Has Covid-19 accelerated opportunities for digital entrepreneurship? An Indian perspective

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ABSTRACT

Covid-19 has challenged many businesses to orient themselves towards digital solutions for their survival. Due to the rising digital wave during Covid-19, there has been a plethora of opportunities for aspiring entrepreneurs to enter the market. Hence, this study focuses on understanding emerging areas and technologies for digital entrepreneurship. This study adopted a qualitative approach with semi-structured interviews through the lens of the diffusion of innovations theory. A total of 23 entrepreneurs responded and presented their views on Covid-19-induced opportunities for digital entrepreneurship. A structured process of open, axial, and selective coding was adopted for the thematic analysis. The study presents a framework based on four promising propositions. Results of the thematic analysis indicate the emergence of digital entrepreneurship opportunities in technology (EdTech, FinTech, cybersecurity), healthcare (diagnostics, virtual care, fitness), entertainment (over the top, gaming, social media), and e-commerce (contactless delivery, payment methods, augmented reality). In this study, entrepreneurs presented their views based on their experience with the platform or technology they operated. To this end, the present study offers implications both for scholars and entrepreneurs working in and aspiring to digital entrepreneurship along with future scope of research.

1. Introduction

The last two decades have witnessed a trend towards diverse technological changes, not only in business, but also in public systems and on the individual level (Brem et al., 2021; Jafari-Sadeghi et al., 2021). In 2020 and 2021, Covid-19 has been like a storm that led to scaling-up of technological changes and fueling digital entrepreneurship in many parts of the world to address different challenges (Iivari et al., 2020; Secundo et al., 2021). Even in established businesses, the ones those invested in digital operations before Covid-19 fared better than those that did not opt for digital transformation (Volberda et al., 2021; Zahra, 2021). In fact, for many companies today, the continuity of their business depends strongly on their digital capabilities (Datta and Nwankpa, 2021). Even governments are encouraging and moving towards digital innovation and the adoption of new technologies to help the environment and develop new ecosystems (Bai et al., 2021).

These digital ecosystems embrace the requirements of digital labor

and bots, and the Covid-19 pandemic has accelerated this shift towards greater automation (Brem et al., 2021). Businesses are continually seeking to leverage digital tool, platforms and technologies to maintain uninterrupted operations during crises (Volberda et al., 2021). Additional pressures to improve margins and enhance efficiency drove the need for digital technologies (Zahra, 2021). Many companies from manufacturing, service, and public sectors may have limited access and orientation towards digital technology implementation and monitoring, thus opening the door for third parties to manage digital business operations on behalf of such companies and fueling the demand for digital entrepreneurship in most countries worldwide (Song, 2019; Szalavetz, 2020).

In Covid-19, multiple restrictions contributed to an economic slowdown in most of the world during 2020–21, whereas digital entrepreneurial activities witnessed a sharp rise (Bacq et al., 2020; Ratten, 2020; Shareef et al., 2021). Complex and uncertain situations gave rise to entrepreneurial orientations and actions especially addressing the

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physical challenges with digital technologies. The literature indicates that entrepreneurial activities grow during uncertain times and increase the appetite for risk (Muñoz et al., 2020). In the last two decades, a digital entrepreneurship phenomenon fueled by Covid-19 has driven by technological assets ranging from Internet tools to communication and information technologies (Abubakre et al., 2021; Bai et al., 2021; Secundo et al., 2021). Business opportunities such as transfer of assets, services, or digitalization of organization processes can offer scope for digital entrepreneurship (Jafari-Sadeghi et al., 2021; Song, 2019). The digitalization of business operations has contributed to the emergence of multiple platforms that offer value creation and innovation in business activities focusing on self-employed individuals, small businesses, and entrepreneurs (Brem et al., 2021; Szalavetz, 2020).

In the recent pandemic, many mobile-based applications have emerged to monitor the spread of Covid-19 in specific geographical areas and now to track vaccination status and identify nearby vaccination centers along with running the business remotely (Rachul et al., 2020; Sharma et al., 2020). For example, recently developed non-government-regulated portals (for example, cowin.gov.in), such as VaccinateMe from HealthifyMe, have developed a slot-finder mechanism in eleven languages in India (Subramanian, 2021). Another initiative called getjab.in helps individuals find out about Co-WIN slots near their postal code. Similarly, there are other digital entrepreneurial initiatives that are directly linked to Covid-19 and mass vaccination such as BasicFloat.com and Under45.in (Bagcchi, 2021; Subramanian, 2021). According to an estimate, by the year 2019, there were approximately 504 million Internet users, 433 million of whom were children above the age of 12 (ET, 2020b). Covid-19 has further influenced the digital engagement of individuals, employees, and businesses to a significant extent, specifically in 2020 and 2021, which otherwise could have taken several years (De et al., 2020; Dwivedi et al., 2020; Iivari et al., 2020; Papadopoulos et al., 2020). A report by Morgan Stanley estimates that Internet users in India will rise to 914 million by 2027; hence there is a huge scope for online market space such as software solutions, applications, and portals addressing the public crisis and helping businesses (ET, 2020a).

In the last few years, multiple platforms (e.g. e-commerce, ride sharing, etc.) have become an inseparable part of life for most of us and are considered a significant sector for any developing economy (Johnston, 2021; Kapoor et al., 2021). Digitally-oriented and technologically-driven platforms also play a key role in enhancing employment levels and innovation culture. The scope for digital entrepreneurship lies in the Internet of things, artificial intelligence, big data analytics, and blockchain technology applications to enhance business competitiveness, performance, and productivity (Dwivedi et al., 2021; Sion, 2019: Zahra, 2021). Before Covid-19, the platforms and opportunities were not considered by many entrepreneurs due to the reason such as lack of familiarity, free-flow movement and no pressure of simplifying business activities. The uncertain and complex environment facilitates the entrepreneurship (Sussan and Acs, 2017). This study took a closer look at the outermost layer of digital entrepreneurship that is visible to consumers by focusing on the following research question *"Has Covid-19 accelerated opportunities for digital entrepreneurship?"*

This study contributes to diffusion of innovations theory with regard to digital entrepreneurship and its underlying business expansion opportunities. This study observed the different factors that influence the adoption of an innovation and indicate how innovation is perceived better than the existing programs or products, how consistently innovation stand with the value and experiences of potential adopters, how difficult or easy it is to use, ability of the innovation to an experiment and the extent to which it can offer tangible results. The rest of this paper is organized in five sections. Underlying elements are presented in section two. The research design is presented in section three. The findings of the study and propositions along with the framework are presented in section four. The discussion on the findings is presented in section five. The implications are presented in Section 6, whereas Section 7

concludes the study.

2. Emerging technologies and digital entrepreneurship

In this era of digital disruption and internet connectivity, developing economies need to take advantage of emerging technologies to strengthen digital entrepreneurship through innovative solutions to meet societal needs and problems (Wang et al., 2021). The role of emerging technologies and digital entrepreneurship is therefore presented below.

2.1. Emerging technologies

Today, companies embrace the adoption and employment of digital tools in their businesses to create and modify existing business processes. Apart from benefiting businesses directly, emerging technologies help organizations to develop their workplace culture and enhance the consumer experience (Kamble et al., 2021). Digital technologies enable companies to reassess their business operations, align resources, and develop capabilities to create a framework to drive innovation in business activities (Schiavone et al., 2021). In addition to business use, emerging technologies have great potential for the general public, and many companies have started to develop services in that direction. For example, CivilCops, a company founded in 2017, exploits big data and artificial intelligence (AI) to fast forward the complaint and resolution system in the public domain (Rana et al., 2016). CivilCops works with the government and can be reached with the swipe of a key. In smart city management, CivilCops utilizes data to provide actionable insights to continually improve smart city operations. It uses machine-learning algorithms to analyze the nature of complaints and map the particular department in order to take the necessary action. Another company, Oxfordcaps, employs technology to improve the student living experience. Oxfordcaps uses AI and machine learning models to enable searches and book accommodation without physical visits and allows hassle-free signatures and payments. Similarly, Rezo.ai makes use of conversations between brands and their customers and automates those conversations to analyze customer concerns, intent, and queries as supported by recent literature (Dwivedi et al., 2021). To do this, Rezo.ai feeds textual dialog into its AI-enabled platform and automates the customer journey with the help of a machine-learning algorithm (Mint, 2019). Another organization, ZunRoof, uses virtual reality, big data, Internet of things, 3D printing, and image processing to generate electricity from solar power and design a solar rooftop system for households needs. Therefore, it can be observed from recently launched digital enterprises such as CivilCops, Oxfordcaps, and ZunRoof, that emerging technologies are not only solving business and public problems, but also contributing to the development of sustainable and innovative ecosystems for the planet, without consuming many resources (Mint, 2019).

2.2. Digital entrepreneurship

A strong need towards digital technologies in the last two decades has resulted in many digital artifacts, digital platforms, and digital infrastructure development initiatives by public and private entities. A digital artifact is defined as a digital element, application, or content interrelated to a product or service that facilitates a particular functionality for the benefit of the end user (Liu et al., 2021). The decoupling of information from its physical product has led to the rise of services in digital artifacts (Barrett et al., 2015; Islam et al., 2020). Such applications cover a wide range of products ranging from smartphones, toys, and automobiles to apparel. Therefore, digital artifacts can be classified as software/hardware element on physical products or as a part of an ecosystem that function on a digital platform and offer many opportunities for digital entrepreneurship (Schiavone et al., 2021). A digital platform is defined as shared space to host services and an architecture that provides complementary offerings along with digital artifacts.

Digital platforms offer a plethora of opportunities for entrepreneurs to develop complementary products and services. Digital platforms are attractive to entrepreneurs in terms of production, marketing, and distribution of services (Nambisan, 2017; Srinivasan and Venkatraman, 2018).

Digital infrastructure is a set of digital tools, technology, and systems (big data, 3D printing, online communities, etc.) that offers computing capabilities, collaboration, and communication capabilities for innovative solutions to organizational problems (Elia et al., 2020). Digital infrastructure helps entrepreneurs follow the democratic process of opportunity with consideration given to concept testing, funding, and launch (Sussan and Acs, 2017). Digital entrepreneurship has seen a sincere persuasion in recent times due to the availability of technologies such as cloud computing, big data analytics, and market spaces.

2.3. Diffusion of innovation

For entrepreneurs, it is very critical to perform rigorous market research to understand and design products or services those are innovative and unique in nature. In the age of Internet and connectivity, individuals are excited about new and innovative concepts that can solve business problems (Zajicek and Meyers, 2018). Hence, the diffusion of innovation (DoI) theory is most suitable to explore the possibilities of digital entrepreneurship. The DoI helps entrepreneurs to visualize how, why and at what rate novel concepts and technology extents (Rogers et al., 2014; Rogers, 1995, 1962). DoI helps entrepreneurs to analyze and predict the consumers' adoption behavior about their service or product (Marcati et al., 2008). The development and adoption of new idea or service takes time and adoption by earlier customers represent different characteristics than who adopts innovation later (Cao and Shi, 2021). Hence, the digital entrepreneurs need to have appropriate understanding of every element that can facilitate or hinder the adoption of innovation (Abubakre, 2021).

The adopters according to DoI can be classified into innovators (first mover), early adopters (those embrace the change and new ideas), early majority (embrace and adopt the innovative ideas before it research to mass and a evidence is needed that innovation works before entrepreneurs believe its worth), late majority (represented by those, who are uncertain about the idea and change and adopt the idea after being generally accepted by the population) and laggards (conservative and traditional entrepreneurs who are the last to shift to new technologies) (Rogers, 1962). Therefore, digital entrepreneurship presents a scope not only for unique and fist hand ideas in the market, but also to the matured markets such as website and content development enterprises. Furthermore, DoI can make unique contribution in visualizing the adoption and expectation of consumers to design and develop innovative propositions.

3. Research methodology

To examine the research questions regarding digital entrepreneurship presented in this study, a qualitative approach is adopted. Since, there is lack of established scale with reference to Covid-19 or very complex environment accelerated opportunities for digital entrepreneurship. Therefore, to address the research questions, it was suitable to start with qualitative study. Due to the busy work schedule of entrepreneurs, limited and well-designed semi-structured interviews were conducted. The qualitative study is best suited to understanding the views of working professionals to obtain better insights. Therefore, this study presents insights for digital entrepreneurs operating in complex and uncertain environments such as Covid-19.

3.1. Data collection

Entrepreneurs from different organizations and sectors servicing local and regional markets were interviewed. The semi-structured interview schedule was developed based on the guidelines of Leech (2002) and McCracken (1988). In total eight questions were developed (see Appendix A), focusing on digital entrepreneurship and technological acceleration with Covid-19 as the impetus for innovation and unique services to solve public and private sector problems. In total, 151 entrepreneurs in the digital field were contacted through LinkedIn in October and November 2020. First, the concept of the study was introduced and requested a time and date for a 30 – 45 min interview. After three consecutive follow-ups in December 2020 and January 2021, 29 respondents were interviewed. Careful transcription and filtering finally resulted in 23 responses. It has been also observed that almost after 23 responses, there was saturation of responses. Therefore, overall 23 responses were finalized for further analysis. Table 1 indicates the profile of the interviewed entrepreneurs. These respondents were further mapped as R1 to R23 to maintain anonymity. Data were collected from India that presents potential for digital entrepreneurship due to an increasing smartphone-user base. The current smartphone-user population is approximately 50% in India. This study therefore considered the scope of digital entrepreneurship for the emerging needs of local and global businesses.

3.2. Data analysis

After conducting the interviews, a verbatim transcription and thematic coding mechanism was applied to extract themes and sub-themes. Fig. 1 indicates the research design. The manuscript utilized transcription a number of times to ensure internal consistency. As a measure of triangulation, the study also compared the themes and sub-themes through available secondary data.

A three-layered coding mechanism was followed to analyze the raw data. First, this study extracts open codes from the interview responses. Second, open codes were further mapped to the emerging axial codes. Finally, axial codes were mapped to the selective coding. After viewing and funneling down to selective codes, a triangulation approach was applied to verify and validate the themes that emerged from the data given in Table 2.

4. Findings

4.1. Technology

4.1.1. Educational technology

Digital adoption in school and college educational institutions has accelerated greatly due to Covid-19. Covid-19 forced most education systems worldwide to go remote and opt for virtual learning overnight. This has fueled digital entrepreneurship in the majority of educational fields (Iivari et al., 2020). Many startups have been funded by venture capitalists due to their potential as well as trust in the performance of these platforms even in the post-pandemic scenario. In the words of R7, "*apart from helping the learner, educational technology (EdTech) widens the scope for customized learning for the scholar on the basis of his or her skills, interests, and strengths. EdTech is offering a platform to empower educators with high-tech tools to innovate in terms of student-learning styles and make the teaching and learning process more effective*". Some of the start-ups in the EdTech field focus on certain areas such as childhood development, where they regionalize the curriculum and stories centered around the local culture. A few digital entrepreneurs in the education field have also brought in innovations such as gaming. These platforms are personalizing the learning experience with the aim of problem solving and critical thinking. EdTech entrepreneurs are expanding their scope to coding, robotics, classical dance, and musical instruments to make it more diversified.

4.1.2. Financial technology

The financial technology (FinTech) sector has continued to expand its services during Covid-19, especially in emerging markets. Access to

Table 1

Detail of respondents.

Respondent profile no.	Respondent code	Job title	Domain of work	Years of experience	Year of establishment
1	R1	Managing Director	Real Estate	8	2015
2	R2	Founder & CEO	Trading	9	2014
3	R3	Co-Founder	E-Bills	6	2017
4	R4	Founder	Clothing	8	2016
5	R5	Co-founder	E-Fitness	7	2017
6	R6	Director	Entertainment	7	2018
7	R7	Chairman	Education	9	2015
8	R8	Co-Director	Website Development	9	2012
9	R9	Director	Gaming	7	2014
10	R10	CEO	FinTech	6	2015
11	R11	Co-Founder	E-Health	8	2015
12	R12	Founder	E-Commerce	6	2016
13	R13	President	Entertainment	8	2013
14	R14	Co-Director	Payments	7	2015
15	R15	Founder	Digital Marketing	8	2017
16	R16	CEO	Education	7	2018
17	R17	CIO	App Development	5	2017
18	R18	Co-founder	Digital Advertising	8	2014
19	R19	Founder	EdTech	6	2016
20	R20	Co-founder	E-Commerce	7	2017
21	R21	Director	E-Health Services	6	2018
22	R22	CTO	Technical Support	5	2017
23	R23	Founder	Cyber Security	7	2015

financial services by corporations and individuals can help an economy grow and increase income levels along with improving resilience and quality of life. FinTech platforms are facilitating services to reduce their cost of operations and to reach out to as many people as possible. More importantly, FinTech platforms are reducing face-to-face interactions and keeping pace with the economy (Vasenska et al., 2021). In the words of R10, *"the online payment industry has witnessed a multi-fold jump in its subscriptions, which demonstrates the potential for payment and banking technology start-ups. Digital technologies have a huge scope in the fields of payment collections, quick loan disbursement, and vendor payouts among other concepts"*. The industry as a whole offers space for innovation and critical insights for policymakers and regulators, while facilitating financial stability, management of customers and investors, etc. FinTech also contributes to relief efforts in a pandemic-like situation and offers multiple services to micro, small and medium-sized (MSMEs) businesses. Even though Covid-19 has accelerated digital initiatives across sectors with the increasing flow of new ventures, some start-ups are still struggling with their financial positions and must be mindful of their actions.

4.1.3. Cybersecurity

Businesses around the world have been focusing on digitization and the large-scale migration towards the cloud has further led to a significant need for secure networks. With the current pandemic outbreak, most companies have moved to a remote working style and have opened the door for many start-ups in the cybersecurity field (Lallie et al., 2021). According to R23, *"due to the work-from-home (WFH) environment during Covid-19, many executives from IT, operations, and security teams are facing cybersecurity challenges and are concerned about how they can prevent cyberattacks and the propagation of malware. Therefore, the challenge for most start-ups is to provide innovative, customized, simple, and affordable cybersecurity solutions for even the smallest organization"*. On one hand, firms are keeping pace with the competition to offer better products and services to their customers, while on the other hand there are concerns regarding threats in cyberspace. The importance of cybersecurity has been underscored by different incidents in various industries. Many start-ups have emerged, thanks to the application of AI and machine learning-based models that can evaluate risk using different methods. Table 3 describes the interview data and open, axial, and selective codes for technology.

4.2. Healthcare

4.2.1. Diagnostics

Covid-19 impacted the healthcare sector the most, thus offering opportunities for digital entrepreneurship in this sector. From medicine and vaccine manufacturers to labs, pharmacies, and hospitals, each stakeholder is compelled to innovate (Jnr, 2020). Most healthcare operators have to be quick during Covid-19 to stay relevant. Sometime there is a large gap between the actual incidence of Covid-19 cases and the reporting, so technology-driven solutions such as AI and machine learning can speed up the process of clinical diagnosis and offer opportunities for digital entrepreneurship. In the words of R21, *"clinicians today are facing the challenge of a complex scale of disease and large available information outlets, so making accurate predictions about a particular diagnosis is critical. Digital start-ups today are offering a wide array of solutions from testing to imaging to pathology to offer personalized health insights"*. Many start-ups are utilizing AI-based medical imaging platforms for diagnosis.

4.2.2. Virtual care

Virtual care focuses on services in terms of interactions with healthcare professionals and online consulting with clinicians. This sector offers significant potential to address the issues of healthcare accessibility. Improved management of a disease requires monitoring of the acute condition and daily routine. This is used to design better care for patients in their homes. During Covid-19, the government placed great emphasis on telemedicine and witnessed a significant reduction in consultation time and greater efficacy through different digital platforms (Janssen et al., 2018). Telemedicine platforms are quite popular where well-qualified practicing clinicians are used and patients also have the option of getting a consultation from a selected clinician (Schiavone et al., 2021). Virtual care platforms are further integrated with e-pharmacies, where in one click patients and customers can order medicines after a prescription is verified. R5 stated that "*digital entrepreneurship in virtual care is converting one-time patients into regular consumers thanks to benefits such as 'an individual can get treatment from home', 'access to special physicians', 'reduced cost of treatment', and 'flexible scheduling and appointments'. These platforms also make the job of clinicians easy and offer room for innovative approaches in virtual care delivery*". Virtual products and care platforms help reduce the wait time for the individual having the consultation online (Algharabat et al., 2017). Additionally, in view of the Covid-19 outbreak, people are avoiding
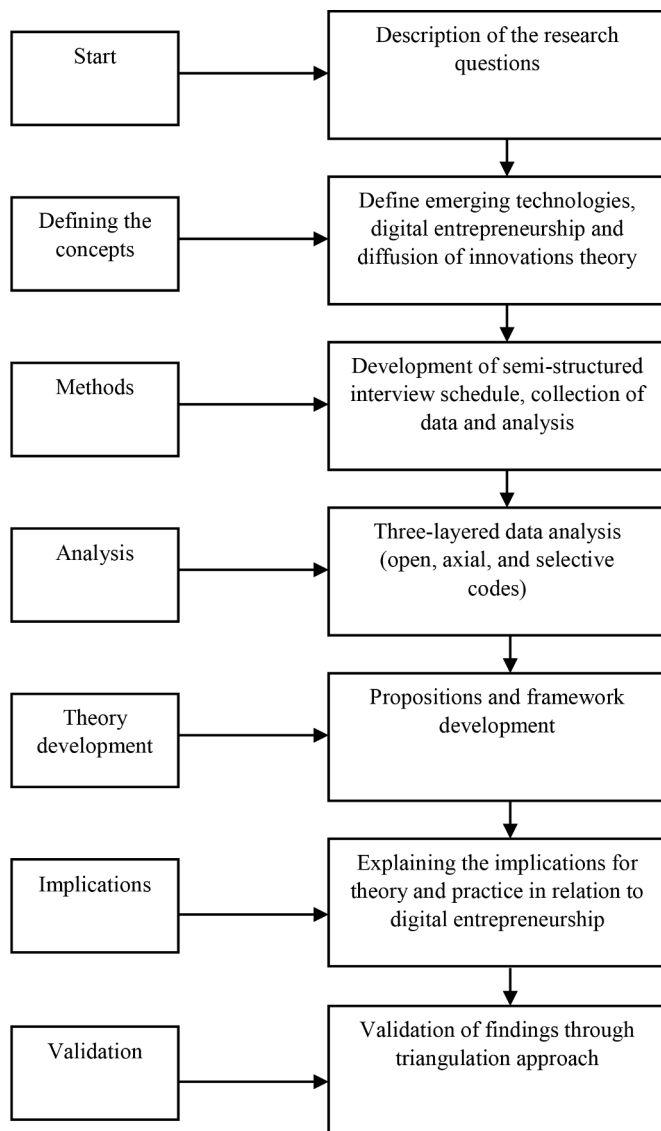
Fig. 1. Research design stages.

Table 2
Triangulation approach.

Industry reports	Research articles	Data gathered	Mapping to themes
UNCTAD (2021)-Despite slowing economic activities, digital transformation accelerated in e-commerce with a rise in global trade from 14% in 2019 to 17% in 2020. New trends such as monitoring of social distancing and augmented realty have offered opportunities for entrepreneurs.	Johnston (2021)-Electronic world trade platforms help unlock trade in developing countries and offer many opportunities for digital entrepreneurs.	R20-There was gap of touch and feel that was even wider due to the fact that shops and malls were shut for a long time. Hence, technologies such as augmented reality have appeared as saviors for an industry such as e-commerce.	Contactless delivery, Augmented reality
McKinsey and Company (2021)-In digital health services, one needs to have experts from the technology field as well as healthcare and regulatory officers to deliver the diagnosis or virtual care service.	Zajicek & Meyers (2018) - Digital healthcare requires innovative solutions and creates value defined by the users in terms of service, platform, and models. Digital home care is on the rise due to patient comfort.	R11-As most of the population is health cautious due to the fear of Covid-19, the scope is huge, and people are embracing digital solutions in the healthcare and fitness domains.	E-fitness Virtual care
PwC (2020)—Covid-19 has amplified and shifted consumer behavior due to the high demand for digitalization and due to social distancing and mobility restrictions.	Madnani et al. (2020) - The world has become remote, virtual, and more streamlined. Therefore, consumers have developed customized entertainment consumption behaviors.	R6-As people stay at home during 2020 and 2021, over-the-top platform revenue surged by 26% in 2020 and is expected to double in 2024.	Over the top
KPMG (2020)-EdTech technology is transforming traditional education from paper and pencil to digital and video-assisted learning.	Iivari et al. (2020)-Covid-19 has created a variety of digital divides through the facility of EdTech, which can better develop skills and competencies that may be helpful in career options later on.	R16-The impact of Covid-19 has been felt most in the education field. This changed the fate of the EdTech sector overnight with the indefinite closure of educational institutions.	Educational technology

visiting hospitals due to the fear of contracting another illness.

4.2.3. Wellness

Developing immunity and staying fit have been buzz words throughout the Covid-19 crisis. Many people have developed healthy habits and are concerned about their fitness. Many people have searched how to stay fit and develop strong immunity on the Internet. In this regard, fitness technology has witnessed exponential growth and many fitness clubs and gyms are conducting live sessions. Since most gyms were closed due to the lockdown and surge in Covid-19 cases, this technology has opened a plethora of opportunities for digital fitness aggregators, trainers, and fitness aspirants (Bentlage et al., 2020). Digital yoga platforms have also emerged, and many start-ups have observed significant growth compared to earlier years. According to R11, *"the technology-driven fitness, yoga, and diet field has created its market and continues to do so due to the increased awareness of people becoming pre-emptive about health and measures to improve from time to time"*. Recent events have resulted in pay cuts, anxiety, and a significant decrease in movement, and people are looking for easy, simple, affordable, and accessible wellness solutions for their health. For digital start-ups, online advertisements for fitness and wellness were low cost due to the shutdown of many marketplaces, and it was therefore easier

to do advertising. This resulted in a low cost of acquisition per person. Table 4 presents the interview data and open, axial, and selective code for healthcare.

4.3. Entertainment

4.3.1. Over the top

Lockdown and other measures to curb Covid-19 have brought after-effects to the media and entertainment industry, specifically for film-making, theme parks, and entertainment. However, this has opened up the opportunity for greater digital media consumption. During the shutdown and lockdown, most parts of the world witnessed the growth of over the top (OTT) television and digital platforms due to the ban on

Table 3
Thematic coding for 'technology'.

Sample quotes from interviews and open code	Profile of respondent	Axial code	Selective code
"The digital revolution has impacted most of us, and K-12 education is no exception. The digitization of education on one hand provides opportunities for start-ups to offer innovative and creative solutions, while on the other hand it fosters self-learning, collaboration, and creativity" (Open code: any-time learning from digital education).	R7	Educational technology	Technology
"Compared to the traditional teaching and learning system, especially competitive exams for public service and entry to higher education, learners have more flexibility when using the digital method due to its extensive coverage of topics and its easy updating in digital form from a start-up point of view" (Open code: variety of services for learners and easy to update).	R1		
"Today, in the era of applications and smartphones, we have developed an AI-based decision engine that evaluates the loan application in minutes and up to Rs. 5 Lakh can be transferred to the respective account. To ease any difficulty for the customers, we have enabled the repayment options through platforms such as PhonePe" (Open code: AI-based platform to analyze and process loan applications).	R3	Financial technology	
"Due to the high volume of transactions in businesses such as insurance, e-commerce, and banks, the reconciliation process has been automated. Being a third party, we ensure that every transaction is accurately accounted for with minimal settlement time by deploying AI models to connect the payment gateways, banks, and vendor order system which further helps identify any discrepancies" (Open code: a high volume of business requires the assistance of financial technologies).	R11		
"Around 50% of all the security attacks concerned small and medium enterprises, which may affect their business significantly. Hackers are capitalizing on Covid-19-like situations for geopolitical supremacy, financial gain and for reputation reasons" (Open code: for different reasons, hackers are planning cyber-attacks).	R19	Cybersecurity	

Table 3 (*continued*)

Sample quotes from interviews and open code	Profile of respondent	Axial code	Selective code
"Industries ranging from healthcare to defense, education, hospitality, and banking are prone to cyber threats. Hence, secure networks are the need of the hour for every business. Not only should the business have on-premises threat detection and mitigation mechanism, but it should also be careful about cybersecurity capabilities across the cloud" (Open code: the data of a business require multi-layer cyber security mechanisms).	R16		

outdoor activities and social distancing norms (Madnani et al., 2020). R6 pointed out that, "*Digital media consumption, specifically OTT, has witnessed a surge in subscription through Netflix, Amazon Prime, Zee5, etc. both in terms of time spent and new consumers. This could result in a shift from mobile to television screens with the ease of internet connections*".

Connected via an OTT platform, the advertisement video-on-demand, subscription video-on-demand, and freemium models are gaining traction and have doubled in the past years. Innovation is the hygiene factor for OTT players and digital entrepreneurs. Hence, organizations in digital businesses such as OTT have to evaluate performance based on multiple facets and set-up in-house laboratories to stay innovative and customer focused.

4.3.2. Gaming

Historically, games have been an integral part of human culture, and over time they have changed from being physical to virtual. Exponential industry growth has challenged traditional forms of entertainment and games. The online gaming industry includes stakeholders such as game developers, software developers, hardware developers, game publishers, distributors, and retailers (Amin et al., 2020). Consumers are mostly aware of the distributors, such as Google Play and Game Stop, but are unaware of game publishers and developers, where most entrepreneurship opportunities exist. Out of the three mobile, computer, and console-based gaming platforms, mobile gaming has the largest share with around 45% and receives 80% of revenues. In the opinion of R9, "*interestingly, mobile gaming applications have become the most popular applications after social media and shopping applications. The success of mobile-based online gaming can be attributed to new loyalty programs that keep players coming back to the platforms. Players can earn rewards in the form of points and other forms of staying in the game, such as a subscription to watch free advertisements*".

To make it faster and easily accessible to consumers, companies are moving to the cloud, and decent internet connectivity ensures the streaming of games rather than playing via a console. In future, the game will be able to generate auto-content and be customized according to the player's personality and gaming style.

4.3.3. Social media

Today, social media has surpassed the phase of connecting family and friends, and now helps businesses connect with their customers. This offers the opportunity for third parties to operate on behalf of focal organization to design, operate, and promote their products on social media. New age entrepreneurs are using the internet of things to promote products and automate workflows to engage customers. Other emerging technologies such as data storage via cloud computing, networks, and software management are covered by third party entrepreneurs to save costs and increase productivity (Song, 2019; Szalavetz,

Table 4
Thematic coding for 'healthcare'.

Sample quotes from the interviews and open code	Profile of respondent	Axial code	Selective code
"Awaking to the impact of Covid-19, many emerging economies made commitments to enhance healthcare infrastructure to tackle both Covid and non-Covid health issues. This has given birth to numerous digital health start-ups and operational fundraising" (Open code: digital healthcare services for both Covid and non-Covid related health issues).	R11	Diagnostic	Healthcare
"Cardiovascular issues are the leading causes of death. Therefore, timely diagnosis and treatment is important. With the help of image analytics and MRI-integrated AI, algorithms help assess the arterial function of a patient. With the help of a web-based platform, one can detect and diagnose cardiovascular disease in the early stage from the comfort of the patient's home" (Open code: web-based platforms that can facilitate online diagnostics).	R5		
"In the last two years, we have witnessed a significant increase in telehealth users, where both image and video-based service are available for both telemedicine and remote patient monitoring. Telehealth is more efficient in terms of cost and makes it convenient for most patients due to their comfort at home" (Open code: due to staying at home, people are opting for telemedicine and virtual treatment via digital platforms).	R21	Virtual care	
"In virtual care, companies are exploring and providing patient-to-clinician, clinician-to-patient and multi-party video visits, since healthcare may require different specializations to come together for a particular disease" (Open code: facilitating patient, clinician, and multiparty communication through web-based video and images).	R8		
"We have developed a platform that uses a pedometer integrated with gamification (number of coins earned, number of levels achieved, and benchmarking through a leaderboard) and gratification (through prizes and rewards) to encourage people to move more and have a healthier lifestyle" (Open code: motivating individuals through gamification to stay fit).	R12	Wellness	
"The problem is not how to keep aspirants moving and exercising routinely, but rather how to motivate them to be fit. Being physically distant for quite some time, people now realize the importance of community. Hence coaching and fitness sessions need to be designed to make things more intimate through the digital route" (Open code: design of an interactive and intimate digital platform).	R10		

2020). In the words of R15, "*the close connection through social media helps companies monitor consumer behavior and design platform-centered insights to drive business. Advertising and marketing solutions other than social media messages address the key concerns of many organizations*".

Organizations are utilizing social media to map their competitors and accumulate knowledge that can be helpful in designing and offering new products and services in the future. Entrepreneurs that assist product and service companies are utilizing innovative and interactive techniques to drive traffic on their pages. Table 5 describes the interview data and open, axial, and selective code for entertainment.

4.4. E-commerce

4.4.1. Contactless delivery

Covid-19 impacted the lives of humans to the extent that now people fear going out even to buy items that are essential to them. Therefore, instead of visiting local stores and fashion outlets, people prefer online platforms even for their daily needs. Apart from convenience, these platforms offer safety in terms of contactless delivery and payment. With the rise in e-commerce in the last decade fueled by Covid-19, there has been a change in the style of home deliveries and doing business. Contactless deliveries have become the new norm and retailers who do not offer contactless deliveries are not part of the game anymore (Johnston, 2021). The contactless delivery process avoids interaction between employees and customers. The employee confirms the delivery of the order with a picture shared with the customer via a mobile application. The customer is reminded through alerts and messages to pick up the order outside the door at his or her convenience. Similarly, R12 pointed out that, "*Contactless deliveries are helpful for both customers and organizations for safety reasons. Additionally, to build confidence among customers, some companies are also displaying the health status of delivery boys and related store staff through the order tracking screen. The scope for digital entrepreneurship lies in contactless pickups from retail, fulfillment centers, and dark stores. From label generation to order collection and order assignment, everything needs to be done without contact and with minimum face-to-face interaction*".

Any lack of or compromise in safety at a pick-up point or at other stages in the supply chain can lead to a chain reaction and an increase in the level of risk. Different models are prevalent for contactless delivery in e-commerce, such as one-time passwords, photo captures, or online links.

4.4.2. Payment methods

Setting up a business online is a current trend due to increased smartphone penetration throughout the world in the past decade. However, fund flows are equally important to any business for its other activities. The smooth flow of funds in an e-commerce environment can be realized using payment platforms/methods. Gone are the days when organizations used to accept cash payments only. With the advent of technology, a wide range of UPIs, e-wallets, and mobile payments are now available to suit the needs of diverse customers (Vasenska et al., 2021). In addition, R20 stated that "*nowadays, businesses not only in e-commerce but also in the physical store format are using more than one payment method for the convenience of customers, and this helps with sales conversions. Multiple payment methods are also helpful in the scenario where one server is down or sometimes does not work, and a second payment gateway can be helpful in the purchase process*".

Many payment aggregators have emerged with the growth of online shopping and e-commerce. The role of payment gateways/aggregators is to support and link the transaction between the customer, bank, and seller.

4.4.3. Augmented reality

In the e-commerce environment, customers are continuously shopping, and sometimes customers find that a product is not suitable to their requirements and return it. The top reasons for returning consumer

Table 5
Thematic coding for 'entertainment'.

Sample quotes from the interviews and open code	Profile of respondent	Axial code	Selective code
"The growing consumption of digital media is challenging most entrepreneurs to experiment with new models of content consumption and hence spend on advertising as well as to shift from the traditional television system towards digital media platforms. Additionally, as consumption is mostly through smartphones, mobile advertising is expected to grow exponentially in the future on OTT platforms" (Open code: shift from traditional to digital advertising).	R15	Over the top	Entertainment
"The OTT landscape offers digital entrepreneurship aggregation in the field of content creation as compared to digital platforms such as YouTube, Voot, Netflix, etc." (Open Code: the scope for digital entrepreneurship in the domain of content creation).	R9		
"With increased smartphone usage, there is rising demand for different types of games that are interoperable on Android, iOS, and Microsoft Windows. Single and multi-player games in both mobile and computer formats are in high demand due to the paradigm shift from console device- oriented gaming" (Open code: shift from console to mobile-oriented gaming).	R20	Gaming	
"Due to increasing screen time on mobile phones and computers, it has been observed that young people play games alone and with peers and frequently look for updated versions or new games. To address this demand from consumers, companies can adopt a platform as a service, where the creation of games will be easier in a short span of time" (Open code: platform as a service facilitates easy and frequent updating of games).	R12		
"Due to improved connectivity and internet penetration, now most start-ups and established organizations are present on social media, and they believe it is one of the easiest ways to connect to their customers, leading to the fact that content is king and can influence customers" (Open code: connecting to customers through social media).	R14	Social media	
"To be seen by consumers on social media, one should have good content, and it will trend. Today, many established organizations are asking for help from digital entrepreneurs and agencies in the form of posts, blogs, celebrities, and stories" (Open code: social media offers opportunities for creating stories, blogs, and posts).	R23		

goods are wrong size, fit, or color. Technology such as augmented reality (AR) can be very helpful in addressing these challenges due to its ability to expand the physical world by adding a layer of digital transformation (Datta and Nwankpa, 2021). Employing AR offers a view of the physical/real environment facilitated by superimposed computer-generated images to better understand product shape, size, and fit. In the words of R4, "*AR helps e-commerce consumers know, understand, and make up their mind about what they are ordering and how accurately products ranging from cosmetics to clothing will suit their bodies. Virtual try-on solutions help customers feel and look before adding the item to their shopping cart. Today, brands ranging from jewelry to eyeglasses are employing AR for customer satisfaction and bringing in more traffic*". Furthermore, AR is applied to e-commerce through interactive user guides to make customers understand product flows and how they work. Many AR-based users' manual applications present the product in real life through animation. Table 6 describes the interview data and open, axial, and selective code for e-commerce.

5. Discussion

The study followed a semi-structured interview approach to understand diverse areas of digital entrepreneurship opportunities, and this revealed some stimulating implications for extending DoI theory in trying times such as during the Covid-19 pandemic. This study assimilates the theory and literature on innovation, entrepreneurship, and technology. Earlier scholars have emphasized entrepreneurship opportunities in the physical mode of business due to wider availability in the physical world and similar customer preference for physical products. With the changes fueled by Covid-19, there has been a significant increase in domains for digital entrepreneurship with a consistent focus on innovation (Brem et al., 2021; Volberda et al., 2021). Therefore, the study theorize diffusion of innovations theory through the lens of digital entrepreneurship in the uncertain, complex, and concerned environment created by Covid-19.

5.1. Spotting trends in covid-19-induced digital entrepreneurship

The complex and uncertain Covid-19 era pushed organizations to a tipping point in terms of technology adoption for transforming their businesses. This digital transformation process of businesses has opened the door for many start-ups and digital entrepreneurs to seize the opportunities (Datta and Nwankpa, 2021). Customers along with companies have shifted online significantly, be the students and educational institutions or a consumer banking segment, and towards other changing virtual workspace requirements such as working from home. With online education in terms of regular classes and competitive examinations, many new start-ups have emerged to cater to different needs of learners and aspirants. Running businesses and households has given rise to financial technologies. This change from a physical to a virtual workplace has increased the pressure of cybersecurity on organizations and has been impacted by hacking incidents in 2020 and 2021 for multiple reasons. Hence, this study proposes:

P1: *The technological changes induced by the Covid-19 environment offer significant scope for digital entrepreneurship in the educational, financial, and cybersecurity fields.*

Health has been the most sensitive issue for most of the world during the Covid-19 period. To go beyond the traditional healthcare system, the trends in diagnosis and examination, healthcare technologies and digital entrepreneurship have changed the landscape forever. Due to increased smartphone penetration in most locations, digital healthcare enterprises have been able to find customers easily. Today, enterprises in healthcare sectors are using digital technologies beyond telemedicine, such as laboratory tests, diagnostics, virtual care, and fitness (Kim et al., 2016). A series of digital enterprises have come up with fitness and yoga programs that engage their consumers digitally with uniquely and innovatively-designed programs. Hence, this study proposes:

Table 6

Thematic coding for 'e-commerce'.

Sample quotes from the interviews and open code	Profile of respondent	Axial code	Selective code
"Today, if your business is not online and not connected with the smartphone of the user, you may be out of business soon. When designing logistics management for a particular supply chain, contactless delivery monitoring is also very much a part of it and creates opportunities for digital start-ups" (Open code: connecting businesses to mobile phones to track contactless delivery).	R2	Contactless delivery	E-commerce
"Different companies operate on different models for contactless delivery. For example, a few companies share notifications with customers that their order is out for delivery and they can view the estimated time of arrival. Other models work with a one-time password (OTP) shared with the customer when the shipment is out for delivery, and this OTP is confirmed by the delivery executive" (Open code: different models for contactless delivery).	R14		
"With the rise in e-commerce, companies are increasingly exploiting online payments. E-wallets and mobile payments are the most common ones compared to cash on delivery. Since e-commerce has become more phone-streamed, customers are finding mobile payment solutions convenient" (Open code: importance of multiple payment methods).	R15	Payment methods	
"For processing the payment in e-commerce, the payment gateway is an essential requirement which further needs to be integrated with the website and account of an organization. This payment gateway facilitates the link between customer and bank and notifies the seller of the amount credited for a particular transaction" (Open code: the payment gateway role as aggregator).	R17		
"For the product-driven industry, augmented reality (AR) can be very helpful. In e-commerce, AR allows customers to see products at their convenience as well as their suitability for the given purpose before an actual purchase. AR can help customers choose the right product the first time and avoid multiple returns as witnessed with normal online purchases" (Open code: giving more confidence to consumers before an actual purchase).	R6	Augmented reality	
"In our industry it is observed that many products are returned due to its mismatch to expectations of the customer. It also believed	R16		

Table 6 (*continued*)

Sample quotes from the interviews and open code	Profile of respondent	Axial code	Selective code
that e-commerce will be rising. For example, a customer might purchase a cupboard and later find that it doesn't fit in the space they have, therefore a gap exists, where in technological innovation can be helpful both for customer, organization and sustainability point of view" (Open code: choosing the right product on e-commerce platform via AR).			

P2: *Digital healthcare services are in demand due to scheduling convenience, the comfort of home, avoidance of crowds at physical facilities and the low chance of error due to the use of technologies such as big data analytics, artificial intelligence, and virtual reality.*

Many individuals experienced quarantine during Covid-19 due to traveling, for their own safety as well as government mandate or because of contracting Covid-19. Out of fear, people have stayed home for longer periods. These intricacies led to the consumption of more television and spending more time on social media. As movie theaters were closed, people were not able to watch movies, so over-the-top (OTT) platforms were accepted quickly by audiences to meet their entertainment needs (Madnani et al., 2020). These platforms offer opportunities in the field of digital advertising. Young people fond of sports and games shifted to online games, which opened up opportunities for entrepreneurs in this field to design and develop games to meet the increasing demand. Gaming has changed a lot over the last two decades from being console-oriented to computer-controlled and now to mobile-based, where it can be in a single or multi-player format. The gaming sector has witnessed a boom in multiple categories in the recent past. Hence, this study proposes:

P3: *Entertainment as an essential part of human recreation is evolving and presenting entrepreneurs with opportunities in the field of social media engagement, next-generation gaming, and innovative ways to present video content.*

Lockdowns have become the new normal due to multiple waves of deadly virus, and businesses and consumers have decided to go digital for their survival. This has led to the rise of e-commerce for purchasing goods and services (Algharabat et al., 2017; Carter et al., 2016). On the one hand, many e-commerce-based platforms are struggling to respond to the sudden surge in demand, while on the other hand they are facing a huge issue of product returns due to a mismatch with customer expectations such as the wrong size or color. This has led many companies to adopt augmented reality to minimize the product return rate and enhance customer satisfaction. On one hand, people are shopping for essentials as well as luxury products and want delivery to their home, while on the other hand they do not want to come in contact with anyone from the outside due to their fear of contracting Covid-19. This has resulted in the birth of contactless delivery (Johnston, 2021). This process of online shopping is not complete until payment is made on the platform, so due to the diverse customer base and for payment comfort, companies have come up with different payment methods. Therefore, this study proposes:

P4: *Next generation e-commerce has opened up opportunities for digital enterprises in the fields of improving and monitoring contactless delivery, ensuring multiple options for successful payment on the consumer end, and reducing the return rate by employing augmented reality for a better look, fit, and feel according to the customer.*

The Fig. 2 below illustrates the emerging fields for digital entrepreneurship propagated through Covid-19.
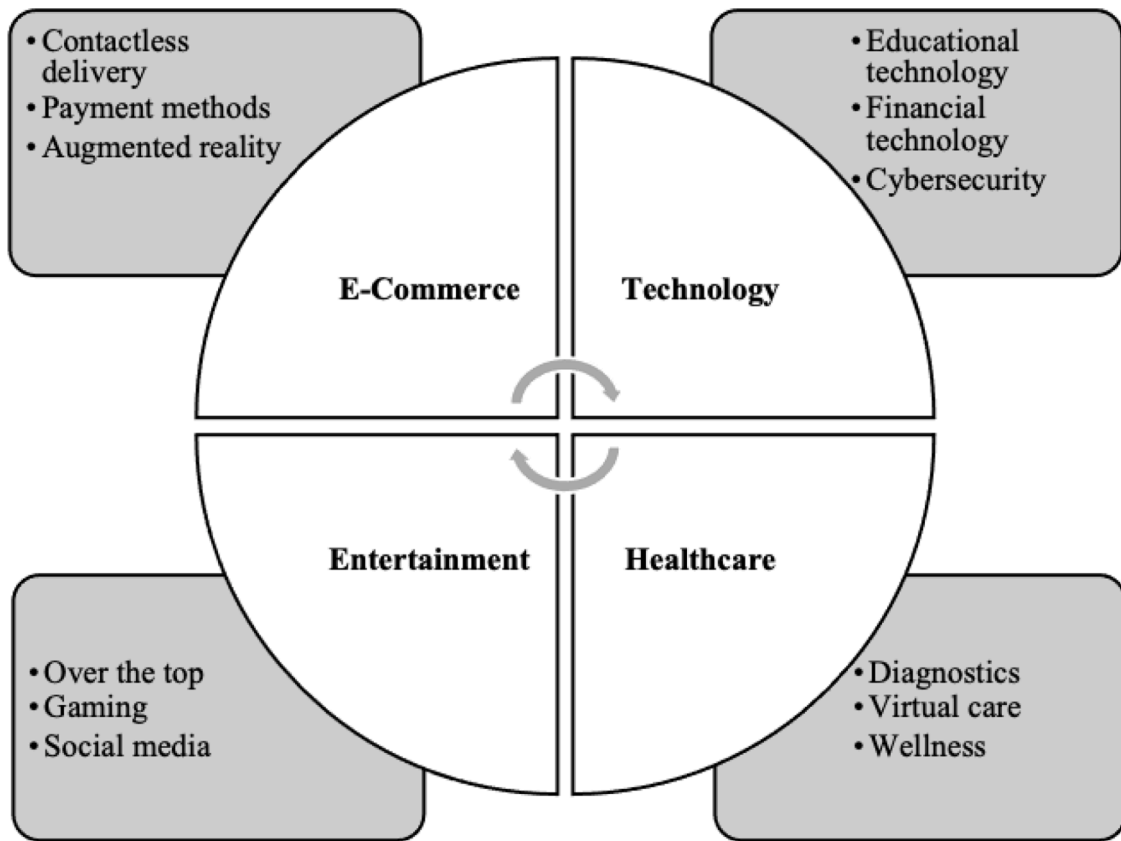
Fig. 2. Emerging digital entrepreneurship fields in the era of Covid-19.

6. Implications

This section presents the implications for theory and practice along with limitations and scope for future research.

6.1. Implications for theory

This study contributes to the literature in three ways. First, it mines the information from seasoned entrepreneurs to extract the sectors and areas of significant potential for digital business in a structured manner through the lens of DoI. This theory helps entrepreneurs visualize how, why and at what rate novel concepts and technology are progressing (Rogers et al., 2014; Rogers, 1995, 1962) and can facilitate in taking certain business decisions. DoI helps entrepreneurs analyze and predict customer adoption behavior influenced by a complex and long event such as Covid-19 with regard to their service or product (Marcati et al., 2008) that can actually help them to improve upon the products and services offered. The development and adoption of new ideas or services takes time, and early customer adoption has different characteristics than later ones (Cao and Shi, 2021). Therefore, digital entrepreneurs need to have an appropriate understanding of each element that can facilitate or hinder the adoption of innovation (Abubakre, 2021). By employing the services of digital entrepreneurs, larger companies can further influence international business practices and culture.

Digital entrepreneurship can be viewed as a capability or facilitator that can transfer the physical value chain to the virtual realm and cater to consumer needs during crises and complex times more effectively. Entrepreneurs from different fields conceptualized emerging opportunities for digital enterprises. Covid-19-induced digital entrepreneurship is facilitating and infusing innovation capabilities into the traditional style of production, marketing, and delivery along with new channels of communication with critical stakeholders. Covid-19 has also fueled digital start-ups, due to the increasing hygiene demands through digital

solutions such as telemedicine and virtual care (Sussan and Acs, 2017).

This hygiene requirement will be expected in the post-Covid era as well, so there is room for increase in digital entrepreneurship even post-Covid world. Second, on the basis of data collected, the study established four propositions that need to be further tested via a grounded approach. Theories such as resource-based view, task-technology fit can be considered to further test the claims. Third, this study proposed a framework indicating different areas ranging from technologies, healthcare, entertainment, and e-commerce that are leading in the race for opportunities for digital entrepreneurs. Additionally, the study highlights the role of diffusion of innovations theory, specifically in relation to digital entrepreneurship and digital start-ups, for their ultimate success and monitoring the business environment continuously. This study presents emerging areas in a particular domain that can be further explored by aspiring digital entrepreneurs in the digital realm.

It offers a list of detailed areas in a particular domain with key insights, where innovation can play a key role in the next few years and benefit budding entrepreneurs in the digital field (Brem et al., 2021; Kim et al., 2016). Technology in the education and public sector can make it possible to consider innovative ideas, i.e. what, how, and why certain models will be appreciated by customers according to their changing needs. EdTech therefore has strong potential, followed by financial services and financial technologies (Iivari et al., 2020; Secundo et al., 2021). In the field of technology, cybersecurity can be examined for opportunities for innovation and be a highly profitable business. Covid-19 has accelerated opportunities for digital entrepreneurship from digital diagnosis to virtual care to fitness (Schiavone et al., 2021).

Subscription-based online entertainment presents vast opportunities for budding entrepreneurs to harness innovation and creativity to launch new concepts. Covid-19-induced changes in the purchasing and consumption style of individuals have moved organizations to embrace innovative and unique solutions for customer safety as well as their

business. Based on these highlights, our study points out *"which opportunities are available for digital entrepreneurship and have been advanced during Covid-19, and which related sectors are set to zoom forward with the application of digital technologies and the diffusion of innovations"*.

6.2. Implications for practice

This study offers implications for digital entrepreneurship not only in emerging areas, but also related areas where DoI helps us to understand how, why, and at what rate new technologies can be adopted and solve a particular issue. Before preparing a business plan in digital space every entrepreneur should (i) *evaluate the technological future* and associated industry inclination (ii) evaluate the *capability of innovation* in terms of ease of use and problem solving (iii) *asses the required degree of resources* to develop and expand the concept in the market and (iv) examine the *applicable legal framework* and required *cybersecurity*. Moreover, aspiring and working entrepreneurs in the digital field need to have technical knowledge of the platform/technology they are going to invest in. To set up a digital business, multiple stakeholders need to be integrated (Secundo et al., 2021).

For example, in healthcare, digital entrepreneurs have to think about seamless communication and innovative solutions by integrating clinicians, nurses, providers, aggregators, insurance agents and patients. Digital platforms help businesses run smoothly and fulfill the essential needs of customers spending most of their time at home during Covid-19. Technologies ranging from artificial intelligence to big data analytics, cloud computing, augmented reality, educational technology platforms, cybersecurity, and virtual reality present a plethora of opportunities for digital entrepreneurship in a sustainable way and address challenges posed due to Covid-19. Today, with minimal investment like single desktop or server, a start-up can be started in the digital field that requires a sincere effort from an individual or team to grow into a big company in the next few years.

Covid-19 resulted in the emergence of digital tools that will shape the world permanently to address the situation and enhance businesses survivability. During Covid-19, governments and supporting agencies had come together in order to empower entrepreneurs to develop innovative solutions to address social problems. Digital entrepreneurs are likely to play a key role in digitizing the economy while focusing on shared value creation. The digital platforms and businesses that people relied on during Covid-19 such as online retailing, digital payment, contactless delivery, and subscriptions to live streaming may henceforth become universal and widen the scope for entrepreneurs further.

Entrepreneurs may adopt an integral approach where multiple parties can come together to devise an innovative concept to solve issues. Breakthrough concepts in the digital field can also offer reliable and low-cost solutions to many small and medium enterprises in emerging markets and put them in an advantageous position in the post-Covid era. Entrepreneurs embracing digital technologies led business solutions can contribute to recover the economy faster than other traditional businesses. The key interest of any entrepreneur in developing their digital business today is that one need not to be physically present while doing business.

With border closures and frequent lockdowns due to multiple waves, consumer traffic was severely limited in the physical marketplace, forcing organizations to switch to providing services remotely. Despite the global downturn, many entrepreneurs have turned Covid-19-induced challenges into opportunities to create, conceptualize, and launch their ventures. Today, the world exists in an age of dynamism, where constant changes occur and that offers opportunities to entrepreneurs. The transition to digital economy was occurring slowly, and then Covid-19 came along and accelerated the process and offered many opportunities for digital innovation. To start a digital venture, aspiring entrepreneurs have to understand the gap between demand and supply and analyze market patterns and associated opportunities. Before investing in a start-up, one has to evaluate the entrepreneur's own skills in the domain, the scope of scalability, and the knowledge of the legal and institutional environment in that business. The possibility of success in a digital venture is greater when innovation is the critical element and relevant experiences are created for consumers and other stakeholders. In an entrepreneurship journey, no matter how much one prepares, there will always be skills and knowledge that one will gain by doing the business. However, one has to plan a few steps ahead so that the business does not end before it could begin. To avoid early failure of a business, one can create a financial plan to cope up with the flow of funds and be sure of what kind of product or services one wants to offer to which market.

6.3. Limitations and scope for future research

Digital technologies have brought a new era to entrepreneurship aspirant as well as professionals. Complexity and concerns in the Covid-19 era have resulted in calls for many start-ups to integrate digitization and technology-related concepts to diffuse innovations and meet the needs of customers, stakeholders and businesses. The emerging propositions demonstrate the impact of Covid-19 and result in novel theorizing in digital technology-led entrepreneurship based on concepts, perspectives, and approaches. The diffusion of innovations and conceptualization of a unique concept are critical for the success of digital entrepreneurship but may not always be true. Some slow adopters can develop the same business or service concept and succeed.

Therefore, studies can be conducted to evaluate the success of early adopters and early majority type of ventures. Additionally, social norms and varying acceptance standards in a community may discard the application of DoI. The theory also does not state the degree of rapidity in adopting an innovation among multiple stakeholders. The findings of present study indicate recently-emerging fields for digital entrepreneurship and the application of digital technologies in different ways. In the future, studies can investigate the impact of other grounded theories, such as task-technology fit and the resource-based view in pursuing digital entrepreneurship. In the future, studies can be conducted; those can map the emergence of businesses during Covid-19 and their survival in post Covid-19 era.

The propositions can be tested through the lens of institutional theories, where entrepreneurs have different types of pressures to perform and innovate continuously. The present study conducted a semi-structured interview process, whereas in the future, a grounded theory-led exploratory study can be conducted to investigate other emerging areas for digital entrepreneurship. Future research can be conducted in understanding the pre-requisites for diffusion of innovation-bound digital entrepreneurship representing different type of adopters of innovation.

7. Conclusion

This study explores innovation-led digital entrepreneurship areas with a high potential to flourish through a semi-structured approach. This study utilizes diffusion of innovation theory view as a basis for Covid-19-induced digital entrepreneurship opportunities. This study adopted a three-layer approach (open, axial, and selective) to perform the thematic analysis. After identifying the themes, a classification and establishment of proposals describing critical areas for digital entrepreneurship was carried out. Furthermore, implications for theory and practice have been drawn on the basis of the developed framework. Hence, this study has attempted to answer the current debate regarding the shift from traditional entrepreneurship to digital entrepreneurship during Covid-19 and the role of DoI in this process. In summary, this study offers meaningful insights for aspiring and existing entrepreneurs in the digital space using technologies innovatively. The application of innovation-oriented solutions is meaningful for digital platforms to stay relevant and meet the needs of their customers and business partners.

CRediT authorship contribution statement

Sachin Modgil: Conceptualization, Project administration, Writing – original draft. **Yogesh K. Dwivedi:** Supervision, Resources, Writing – review & editing. **Nripendra P. Rana:** Data curation, Investigation, Visualization. **Shivam Gupta:** Methodology, Formal analysis, Writing – original draft. **Sachin Kamble:** Data curation, Validation.

Appendix A: Semi-structured interview schedule

Question	Criteria considered while designing questions	Duration	Reference
1. The interaction and dialog is critical aspect of present education system worldwide, be it regular class room or competitive examination preparation or tuition classes. Being country shut, many solutions have been witnessed to keep education imparted. According to you what technology offer towards digital entrepreneurship in a critical sector such as education? 2. In a developing country like India, many businesses work primarily in a physical mode and make products available through local "grocery stores", or "services" through physical visits. In your opinion, how emerging technologies are offering innovative and unique solutions? 3. In pre-Covid world, most of the businesses used to run directly from a set location of a business premises and employees use to operate from their office and factories. Now being most of things from work from home (WFH), what kind of opportunities do you see for digital world? 4. In the Covid-19 era, the most important criteria for consumers when buying a product are its safety, security and sanitization. How technologies in this regard and create opportunities for digital entrepreneurship? 5. Markets being shut for almost two years; many people are missing the touch and feel of buying products such as clothing and other fashion items. Therefore, customer are turning up to E-commerce to fulfill their needs of shopping. How and what kind of technologies offer the opportunities for digital entrepreneurship here? 6. The hospitals and healthcare industry is having high load of service due to its physical mode of operations. There are very few platforms are operating in digitizing the healthcare. What do you feel about expansion of digital healthcare in near future? 7. Many people are health conscious and follow a routine gym exercise through a physical trainer available at facility. Being lockdown and ban on gym opening in most parts of the country, what can be the solutions going forward and sustaining the business? 8. Entertainment is integral part of life and Covid-19 has brought it to standstill with cinema hall closures for a year now. How entertainment industry does is coping up with this situation?	1. Questions are open ended to avoid any acquiescence bias. 2. Questions were designed that allows respondents accepted no matter what the answer is. 3. Question are designed to engage the respondent during the interview schedule. 4. Questions designed to keep general questions first leading to specific ones. 5. Avoided the questions that can prompt to respondents to respond in a particular way or in favor.	30 to 45 min for each interview	Leech (2002); McCracken (1988)

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