

Innovation performance in digital economy: does digital platform capability, improvisation capability and organizational readiness really matter?

Innovation
performance in
digital
economy

1309

Received 20 June 2020
Revised 16 January 2021
Accepted 8 February 2021

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Abstract

Purpose – The purpose of this study is to investigate how digital platforms capability, improvisational capability and organizational readiness directly affect innovation performance. This study also explores how organizational readiness acts as mediator.

Design/methodology/approach – This empirical study is based on quantitative research design. Data were collected from 647 managers of small and medium enterprises (SMEs) working in Pakistan. Correlations and regression techniques were used for analyses. The Preacher and Hayes technique, the Sobel test and Bootstrap techniques were used to test mediation effect.

Findings – The results reveal a significant and positive relationship of digital platforms capability, improvisational capability and organizational readiness with innovation performance. Organizational readiness fully mediates the relationships between digital platforms capability and innovation performance link as well as between improvisational capability and innovation performance link.

Originality/value – In the age of digital economy the achievement of innovation performance is very important for SMEs. Businesses are shifting from traditional operational activities to digitalization. This study is imperative to offer new realm of modern technologies by exploring the role of digital platform capability, improvisational capability and organizational readiness for achieving innovation performance in digital economy.

Keywords Digital economy, Digital platform capability, Improvisational capability, Innovation performance, Organizational readiness, Small and medium enterprises (SMEs)

Paper type Research paper



European Journal of Innovation
Management
Vol. 25 No. 5, 2022
pp. 1309-1327
© Emerald Publishing Limited
1460-1060
DOI 10.1108/EJIM-10-2020-0422

National Natural Science Foundation of China for the Project: The Impact of Economic Sanctions on Technological Innovation in China (Grant number is 72074176).

1. Introduction

The notion of “digital economy” has attained vast scholarly attention in this decade (Sturgeon, 2021). The business sector is increasingly adapting information technology (IT) and associated with newest technologies, resulting in emergence of digital economy. Hence, the role of IT in businesses is critical in digital economy for achieving innovation (Viriyasitavat *et al.*, 2019). Digital economy contributes 6.9% to the United States (US) gross domestic product (GDP), 6% to China's GDP and 4.5% of the global GDP (UNCTAD, 2019). These statistics show that businesses need digital technologies and instant innovation performance to contribute to digital economy (Afonasova *et al.*, 2019). Innovation performance has become critical success factor for almost every organization of current digital era (Alegre and Chiva 2008; González and Nuchera, 2019). The use of Electronic word-of-mouth (eWOM), Internet of Things (IoT), cloud computing, big data, artificial intelligence (AI) and robotics are opening new corridors for businesses to shape innovation performance in an effective manner (Mullangi *et al.*, 2019). The current debate on innovation performance shows that innovation performance is concerned with both individual and organizational level factors (Alegre and Chiva, 2008). But all these studies have been conducted to explore factors affecting innovation performance other than digital economy.

Digital platform capability (DPC) is firm's ability to make connections with other firms using online platforms (Blaschke *et al.*, 2018). DPC offers a valuable exchange between network participants at zero marginal-cost to improve innovation performance (Helfat and Raubitschek, 2018; Rai and Tang, 2010). The continuous improvement is a fundamental requirement for the digital economy and businesses are seeking more opportunities to upgrade their innovation performance (Teece, 2018). Researchers highlighted that innovation performance is an outcome of individual factors like employees' learning (Lorenz and Kraemer-Mbula, 2019), employees' proactive behavior (Segarra-Ciprés *et al.*, 2019) and employees' openness (Rangus and Černe, 2019). Another school of thought linked innovation performance with organizational level factors, i.e. technology partnership portfolios (Alegre and Chiva, 2008; Carree *et al.*, 2019), innovation networks, technological learning (Pan *et al.*, 2019), ambidextrous knowledge and learning capability (Muñoz-Pascual and Galende, 2020), organizational learning (Ghasemzadeh *et al.*, 2019), technological innovation capability, absorptive capacity (Lau and Lo, 2019). Beyond these traditional antecedents, some recent researchers extended that the most important factors for achieving innovation performance in digital economy is digital platform (Jacobides *et al.*, 2019; Yudina and Geliskhanov, 2019). However, no study has been conducted to explore the impact of DPC on innovation performance of small and medium enterprises (SMEs) in the context of digital economy. The current study fills this research gap and contributes to existing literature by studying the relationship of digital platforms capability, improvisational capability and organizational readiness with innovation performance.

Digital economy refers to economic activities based on digital technology, i.e. use of eWOM, IoT, cloud computing, big data, AI and robotics (Yudina, 2019). The economies of developing and developed nations primarily depend on the business sectors. These deliberations have confirmed that organizational innovation performance is rooted in digital platforms in digital economy (Alegre and Chiva, 2008; Kaushik, 2019). Digital economy is based on information and communication technology (ICT) and other digital technologies (Petrenko *et al.*, 2017); hence it is very dynamic in nature (Rai and Tang, 2010). Therefore, along with digital technologies, business needs improvisational capability to match the needs which helps in achieving innovation performance (Ahuja *et al.*, 2016). Such kind of improvisational capability are known as organizational improvisational capability which is the ability to extemporaneously reconfigure current resources for shaping newest skills to address imperative and unpredictable issues relating to the environment (Kung and Kung, 2019). The current study explores both DPC and improvisational capability as major antecedents of innovation performance more specifically in the context of digital economy. The current study contributes and fills this knowledge gap by focusing on digital platforms

and improvisational capability for achieving innovation performance in the context of digital economy (Cunha *et al.*, 2020).

In spite of making remarkable contributions, serious oversights exist in the literature on the interplay between digital platforms, capability-innovation performance and improvisational capability-innovation performance which need to be addressed. Moreover, lacking research on this available information and developed theory of aforesaid direct links are not enough. Researchers have over-sighted the indirect links of digital platforms capability and improvisational capability with innovation performance through organizational readiness (Anser *et al.*, 2020; Petrenko *et al.*, 2017). To address this knowledge gap, our stance is meager at best and we suggest that organizational readiness mediates the relationship between digital platforms capability-innovation performance link and between improvisational capability-innovation performance link. Organizational readiness is the ability of an organizational to quickly adapt required up gradations in technologies due to dynamic influences of digital economy.

In summary, this study aims to investigate how digital platforms capability, improvisational capability and organizational readiness directly affect innovation performance. This study also explores how organizational readiness acts as mediator. Theoretical model showing interaction of aforesaid variables is shown in Figure 1.

To achieve the objectives of this study, the paper is divided into different sections including introduction, literature review followed by methodology and analyses. Finally, discussion and implications are presented for both theory and practice.

2. Literature review

2.1 Digital platform capability and innovation performance

DPC refers to the ability to stay connected with business world through online market places or communication channels which permits prompt and low-cost scaling (Blaschke *et al.*, 2018; Rai and Tang, 2010). Digital platforms provide useful information in a form of forecasting, production information and customer trends (Warner and Wäger, 2019). In the context of digital economy, one of the most discussed topics in academia as well as in practice is the relationship between DPCs and innovation (Nwankpa and Roumani, 2016; Teece, 2018). Most of the research asserts the close relationship between digital platform technology and innovation (Yoo, 2012). It is due to the fact that DPC is emerging as a new source of competitive advantage in digital economy to attain innovation performance (Alegre and Chiva, 2008; Rai and Tang, 2010). Knowledge sharing through digital platforms helps organizations in resources allocation to optimize organizational network both internal and external, thus improving decision-making efficiency and innovation performance (Burgelman *et al.*, 1996). DPC enables enterprises to integrate key knowledge, utilize internal and external resources of the organization, and face the rapid changes of the market

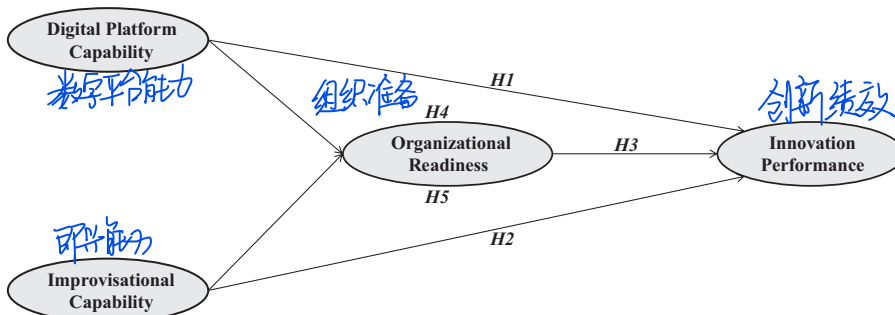


Figure. 1.
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in an efficient way (Nambisan *et al.*, 2017; Rai and Tang, 2010). Researchers like Teece (2018) acknowledged that DPC plays an essential role for improving innovation performance in digital economy. Hence, DPC has the ability to trigger innovation performance in an organization (Teece, 2017).

H1. Digital platform capability has a positive influence on innovation performance.

2.2 Organization's improvisational capability and innovation performance

Organizational improvisation capability refers to the firm's ability to instinctively reconfigure existing resources to develop new operational skills to cope critical, unpredictable and newest environmental issues (Kung and Kung, 2019). It is the degree of concentration and overlaps of planning and execution the required strategies to address dynamic situations (Vera and Crossan, 2005). Literature shows that organizational improvisation, as a part of the strategy, is a supplement to traditional organizational planning (Pavlou and El Sawy, 2010). It helps organizations' deal with new opportunities and challenges more effectively (Adomako *et al.*, 2018; Kung and Kung, 2019). In addition, many organizations cultivate improvisation ability as the internal ability of the organization and formulate the system and implementation process of improvisation (Adomako *et al.*, 2018; Tseng *et al.*, 2015; Vera and Crossan, 2005).

Cunha *et al.* (2012) believe that organizational improvisation along with other factors will have a certain impact on innovation performance of enterprise. Improvisational capability fuels innovation as an internal ability of an organization, it acts as creative response to difficulties or opportunities (Alegre and Chiva, 2008; Mendonça *et al.*, 2004). Therefore, we build our argument that improvisational capability can determine innovation performance. Organizational improvisational capability can help research and development (R&D) teams through capturing new knowledge and exploit new opportunities in innovative ways (Akgün *et al.*, 2007; Maldonado and Vera, 2014; Vera and Crossan, 2005). Under the environment of organizational harmony and the support of knowledge resources, organizational improvisation is more likely to promote innovation performance.

H2. Organization's improvisational capability has a positive influence on innovation performance.

2.3 Organizational readiness and innovation performance

Organizational readiness is rooted in change management and refers to a firm's ability to accept certain alterations; hence is a key factor to promote organizational innovation (Lokuge *et al.*, 2019). In digital economy, the role of organizational readiness is very important as it helps to adapt new technologies and helps to improve innovation performance (Alegre and Chiva, 2008; Claiborne *et al.*, 2013). According to the Sanders *et al.* (2017), the organizational readiness is a will and ability to adapt required changes. In digital economy firm readiness is essential for acquiring the latest technology which is supposed to be well-suited with firm human resource, infrastructure and technology. Tsou and Hsu (2015), and Keramati *et al.* (2011) argued that there are two main types of organizational readiness, i.e. psychological readiness and structural readiness. The structural readiness of the firm is the internal capability to accept change and provide background to adopting latest technology which is a key requirement for improving innovation performance (Forés and Camisón, 2016). The competencies, knowledge, resources and infrastructure are mandatory to implement and use new technology for innovation (Buccieri *et al.*, 2020). The psychological readiness is the company's shared values toward using latest technology to achieve the targets of innovation performance (Kobarg *et al.*, 2019). According to Rajapathirana and Hui (2018), creativity is essential to support climates that maximize and promote latest technology. In digital

economy, organizational readiness enable firms to utilize, gain and implement advantage over competitor by implementing and adopting technological improvements for achieving innovation performance (Claiborne *et al.*, 2013; Tsinopoulos *et al.*, 2019). Organizational readiness enables managers to utilize their existing resources and make more active use of technologies, to accomplish the targets of innovation performance (Keramati *et al.*, 2011; Silva *et al.*, 2017). Therefore, it is argued that organizational readiness predicts organizational innovation performance in digital economy (Tan *et al.*, 2007). Organizational readiness is well-thought-out and a helpful factor to boost innovation performance (Alegre and Chiva, 2008; Kobarg *et al.*, 2019; Steinberg *et al.*, 2017).

H3. Organizational readiness positively affects innovation performance

2.4 Organizational readiness mediates the link between digital platform capability and innovation performance

The implementations of digital technologies will be possible only when firms are able to adapt newest technologies (Matt *et al.*, 2015). DPC enables firms to adapt digital innovations based on digital technologies and ICT systems and give a room for organizational readiness (Alegre and Chiva, 2008; Cenamor *et al.*, 2019; Claiborne *et al.*, 2013). This organizational readiness permit firms to rapidly adapt, stock up, formalize and hand out information for achieving innovation performance (Ojala *et al.*, 2018). Agents in the digital platform ecosystem can get benefits through gathering needed information to facilitate the mechanism of organizational readiness (Lokuge *et al.*, 2019). Such organizational readiness helps to promote innovation performance and offers newest information and network management through quick adaptation (de Oliveira *et al.*, 2018). Therefore, the DPC represents the enterprise's ability to deploy a combination of internal and external resources for improving organizational readiness for achieving innovation performance (Fairchild *et al.*, 2012). Once the organizations become ready to adapt these changes initiated through DPC, they are more eager to attain innovation performance. So, the direct link of DPC and innovation performance seems meager and there is a missing link of organizational readiness. This study argues that organizational readiness acts as a driver of DPC to reach innovation performance. Hence the main argument of this discussion is that DPC and innovation performance link is mediated through organizational readiness.

H4. Organizational readiness mediates the link between digital platform capability-innovation performance

2.5 Organizational readiness mediates the link between improvisational capability and innovation performance

Improvisation capability being a multiobjective capability has received massive attention among business researchers (Magni *et al.*, 2018; Pavlou and El Sawy, 2010). Businesses can create innovation if they can adapt required changes and manage timely response, i.e. possible through improvisational capability (Weick, 1998). The improvisational capability alone is not sufficient for sustained innovation performance (Alegre and Chiva, 2008). Therefore, we suggest that organizational readiness should be added as a mediator between improvisation capability and innovation performance. Improvisational capability helps to quickly respond to environmental changes, hence improve organizational readiness and finally reach at innovation performance (Chelariu *et al.*, 2002). Most of these changes are due to rapid advancements in digital technologies. Businesses are now focusing on their level of readiness to adapt these changes initiated through improvisational capability via quick responses and adaptation of newest technologies (Chelariu *et al.*, 2002). The organizational readiness created by improvisational capability plays prominent role in establishing the innovation performance (Anderson *et al.*, 2015; Lokuge *et al.*, 2019; Padilha and Gomes, 2016).

H5. Organizational readiness mediates between organization's improvisational capability and innovation performance link.

3. Research methodology

3.1 Research methods

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This is primarily quantitative research with survey as the main research strategy. Questionnaire was used as a data collection instrument or tool. The analysis of this research was based on correlation, regression and structural equation modeling (SEM) technique. To test the mediating role of organizational readiness, Preacher and Hayes's (2004, 2008) approach was utilized with 5000 bootstrap.

3.2 Data collection

SMEs play an essential role to uplift the economy of developing nations (Yousaf and Majid, 2016, 2017). Data were collected from those SMEs from the manufacturing sector, which were involved in digital economy, i.e. their operational mechanism should be based on ICT, latest technologies, maximum usage rate of crypto currencies etc. Data were collected with the help of seven professional research assistants who sent questionnaires to respondents via emails and postal mail. After four months' efforts, these research assistants collected 697 responses out of which only 647 were useable. Questionnaire consists of two sections, Section 1 includes the demographics variables, i.e. business age, business size, respondent experience and respondent education. Section 2 includes questions about study variables, i.e. DPC, improvisational capability, organizational readiness and innovation performance.

3.3 Measurement scale

The responses were rated on a 5-point Likert scale, i.e. 5 = Strongly Agreed to 1 = Strongly Disagreed. Detail of all the measures is provided below:

3.3.1 Independent variables. DPC refers to the ability to stay connected with the business world through online marketplaces or communication channels (Blaschke et al., 2018; Rai and Tang, 2010). DPC was adapted from the work of Rai and Tang (2010) and it was measured through the following 8 items. The first dimension of platform integration includes 4 items, i.e. (1) Our platform easily accesses data from our partners' IT systems. (2) Our platform provides seamless connection between our partners' IT systems and our IT systems (e.g., forecasting, production, manufacturing, shipment etc.). (3) Our platform has the capability to exchange real-time information with our partners. (4) Our platform easily aggregates relevant information from our partners' databases (e.g., operating information, business customer performance, cost information etc.). The second major dimension of digital platforms, platform reconfiguration, is based on 4 items including: (1) Our platform is easily adapted to include new partners. (2) Our platform can be easily extended to accommodate new IT applications or functions. (3) Our platform employs standards that are accepted by most current and potential partners. (4) Our platform consists of modular software components, most of which can be reused in other business application.

3.3.1.1 Improvisation capability. Improvisation capability is a spontaneous and creative response taken by an actor when time is tight, detailed planning is lacking and the environment is poorly understood (Alavesa et al., 2014; Du et al., 2019). The scale of improvisational capability shows the purposeful and practical fusion of the designing and execution of a novel production, it is organizational commitment toward innovation and novel ideas. Hence the holistic view of the said theme can be measured through 3 item scale used by Vera et al. (2016) in their latest work. (1). While designing this innovation, our team

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was very good at dealing spontaneously with unanticipated problems. (2). While designing this innovation, our team was very capable at responding extemporaneously to unexpected opportunities. (3). While designing this innovation, our team had a strong capability to creatively improvise.

3.3.2 Mediating variable. The organizational readiness is a will and ability to adapt required changes (Sanders *et al.*, 2017). The organizational readiness was measured using a six-item scale adapted from the Claiborne *et al.* (2013). Organizational readiness was measured through the following 6 items which include: (1) We understands that specific changes may improve outcomes. (2) Most staff members are willing to try new ideas and it is easy to change procedures to meet new conditions. (3) Staff members ask questions and express concerns about changes. (4) When changes are necessary, management provides a clear plan for implementing. (5) Staff members are encouraged to discuss and explore evidence-based practice techniques. (6) Staff members adapt quickly when they have to shift focus to accommodate program changes.

3.3.3 Dependent variable. Innovation performance is the ability of the firm to produce radical innovations in terms of improved products, products new to the firm and/or new to the world market (Laursen and Salter, 2006). Innovation performance was measured through 11 items scale adapted from the work of Alegre and Chiva (2008). The first dimension of innovation performance is innovation efficacy and based on 7 items which include (1) Replacement of products being phased out. (2) Extension of product range within main product field through new products. (3) Extension of product range outside main product field. (4) Development of environment-friendly products. (5) Market share evolution. (6) Opening of new markets abroad. (7) Opening of new domestic target groups. The second major dimension of innovation efficiency is based on 4 items including: (8) Average innovation project development time. (9) Average number of working hours on innovation projects. (10) Average cost per innovation project. (11) Global degree of satisfaction with innovation project efficiency.

All the items used in this questionnaire are valid and reliable. The supporting evidence shows that value of Cronbach's alpha, average variance extracted (AVE) and composite reliability (CR) were with the range of threshold level (See Table 1). 检验量表信效度

4. Analysis

Questionnaire of 647 firms were included for the analysis. Demographic statistic shows that 345 SMEs were working from last 10 years, 237 SMEs from last 15 years, and 65 SMEs working from last 20 years and above. From size perspective, more than 50 employees were working in 298 SMEs, more than 100 employees were working in 129 SMEs. More than 150 employees in 117 SMEs, and more than 200 employees were working in 103 SMEs.

From the respondent perspectives, 269 employees had experience between 5 and 10 years, 135 employees between 11 and 15 years, 156 employees between 16 and 20 years and 87 employees with experience of above 20 years. From educational perspective, 69 employees had 10 years of education (secondary school certificate), 221 employees had 12 years of education (higher secondary school certificate), 245 employees had 14 years of education (bachelor's degree) and 112 employees had master or higher degree (postgraduate).

The results supported that validity and reliability of the scales is not an issue. Both convergent and discriminant validity shows scales were valid. Results of convergent validity were satisfactory, i.e. factor as loading >0.70 and AVE > 0.50. Discriminant validity was also confirmed as AVE was greater than shared variance constructs with every other constructs. CR was >0.60, and α (Cronbach's alpha) was >0.70. Results are presented in Table 1.

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Details	F-L <i>>0.7</i>	<i>t</i> -value	Alpha <i>>0.7</i>	CR <i>>0.6</i>	AVE <i>>0.5</i>
<i>Digital platform capability</i>			0.84	0.93	0.77
DigPC1	0.78	15.22			
DigPC2	0.75	14.32			
DigPC3	0.76	15.66			
DigPC4	0.82	14.56			
DigPC5	0.83	14.22			
DigPC6	0.85	14.56			
DigPC7	0.72	15.66			
DigPC8	0.72	15.21			
<i>Improvisation capability</i>			0.89	0.94	0.74
ImpC1	0.78	15.22			
ImpC2	0.81	14.33			
ImpC3	0.82	15.44			
<i>Organizational readiness</i>			0.86	0.96	0.75
OrgR1	0.78	15.44			
OrgR2	0.82	14.55			
OrgR3	0.81	13.22			
OrgR4	0.85	15.78			
OrgR5	0.86	14.66			
OrgR6	0.84	13.31			
<i>Innovation performance</i>			0.78	0.95	0.76
InnP1	0.73	13.24			
InnP2	0.78	14.25			
InnP3	0.81	15.44			
InnP4	0.83	16.23			
InnP5	0.85	16.58			
InnP6	0.86	14.56			
InnP7	0.74	13.29			
InnP8	0.75	13.45			
InnP9	0.76	14.11			
InnP10	0.83	15.44			
InnP11	0.84	15.66			
Note(s): F-T = Factor loading; CR: Composite reliability; AVE: Average variance extracted; Alpha = Cronbach's alpha					

Table 1. Results of alpha, CR and AVE **Note(s):** F-T = Factor loading; CR: Composite reliability; AVE: Average variance extracted; Alpha = Cronbach's alpha

4.1 Structural equation modeling (SEM) analysis

In this study, SEM is used as a statistical technique to test the study hypotheses. SEM is based on two-step approach, i.e. confirmatory factor analysis (CFA) also known as measurement model and structural model. CFA is a part of SEM and also known as the measurement model. CFA was incorporated prior to testing structural model in order to evaluate the precision of the measurement properties of the hypothesized model with the help of fit indices. In the current study, we employed CFA to assess the **unidimensionality** (Joreskog and Sorbom, 1996). CFA was conducted to check model fitness and results of CFA are presented in Table 2. Results supported that our four-factor model is fit to data ($\chi^2 = 922.45$, $df = 317$; $\chi^2/df = 2.910$; Root-Mean-Square Error of Approximation (RMSEA) = 0.04; Comparative Fit Index (CFI) = 0.95; Goodness of Fit Index (GFI) = 0.96).

The second part of SEM contain structure model which represent a set of dependence associations among the variables used in the current study. The purpose of structural model is to determine the relationships exist between the study constructs (Hair *et al.*, 2010). In the current study, we used SEM technique to test the study hypotheses developed on the basis of theoretical framework.

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Table 3 shows the results of mean, standard deviation (SD), alpha and correlation. Results supported that DPC is significantly associated with innovation performance ($r = 0.37^{**}$, $p = \text{Sig}$). Improvisational capability and innovation performance has positively and significant association ($r = 0.52^{**}$, $p = \text{Sig}$). Organizational readiness and innovation performance has positive and significant association ($r = 0.70^{**}$, $p = \text{Sig}$). The Variance inflation factor (VIF) was less than 10.0 showing that multicollinearity is not an issue.

Table 4 shows the results of H1, H2 and H3. Results supported that H1 stating “DPC has positive effect on innovation performance” is accepted, ($\beta = 0.37$, $t = 19.15$, $p = \text{Sig}$). The analysis also supported H2 relating improvisational capability and innovation performance ($\beta = 0.52$, $t = 13.52$, $p = \text{Sig}$). Data also supported the H3 stating “organizational readiness is positively associated with innovation performance” ($\beta = 0.70$, $t = 22.03$, $p = \text{Sig}$). These results are shown in Table 4.

For testing H4, proposing organizational readiness mediates between DPC and innovation performance’ (DPC–OR–IP), Preacher and Hayes’s (2004, 2008) technique was used with 5000 bootstrap method at 95% confidence level. The results are depicted in Table 5. The results present total effect, direct effect and indirect via different paths “a, b, c, c’ and ab”. Path “a” supported that DPC predicts organizational readiness ($B = 0.50$, $p = \text{sig}$). Path “b” supported direct effect of organizational readiness on innovation performance ($B = 0.68$, $p = \text{sig}$). Path “c”

模型比较

Model detail	χ^2	Df	χ^2/df	RMSEA	GFI	CFI
Hypothesized four-factor model	922.45	317	2.910	0.04	0.95	0.96
Three-factor model	996.21	310	3.214	0.09	0.84	0.83
Two-factor model	1024.78	315	3.253	0.11	0.78	0.76
Single-factor model	1056.28	321	3.291	0.22	0.71	0.72

Table 2.
CFA results

Variable	Mean	SD	Alpha	1	2	3	4	5	6	7	8
1 Business Age	7.47	1.01	–	1.00							
2 Business Size	14.85	1.08	–	0.04	1.00						
3 Respondent Experience	12.31	2.03	–	0.12	0.12	1.00					
4 Respondent Education	4.52	1.12	–	0.11	0.11	0.08	1.00				
5 Digital Platform Capability	4.34	0.67	0.84	0.09	0.09	0.11	0.11	1.00			
6 Improvisational Capability	4.71	0.58	0.89	0.05	0.02	0.08	0.09	0.59**	1.00		
7 Organizational Readiness	4.62	0.61	0.86	0.01	0.06	0.09	0.07	0.57**	0.56**	1.00	
8 Innovation Performance	4.13	0.58	0.76	0.11	0.05	0.04	0.05	0.37**	0.52**	0.70**	1.00

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Note(s): Sig level: **0.001

Table 3.
Mean, SD and correlations

Details	Beta-Value	F	T-value	Sig	Remarks
DP capability → Innovation performance	0.370	78.227	19.158	0.000	H1-Supported
Imp capability → Innovation performance	0.520	182.915	13.525	0.000	H2-Supported
Org readiness → Innovation performance	0.704	485.303	22.030	0.000	H3-Supported

Table 4.
Results of hypothesis of H1, H2, and H3

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C₂
C₃

supported total effect of DPC on innovation performance ($B = 0.31, p = \text{sig}$). Path “c” shows that when organizational readiness was controlled direct effect DPC on innovation performance was reduced and nonsignificant, proving full mediation ($B = 0.03, p = \text{non-sig}$). Path “ab” shows the results of indirect effect. The results of indirect effect supported that organizational readiness acts as mediator (Beta = 0.34, Lower = 0.2736 to Upper = 0.4201). The normal test was also conducted to confirm mediation effect of organizational readiness. The last row of Table 5 shows the value of Sobel test was significant “z” value is 4.875. Thus, H4 is proven showing the link between DPC and innovation performance is mediated through organizational readiness.

Results of H5 are shown in Table 6 i.e. total effect, direct effect and indirect via paths “a, b, c, c’ and ab”. Path “a” supported that improvisational capability predicts organizational readiness (Beta = 0.66, $p = \text{sig}$). Path “b” supported direct effect of organizational readiness on innovation performance (Beta = 0.56, $p = \text{sig}$). Path “c” supported total effect of improvisational capability on innovation performance (Beta = 0.57, $p = \text{sig}$). Path “c” shows that the addition of mediator, organizational readiness has reduced the effect of improvisational capability on innovation performance, proving mediation ($B = 0.19, p = \text{sig}$). Path “ab” shows the results of indirect effect. The results of indirect effect supported that organizational readiness acts as a mediator between IC–IP link (Beta = 0.3792, CI = −0.2931 to 0.4782). The Sobel test “z” value is 4.125, $p = \text{sig}$, proving that H5 is accepted.

The results of all hypotheses are also presented in Figure 2.

5. Discussion and conclusion

In the current hyper-competitive environment, organizations need to be more proactive to survive and remain competitive. Especially, SMEs are more prone to current dynamic environment as SMEs have limited resources (Awan *et al.*, 2019; Javed *et al.*, 2018).

Path Details	Coefficient	<i>t</i>	SE	Sig
Path a (DPC→ Org Readiness)	0.508	15.316	0.033	0.000
Path b (Org Readiness→ IP)	0.686	18.786	0.037	0.000
Path c (DPC → IP)	0.312	8.845	0.353	0.000
Path c' (DPC→ IP)	0.037	1.129	0.033	0.259

Model details ($R^2 = 0.4969$; $F = 243.4244$; $p = 0.000$)
Bootstrap with indirect effect test for H4 (Path ab)

Model Detail	Data	Boot	Bias	SE	Lower	Upper
DPC→OR→IP	0.3489	0.3481	0.001	0.038	0.2736	0.4201

Sobel Test Z Score = 4.875

Table 5.
Results of H4 (Path a, b, c and c')

Details	Coefficient	<i>t</i>	SE	Sig
Path a (Imp cap→ Org readiness)	0.668	15.230	0.044	0.000
Path b (Org readiness→IP)	0.568	15.890	0.036	0.000
Path c (Imp cap→IP)	0.579	13.525	0.043	0.000
Path c' (Imp cap→IP)	0.199	4.723	0.042	0.000

Model details: $R^2 = 0.5174$; $F = 264.2717$; $p = 0.000$
Results of H5 (Path a, b, c and c')

Model Detail	Data	Boot	Bias	SE	Lower	Upper
IC→OR→IP	0.3792	0.3758	0.003	0.047	0.2931	0.4782

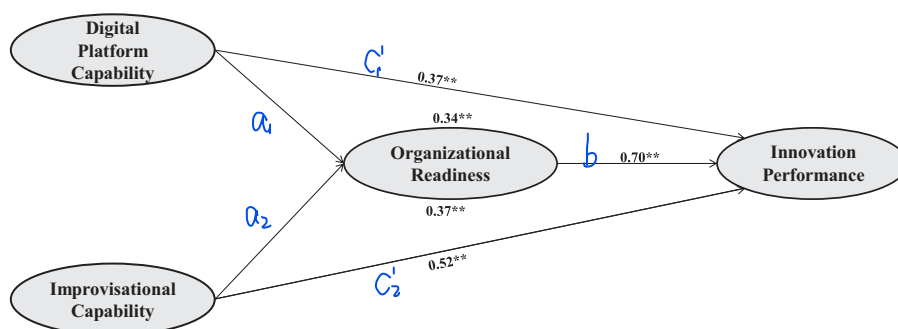
Sobel test Z score = 4.125

Table 6.
Results of H5 (Path a, b, c and c')

$C_1 = a_1 \times b + c_1'$

$C_2 = a_2 \times b + c_2'$

Figure. 2.
Results of H1, H2, H3,
H4 and H5



Organizations are utilizing innovation as a valuable tool to achieve sustainability in its all components. However, for innovative performance organizations need to reconfigure their resources as per market demands, make themselves ready for change and have to remain connected with external stakeholders. The notion of digital platform has attained a strategic importance for all kind of businesses and more specifically in SMEs (Blaschke *et al.*, 2018). SMEs need digital platforms for unprecedented assistances and manage their diverse relationships for acquiring large amount of information (Warner and Wäger, 2019).

The current study tested the relationship of DPCs, improvisational capability and organizational readiness with innovation performance. This study supported that DPC determines innovation performance in digital economy. The findings of the study are supported by Cenamor *et al.* (2019) and Yoo *et al.* (2010) studies showing a positive relationship between DPC and innovation performance. For achieving innovation performance in digital economy all type of businesses need alternative dynamic capabilities and among these the most important one is DPC (Alegre and Chiva, 2008; Rai and Tang, 2010; Teece, 2017). Similarly, the study also supported that improvisational capability determines innovation performance. This hypothesis is supported by the findings of Liu *et al.* (2018) and Chatterjee *et al.* (2015). Improvisational capability helps to bounce back difficulties and solve problems in creative way i.e. boost innovation performance process (Vera and Crossan, 2005). The study also supported the positive impact of organizational readiness on innovation performance. Uzokurt *et al.* (2013) and Snyder-Halpern (2001) also found similar results. Literature supports the findings by asserting that organizational readiness is an inclination toward adaptation for new technology (Claiborne *et al.*, 2013) for better performance of a firm (Yudina and Geliskhanov, 2019).

In addition to abovementioned hypotheses, the study evaluated the mediating role of organizational readiness in the relationship of DPC and innovation performance and between improvisational capability and innovation performance. The results revealed that organizational performance fully mediate both the relationships. As suggested by the research that the organizational readiness created by improvisational capability plays a prominent role in establishing the innovation performance (Anderson *et al.*, 2015; Lokuge *et al.*, 2019; Padilha and Gomes, 2016). This research shows a digital-driven innovation performance model for digital economy. Theoretical and practical implications of this research are discussed in next section.

5.1 Theoretical implication

In digital economy, the use of modern technology equipped with 24/7 Internet facilities has noticeably changed the operational mechanisms of business. Businesses have experienced unparalleled technological swifts, novel ways of services and other complex conveniences

due to digital economy (Yousaf *et al.*, 2014). This study has extended the work of previous researcher about the achievement of innovating performance in digital economy. This study suggests that in current digital economy, SMEs can attain innovation performance through DPC, improvisational capability and organizational readiness. 问题

A serious issue faced by SMEs working in current digital economy is their **nonreadiness to adapt digital transformations**. Most of the SMEs are working in a traditional way and overlooked the demands of digital economy. It is affecting dynamics of digital platforms, improvisational capability and organizational readiness. These problems are bigger for launching latest technology, which is possible when firms are ready to adapt required changes. **This is the main contribution of this research study to highlight that innovation performance is possible with the organizational acceptance to acquire valuable incorporations.** Organizational readiness is a key factor for determining innovation performance in digital economy. 理论贡献

Mostly businesses are using modern technologies and manage their receipts and payments through online (Yousaf *et al.*, 2018). These online cash transfers are the core of digital economy, i.e. business can handle their funds in most secure way. This research finds that DPC is one of the important capabilities that enterprises need to develop and cope with the digital development trend at the present stage (Ardolino *et al.*, 2018). Available literature shows that the required attention on the link between DPC and innovation is **weak** in the context of digital economy (Nwankpa and Roumani, 2016). The effects of individual and groups capabilities on innovation performance are overlooked by the researchers observing digital economy. Only a few studies have suggested that DPC supports innovation performance but they did not view this mechanism in the digital economy context (Teece, 2017). We investigated that organizational readiness mediates between DPC and innovation performance. The digital economy using number of different ways for their working operations, funds transfers, online payments/receipts. Hence, SMEs must be ready to adapt all these changes. In a simply way, this study suggested how SMEs working in digital economy can use digital platforms to attain innovation performance through organizational readiness. This is a novel addition and a major contribution in the existing literature. **This study shows the contribution to the literature and supported theoretically how organizational readiness mediates between DPC and innovation performance.** (OR)
DPC—ZP
理论意义1

Organizational improvisation ability improves the decision-making power and efficiency of firms through quick response which is an imperative feature of SMEs in digital economy (Magni *et al.*, 2018; Steinberg *et al.*, 2017). However, there is hardly any evidence in the available stream of literature about the indirect effect of improvisational capability and innovation performance through organizational readiness. This study majorly contributes in the literature by **filling this research gap and highlighting the mediating role of organizational readiness.** The study suggested that in digital economy firm's improvisational capability help to foster the mechanism of organizational readiness to lead innovation performance of SMEs. OR
DPC—ZP
理论意义2

Finally, the study developed and empirically tested **a model that can be utilized by SMEs for enhancing their innovation performance.** In current literature, no such model exists involving the interplay of abovementioned **four variables used in the current study.** 模型分析
理论意义3

5.2 Practical implication

This study also has numerous managerial contributions. *First*, it is recommended that **DPC is novel and powerful predictor of innovation performance in digital economy.** All type of organizations critically needs relevant and instant knowledge, whereas the most important source of knowledge is digital platforms. The current study guides the management in practice about the **supporting role of digital platforms for improving innovation performance.** Digital economy is based on digital platforms and management in practice need digital 实践意义1

platforms for acquiring useful information in a form of forecasting, production information and customer trends through synergistic collaborations. *Secondly*, in digital economy the managerial level employees face dynamic technological advancements and ever-changing customers' demands. These hurdles are managed by their enhanced level of improvisational capability. This study highlighted that only quick responses to competitors' pressures are not enough to stay in business while operating in digital economy for longer time span. Hence, the organization improvisational capability should be focused to improve overall innovation performance. For practical management, our study shows that **improvisational capability helps the organizations' deal with new opportunities and challenges more effectively to develop sustained innovation performance in digital economy.** 实践意义2

Third, major contribution of this study is to highlight the pertinent role of organizational readiness to adapt required changes as major antecedent of innovation performance. **DPC and innovation performance links can be positively associated at first stage, but outside information and technological advancement can be implemented when organizations are ready to adapt.** Hence, organizational readiness is a major factor to improve overall innovation performance. The current study contributes by guiding practical management to utilized both internal and external resources to cope innovation performance through organizational readiness. However, SMEs working in digital economy need to align its operational mechanism to fulfill the demands of technological advancements which is possible through organizational readiness. The study suggests that **management should focus on organizational initiated through DPC for reaching innovation performance of SMEs.** The final argument of this study for practical management is about the mediating role of organizational readiness between the improvisational capability and innovation performance. **The role of improvisational capability is very imperative in digital economy which enables firms to quickly response to technological challenges which informs the correct time of adoptions required changes.** Hence, this capability can set the direction for innovation performance but the most secure route to achieve innovation will be through **organizational readiness.** This is important advice for management in practice enhances innovation through improvisational capability and adaptability. Moreover, **Pakistan** is a developing country (Yousaf *et al.*, 2019) and located at the cross-sea where international businesses can seek various opportunities (Yousaf and Majid, 2018). The practical management can **expand their businesses worldwide through focusing digital technologies.**

实践意义3
聚焦于由DPC形成
的组织创新

跨国商务

5.3 Limitations and future directions

Besides aforesaid interesting contributions, the current research also encompasses some limitations which might be used as future directions. *Firstly*, the study was based on quantitative research design and data were collected at one time (cross sectional research). The future research can be based on qualitative research with **longitudinal research design.** *Secondly*, this research includes only SMEs involved in manufacturing sector. Future research may be conducted on **service industry** where networks really matter. *Lastly*, some more independent, mediating, moderating or/and intervening **variables can be added** to the model to make it more comprehensive.

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Further reading

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