can work remotely, each in his home, away from work. In the beginning, that was a strange situation for our customers and us. Over time it became more acceptable, and customers became more familiar with communicating with us through phone, emails, or our interactive website.

Moreover, this situation facilitated some other technology-based businesses to grow in the Saudi market.

Although it exists on a large scale in many countries, online business and its associated product delivery activities saw significant growth during the pandemic in Saudi Arabia. Companies had to flock to automating their services, encouraging customers to go online and pass their orders, aiming to raise sales and mitigate the negative consequences of the market slowdown after the pandemic hit. These new market conditions created an increased demand for IT solutions and a noticeable increase in the number of technology services providers that strive to introduce innovative IT services and products to satisfy this demand.

Participant 23, a manager, stated

> Some business opportunities were created in order to support remote work. We, like many companies, had to contract an IT provider to supply and maintain technologies such as cloud software and applications to support our new business processes and interactions. Everything now is online, and reservations and payments are made through online payment applications; we do not require travellers to attend the office.

Participant 17, a manager suggested

> There are huge business opportunities for food delivery applications, and something similar to Uber Eat is expected to succeed rapidly, especially in the current situation.

Participant 33, an entrepreneur

> We lost around 50% of our sales at the pandemic's beginning. Online sales and delivery apps helped a lot in restoring our sales. I think such technologies have become essential for businesses and will play a greater role, even after the pandemic, as people have become more reliant on online.

Some participants expressed their intentions towards technology. A positive perception of the technology's role in supporting businesses during the pandemic and a clear orientation to investing in more sophisticated technologies was evident, which predicts a promising future for digital entrepreneurship, technology support providers and technology-based business in Saudi Arabia.

For example, participant 11, a manager, declared

> Companies' future response should be to improve technological capabilities and increase the use of working applications. Technology has helped greatly to cope with the pandemic, and therefore I encourage and stress the importance of organisations to embrace everything new and suitable in the system technology and communication technology fields.

Similarly, Participant 1, a manager, recommended

> Businesses should brace for any potential similar event or crisis. They must launch electronic sites where they can easily provide their services and possess technologies that enable them to sustain work operations. Having an online presence will facilitate the delivery of services, and in case of crises, the company will still be in operation.

Participant 6, a manager, confirmed

> Everyone doing a business should be passionate about continuously improving his business model using the latest technologies. So, we need people who can think outside the box and give companies new ways to reach customers under any conditions.

Discussion

Analysing participants' responses revealed a rapid response from Saudi companies to the changes in the market conditions and customers' behaviours imposed by the COVID-19 pandemic. Saudi firms rushed into digitalisation and adopted communication technologies and contact-less interaction techniques to cope with the current situation and manage stakeholders' safety concerns (staff, customers and government) where physical interaction represented a significant risk of infection during the pandemic, at the same time, fulfilling customer needs for services and products, and sustain business operations to survive the crisis. This reaction implies an exemplary application of the stakeholder theory, which supposes that companies must operate in consistence with stakeholders' needs, concerns and trends and respond to changes that occur in the business ecosystem, which typically impact internal stakeholders (e.g. partners, clients, employees and suppliers) and external stakeholders (e.g. communities, governmental entities, competitors and naturalists) (Freeman, 1984; Parmar *et al.*, 2010). Based on the theory, organisations' growth and longevity rely on their ability to pursue and respond to stakeholders' change dynamics and establish positive, persisting connections with stakeholders through different communication methods (Giraud Voss *et al.*, 2005). Thus, the results support the use of stakeholder theory in terms of understanding how the COVID-19 pandemic and other crisis are dealt with by firms.

The Saudi government facilitated using communication technologies among all Saudi citizens by providing high-speed internet and launching the "Tawakkhalna" app, which used for contact tracing. This application helped companies to have regular updates on employees' health conditions. Employees used the app to report their COVID-19 status and receive instructions on necessary reactions and where to seek help if infected. The "Tawakkhalna" was a very successful program and became famous worldwide. Technology has increasingly become an essential facilitator of people's daily activities at work and other life aspects. The increased role of technology in people's lives can be considered an unintended or not pre-planned cultural initiative driven by the current situation and the social distancing settings enforced due to the pandemic, impacting people's behaviour towards technology and preparing the Saudi digital ecosystem to accommodate more digital entrepreneurship activities.

Now, and like never before, Saudi companies realise the importance of adjusting their business models to fit the new normal of the market, where technology has become a predominant factor in determining business survival and longevity. It was evident in participants' answers that they understand and appreciate the decisive role of technologies, such as the internet, communication platforms and channels, and online applications for sales and payment processing that replaced the traditional trading methods in keeping businesses running. In some cases, investing in new technologies contributed to achieving better financial performance than before the pandemic, expanding the geographic scope of business operations and opening windows for new business opportunities. These unexpected outcomes stimulated companies to improve their technological capabilities, aiming to benefit from the current conditions and the incursion of technology in all fields of people's lives, which, in turn, increased the need for technological solutions to support the digital transition. That opens the way to digital entrepreneurship to drive digitalisation in Saudi Arabia, capitalising on the raised orientation of Saudi firms towards using information technology sources.

Entrepreneurship, at its core, is a process of exploring and capturing business opportunities. The knowledge spillover theory of entrepreneurship (KSTE) claims that individuals with new knowledge assets tend to use such knowledge in their organisations. Hence, it will spill over, leading to increased entrepreneurial activities (Acs *et al.*, 2013), and this theory is a useful way to understand how in times of crisis conditions firms will behave. Moreover, the knowledge spillover theory emphasises entrepreneurship's vital role in producing channels for new knowledge dissemination, making entrepreneurship a vital driver for the economy's dynamics and development (Hayter, 2013). The theory defines two subsequent events of entrepreneurship, discovering and capitalising on opportunities (Braunerhjelm *et al.*, 2010). According to what can be inferred from the participants' responses, opportunities for digital entrepreneurship are detected in the Saudi market. The Saudi digital ecosystem saw a significant positive shift, where organisations and people have become more aware of the vital role of technology in leading the interactions between them, facilitating business operations, and people's other life aspects. It is the entrepreneurs' turn to take advantage of the current conditions, starting entrepreneurial ventures to provide the required technologies and support the digitisation of the Saudi market.

Managerial implications

The findings of this study have important managerial implications for Saudi managers as well as managers operating in other country environments. The most important implication is that managers have a high degree of resilience and flexibility when dealing with crises situations. This means they need to acknowledge the difficult of the situation and the complexity involved but try to continue to sustain business operations. To do this, digital

communication and technology should be harnessed so it is important that managers keep up to date with new technological innovations. This means focussing on government policy in terms of education and training courses related to digital technology. Managers should be involved in advising governments on digitalisation trends and also facilitate the introduction of new technology in their workplace.

Limitations and future research

This research was qualitative in nature and based on in-depth interviews of Saudi managers. Thus, there is a limitation in terms of only focussing on Saudi managers and not managers from other countries. However, this is also a strength in terms of understanding in detail the specific Saudi situation and how the government dealt with the COVID-19 pandemic. Future research could compare and contrast the findings of this study from Saudi Arabia with other Middle Eastern countries and other countries. This would help to understand whether there are geographical or religious differences in how the COVID-19 pandemic was dealt with. Another limitation was the use of in-depth interviews which are perceptual in nature and not objective. However, they enable questions and answers to be probed in more detail enabling more detailed responses. Future research could examine through different kind of methodologies including survey and experimental research to understand the COVID-19 effects.

Conclusion

This article introduced the key findings from investigating the opinions of a sample of 13 Saudi managers and entrepreneurs from different Saudi economic sectors on the implications of the COVID-19 pandemic and the associated changes in Saudi market dynamics, corporate operations and customers behaviours on the digital ecosystem and digital entrepreneurship practices in Saudi Arabia. Findings from analysing participants' responses confirmed that although it generated many negative implications and led to an economic slowdown, the pandemic also brought some positive changes in the technology orientation of companies and people. Saudi firms resorted to modifying their business models, embracing remote working, digitalising business operations and relying on the internet and other technology applications to sustain sales and interact with customers. On the other hand, people have become more reliant on technology in their daily routines and communications. These conditions led to expansion in online trade, improving companies' financial performance and creating new business opportunities. Most importantly, it increased Saudi firms' willingness to invest in more technology and the need for digital entrepreneurship to support their digital transition. It was evident that the Saudi digital ecosystem saw a significant improvement that could attract and accommodate more digital entrepreneurial ventures.

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Corresponding author
Vanessa Ratten can be contacted at: v.ratten@latrobe.edu.au